The 5ᵗʰ International Conference on Teacher Education and Professional Development (InCoTEPD) in Collaboration with SEAMEO and JETA

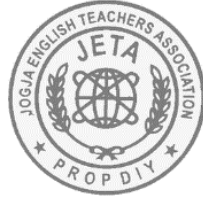## "Teacher Professional Development in the Age of AI"

PROCEEDING

Editors:
Ashadi
Anita Triastuti
Sari Hidayati
Surono
Didik Nurhadiyanto
Oktaf Agni Dhewa

Universitas Negeri Yogyakarta

JUNE 25-26 2024

The 5th International Conference on Teacher Education and Professional Development (InCoTEPD) in Collaboration with SEAMEO and JETA

"Teacher Professional Development in the Age of AI"

PROCEEDING

Editors:
Ashadi
Anita Triastuti
Sari Hidayati
Surono
Didik Nurhadiyanto
Oktaf Agni Dhewa

Universitas Negeri Yogyakarta

JUNE 25-26 2024

Foreword

It is with a great pleasure and sense of profound accomplishment that I welcome you to The 5th International Conference on Teacher Education and Professional Development (InCoTEPD) 2024. This year, we gather under the timely and transformative theme, "Teacher Professional Development in the Age of AI," to discuss, deliberate, and shape the future of education in an era increasingly defined by artificial intelligence.

Universitas Negeri Yogyakarta (UNY) is honored to host this seminal event on our campus on the 25 and 26 June 2024. Our university has long been a beacon of excellence in education, and we are proud to bring together distinguished scholars, educators, and practitioners from around the globe to engage in critical conversations that will drive the evolution of teaching practices in the context of rapid technological advancements.

The integration of AI in education presents both opportunities and challenges. As educators, we must harness these emerging technologies to enhance the learning experience, while also addressing the ethical and practical considerations they bring. This seminar provides a platform for sharing innovative research, best practices, and collaborative strategies that support teachers in navigating this new landscape.

I extend my heartfelt thanks to all the contributors, reviewers, and members of the organizing committee for their hard work and dedication. Your efforts have made this conference and this proceeding possible. I also express my gratitude to our distinguished speakers and participants for sharing their expertise and engaging in thoughtful dialogues.

As you delve into the proceeding, I hope you find the research, discussions, and ideas presented here both enlightening and inspiring. May they serve as a catalyst for further exploration and action in the ongoing quest to enhance teacher education and professional development in the age of AI.

With sincere appreciation,

Prof. Dr. Sumaryanto, M.Kes., AIFO.
Rector, Universitas Negeri Yogyakarta

Organizing Committee

Patron
Sumaryanto
Soni Nopembri
Lantip Diat Prasojo
Edi Purwanta
Margana

Steering Committee
Erwin Setyo Kriswanto
Mochamad Bruri Triyono

Chairpersons
Darmono
Muslikhin

Treasurer
Abdul Alim

Secretaries
Nunik Sugesti
Nur Endah Januarti

Editors
Ashadi
Anita Triastuti
Sari Hidayati
Surono
Didik Nurhadiyanto
Oktaf Agni Dhewa

Reviewers
Unik Ambarwati
Priadi Surya
Suyatiningsih
Lusi Nurhayati
Ari Purnawan
Ella Wulandari
Agus Widyantoro
Paramita Cahyaningrum
Awanis Akalili
Achmad Arifin
Didik hariyanto
Ratna Wardani
Gunadi
Apri Nuryanto
Rifky Riandi Prasetyawan
Fitria Dwi Andriyani
Rizki Mulyawan
Muh Sigit Antoni
Denies Priantinah
Kiromim Baroroh
Mustofa
Mahendra Adhi Nugroho

Table of Contents

The Effectiveness of the Platform Merdeka Mengajar (PMM) as an Effort to Improve the Professional Competence of Teachers at State Junior High School 8 Yogyakarta

Daffa Fakhri Maulana[1*], Muhammad Abdul Aziz[2]

[1] State Junior High School 8 Yogyakarta, Yogyakarta, Indonesia
[2] State Junior High School 8 Yogyakarta, Yogyakarta, Indonesia

[*]E-mail: daffa551@guru.smp.belajar.id

Abstract. This study examines the effectiveness of the Merdeka Mengajar Platform (PMM) in enhancing the professional competence of teachers at State Junior High School 8 Yogyakarta. Using a quantitative approach with a survey method, this research involved 35 teachers selected through random sampling. Data were collected using questionnaires that measured accessibility, frequency of access, feature utilization, and the impact of PMM on teachers' professional competence. Data analysis was conducted descriptively and inferentially using SPSS software. The results showed that PMM plays a significant role in helping teachers at State Junior High School 8 Yogyakarta independently develop their professional competence through the various features available. The aspects of professional competence improved through PMM include subject matter expertise, performance reflection, technology utilization, as well as teaching competence and skills. However, the most significantly improved aspect is technology utilization.

1. Introduction

Education undeniably plays a fundamental role in building and developing a nation. In the ever-evolving era of technology, the importance of education becomes increasingly fundamental. Technological advancements have brought significant changes to various aspects of life, including the field of education. This phenomenon has transformed the global educational landscape, compelling education to adapt and remain relevant and responsive to the changing times. These changes encompass various aspects such as the integration of technology in the learning process, the development of curricula that meet contemporary demands, and the enhancement of teachers' skills and competencies in utilizing technology.

Teachers, as the main actors in the educational process, must be prepared to adapt. In the current era of technological advancement, teachers are under immense pressure to provide quality education to students [1]. This condition arises because teachers are required to utilize existing technology to support and enhance the effectiveness of learning in a technologically evolving world [2]. This means that the challenges faced by teachers are not only in mastering the technology itself but also in their ability to integrate it into the learning process to provide engaging and relevant learning experiences for students.

The adaptation that teachers can undertake in facing technological advancements is by enhancing their competencies. The competencies that professional teachers must possess include pedagogical competence, personal competence, social competence, and professional competence [3]. In this context, professional competence is one of the essential competencies that teachers must have in the era of

technological advancement. Professional competence refers to the expertise that teachers have in mastering subject matter, technology, and cultural arts aspects, which will influence their performance [4]. Furthermore, referring to the Regulation of the Director General of Teachers and Education Staff of the Ministry of Education, Culture, Research, and Technology Number 2626/B/HK.04.01/2023 on the Teacher Competency Model, professional competence includes knowledge of the content being taught and how to teach it, the characteristics and learning methods of students, as well as the curriculum and how to use it [5].

However, based on the researcher's observations in the field, the professional competence of teachers is still low. This is supported by several previous research findings. According to a study by Foster [6], competent teachers are a prerequisite for teacher professionalism in performing their duties. However, in reality, the quality of teacher resources is still not optimal. Furthermore, according to a study by Aulia, Murni, & Desyandri [7] this situation has led to a learning crisis that impacts the quality of education. This means that if teachers' professional competence is low, the process of building and developing the nation, which is supported by education, will be hindered.

To address these challenges, the government launched the Platform Merdeka Mengajar (PMM) as an educational innovation aimed at enhancing teachers' professional competence. PMM is a technological platform prepared by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) with the purpose of assisting teachers in conducting lessons and optimizing the implementation of the Merdeka Curriculum (IKM) [8]. PMM offers various products comprising several features that support teachers in their competency development, including self-development, teaching, and inspiration.

Several studies have revealed that the presence of PMM can enhance teachers' professional competence. PMM plays a significant role in helping teachers independently develop their competencies [9], [10], [11]. This is because its various features can assist teachers in obtaining inspiration, references, and understanding about teaching [12]. PMM provides opportunities for all teachers in Indonesia to continuously learn and improve their competencies anytime and anywhere they are [13].

Currently, PMM has been utilized by most schools in Indonesia, including State Junior High School 8 Yogyakarta. Based on observations conducted by the researcher, this school has been using PMM since the platform was first launched. The teachers at State Junior High School 8 Yogyakarta have been striving to use various features available on PMM. Although PMM is claimed to improve teachers' professional competence, the effectiveness of PMM usage in enhancing professional competence at State Junior High School 8 Yogyakarta has not been thoroughly studied. Therefore, this research aims to evaluate the effectiveness of PMM as an effort to improve the professional competence of teachers at State Junior High School 8 Yogyakarta.

2. Method of The Research

This research employs a quantitative approach with a survey method. The research population consists of all teachers at State Junior High School 8 Yogyakarta, with a sample of 35 teachers selected using random sampling techniques. The research instrument is a questionnaire that measures accessibility, frequency of access, utilization of features, and the impact of PMM on teachers' professional competence. Data were collected through the distribution of questionnaires that had been tested for validity and reliability, then analyzed using descriptive and inferential statistics with the help of SPSS software. Descriptive analysis was used to describe the characteristics of the data, while correlation analysis and hypothesis testing were conducted to examine the relationships and significance of differences in the use and effectiveness of PMM.

3. Main Discussion

3.1 Accessibility and Features of the Platform Merdeka Mengajar
The Platform Merdeka Mengajar (PMM), launched by the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) on February 11, 2022, has impacted all teachers in Indonesia, including those at State Junior High School 8 Yogyakarta. PMM, which offers a variety of features to help enhance teachers' competencies in implementing the Merdeka curriculum, is required to have good accessibility [14]. Based on the survey data distributed to the teachers at State Junior High School 8 Yogyakarta, the results are shown in Table 1.

Table 1. Results of Analysis of Accessibility and Frequency of Teacher Access to PMM

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Accessibility	35	3.54	.505	-.180	.398	-2.091	.778
FreqAccess	35	2.46	.505	.180	.398	-2.091	.778
Valid N (listwise)	35						

Based on the data analysis in Table 1, it is shown that the average respondents gave a score of 3.54 out of a maximum score of 4.00 for the accessibility level of PMM. This score of 3.54 indicates that the PMM application has a good level of accessibility, meaning respondents can access the application easily and from anywhere. However, this level of accessibility has not been complemented by a good frequency of access by the respondents. The frequency of respondents accessing PMM shows a score of 2.46 out of a maximum score of 4.00. This score of 2.46 indicates that the frequency of access to PMM by respondents falls into the category of inadequate.

PMM, as one of the efforts to develop teachers' competencies in implementing the independent curriculum, brings several features accessible to teachers [15]. Based on the 3 (three) products PMM possesses to support teachers in developing their competencies, namely self-development, teaching, and inspiration, there are several features specifically designed to enhance teachers' professional competence. These features include Self-Training, Real Actions, and Webinars. Based on the questionnaire data distributed to teachers at State Junior High School 8 Yogyakarta regarding the utilization of these features, it can be seen in Table 2.

Table 2. Results of Analysis of Teachers' Use of PMM Features

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Self-Training	35	2.66	.725	.148	.398	-.319	.778
RealActions	35	2.57	.698	.831	.398	-.464	.778
Webinars	35	3.09	.781	-.154	.398	-1.314	.778
Valid N (listwise)	35						

Based on the data in Table 2, the feature most utilized by respondents is the webinar feature. The average score obtained from respondent data regarding the utilization of the webinar feature is 3.09 out of a maximum score of 4.00. This score of 3.09 falls into the good category, indicating that the feature is well-utilized by respondents. In contrast, other features such as Self-Training and Real Actions are not yet well-utilized by respondents. The average score for the utilization of the Self-Training feature is 2.66 out of a maximum score of 4.00, while the Real Actions feature has a lower score of 2.57 out of a maximum score of 4.00. Scores of 2.66 for Self-Training and 2.57 for Real Actions fall into the inadequate category, meaning that both features are still not well-utilized by respondents.

3.2 Effectiveness of the Platform Merdeka Mengajar

The enhancement of teachers' professional competence through PMM can be observed through several indicator categories, namely the aspects of content and expertise, performance reflection, technology utilization, as well as teaching competence and skills aspect. The launch of PMM, aimed at developing teachers' competencies in implementing the independent curriculum, is also expected to enhance teachers' professional competence as outlined in Director General of Teachers and Education Staff Regulation Number 26216/B/HK.04.01/2023 on the Teacher Competency Model.

When viewed from the aspect of content and expertise, there are several indicators that can serve as guidelines for teachers' professional competence. Based on the questionnaire data from the research regarding the content and expertise aspect of teachers' professional competence, it can be seen in Table 3.

Table 3. Results of Teacher Professional Competency Analysis on Material and Scientific Aspects

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
MaterialMastery	35	3.23	.547	.116	.398	-.084	.778
ScientificConcepts	35	3.20	.632	-.917	.398	3.215	.778
CPUnderstanding	35	3.20	.531	.200	.398	.181	.778
MaterialDevelopmentCreativity	35	3.31	.530	.192	.398	-.677	.778
ProcessingMaterialAccordingtoStudentNeeds	35	3.29	.519	.301	.398	-.494	.778
Valid N (listwise)	35						

The utilization of PMM in enhancing professional competence for teachers can be observed in Table 3. There are 5 indicators measured in the aspect of content and expertise, namely the influence of PMM utilization in improving mastery of subject matter, development of scientific concepts, enhancing understanding of learning outcomes, teacher creativity development, and material development to meet student needs. Based on the data gathered from respondents, it can be seen that the highest average score is for teacher creativity development with a score of 3.31. This score indicates that the utilization of PMM is good in fostering teacher creativity. Apart from teacher creativity development, other indicators such as mastery of subject matter have an average score of 3.23, development of scientific concepts and improvement of understanding of learning outcomes have average scores of 3.20 each, while material processing to meet student needs receives a score of 3.29. This suggests that the utilization of PMM also has a positive impact on enhancing teachers' abilities in subject matter mastery, development of scientific concepts, improvement of understanding of learning outcomes, and material processing to meet student needs.

A teacher's professional competence can also be assessed through performance reflection. This can be facilitated through PMM via its performance assessment feature. Based on the gathered questionnaire data, respondents feel supported by PMM in conducting performance reflection. This is evidenced by the average performance reflection score within PMM reaching 3.29 out of a maximum score of 4.00. A score of 3.29 indicates that PMM falls into the good category in assisting teachers in their performance reflection.

The development of professional competence through the utilization of PMM that needs to be highlighted in this research is the aspect of technology utilization. Respondents feel greatly assisted by PMM in self-development through the utilization of technology for personal development as well as for the development of media in the classroom. Based on the gathered questionnaire data regarding the aspect of technology utilization by teachers, it can be seen in Table 4.

Table 4. Results of Teacher Professional Competency Analysis Aspects of Technology Utilization and Personal Development

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SkillUpdatesforModernTimes	35	3.37	.547	-.024	.398	-.891	.778
UtilizationofTechnologyinTheClassroom	35	3.37	.547	-.024	.398	-.891	.778
Self-Training	35	3.37	.547	-.024	.398	-.891	.778
Valid N (listwise)	35						

The technological development within PMM emerges as the aspect with the highest average score in enhancing teachers' professional competence, amounting to 3.37 out of a maximum score of 4.00. It cannot be denied that PMM has a significant impact on a teacher's self-development through the utilization of technology provided by the platform [7]. Respondents perceive that PMM effectively aids in enhancing teachers' skills to keep pace with the evolving times. Additionally, teachers also gain inspiration from real-life examples of fellow educators in Indonesia leveraging technology in teaching, motivating them to engage in self-improvement.

Another aspect within PMM, based on the questionnaire data from the research, that has a relatively high average score is the aspect of teachers' teaching competence and skills. The questionnaire data indicates that the aspect of developing teachers' competence through the utilization of PMM receives an average score of 3.34. This signifies that PMM effectively impacts teachers in enhancing and developing their teaching competence and skills. Based on the gathered questionnaire data regarding the role of PMM for teachers at State Junior High School 8 Yogyakarta, it can be seen in Table 5.

Table 5. Results of Analysis of the Level of Effectiveness of PMM's Role for Teachers at State Junior High School 8 Yogyakarta

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Effectiveness	35	2.1	4.0	3.308	.4600	-.106	.398	-.132	.778
Valid N (listwise)	35								

Based on the data in Table 5, PMM generally exhibits a good level of effectiveness in enhancing teachers' professional competence at State Junior High School 8 Yogyakarta. The average effectiveness score of PMM's role in enhancing teachers' professional competence at State Junior High School 8 Yogyakarta is 3.308, indicating that PMM is effective within the good category. Although the average effectiveness score of PMM's role falls within the good category, based on the SPSS analysis data in Table 5, the minimum value of PMM effectiveness still falls within the inadequate category. This means that there are still respondents who believe that PMM has a limited impact on their professional competence as teachers.

4. Conclusion

Based on the research findings and discussions conducted, and in line with the purpose and objectives of the study, it can be concluded that the Platform Merdeka Mengajar (PMM) plays a significant role in effectively enhancing the professional competence of teachers at State Junior High School 8 Yogyakarta. The aspect of teachers' professional competence that develops the most with the presence

of PMM is the utilization of technology. Additionally, other aspects that have shown significant development due to PMM include improvement in content and expertise, performance reflection, as well as teaching competence and skills among teachers at State Junior High School 8 Yogyakarta. Thus, with the presence of PMM, the professional competence of teachers at State Junior High School 8 Yogyakarta can improve significantly.

References

[1] J. M. Fernández-Batanero, P. Román-Graván, M. M. Reyes-Rebollo, and M. Montenegro-Rueda, 'Impact of educational technology on teacher stress and anxiety: A literature review', *Int J Environ Res Public Health*, vol. 18, no. 2, pp. 1–13, Jan. 2021, doi: 10.3390/ijerph18020548.

[2] E. A. K. Marpaung, I. Siregar, and R. Manurung, 'Teachers' perspectives on the impact of the digital era on education', *Journal of Sumatera Sociological Indicator*, vol. 2, no. 2, pp. 224–230, 2023, [Online]. Available: https://talenta.usu.ac.id/jssi

[3] O. Okpatrioka and S. Sopian, 'Increasing teacher competence in the revolution industry 4.0', *JHSS (Journal of Humanities and Social Studies)*, vol. 7, no. 2, pp. 380–386, 2023, doi: 10.33751/jhss.v7i2.8534.

[4] S. Biora, Y. Arafat, and M. Mulyadi, 'The influence of teachers' professional competency and working discipline on teachers' performance at state elementary school', *JPGI (Jurnal Penelitian Guru Indonesia)*, vol. 6, no. 2, pp. 514–524, Sep. 2021, doi: 10.29210/021082jpgi0005.

[5] *Peraturan Direktur Jenderal Guru Dan Tenaga Kependidikan Kementerian Pendidikan, Kebudayaan, Riset, Dan Teknologi Nomor 2626/B/HK.04.01/2023 Tentang Model Kompetensi Guru.*

[6] B. Foster, 'Teacher performance: The role of professional competence and satisfaction', *Kontigensi : Scientific Journal of Management*, vol. 8, no. 2, pp. 41–49, 2020, doi: 10.56457/jimk.v8i2.79.

[7] D. Aulia, I. Murni, and D. Desyandri, 'Peningkatan kompetensi guru sekolah dasar melalui Platform Merdeka Mengajar (PMM)', *Jurnal Ilmiah Profesi Pendidikan*, vol. 8, no. 1b, pp. 800–807, Apr. 2023, doi: 10.29303/jipp.v8i1b.1310.

[8] R. Meuthia, 'Strategi pendampingan komunitas belajar dalam pemanfaatan platform merdeka mengajar terhadap implementasi kurikulum merdeka', in *Prosiding Seminar Nasional Pendidikan Dasar*, Yogyakarta, 2023, pp. 614–639. Accessed: Jun. 07, 2024. [Online]. Available: https://seminar.ustjogja.ac.id/index.php/semnas_dikdasUST/article/view/1154/667

[9] A. Elpin, N. Simarona, A. Aunurrahman, and H. Halida, 'Peran Platform Merdeka Mengajar (PPM) dalam meningkatkan efektivitas implementasi kurikulum merdeka', *Asatiza: Jurnal Pendidikan*, vol. 5, no. 1, pp. 81–96, 2024, doi: 10.46963/asatiza.v5i1.1436.

[10] E. Setiariny, 'Pemanfaatan platform merdeka mengajar sebagai upaya meningkatkan kualitas pembelajaran', *Jurnal Lingkar Mutu Pendidikan*, vol. 20, no. 1, pp. 23–33, Jun. 2023, doi: 10.54124/jlmp.v20i1.81.

[11] M. S. Lena, S. Nisa, O. K. Putri, and R. H. Husna, 'Penggunaan Platform Merdeka Mengajar (PMM) untuk meningkatkan kompetensi guru di sekolah dasar', *Lencana: Jurnal Inovasi Ilmu Pendidikan*, vol. 1, no. 3, pp. 177–185, 2023, doi: 10.55606/lencana.v1i3.1816.

[12] M. D. Ma'ruf and Y. Yasin, 'Kompetensi guru dalam kurikulum merdeka melalui platform merdeka mengajar', *Pediaqu: Jurnal Pendidikan Sosial dan Humaniora*, vol. 3, no. 1, pp. 312–324, 2024, [Online]. Available: https://publisherqu.com/index.php/Al-Furqan

[13] A. Arnes, M. Muspardi, and Y. Yusmanila, 'Analisis pemanfaatan platform merdeka mengajar oleh guru PPKn untuk akselerasi implementasi kurikulum merdeka', *Edukatif: Jurnal Ilmu Pendidikan*, vol. 5, no. 1, pp. 60–70, Jan. 2023, doi: 10.31004/edukatif.v5i1.4647.

[14] F. B. Rahmadani and K. Kamaluddin, 'Pemanfaatan Platform Merdeka Mengajar (PMM) untuk meningkatkan kompetensi guru di sekolah menengah kejuruan', *Jurnal Ilmu Manajemen dan Pendidikan*, vol. 3, pp. 113–122, Dec. 2023, doi: 10.30872/jimpian.v3ise.2929.

[15] V. Triscova, F. A. Rahma, and A. A. Nurlillahi, 'Persepsi guru sekolah dasar dalam pemanfaatan platform merdeka mengajar', *Aksara: Jurnal Ilmiah Pendidikan Bahasa dan Sastra Indonesia*, pp. 75–82, 2022, doi: 10.33087/aksara.v6i0.453.

The Effect of Using Merdeka Mengajar Platform on Improving the Good Practices of Social Studies Teachers in Yogyakarta City

Dian Azizah Sadriansyah Wijaya[1*] , Bima Purba Tangkas[2*]

[1] SMP Negeri 8 Yogyakarta, Yogyakarta City, Indonesia
[2] SMP Negeri 8 Yogyakarta, Yogyakarta City, Indonesia

[*]E-mail: dianazizah.2023@student.uny.ac.id

Abstract. This study explores the impact of using the Merdeka Mengajar Platform (PMM) on improving best practices among social studies teachers in Yogyakarta City. The study employs a descriptive quantitative approach, involving all social studies teachers in Yogyakarta City. Data were collected through questionnaires and documentation. After processing the data using SPSS software, the results indicated that PMM use significantly contributes to the enhancement of teachers' best practices. The platform provides various features such as inspirational videos, self-directed training, and learning communities that facilitate competency development and the sharing of best practices among teachers. However, there are some challenges in utilizing PMM, such as limited technological proficiency and lack of understanding of the platform's features. Overall, PMM has proven to be effective in improving educational quality by enhancing teachers' competencies and best practices.
Keywords: Education, Best Practices, Merdeka Mengajar Platform

1. Introduction

The curriculum is a set of plans and arrangements regarding the objectives, content, and learning materials as well as the methods used as guidelines for organizing learning activities to achieve certain educational goals [1]. The curriculum is made so that education is able to adapt to the times with all its challenges. The 21st century provides opportunities and challenges for education in terms of mastery of technology. The intrusion of technology in education must encourage acceleration in classroom practice. Teachers need to be able to utilize advances in information technology to improve the quality of the teaching and learning process and prepare superior human resources [2]. The Ministry of Education and Culture of the Republic of Indonesia has a program focus for teachers in improving teacher performance and competence through the Merdeka Teaching Platform (PMM).

Currently, there are several products that are grouped based on their benefits, namely Teacher Development and Teaching and Learning Activities. The products for teacher development include (1) Video Inspiration, which contains a collection of inspirational videos made by Kemendikbudristek and experts, as a reference to improve competence as an educator. (2) Independent Training, which contains various training materials that are made short, so that you can conduct training independently, anytime and anywhere. (3) Evidence of My Work, which serves as a place for documentation of work to describe the performance, competence, and achievements achieved while carrying out the profession of teacher and principal. As well as a place to share good practices and get feedback from peers. (4) Community, which contains a variety of learning communities throughout Indonesia and can be used by teachers to share good practices and learning tools as well as discussions with other teachers. While the Teaching and Learning Activity products include (1) Student Assessment, helping teachers to quickly conduct

diagnostic analysis of literacy and numeracy so that they can implement learning in accordance with the stage of achievement and development of students, and (2) Teaching Tools, which contain various teaching materials to support teaching and learning activities, such as teaching materials, teaching modules, project modules, or textbooks [3].

The Merdeka Mengajar (PMM) platform provides freedom for educators to learn and advance their abilities and skills at any time and place [4]. Ease of access and many features make the *experience of* finding references through PMM more interesting. Based on data from the Data and Information Center of the Ministry of Education and Culture in 2022 PMM reached more than 1.6 million users who downloaded the application. Meanwhile, users who utilize through the website recorded approximately 2.7 million users have utilized the PMM application. While in its utilization. In addition, 312 thousand teachers have downloaded teaching tools and more than 1,000 teacher communities utilize to share good practices, 51 thousand more shared works and 55 thousand contents on the platform [5]. The downstreaming of the Merdeka Mengajar Platform is a necessity for educators and schools. The data shows that the participation of educators in developing education through this platform is still relatively high. However, the contribution to the platform is still low in terms of uploading and sharing good practices. When compared to the number of teachers in Indonesia according to the Central Statistics Agency in 2022, there are 3.37 million teachers in Indonesia. Based on this data, the contribution of uploading teaching tools and sharing good practices to the independent teaching platform is 11.5% of the total teachers in Indonesia [6]. The low contribution to PMM needs to be supported by strategies and innovations in sharing good practices and developing learning communities, so that it can benefit teachers in Indonesia.

The lack of utilization of PMM is influenced by several factors including limited mastery of technology, lack of teacher understanding of the features on the platform, learning communities that are not yet active [7]. This shows the need for innovation and improvement in *interface*, features, and convenience for teachers. Thus, more teachers will access to share their experiences, real actions, and good practices that have been carried out in education units. This platform has many functions ranging from sharing information about education, inspiring each other through videos, and providing positive feedback to each other [8]. Sharing good practices is a measure that the high competence of teachers in mastering the process in education. Teacher performance is still low as seen from the percentage of teaching eligibility in various education units at the junior high school level of around 54.12% for public schools and private schools of around 60.99% [9]. This data illustrates that there is a need to improve performance through sharing good practices.

Several studies explain that the Merdeka Mengajar Platform has been well utilized and has a positive impact on increasing teacher participation in learning [10] [11]. Through the features provided by this platform, it is easier for teachers to access learning and training resources and collaboration between educators [12]. Therefore, this study aims to determine how the effect of Merdeka Mengajar (PMM) Platform on improving the good practices of social studies teachers in Yogyakarta City. The implication of this research is to find out the extent to which the sharing of good practices of social studies teachers has increased. Thus, it can see the effect of PMM implementation to increase sharing of good practices.

2. Methods

This study uses the research method used, namely quantitative research with simple regression analysis. This method is designed to model the relationship between variables [13]. The subjects of this study were social science teachers in Yogyakarta City. This research started from May to June 2024. Data collection techniques using a questionnaire with the use of a Likert scale for the variability of scores on a scale of 1-4. Before analyzing using the regression model, first test the prerequisite analysis. This test is intended to determine whether the data collected meets the requirements if it is to be analyzed using the data analysis technique that has been selected. The tests carried out to analyze the data include normality test and linearity test. The data analysis technique uses simple regression analysis which aims to conclude directly about one dependent variable (Y) and the independent variable (X). This research

hypothesis test uses the t statistical test or parameter significance test to show how much influence each independent variable has in explaining the variation in the dependent variable [14] .

The hypothesis in this study is formulated as follows:

H_0 = The use of Merdeka Mengajar Platform does not have a positive effect on increasing good practices of social studies teachers in Yogyakarta City

H_a = The use of Merdeka Mengajar Platform has a positive effect on improving practice good social studies teachers in Yogyakarta City

3. Results and Discussion

3.1. Prerequisite Test Analysis

3.1.1. Normality Test

The normality test aims to determine whether the distribution of research data is normally distributed or not, so that after knowing the distribution, the data can be processed for further analysis. The normality test is carried out using the *Kolmogorov-Smirnov* test, if it is known that the variable value has a value above 0.05, it can be said that the variable is normally distributed. The following are the results of the normality test that have been processed with the help of *SPSS 27*.

Table 1. SPSS Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		67
Normal Parameters[a,b]	Mean	0,0000000
	Std. Deviation	2,36825758
Most Extreme Differences	Absolute	0,106
	Positive	0,106
	Negative	-0,070
Test Statistic		0,106
Asymp. Sig. (2-tailed)[c]		0,059
Monte Carlo Sig. (2-tailed)[d]	Sig.	0,055
	99% Confidence Interval	Lower Bound	0,049
		Upper Bound	0,061

Based on the calculation results from the table above, the residual significance value is 0.059, so in accordance with the existing provisions it can be concluded that each variable is normally distributed.

3.1.2. Linearity Test

The linearity test aims to determine whether or not the relationship between the independent variable and the dependent variable is linear. The test used for linearity testing is the F test, what is meant by the F test in this analysis is the price of the F coefficient on the *deviation from linearity* line listed in the *ANOVA Table* from the *output* generated by the *SPSS 27* program (table 2).

Table 2. Linearity Test Results

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
GOOD PRACTICE * PMM	Between Groups	(Combined)	291,444	12	24,287	4,425	0,000
		Linearity	217,680	1	217,680	39,657	0,000
		Deviation from Linearity	73,764	11	6,706	1,222	0,296
	Within Groups		296,406	54	5,489		
	Total		587,851	66			

Based on the table above, the linearity test between the independent variable (Independent Teaching Platform) and the dependent variable (Good Practice) obtained a *deviation from linearity* value of 0.269. According to the criteria, if the *deviation from linearity* price is greater than the significance level, namely 0.05, it means that the relationship is linear. In this study, it is proven that the *deviation from linearity* between the independent variable and the dependent variable is greater than the significance level, so it can be concluded that the Independent Teaching Platform variable and the Good Practice variable are linear. This means that the relationship or correlation can be expressed with a straight line. If it has a positive linear relationship or correlation, if one variable increases, the other variable will also increase and vice versa.

3.2.   Hypothesis Testing

Based on the results of research that has been conducted on social studies teachers in Yogyakarta City by distributing questionnaires, some data can be obtained. The data is obtained from a series of statistical tests. From the data processing obtained regression coefficient (b) of 0.590, at a significance level of 5%. Furthermore, a partial calculation (t test) is carried out and it can be seen that the $t_{count\ value}$ is 6.183 with a significance value of 0.00. At a *degree of freedom of* 65, the t table is obtained at 1.669. By comparing the value of tcount and t_{tabel} it can be seen that the value of tcount> t_{tabel} in accordance with the provisions, then H_o is rejected and Ha is accepted. From this statement, it can be concluded that the use of the Merdeka Mengajar Platform has a positive effect on variations (up/down) in improving the good practice of social studies teachers in Yogyakarta City. Based on table 3, it can be seen that the coefficient of determination is 0.370 or equal to 37%. This figure shows that there is an influence of variable X on variable Y by 37%, while the remaining 63% is influenced by other variables outside the variables studied.

Table 3. T-test Results

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.609^a	0,370	0,361	2,386

Although the increase in good practices of social studies teachers in Yogyakarta City is supported by other factors outside the variables studied, the results of this analysis show that the use of the Merdeka Mengajar Platform (PMM) has a significant effect on improving the Good Practices of Social Studies Teachers in Yogyakarta City. This illustrates that the use of PMM can support the good practices of teachers in Yogyakarta City. This is in line with the purpose of PMM, namely to support teachers' performance in sharing good practices in teaching, learning, and creating and to assist teachers in sharing inspiration for implementing the independent curriculum [15]. There are many features that teachers can use to share and get references.

The role of PMM is very large in teachers doing good practices independently. From the research conducted, it can be seen that PMM is effective in improving teachers' good practices. This is based on several factors, namely:

a. Ease of PMM Access, *interface* and dashboard *experience* that makes it easy for users to explore the features on the Platform. Thus, users are quite comfortable in using this Platform and information updates that are always in the main menu allow users to follow application updates.

b. Provision of Information Sources, Merdeka Mengajar Platform (PMM) provides various features and in its features there is access to information and improvement of performance and

teacher competence. In addition, it is easy to participate in webinars and seminars online, which provides flexibility for teachers in developing their competencies. Apart from pedagogical, personality, social, and professional competencies, a teacher is also required to have other competencies to face challenges in the era of the industrial revolution 4.0, namely *(educational competence, competence for technological commercialization, competence in globalization, competence in future strategies, and counselor competence)* [16]

c. Sharing Inspiration, PMM gives teachers access to share their inspiration or good practices with teachers in Indonesia by sharing documents through the real action feature and providing feedback on work shared by others. Of course this is interesting because it provides a virtual space with teachers in Indonesia.

d. Ease of access to infrastructure, Yogyakarta City has fairly easy access to economic, social, political, and technological facilities. Thus, this is an important factor for easy access to improving good practices through PMM. Equipment and media owned by social studies teachers in the city of Yogyakarta has also been classified as good to access PMM. In addition to qualified equipment and media, internet access from various providers is also very easy, there are no blindspots to internet access in Yogyakarta City.

This proves that teachers do not experience obstacles in operating PMM, teachers have access to both devices, infrastructure and good digital mastery capital, so that teachers are able to feel the benefits provided by PMM, especially in terms of good practices. The Merdeka Mengajar (PMM) platform is able to have a positive influence on improving teachers' good practices and providing *feedback* on good practices carried out by other teachers.

4. Conclusion

This study concludes that the use of the Merdeka Mengajar Platform (PMM) has a positive effect on improving the good practices of social studies teachers in Yogyakarta City, as evidenced by a simple regression analysis which shows a significant effect of 37%. PMM provides easy access and features that support competency improvement, such as Inspiration Videos, Self-Training, and Community, and facilitates sharing good practices. Ease of access and adequate infrastructure in Yogyakarta City support the use of PMM, although there are still challenges such as low contribution of sharing good practices and limited mastery of technology. The recommendation of this study is to develop PMM features and provide intensive training to teachers to optimize the use of this platform, so that it can more effectively improve the competence and performance of social studies teachers in Yogyakarta City.

References

[1]   *Undang-undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional* . Jakarta, 2003.

[2]   Okpatrioka and Septian, "INCREASING TEACHER COMPETENCE IN THE INDUSTRIAL REVOLUTION INDUSTRI 4.0," *JHSS (Journal of Humanities and Social Studies)* , vol. 7, no. 2, pp. 380–386, Jun. 2023.

[3]   Kemdikbud-Ristekdikti, *Buku Saku Paltform Merdeka Mengajar*. Jakarta: Kemdikbud RI, 2022.

[4]   N. Prasetyaningsih, A. Muiz, and Fatimah, "Penggunaan Platform Merdeka Mengajar (PMM) untuk Peningkatan Kompetensi Guru di Sekolah Dasar," *Jurnal Basicedu*, vol. 8, no. 1, pp. 789–798, 2024, Accessed: Jun. 11, 2024. [Online]. Available: https://jbasic.org/index.php/basicedu/article/view/7108/3240

[5]   Kemdikbud, "Platform Merdeka Mengajar Bantu Jutaan Guru Tingkatkan Kompetensi," https://pusdatin.kemdikbud.go.id/platform-merdeka-mengajar-bantu-jutaan-guru-tingkatkan-kompetensi/.

[6]   "Statistik Indonesia 2023," 2023.

[7]   G. Angraini and Winarti, "Problematika Penggunaan Platform Merdeka Mengajar (PMM) Pada Daerah Tanpa Jaringan Listrik (Studi di SMPN Satu Atap 2 Mentaya Hulu)," *Jurnal Pendidikan Teknologi Informasi*, vol. 8, no. 2, pp. 103–112, 2023, Accessed: Jun. 11, 2024. [Online]. Available: http://journal.umpalangkaraya.ac.id/index.php/bitnet

[8] K. Hidayati, Tamrin, and T. Budi, "Efektivitas Penggunaan Platform Merdeka Mengajar untuk Peningkatan Kompetensi Guru pada Kurikulum Merdeka," *Jurnal Ilmu Pendidikan*, vol. 8, no. 1, pp. 232–240, 2024, Accessed: Jun. 11, 2024. [Online]. Available: https://edukatif.org/index.php/edukatif/index

[9] F. Pratami, "Pengaruh Supervisi Kepala Sekolah Dan Iklim Organisasi Terhadap Kinerja Guru Sekolah Menengah Pertama di Kecamatan Bukit Kecil Palembang," Universitas PGRI Palembang, Palembang, 2018.

[10] Yunaini Yunaini and Suryani Lilis, "Penerapan Platform Merdeka Mengajar (PMM) dalam Mengembangkan Kemampuan Mengajar Guru pada TK Mekar Jaya di Kabupaten Pesisir Barat Lampung," *Jurnal Ilmiah Ilmu Pendidikan*, vol. 7, no. 6, pp. 5450–5455, 2024, Accessed: Jun. 11, 2024. [Online]. Available: https://www.jiip.stkipyapisdompu.ac.id/jiip/index.php/JIIP/article/view/4560

[11] R. Anrichal and D. Pramono, " Strategi Adaptasi dan Dampak Implementasi Platform Merdeka Mengajar di SMA Kesatrian 2 Kota Semarang," *Jurnal Ilmiah Profesi Pendidikan*, vol. 8, no. 4, pp. 2197–2209, 2023, Accessed: Jun. 11, 2024. [Online]. Available: https://jipp.unram.ac.id/index.php/jipp/article/view/1687

[12] M. Hakim and A. Abidin, "Platform Merdeka Mengajar: Integrasi Teknologi dalam Pendidikan Vokasi dan Pengembangan Guru," *Kharisma: Jurnal Administrasi Dan Manajemen Pendidikan*, vol. 3, no. 1, pp. 68–82, 2024, Accessed: Jun. 11, 2024. [Online]. Available: https://kharisma.pdtii.org/index.php/kh/article/view/47

[13] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan Kombinasi (Mix Methods)*. Bandung: Alfabeta CV, 2015.

[14] Muh Alwy Yusuf, Herman, Trisnawati. H, A. Abraham, and H. Rukmana, "Analisis Regresi Linier Sederhana dan Berganda Beserta Penerapannya ," *Journal on Education*, vol. 6, no. 2, pp. 13331–13344, Feb. 2024.

[15] D. Marisana, S. Iskandar, and D. T. Kurniawan, "Penggunaan Platform Merdeka Mengajar untuk Meningkatkan Kompetensi Guru di Sekolah Dasar," *Jurnal Basicedu*, vol. 7, no. 1, pp. 139–150, 2023, Accessed: Jun. 11, 2024. [Online]. Available: https://jbasic.org/index.php/basicedu/article/view/4363

[16] D. Aulia, I. Murni, and Desyandri, "Peningkatan Kompetensi Guru Sekolah Dasar melalui Platform Merdeka Mengajar(PMM)," *Jurnal Ilmiah Profesi Pendidikan*, vol. 8, no. 1b, Apr. 2023.

Teacher Competency Development Training Curriculum at Miftahul Iman Junior High School Using Didactical Situation Analysis Approach and Sharing and Jumping Tasks

Dwi Ajni Shafarwati[1*], Syahrul Bachtiar[2] and Dinn Wahyudin[3]

[1] Curriculum Development, Indonesian University of Education, Bandung, Indonesia
[2] Curriculum Development, Indonesian University of Education, Bandung, Indonesia
[3] Curriculum Development, Indonesian University of Education, Bandung, Indonesia

*E-mail: dwiajni@upi.edu[1], syahrulbachtiar@upi.edu[2], Dinn_wahyudin@upi.edu[3]

Abstract. Abstract. Teachers must have pedagogical and professional competencies in order to provide cognitive knowledge and develop student's character. The 2023 teacher competency test in Bandung City obtained a pedagogical competence of 58.79%, lower than professional competence of 65.97%. According to the Miftahul Iman Junior High School Report cards, the quality of teacher learning reached 61.47%. This problem can be addressed with a training program to improve professional and pedagogical competencies through a didactical situation analysis approach. This study aims to improve teachers' competencies and skills in designing lessons based on didactical situation analysis before, during, and after learning by implementing Sharing and Jumping Tasks. This qualitative study used a case study design. Data collection techniques covered interviews, documentation studies, and observations. Data analysis used an interactive model. The results of this study were in the form of training programs for designing lessons based on didactical situation analysis and Sharing and Jumping Tasks.

Keywords: *Lesson Design; Need Assessment; Sharing and Jumping Task; Teacher Competence; Training Curriculum; Indonesian Education Curriculum.*

1. Introduction

Quality human resources have to possess good social skills, critical thinking skills, and self-efficacy. This can be achieved through education. Improving the quality of education starts with equal distribution of teacher quality. Quality education depends on the human resources. In an educational context, teachers play a key role in educational success. Teachers are the most important factor in the education system. As agents of change, teachers are a key element in the education system [9]. Besides, his study shows that teachers have the most important position in the implementation of education. It can be said that a well-designed curriculum cannot be implemented well without a teacher's optimal effort [4].

Complex learning processes do not only involve teachers but also other elements such as lesson objectives, materials, media, teaching methods, learning resources, interaction management, evaluation, and the students [7]. Teaching methods are important for making students learn. Thus, inappropriate methods will result in less optimal learning which can influence student learning outcomes.

Some teachers often use conventional learning methods placing students as learning objects who passively receive learning materials. This method usually uses lecturing, question and answer, and assignment models, which prevent students from contributing to the learning process in the classroom [11].

According to the Ministry of Education and Culture's website (https://npd.kemdikbud.go.id/?appid=ukg), the results of the Teacher Competency Test (UKG) showed that the teacher's pedagogical competence in Bandung City only reached 58.79% which is lower than the professional competence, namely 65.97%. The average score was below 70 out of 100 up to 2023. This indicates that the teacher's competence is still low [6]. Referring to the results of a learning environment survey (Sulingjar) and Computer-Based National Assessment (ANBK) published in the school report cards, the learning quality at Miftahul Iman Junior High School, Bandung City in 2023 obtained a score of 61.47% with MEDIUM achievements that need to be improved. The problem in this school is the learning methods used [14].

Teachers must have pedagogical competence, personality competence, social competence, and professional competence obtained from professional education. Thus, they will not only deliver cognitive knowledge but also develop students' character. These competencies can be obtained from education, career, training, or teaching experience [1]. Teacher performance is significantly influenced by pedagogical competence. The higher the pedagogical competence and professional competence, the better the teacher's teaching performance [12]. If teachers have pedagogical competence, they are expected to have the ability to understand students and manage educational learning. This ability includes designing and implementing learning, evaluating learning outcomes, and developing students' skills to maximize teacher potential [3]. Thus, both public and private institutions have to provide facilities for teachers and education personnel to continue to improve their abilities and keep up with current developments.

Training as a widely accepted and systematic practice for professional development. It helps people gain a basic level of mindset, understanding, and abilities [5]. Internal training programs are most effective for the long-term success of an organization's strategic goals [13]. An internal training program like the In-House Training model can be implemented to answer this problem. This training program is held on-site, as an effort to increase teacher competence in carrying out work by optimizing their existing potential [2]. Determining training programs using needs analysis can help teachers overcome daily difficulties in the teaching and learning process [10]. The teacher training program is expected to improve teachers' abilities regarding the concept of designing lesson plans based on didactical situation analysis before, during, and after learning. The design uses Sharing and Jumping Tasks so that participants can improve their professional competence, particularly pedagogical competence. This is done by considering the triggering questions that will be asked by the teacher and predictions of student responses. Designing lesson plans using didactical situation analysis strengthens the teacher's capacity to develop learning materials and methods so that students can actualize their potential. After gaining training in designing lesson plans based on didactical situation analysis and implementing sharing and jumping tasks, teachers are expected to have more knowledge and skills related to their tasks in the learning process. This can help them in improving the quality of learning in their respective classes.

2. Method

This study used a qualitative approach with a case study design. The subjects in this study were the Deputy Principal for Curriculum, Subject Teachers, and Students. This study was carried out at Miftahul Iman Junior High School, Bandung City. Data were obtained from interviews, documentation studies, and observation. Interviews and observations were carried out to explore problems related to the contribution of the deputy principal in the field of curriculum, teachers and students in the learning planning process, learning strategies used, and school programs that support the needs of teachers and students. The documentation study was done by analyzing school report cards to identify teachers' pedagogical competence and identify the quality of learning in the school environment. Data were

analyzed using an interactive data analysis model covering (1) Data reduction to determine data that are relevant, meaningful, and important based on the research and obtaining the required data, in this case referring to needs analysis; (2) Data presentation in the form of narrative descriptions; and (3) Drawing conclusions [8]. The data reduction stage which refers to needs analysis was carried out using a process of interviews, observations, and documentation studies and obtained the low quality of learning which influences student learning outcomes. The teachers' pedagogical competence is not good, especially in designing learning where most of them did not consider the needs of students, and even, the educational units rarely provided training. In the next stage, a solution was presented based on the needs analysis and then described in the form of a narrative description. It can be concluded that the teacher's pedagogical competence and the quality of learning can be improved by developing training for designing lesson plans based on didactical situation analysis and implementing sharing and jumping tasks.

3. Result and Discussion

3.1 Learning Process at Miftahul Iman Junior High School

Based on the results of interviews with three students, the problems in the learning process at Miftahul Iman Junior High School are: (1) the teacher still uses lecturing methods to explain materials and give assignments; (2) the learning process needs to be improved by using more varied learning methods and media to help students understand the material; and (3) the teacher does not organize learning according to the student's needs.

3.2 Teacher Competence in Designing Learning at Miftahul Iman Junior High School

Teacher competency in learning quality assessment obtained a score of 61.47% with MEDIUM achievements so it needs to be improved. As explained earlier, this is based on the 2023 learning environment survey (sulingjar) and Computer-Based National Assessment (ANBK) published in the Miftahul Iman Junior High School Report Cards. The problem in this school is learning methods.

Based on the results of the interview with the teachers at Miftahul Iman Junior High School, it can be said that (1) the teacher used the flow of learning objectives provided by the Ministry of Education and Culture but are readjusted according to the needs of students; (2) the teacher did not consider learning outcomes in developing the learning objectives; (3) Some subject teachers used the lesson plans or teaching modules that are developed and modified independently according to the needs of students, but some only based on examples provided by the Ministry of Education and Culture or based on the internet; (4) The assessments used by subject teachers were not modified according to students' needs, but are based on textbooks or the internet; (5) The developed lesson plan did not consider the competency characteristics of learning achievement; (6) the teacher did not choose teaching materials according to the local context and students' needs, but according to the order in the textbook; (6) the teacher used textbooks as the main source with the additions modified according to students' needs; (7) the teacher did not use learning strategies in accordance with previously prepared learning plans; (8) The learning process was still teacher-centered as indicated by the frequent use of lecturing methods; (9) The learning methods were not adjusted to the learning objectives and students' needs; (10) The teacher carried out cognitive and non-cognitive diagnostic assessments but they do not use it as a guide in adjusting and designing learning; (11) the teacher had never carried out differentiated learning; (12) the teacher did not pay special attention to students who need different treatment; and (13) the teacher did not collaborate in planning lessons because there is only one teacher for each subject.

Based on the results of the interview with the Deputy Principal for Curriculum Miftahul Iman Junior High School, it can be said that (1) The Deputy Principal for Curriculum collaborated with subject teachers in determining essential learning according to the student's needs who are not textbook-

oriented. One of the mapping activities carried out was a basic ability test in reading and writing the Al-Quran, reading, writing and arithmetic for students in class 7; (2) The Deputy Principal for Curriculum encouraged teachers to carry out initial diagnostic assessments on students through observations during the learning process in class; (3) The Deputy Principal for Curriculum adjusted the flow of learning objectives with subject teachers through training but the dissemination is still insufficient; (4) The Deputy Principal for Curriculum together with the teacher provided support for differentiated learning, but still no follow-up; (5) the Deputy Principal for Curriculum collaborated with the teacher in preparing the school program, for example involving the counseling teacher (BK) in the Violence Prevention and Handling Team (TPPK) for designing the schedule every Wednesday or inserted during the counseling lesson to reinforce the program. Character development program covers ceremonies, literacy day, duha prayers, *kitan* studies and scouting; (6) The teacher monitoring and evaluation program existed but the Deputy Principal for Curriculum had not collaborated optimally with the principal; (7) Feedback for improvement in the quality of curriculum implementation existed but was only limited to feedback carried out through discussions between teachers.

3.3 In-House Training Programs for Designing Lesson Plans based on Didactical Situation Analysis and Implementing Sharing and Jumping Tasks
Based on the results of interviews with teachers, students and the Deputy Principal for Curriculum, an In-House Training program for designing lesson plans based on Didactical Situation Analysis and implementing Sharing and Jumping Tasks was prepared to improve teachers' instructional competence. This is expected to provide a conceptual understanding regarding designing lesson plans based on didactical situation analysis and implementing Sharing and Jumping Tasks in the learning process to be able to learn independently and responsibly and think critically based on collaboration with colleagues.

This in-house training develops the competence of (1) Understanding the concept of designing lesson plans, didactic situation analysis, Sharing and Jumping Tasks; (2) Determining the appropriate model, approach and method based on student needs; (3) developing learning media; (4) Identifying didactic situations before, during and after learning; (5) Developing a lesson plan based on didactic situation analysis; (6) Determining trigger questions and predicting student responses in the learning process from the beginning until the end of the lesson; and (7) Creating Sharing and Jumping Tasks based on didactic situation analysis.

The expected learning indicators in this in-house training are: (1) Participants can explain the concepts of designing lesson plans, didactic situation analysis, Sharing and Jumping Tasks; (2) Participants can determine appropriate learning models, approaches and methods based on student needs; (3) Participants can develop learning media based on student needs; (4) Participants can identify didactic situations before, during and after learning; (5) Participants can design lesson plans based on didactic situation analysis; (6) Participants can determine trigger questions during the learning process (7) Participants can predict student responses during the learning process; (8) Participants can create Sharing and Jumping Tasks based on didactic situation analysis. The materials and skills included in the training curriculum structure can be seen in the following table.

Table 1. 1 Training Curriculum Structure

Materials	Skills
1) BK-P1 definition of *lesson Design* 2) BK-P2 stages in developing *lesson design* 3) BK-P3 definition of didactical situation analysis 4) BK-P4 types of didactical situation analysis 5) BK-P5 definition of Sharing and Jumping Task 6) BK -P6 differences between Sharing and Jumping Task 7) BK-P7 examples of Sharing and Jumping Task 8) BK-P8 concept of learning strategy 9) Bk-P9 identifying learning media	1) BK-K1 determining learning strategies (learning models, approaches and methods) 2) BK-K2 developing learning media 3) BK-K3 applying didactical situation analysis in lesson design 4) BK-K4 determining trigger questions and predicting student responses 5) BK-K5 creating Sharing and Jumping Tasks based on the results of the didactical situation analysis.

The learning process carried out in in-house training starts from program direction with the following stages: (1) Dynamizing and exploring participants' expectations and creating a commitment to learning among participants; (2) Preparing participants as individuals or groups who can influence behavior change in creating a conducive climate for carrying out tasks; (3) Determining the class or group organization; and (4) Discussion of the material. In each material discussion, participants participate actively in both theory and assignments. (1) The trainer prepares participants to take part in the learning process; (2) The trainer provides a brief explanation of the material and the learning objectives; (3) The trainer starts the lesson with an individual or group assignment and a brief explanation of the material; and (4) After completing the discussion of the material, the trainer gives an assignment. The learning method used in this training is based on the principles of (1) Providing orientation to participants which includes information about background, needs and expectations related to the tasks; (2) Providing participant roles and activities in accordance with the learning approach; and (3) Creating a democratic and dynamic environment where communication can occur from and in various directions. The learning process uses various methods such as lecturing, questions and answers, discussions, assignments, and presentations.

The evaluation in in-house training is intended to determine the extent of the training's success from academic and administrative perspectives and as an effort to improve the training program. The evaluation was carried out on training participants with the focus on attitudes, practices and knowledge; evaluation of trainers and evaluation of organizers.

4. Conclusion

Based on the results of the needs analysis at Miftahul Iman Junior High School, a training curriculum is needed to improve teacher competence in planning lessons. The expected competencies to emerge are (1) Understanding the concept of lesson design, didactical situation analysis, Sharing and Jumping Tasks; (2) Determining appropriate learning models, approaches and methods based on student needs; (3) Developing learning media; (4) Identifying didactical situations before, during and after learning; (5) Designing a lesson plan based on didactical situation analysis; (6) Determining trigger questions and predicting student responses in the learning process from the beginning until the end; (7) Developing Sharing and Jumping Tasks based on didactical situation analysis. The in-house training program has a total of 34 lesson hours using the online method. The learning process in the in-house training begins with the program direction with the following stages: (1) Dynamizing and exploring

participants' expectations and creating a commitment to learning among participants; (2) Preparing participants as individuals or groups who can influence behavior change in creating a conducive climate for carrying out tasks; (3) Determining the class or group organization; and (4) Discussion of the material. The evaluation covers the evaluation of training participants, evaluation of trainers and evaluation of organizers. The evaluation of training participants focuses on attitudes, practices, and knowledge.

References

[1] Arif, A. (2019). Pelatihan Modul Pembelajaran Menggunakan MS.Word Pada Guru SMKN 1 Jarai. Ngabdimas, 2(1), 31–38. https://doi.org/10.36050/ngabdimas.v2i1.224

[2] Astuti, S., Slameto, S., & Dwikurnaningsih, Y. (2017). Peningkatan kemampuan guru sekolah dasar dalam penyusunan instrumen ranah sikap melalui in house training. Kelola: Jurnal Manajemen Pendidikan, 4(1), 37-47

[3] Bhakti, C. P., & Maryani, I. (2017). Peran LPTK dalam Pengembangan Kompetensi Pedagogik Calon Guru. Jurnal Pendidikan (Teori Dan Praktik), 1(2), 98. https://doi.org/10.26740/jp.v1n2.p98-106

[4] H. Mahmud. (2013). Guru di tengah perubahan kurikulum. Al-Khwarizmi, 2 (111).

[5] Islam, R. (2020). Enhancing Instructional Leadership using in-House Training. i-Manager's Journal of Educational Technology, 17(2), 14.

[6] Kemdikbud. (2023). Data Uji Kompetensi Guru. [online], diakses pada laman https://npd.kemdikbud.go.id/?appid=ukg.

[7] Mahananingtyas, E. (2016). Metode quantum learning untuk meningkatkan efikasi diri dan hasil belajar IPS peserta didik kelas V sekolah dasar. Pedagogika: Jurnal Pedagogik Dan Dinamika Pendidikan, 4(1), 17-25.

[8] Miles, matthew B., Huberman, A. M., & Saldana, J. (2014). Qualitative data Analysis "a methods sourcebook." SAGE Publications.

[9] N. Shahmohammadi. (2017). The evaluation of teachers' job performance based on total quality management (TQM)". International Education Studies, 10, (4).

[10] Puspitasari, R., & Budiningsih, C. A. (2020. In House Training Optimization: Efforts to Improve Teacher Quality. In 2nd Yogyakarta International Conference on Educational Management/Administration and Pedagogy (YICEMAP 2019) (pp. 179-185). Atlantis Press.

[11] Ridha, Adnan. (2021). Pengaruh Model Quantum Teaching Terhadap Minat dan Hasil Belajar Peserta didik di Sekolah Dasar. Jurnal Basicedu. 5, (1). https://jbasic.org/index.php/basicedu.

[12] Roy Wahyuningsih dan Retnaningtyas. (2021). Pengaruh Kompetensi Pedagogik Dan Kompetensi Professional Guru Terhadap Kinerja Guru Di Man 3 Jombang. Jurnal Cahaya Mandalika ISSN 2721-4796 (Online), 2(2), 95–102. https://doi.org/10.36312/jcm.v2i2.392

[13] Sudarto, T., Asmawi, M., Yasin, M., & Suratman, A. (2019). Evaluation of Training Program for Warehouse Manager Candidates within the Warehouse Receipt System Scheme at Commodity Future Trading Regulatory Agency (COFTRA) Indonesia. International Journal of Mechanical Engineering and Technology, 10(3), 525-542.

[14] SMP Miftahul Iman. (2023). Laporan Rapor Pendidikan SMP Miftahul Iman 2023.

Implementation of the Development of an Integrated Islamic Curriculum Based on Character Education in Installing Religious Values in Students at SMPIT Menara Fitrah

Izzah Syamilah[1*], Zainal Arifin[2], Nadila Nurfariza Tahir[3]

[1,2] Department of Educational Management, Universitas Negeri Yogyakarta, DIY, Indonesia
[3] Department of Mathematics Education, Universitas Negeri Yogyakarta, DIY, Indonesia

[*]E-mail: izzahsyamilah.2022@student.uny.ac.id

Abstract. This research aims to analyze the implementation of the development of an integrated Islamic school curriculum based on character education in instilling religious values in students at SMPIT Menara Fitrah. This research is a qualitative descriptive study. carried out at SMPIT Menara Fitrah, Ogan Ilir Regency. The research subjects consisted of: the principal, deputy principal for curriculum and student affairs. Research data was collected by interviews, observations and documentation studies. To obtain credible findings and data validity, triangulation techniques were used.

The results of the research show that in order to instill religious values in students and make the SMPIT Menara Fitrah environment an Islamic environment, SMPIT Menara Fitrah developed a character education-based curriculum which is also integrated with other curricula in the school and is carried out by integrating the character education program through: 1) Every activity at school, including intra-curricular, co-curricular and extra-curricular activities, 2) Through habituation and school culture, 3) Through teacher example. The stages followed in curriculum development include: First, the planning stage is carried out by analyzing problems and needs, setting goals, and designing programs. Second, the organizing stage is carried out by distributing tasks to the person in charge and all school components involved. Third, the implementation stage is carried out through activities in class and outside of class as well as through habituation and school culture. Fourth, the control stage is carried out through routine monitoring of all activities in general by the principal and assisted by each person in charge on a regular basis, supervision of all subject teachers on a scheduled basis by the principal, and monthly meetings and work meetings at the end of each year to evaluate the progress of activities and programs in the curriculum.

Keywords: Curriculum development, character education, religious values

1. Introduction

Character education is the education of values, manners, morals, character which aims to develop a person's ability to make good and bad decisions, be an example, maintain what is good and realize that goodness in everyday life (Yusri, 2021: 72). The aim of character education is to instill values in students and improve the quality of education providers and outcomes in schools which leads to the achievement of the formation of students' character and noble morals in a complete, integrated and balanced manner in accordance with graduate competency standards (Atika et al., 2019: 107). Therefore, character education is an important aspect of education in Indonesia. Because according to Susanto (2022: 316)

education does not only teach children to know and simply produce quality workers, but also educates children's character. This is in line with the function and goals of national education which does not only focus on intellectual development, but also on forming students' good character in morals and ethics. However, currently the Indonesian nation is experiencing a decline in morals and ethics, especially among students at school. This is proven by various data on cases of juvenile delinquency that have occurred, including, according to data from the 2018 Program For International Students (PISA) research, which shows that 41.1% of students have experienced bullying in Indonesia. This number of victims of bullying is far above the average for OECD member countries, which is only 22.7%. Apart from that, Indonesia is in the fifth highest position out of 78 countries as the country where the most students experience bullying (OECD, 2019). The Indonesian Child Protection Commission (KPAI) stated that 5.9 million of Indonesia's 87 million children are drug addicts. Based on the results of the BNN survey, the number of drug addicts in the 10-59 year age group is estimated to reach 3.8-4.1 million and will increase in the coming years (Putri, 2022: 5507-5508). The National Population and Family Planning Agency (BKKBN) reports that of the 2.4 million cases of abortion, 700,000 to 800,000 were carried out by teenagers. Based on data on student brawls at the Polda Metro Jaya District Court in 2012, there were dozens of cases of student brawls which resulted in injuries and deaths (Suryandari, 2020: 24).

Therefore, the development of character education programs in schools must be seriously optimized and become a priority program in schools. Character development in schools can be done through various approaches, one of which is through developing a curriculum based on character education. The character education-based curriculum is designed to instill good character values in students through various activities at school. both intracurricular, co-curricular and extracurricular activities. The character values that we want to instill in students are varied, one of which is religious values. Religious values are one of the character values which are used as attitudes and behavior that are obedient in carrying out the teachings of the religion one adheres to, tolerant towards the practice of worship of other religions, and living in harmony with followers of other religions. This religious character is really needed by students in facing changing times and moral degradation like today. In this case, students are expected to be able to have and behave with good and bad standards based on religious provisions and regulations (Hardiansyah et al., 2020: 16). SMPIT Menara Fitrah is an integrated Islamic school that is committed to developing the character of its students. This school has a clear vision and mission to produce a generation of Qur'anists who are scientific, have noble character, noble character, and are competitive. In order to realize its vision and mission, SMPIT Menara Fitrah has developed a curriculum based on character education. This curriculum is designed to instill various character values in students, including religious values. This research was conducted to find out how to implement curriculum development based on character education in instilling religious values in students at SMPIT Menara Fitrah.

2. Method of the Research

This research uses a qualitative research method with a qualitative descriptive approach. This research was carried out at SMPIT Menara Fitrah, Ogan Ilir Regency. The research subjects consisted of: the principal, deputy principal for curriculum and student affairs. Research data was collected by interviews, observations and documentation studies. To obtain credible findings and data validity, triangulation techniques were used. The data analysis technique used is the interactive model from Miles, Huberman & Saldana including collection, reduction, presentation of data and conclusions.

3. Main Discussion

3.1 Implementation of Curriculum Development Based on Character Education
SMPIT Menara Fitrah is under the auspices of the Menara Fitrah Integrated Islamic School (SIT) foundation. Where SIT Menara Fitrah has the main goal, namely to produce a superior generation with Islamic character and a Qur'anic spirit, so that in the process of providing education it prioritizes Islamic values and increases the religiosity of students. This is also in accordance with the vision of SMPIT Menara Fitrah, namely "Creating a Qur'anic Generation, Achieving and Characteristic with a Pancasila Student Profile. In order to instill religious values in students and make the SMPIT Menara Fitrah environment an Islamic environment, the school has developed a character education-based curriculum which is also well integrated with several other curricula which are also used at SMPIT Menara Fitrah. According to Kusumadewi (2019), her research revealed that the role of relevant curriculum design has a significant influence on the effectiveness of implementing character strengthening programs. Curriculum development is carried out by integrating character education programs through; 1) Every activity at school starts from intracurricular activities, namely learning activities both in the classroom and outside the classroom, co-curricular activities, namely through activities to develop students' interests, talents and skills, and extracurricular activities, 2) Through school culture and habits positive students, and 3) Through exemplary positive behavior exemplified by teachers at school. Extracurricular activities, student development programs, and school culture as strategies for strengthening character in developing students. School culture, by carrying out habituation activities so that it becomes a culture that is carried out routinely every day by both students and teachers. Student development and extracurricular programs are not only used as programs to increase skills and develop student potential, but also as a means of strengthening character (Carlyna et al., 2022)

3.2 Stages of curriculum development based on character education
As for the internal stages character education-based curriculum development in instilling religious values at SMPIT Menara Fitrah includes several management functions, namely planning, organizing, implementing and controlling. First, curriculum planning, namely by forming a character education curriculum development team, where this team plays a role in compiling and managing all curriculum and activities at SMPIT Menara Fitrah. This curriculum team consists of the deputy principal for curriculum, deputy principal for student affairs, along with several teachers who are assigned to help prepare the curriculum. Then the curriculum development team will carry out an analysis of problems and needs related to the problem of juvenile delinquency which is rife both on a national and regional scale, and of course within the students of SMPIT Menara Fitrah itself. The curriculum development team prepares a character education curriculum by integrating Islamic values into the student learning curriculum, so that in every lesson in class, both in Islamic subjects and general subjects, students can associate and practice Islamic values in their daily lives. -day. Apart from that, the efforts made by the school to increase students' religious values are by designing superior programs outside of classroom learning which not only aim to improve students' soft skills but also increase their faith & piety. Then, cultural practices & habits of Islamic etiquette in schools are also arranged for students, and teachers are also encouraged to be able to set good examples in practicing Islamic values.

Second, organizing the curriculum, is carried out by organizing the distribution of tasks to teachers, whether they are just class subject teachers, homeroom teachers, those in charge of programs or those who are extracurricular supervisors and school organizations. The Deputy Principal for curriculum together with the curriculum team has the task of ensuring that every subject teacher integrates Islamic values into every learning topic. The deputy principal for student affairs is tasked with overseeing the running of all student and extracurricular programs in general, where each program and extracurricular has a person in charge of the program and an extracurricular supervisor who is taken from a teacher at

SMPIT Menara Fitrah who is deemed to have the ability or qualifications in the assigned section. Teachers who are homeroom teachers have the task of supervising and developing students in their class to practice Islamic values in the school environment and in everyday life. The role of teachers as inheritors of values and moral agents is very important in instilling moral values. Teachers also need to understand what strategies and approaches will be used in instilling morals in students, either through a transmission approach or a construction approach, depending on the situation and conditions of the values that the teacher and school want to develop. With these two approaches, it is hoped that it will make it easier for teachers to internalize moral values so that they can effectively shape students' character within the scope of education (Faiz, 2022: 316). Then, the timing and schedule of all program activities are handled by the curriculum team & student affairs team, as well as involving the people in charge of the program and extracurricular supervisor.

Third, the implementation of the character education curriculum at SMPIT Menara Fitrah in instilling religious values involves all school members, because it must be implemented comprehensively and consistently by involving all related parties so that it can be a solution in overcoming various social and moral problems (Solihin et al., 2020 : 25) implemented through various things, namely, a) Integrating religious knowledge into each subject, integrating religious knowledge into each general subject as a whole is one strategy in an effort to instill religious character values in students at SMPIT Menara Fitrah. According to Rizanti et al. (2023) Implementation of character education in classroom learning activities is carried out by integrating character values into the learning curriculum for each subject. So that in each subject there is character education content, which is implemented through appropriate learning methods, through assignments, both individual and group, through presentations and through games in classroom learning activities, with the aim of making learning more active and interesting in accordance with principles of character development b.) Tahsin & Tahfidz Qur'an (TTQ) program, aims to increase students' ability to read the Al-Qur'an with correct recitation, help students memorize the Al-Qur'an, and form religious character students through understanding & experiencing the values of the Koran. Apart from that, through TTQ it is hoped that it can increase students' closeness and love for the Al-Qur'an.

Al-Qur'an Certification, is a continuation program of the Tahsin & Tahfidz Qur'an (TTQ) program, where for students who have memorized even one juz, there will be a tasmi' activity, namely the activity of listening to memorizing the Al-Qur'an "To the examiners and listeners, after completing the task, students will receive a certificate that they have memorized and completed their memorization. d) Qur'an Camp, lasts for one day and one night, where students will be given several materials related to the Qur'an and also given special time to read and memorize the Qur'an, so that on that day students focus on learning Al-Qur'an e.) Evening for Building Faith & Piety of Character, in this activity students will focus on spiritual activities, group worship, self-reflection, and several materials related to character development. This character Mabit program aims to strengthen students' faith and devotion to Allah SWT. and forming religious character and noble morals. f) Hajj rituals, designed to provide an overview of the implementation of the Hajj pilgrimage to students. This program aims to shape religious character and prepare students to carry out the Hajj pilgrimage in the future, strengthen Islamic brotherhood among students, increase students' knowledge and understanding of the Hajj pilgrimage. g) Commemoration of Islamic Holidays (PHBI), by commemorating Islamic holidays it is hoped that it can increase students' knowledge and understanding of the history and meaning of PHBI, shape religious character through the experience of Islamic values, and foster students' love and enthusiasm for the Islamic religion.

Islamic Personal Development (BPI), held regularly once a week and must be attended by all SMPIT Menara Fitrah students. The form of activity in this BPI program is in the form of providing material about the Islamic religion, such as fiqh, aqidah, Sufism, etc. which is wrapped in a simpler

presentation. In this BPI program, students are also usually given daily mutabaah/worship targets that must be fulfilled every day, and there will be an evaluation of the results of the daily mutabaah at each meeting. i) Weekly Muslimah Study, the weekly Muslimah Study which is filled in by female students alternately every week is an innovative program which becomes a forum for students to share knowledge and convey back the Islamic knowledge and insight they have gained. j) Through extracurricular activities, such as Scouting and Islamic Personal Development, k) Positive habits and school culture, such as Duha prayer, dhikr, congregational prayer, murojaah memorizing the Koran, fasting Monday & Thursday, etc. l) Exemplary, giving Good examples and role models are very effective in supporting the implementation of character education in schools, because basically human nature is to imitate, whether intentionally or unintentionally. Exemplary is a step taken by SMPIT Menara Fitrah in an effort to instill character values in students. In particular, religious character values, teachers are encouraged to be able to provide examples for students in practicing Islamic values in everyday life.

Fourth, control in instilling religious values is carried out in several ways, namely, a) the integration of religious values in learning is carried out by the school principal through routine supervision and monitoring assisted by the deputy principal for curriculum and the curriculum team. For extracurricular programs and activities outside of classroom learning as a whole, they are monitored by the Principal who is assisted by the Deputy Principal for Student Affairs and the student affairs team consisting of the group who is responsible for the program and the extracurricular supervisor. b) the Tahsin & Tahfidz Qur'an (TTQ) program, Al-Qur'an certification, Qur'an Camp is routinely coordinated by the Al-Qur'an teacher coordinator. For other programs such as character training, Hajj rituals, commemoration of Islamic holidays, Islamic Personal Development (BPI), and weekly Muslim women studies, routine control is coordinated by the teacher who is in charge of the program. c) Islamic adab habituation programs such as midday prayers, dhikr, congregational prayers, murojaah memorizing the Koran, fasting on Mondays & Thursdays, etc. Routine control is coordinated by each homeroom teacher. And controlling the instillation of religious values through teacher example is carried out directly by the School Principal. Even though each program has a person in charge of the control activities, general and overall control is carried out by the Principal of SMPIT Menara Fitrah.

4.   Conclusion

The development of a curriculum based on character education in instilling religious values in students at SMPIT Menara Fitrah is a form of strategy used by SMPIT Menara Fitrah in an effort to instill religious character values in students at school through curriculum management that is integrated with various activities and character strengthening programs. Starting from intracurricular, co-curricular and extracurricular activities, apart from that also through positive habits and school culture, as well as through teacher example. character strengthening program. The stages followed in curriculum development include: First, the planning stage is carried out by analyzing problems and needs, setting goals, and designing programs. Second, the organizing stage is carried out by distributing tasks to the person in charge and all school components involved. Third, the implementation stage is carried out through activities in class and outside of class as well as through habituation and school culture. Fourth, the control stage is carried out through routine monitoring of all activities in general by the principal and assisted by each person in charge on a regular basis, supervision of all subject teachers on a scheduled basis by the principal, and monthly meetings and work meetings at the end of each year to evaluate the progress of activities and programs in the curriculum. Where carrying out each of these stages is in accordance with the vision, mission and goals of the school.

References

[1] Atika, N. T., Wakhuyudin, H., & Fajriyah, K. (2019). Pelaksanaan Penguatan Pendidikan Karakter Membentuk Karakter Cinta Tanah Air. *Mimbar Ilmu*, *24*(1), 105-113. https://doi.org/10.23887/mi.v24i1.17467

[2] Boko, Y. A. (2021). Implementasi Guru Dalam Pembentukan Manajemen Pendidikan Karakter. *Jurnal Pendas (Pendidikan Sekolah Dasar)*, *3*(1), 71-77 http://dx.doi.org/10.25157/ag.v4i2.8610

[3] Carlyna, A., Ahmad, S., & Kesumawati, N. (2022). Strategi kepala sekolah untuk penguatan pendidikan karakter dalam membina peserta didik. *Jurnal Pendidikan Tambusai*, *6*(3), 14046-14057. https://doi.org/10.31004/jptam.v6i3.5043

[4] Faiz, A. (2022). Peran guru dalam pendidikan moral dan karakter. *Jurnal Education and development*, *10*(2), 315-318. https://doi.org/10.37081/ed.v10i2.3671

[5] Hardiansyah, F. (2020). Implementasi nilai religius melalui budaya sekolah: Studi fenomenologi. *Autentik: Jurnal Pengembangan Pendidikan Dasar*, *4*(1), 15-24.https://doi.org/10.36379/autentik.v4i1.49

[6] Kusumadewi, S. (2019). Pengembangan Model Manajemen Kurikulum Berbasis Penguatan Pendidikan Karakter Untuk Meningkatkan Mutu Pembelajaran Di Sekolah Dasar. *Refleksi Edukatika: Jurnal Ilmiah Kependidikan*, *10*(1), 87-96. https://doi.org/10.24176/re.v10i1.3889

[7] Rizanti, W. N., & Jufri, A. W. (2023). Peningkatan Pendidikan Karakter Peserta Didik Melalui Bahan Ajar IPA Berbantuan Media Game. *Journal of Classroom Action Research*, *5*(1), 114-120. https://doi.org/10.29303/jcar.v5i1.2931

[8] Solihin, I., Hasanah, A., & Fajrussalam, H. (2020). Core ethical values of character education based on Islamic values in Islamic boarding schools. *International Journal on Advanced Science, Education, and Religion*, *3*(2), 21-33. https://doi.org/10.33648/ijoaser.v3i2.51

[9] Suryandari, S. (2020). Pengaruh pola asuh orang tua terhadap kenakalan remaja. *JIPD (Jurnal Inovasi Pendidikan Dasar)*, *4*(1), 23-29. https://doi.org/10.36928/jipd.v4i1.313

[10] Susanto, F. X. (2022). Manajemen Penguatan Pendidikan Karakter Dalam Mewujudkan Mutu Lulusan Peserta didik Di Sekolah Satuan Pendidikan Kerjasama. *Al-Afkar, Journal For Islamic Studies*, 315-322. https://doi.org/10.31943/afkarjournal.v5i4.379

Elementary School Students Ocean Literacy Knowledge: A Preliminary Study

Mauliatun Nisa [1*], **Mutia Yulita Sari** [1*], **Sri Marlini** [1*], **Zetra Hainul Putra** [2], **Dahnilsyah** [2], **Hadriana**[2]

Departement of Elementary Education, University of Riau, Pekanbaru, Indonesia
Departement of English Education, University of Riau, Pekanbaru, Indonesia

*E-mail: mauliatun.nisa6876@grad.unri.ac.id, mutia.yulita6882@grad.unri.ac.id, Sri.marlini6878@grad.unri.ac.id

Abstract. This study aims to evaluate the ocean literacy knowledge of elementary school students, specifically 4th-grade students at SDS Cendana Duri, and understand their perceptions of marine environmental issues. Using a qualitative approach, in-depth interviews were conducted with 10 students to gather data on their understanding of various aspects of ocean literacy. The results show that most students have a basic knowledge of the ocean, its benefits, and the importance of keeping it clean. They are aware of the negative impacts of plastic waste and pollution on marine ecosystems and demonstrate a positive attitude towards maintaining ocean cleanliness through practical actions. However, their understanding is still limited to basic concepts and needs further depth. Additionally, the students show high enthusiasm for learning more about marine ecosystems. Based on these findings, there is a need for a deeper integration of ocean literacy topics into the elementary school curriculum, the use of interactive teaching methods, and better teacher training. These steps are expected to improve students' ocean literacy and prepare them to become environmentally responsible and aware citizens who care about marine conservation.
Keywords: Knowledge, Ocean Literacy, Elementary School

1. Introduction

Indonesia is an archipelagic nation characterized by its maritime nature with abundant marine wealth, possessing vast marine and fishery resources (Muattininggar et al., 2023). Coasts and oceans play an important role in our lives, both as sources of livelihood, biodiversity, and as global climate regulators. However, the health of the oceans is severely threatened by continuous human actions, which cause marine environments to not function as they normally would (Freitas et al., 2022). This is due to the low awareness and knowledge of the public, including the younger generation, about the importance of protecting and preserving marine ecosystems (Gkargkavouzi et al., 2020).

People living far from the coast often lack awareness of the critical role marine ecosystems play in our daily lives (Pantò, 2019). In this regard, marine science education and outreach play a crucial role in increasing knowledge about the ocean and raising awareness about the importance of life on Earth, its vulnerabilities, and the actions we can take to protect it (Ryabinin et al., 2019). To protect, conserve, and sustainably use marine resources, people of all ages need to know and understand the relationship between humans and the ocean, becoming ocean-literate citizens (Mogias et al., 2019).

Ocean literacy is not just about understanding marine flora and fauna but also understanding how humans interact with marine ecosystems and their impact on environmental sustainability (Brennan et

al., 2019). Sustainable management of marine resources requires a deeper understanding of knowledge, attitudes, values, general beliefs, and public views towards marine biodiversity (Gkargkavouzi et al., 2020). In this context, understanding ocean literacy becomes increasingly important to be instilled early, even from the first year of school, by integrating the topic of Ocean Literacy development into the curriculum (Kautsari et al., 2023). If we want children to become environmental stewards in the future (Heggen et al., 2019), then education about the ocean must start from an early age (Santoro et al., 2022).

Elementary School (SD) students are an appropriate group to be taught the importance of the ocean because, at this age, they begin to form mindsets and behaviors towards their environment. Therefore, ocean literacy education should be introduced to students in an engaging way, highlighting the teacher's role as a facilitator in creating interesting learning processes, guiding students to understand the lesson material and connect it with ocean literacy (Mogias et al., 2019).

An ocean-literate person should possess three aspects: content knowledge about the ocean, a positive attitude towards the marine environment without violating marine values, and good behavior towards the marine environment (Hindrasti & Irawan, 2018). Thus, it can be said that Indonesian citizens have never received marine literacy education during their schooling. It is no wonder that students and the wider community in Indonesia do not have knowledge and love for the ocean. As a result, the maritime development goals will be challenging to achieve without the support of an apathetic society, making it difficult to implement (Hindrasti & Irawan, 2018). Based on the problems above, the solution is to implement ocean literacy education for students from an early age at the elementary school level. Therefore, the aim of this preliminary study is to evaluate the extent of ocean literacy knowledge among elementary school students and their perceptions of marine environmental issues. Through this study, it is hoped to find a clear picture of the need for ocean literacy education at the elementary school level and provide recommendations for developing more effective and engaging lesson materials for students.

2. Methods

This study uses a qualitative approach focusing on in-depth exploration of elementary school students' ocean literacy knowledge. The qualitative approach allows researchers to understand the perspectives, beliefs, and experiences of students regarding ocean literacy in more depth. The object of this research is the exploration of ocean literacy knowledge among elementary school students. This activity was conducted at SDS Cendana Duri in the 2023/2024 academic year. The subjects of this trial were 4th-grade phase B elementary school students. The type of data needed in this study is qualitative data. According to Emzir in (Afnan, 2019), qualitative data is data collected more in words or pictures than numbers. The written research results contain quotes from the data to illustrate and provide presentation evidence. These data include interview transcripts. Data collection in this study used interview methods and data collection tools such as recorders and notebooks used to record data collected in the field.

3. Results and Discussion

This study aims to explore the ocean literacy knowledge of elementary school students, specifically 4th-grade students at SDS Cendana Duri in the 2023/2024 academic year. Using a qualitative approach, interviews were conducted with 10 students to understand their understanding of various aspects of ocean literacy. The results of the interviews show that most students have a basic knowledge of the ocean, its benefits, and the importance of keeping it clean.

Most students understand that the ocean is an ecosystem full of water and life, such as fish and marine plants. For instance, one student answered that the ocean is "a place with a lot of water, fish, and

boats," showing a basic understanding of the ocean as an aquatic ecosystem. This indicates that students have the right basic knowledge about what the ocean is and its main components.

When asked why the ocean is important to us, the majority of students mentioned that the ocean is a source of food (fish) and a place for recreation. Some students also realize that the ocean plays an important role in their daily lives. For example, one student said that "the ocean is important because we can eat fish from there, and we can play on the beach." This answer shows that students already recognize some direct benefits provided by the ocean, although their understanding is still focused on simpler and more immediately visible aspects.

Regarding threats to the ocean, students showed quite good awareness of the various factors that can damage the ocean. The majority of students mentioned plastic waste and pollution as the main threats. One student answered that the ocean could be damaged by "plastic waste, oil spills, and ships dumping waste." This shows that students are aware of the negative impacts of human activities on marine ecosystems, although their understanding may not be fully in-depth regarding the processes and long-term consequences of ocean pollution.

Regarding actions that can be taken to keep the ocean clean, most students answered that not littering and participating in beach cleaning activities are steps that can be taken. Answers such as "not littering on the beach, participating in beach cleaning" indicate a positive attitude of students towards protecting the marine environment. This shows that students already have a basic awareness of the importance of keeping the ocean clean and feel responsible for taking concrete actions.

When asked about marine animals, students could mention several common species such as fish, dolphins, whales, and turtles. One student answered that the marine animals he knew were "fish, dolphins, whales, jellyfish, and turtles." This shows that students' knowledge about marine biodiversity is quite good, although limited to more famous species.

Students' understanding of climate change and its relationship with the ocean also shows quite good awareness. Most students linked climate change with melting ice at the poles and rising sea levels. For example, one student answered that "climate change causes the ice at the poles to melt and the sea to rise." This indicates that students are already familiar with the concept of climate change and its impact on the ocean, although their understanding may still be in the early stages.

When asked about concrete steps to protect the ocean, students' answers varied but mostly included actions such as not littering, reducing plastic use, and participating in cleaning activities. Answers like "not littering, reducing plastic use, saving water" indicate that students are aware of practical actions that can be taken to protect the ocean. This shows that education about practical actions for marine conservation has started to be effective, although it may still need to be strengthened.

In the context of learning at school, most students mentioned that they learned about marine animals and the importance of keeping the beach clean. Answers such as "learning about marine animals and how to keep the beach clean" indicate that the school curriculum already includes basic topics on ocean literacy. However, their understanding still needs to be deepened with more complex and comprehensive information about marine ecosystems and their conservation.

Finally, almost all students showed enthusiasm for learning more about the ocean. For example, one student said, "yes, because the ocean is interesting and important." This shows that there is high interest among students to further understand the ocean and its ecosystems, which can be an important asset for further ocean literacy education.

4. Conclusion

Based on the results of this study, it can be concluded that elementary school students at SDS Cendana Duri have basic knowledge of ocean literacy and show a positive attitude towards protecting the marine environment. Their knowledge includes basic understanding of what the ocean is, the benefits of the

ocean for humans, the threats facing the ocean, and actions that can be taken to protect the ocean. Students also show awareness of the impact of climate change on the ocean and demonstrate interest in learning more about marine ecosystems.

However, students' understanding is still limited to basic concepts and requires further depth. There is a need for deeper integration of ocean literacy topics into the elementary school curriculum. The use of more interactive and engaging teaching methods such as direct experiments, field trips, and visual media can help deepen students' understanding of marine ecosystems. Additionally, training for teachers to improve their knowledge and skills in teaching ocean literacy is crucial so that they can become effective facilitators in the learning process.

With these steps, it is hoped that elementary school students' ocean literacy can be improved, so they can grow into a generation that cares and is responsible for the sustainability of the marine environment. This study also shows that there is a need for the development of more effective and engaging lesson materials for students, as well as the need for continuous education that involves students in practical activities to protect and preserve the ocean. Thus, students will be more prepared and motivated to become environmental stewards in the future.

References

[1] Afnan, D. (2019). Fungsi Humas Desa Sebagai Pengelola Informasi di Era Keterbukaan Informasi Publik. *Jurnal Soshum Insentif*, 153–163. https://doi.org/10.36787/jsi.v2i2.135

[2] Brennan, C., Ashley, M., & Molloy, O. (2019). A System Dynamics Approach to Increasing Ocean Literacy. *Frontiers in Marine Science*, *6*. https://doi.org/10.3389/fmars.2019.00360

[3] Freitas, C., Bellgrove, A., Venzo, P., & Francis, P. (2022). Towards a 2025 National Ocean Literacy Strategy: Current Status and Future Needs in Primary Education. *Frontiers in Marine Science*, *9*. https://doi.org/10.3389/fmars.2022.883524

[4] Gkargkavouzi, A., Paraskevopoulos, S., & Matsiori, S. (2020). Public perceptions of the marine environment and behavioral intentions to preserve it: The case of three coastal cities in Greece. *Marine Policy*, *111*, 103727. https://doi.org/10.1016/j.marpol.2019.103727

[5] Heggen, M. P., Sageidet, B. M., Goga, N., Grindheim, L. T., Bergan, V., Krempig, I. W., Utsi, T. A., & Lynngård, A. M. (2019). Children as eco-citizens? *Nordic Studies in Science Education*, *15*(4), 387–402. https://doi.org/10.5617/nordina.6186

[6] Hindrasti, N. E. K., & Irawan, B. (2018). Pengembangan Instrumen Penilaian Literasi Kelauan untuk Siswa SMA. *Jurnal Kiprah*, *6*(2), 1–7.

[7] Kautsari, N., Hidayat, P. R., Sapilin, A., Rahma, W. M., & Sary, R. (2023). PENINGKATAN LITERASI LAUT ANAK-ANAK SEKOLAH DASAR TANJUNG BELE SEBAGAI UPAYA MENDUKUNG PENGELOLAAN PERIKANAN BERKELANJUTAN. *Jurnal Pengembangan Masyarakat Lokal*, *6*(1), 108–116.

[8] Mogias, A., Boubonari, T., Realdon, G., Previati, M., Mokos, M., Koulouri, P., & Cheimonopoulou, M. Th. (2019). Evaluating Ocean Literacy of Elementary School Students: Preliminary Results of a Cross-Cultural Study in the Mediterranean Region. *Frontiers in Marine Science*, *6*. https://doi.org/10.3389/fmars.2019.00396

[9] Muattininggar, M. A. P. P., Ratnasari, F. D., Sejati, M. P., & Mahardika, A. (2023). Metode Pembelajaran Bersiklus yang Berbasis Aofic Indeso Guna Mengoptimalkan Potensi Lokal Berdasarkan Literasi Maritim. *Saintek: Jurnal Sains Teknologi Dan Profesi Akademi Angkatan Laut*, *16*(1), 1–9. https://doi.org/10.59447/saintek.v16i1.108

[10] Pantò, E. (2019). A Game for Learning Ocean Literacy: The ResponSEAble Project. *International Information & Library Review*, *51*(3), 247–252. https://doi.org/10.1080/10572317.2019.1629067

[11] Ryabinin, V., Barbière, J., Haugan, P., Kullenberg, G., Smith, N., McLean, C., Troisi, A., Fischer, A., Aricò, S., Aarup, T., Pissierssens, P., Visbeck, M., Enevoldsen, H. O., & Rigaud, J. (2019). The UN Decade of Ocean Science for Sustainable Development. *Frontiers in Marine Science*, *6*. https://doi.org/10.3389/fmars.2019.00470

[12] Santoro, F., Tereza de Magalhães, A. V., Middleton, F., & Buchanan-Dunlop, J. (2022). *A new Blue Curriculum: a toolkit for policy-makers.*

Optimization of Field Study Activity Management in the Master's Program at the Faculty of Tarbiyah and Teacher Training, Sunan Kalijaga State Islamic University of Yogyakarta

Mira Mardiyani

Education Loboratory, Faculty of Tarbiyah, State Islamic University Yogyakarta, Indonesia
E-mail: 199007062022032001@uin-suka.ac.id

Abstract. Field Study is a training program designed to prepare students to master the competencies of educators (lecturers). One of the functions and services of the Education Laboratory at the Faculty of Tarbiyah and Teacher Training is the Field Competency Test (Field Study). The purpose of this study is to analyze the optimization of the management of the Field Study Program activities for the Master's program at the Faculty of Tarbiyah and Teacher Training, UIN Sunan Kalijaga Yogyakarta. This research uses a qualitative method. The location of the research is the Education Laboratory. The results of this study indicate that the management of field study activities can be well organized, with indicators showing that students benefit from innovations in digitalized administration and management services through the use of Google Drive. Additionally, students find it easier to understand the flow and activities of field studies through videography created by the author, and they are aided by briefing activities that invite speakers from the FITK Journal House to discuss writing scientific articles.

1. Introduction

Based on the Regulation of the Minister of State for Empowerment of State Apparatus and Bureaucratic Reform Number 03 of 2010, concerning the Functional Position of Educational Laboratory Administrators and their Credit Points. Article 1 paragraph 3 states that an educational laboratory, hereinafter referred to as a laboratory, is an academic support unit in an educational institution, in the form of a closed or open room that is permanent or mobile, managed systematically for testing, calibration, and/or production activities on a limited scale using equipment and materials based on certain scientific methods, in the context of implementing education, research, and/or community service. One of the functions and services of the Educational Laboratory of the Faculty of Tarbiyah and Teacher Training is the Field Competency Test (Field Study) [1]. This program is an applicative and integrated course in a learning training program to prepare students to master the competencies of educators (lecturers) so that they can carry out their duties and responsibilities professionally. Field study is a program for prospective educators to provide experience and improve their abilities so that they can create effective learning in practice in the field [2].

Field Study is carried out by PAI, PBA, PGMI, PIAUD, and MPI master students at universities or partner offices/institutions/agencies/ministries. The implementation of the activities is categorized into different stages from other study programs at the Faculty of Tabiyah and Teacher Training (FITK), but overall it is directed towards a superior and leading vision in producing education graduates/education personnel. This program is a course with a weight of 2 credits for master's students which includes

knowledge sourced from the real practice of professional education personnel (teaching), conducting observations, and mini-research. This new knowledge is expected to be the subject of discussion and reflection which is manifested in the Final Report of the Field Competency Test (Field Study) of the Masters Program. Students who have carried out field studies will gain teaching experience in real classes [3].

In its implementation, several obstacles are faced, including the lack of human resources (HR) involved in managing Field Study activities, the suboptimal control function in preparing activities, SOP activities, and the use of information technology media in service management and archiving. This Field Study activity is routinely carried out every semester as one of the compulsory courses that must be taken by 3rd-semester master's students. The flow of Field Study activities begins with briefing activities for students, field observations, practice conducting mini-research in the field, and writing articles/scientific works published in reputable scientific journals. Issue analysis is carried out to determine the criteria and quality of the issue. Issue analysis is carried out using the APKL analysis tool (Actual, Problematic, Audience, and Feasibility) [1], [4], [5], [6]. Actual means that the issue is really happening and is being hotly discussed. Problematic means that an issue has a complex problem dimension so a solution to the problem must be found immediately. Audience means an issue that concerns the lives of many people. Feasibility means that the issues raised are reasonable and realistic to solve the problem. The APKL analysis tool is used to determine the issue criteria. After the APKL analysis is obtained, the issues that are the main priority are selected which will then be identified [7]. The assessment of the issues uses a scale of 1-5 as follows:

Table 1. Determination of APKL Criteria

Weight	Description
5	Very Strong Influence
4	Strong Influence
3	Moderate Influence
2	Less Influence
1	Very Less Influence

Based on the analysis of issue identification using the fishbone method, then the cause of the main issue is re-analyzed using the USG (Urgency, Seriousness, and Growth) method. The explanation is as follows:

1. Urgency, namely how urgently the issue must be discussed, analyzed, and followed up,
2. Seriousness, namely how seriously the issue must be discussed about the consequences caused,
3. Growth, namely how likely the issue will worsen if not handled properly.

Table 2. Analysis of Issue Criteria using the APKL Method

No	Issue	Criteria APKL				Total Score	Ranking
		A	P	K	L		
1	Lack of effectiveness in carrying out administrative matters because it still uses conventional methods.	5	4	4	5	18	3

No	Issue	Criteria APKL				Total Score	Ranking
		A	P	K	L		
2	Lack of file archiving management, and documentation of Education Lab activities such as PLP, KKN, and Field Study (Master's students).	4	4	4	4	16	4
3	Lack of interest in talents and efforts to improve soft skills/skills of Educators according to the demands of technological advances that continue to experience innovation and renewal.	5	5	5	4	19	2
4	The management of UKL/Field Study of FITK Master's Students in terms of technical matters in the field is not yet optimal.	5	5	5	5	20	1
5	The management of the Education Lab Journal, namely Edulab, which is currently being prepared for reaccreditation has not been optimal.	4	4	3	3	14	6
6	Updates have not been made regarding the inventory of goods belonging to the Education Lab, updates on needs, and procurement of facilities and infrastructure that support academic activities.	4	4	3	4	15	5

Tabel 3. Core Issue Analysis with USG Method

No	Issue	Criteria USG			Total Score	Ranking
		U	S	G		
1	Lack of effectiveness in carrying out administrative matters because it still uses conventional methods.	4	5	5	14	2
2	Lack of interest in talents and efforts to improve soft skills/skills of Educators according to the demands of technological advances that continue to experience innovation and renewal.	4	4	5	13	3
3	The management of FITK Masters Students' Field Study is not yet optimal in terms of technical matters in the field.	5	5	5	15	1

From the APKL and USG analysis, the results show that the priority problem that ranks first is the suboptimal management of the FITK Masters Student Field Study in terms of technical matters in the field.

Based on the analysis of the identification of issues using the fishbone method above, the causes of the main issues were re-analyzed using the USG (Urgency, Seriousness, and Growth) method [8]. From the APKL and USG analysis, the results show that the priority problem that ranks first is the suboptimal management of the FITK Masters Student Field Study in terms of technical matters in the field. Based on these data, the formulation of the problem is how to optimize the management of the FITK Masters Student Field Study in terms of technical matters in the field.

2. Method

The research method used in this writing uses a qualitative method [9], [10]. The researcher gave several questionnaires to PAI, PBA, PGMI, PIAUD, and MPI master students. Qualitative research is used to understand events such as behavior, opinions, and motivations with scientific methods experienced by research subjects. Based on the results of the APKL (Actual, Problematic, Audience, and Feasible) and USG (Urgency, Seriousness, and Growth) analysis, 1 (one) issue has been determined that can be developed into various ideas/activities to solve problems by involving existing components. The actualization activity design is an operational plan for the implementation of actualization and habituation that will be implemented by the author within 34 days in the master's program of the Faculty

of Tarbiyah and Teacher Training, UIN Sunan Kalijaga Yogyakarta. The activities and implementation of Field Study for master's program students of the Faculty of Tarbiyah and Teacher Training are as follows:

Table 4. Field Study activities and implementation

No	Activity And Implementation	Activity Stages
1	Conducting preparation activities for the implementation of the actualization of optimization of field study management for Masters Program Students of FITK UIN Sunan Kalijaga Yogyakarta;	Arranging a meeting schedule with a mentor. Consulting with a mentor about the actualization activity design. Discussion with colleagues/management team.
2.	Creating a one-stop administrative service innovation by utilizing Google Drive	Collecting data on student names and Field Study DPLs through the academic information system (SIA) Creating a Whatsapp group for FS students as an information service center Creating a form to collect emails from institutions owned by students, DPLs, Field Study Institution Partners Creating a Google Drive link containing templates for administrative letters to be downloaded by students/DPLs/Field Study Institution Partners Student activities Coordinating with the Field Study Management Team
3.	Creating a schedule for Field Study	Creating a draft list of activities/schedule for Field Study activities Creating an infographic design from the schedule for Field Study activities that was created in the previous stage
4.	Collaborating with FITK Journal House on Field Study Student briefing activities to improve students' ability to design and produce quality activities and scientific works	Coordinating with the Journal House manager Creating student briefing activities with resource persons from the Journal House Preparing a schedule for consultation with the Journal House based on the division of study programs
5.	Evaluating the results that have been achieved.	Preparing evaluation instruments by utilizing Google Forms Distributing Google Forms to Field Study students to fill in Collecting data on student responses/questionnaire filling in

3. Results

This research was conducted on master's program students of the Faculty of Tarbiyah and Teacher Training, UIN Sunan Kalijaga Yogyakarta. The preparation activities for the implementation of the actualization of the optimization of field study management began with arranging a meeting schedule with the head of the FITK laboratory department, consulting on the design of actualization activities, and discussions with colleagues or management teams. Furthermore, creating an innovation of a one-stop administrative service by utilizing Google Drive, creating a schedule for Field Study Student activities, and collaborating with Rumah Jurnal FITK in the Field Study Student briefing activity to improve students' ability to design and produce quality activities and scientific works, and evaluating the results that have been achieved. In the implementation of actualization, there are obstacles faced in this process. The following are some obstacles and solutions summarized by the author:

Table 5 Constraints and Efforts to Optimize Field Study

No.	Activity	Constraint	Solution
1.	Carrying out activities to prepare for the actualization of optimizing field study management for FITK UIN Sunan Kalijaga Yogyakarta Masters Program Students ;	Difficulty finding a suitable time to discuss RA with mentors due to busy work.	Preparation activities and direction from mentors via Whatsapp/Zoom.
2.	Creating an innovation in one-stop administrative services by utilizing agency email accounts	Not all study programs have uploaded their student data, so data collection is expected to be delayed again	Always build communication with the FITK Masters Program TU
3.	Creating a draft SOP for Field Study Student activities with a structured and detailed flow (Time, Responsible Team)	Infographic work requires a laptop with high specifications.	The PC in the lab is already very full of RAM Bring a personal laptop
4.	Collaborating with FITK Journal House in UKL/FS Student briefing activities to improve students' ability to design and produce quality activities and scientific works	It is difficult to agree on a time because the Journal House is quite far away	Coordination is diverted via Zoom/online.
5.	Evaluate the results that have been achieved.	Not all students participate in filling out the questionnaire	Socialize well in advance so that the participation rate reaches 100%

Based on the data above, it can be concluded that the management of field study activities can be well organized with indicators; students get convenience in terms of innovation in digitalized administration and archiving services through the use of Google Drive, and students find it easier to understand the flow and activities of field study through videographics made by the author and students are helped by student briefing activities that invite speakers from Rumah Jurnal FITK regarding the discussion of writing scientific articles.

4. Conclusion

The activities in this actualization report are an effort to solve or provide solutions to the issue of suboptimal management of Field Study in the Education Laboratory of the Faculty of Tarbiyah and Teacher Training, UIN Sunan Kalijaga Yogyakarta, which is indicated by administration and archiving management services still using conventional methods that are less effective, and the lack of use of information technology media in the process of managing Field Study activities. Based on the findings of the causes of these issues, it is a challenge for the author to immediately find a solution where as an ASN, they are required to be agile and responsive in understanding the needs of the community, competent, and provide solutions. Activities carried out to resolve the issue include conducting preparation activities for the implementation of the actualization of the optimization of field study management for FITK UIN Sunan Kalijaga Yogyakarta Masters Program Students, creating innovations in one-stop administrative services by utilizing Google Drive, creating a draft of SOP for Field Study Student activities, collaborating with Rumah Jurnal FITK in providing Field Study Student supplies, and evaluating the results that have been achieved. This actualization activity is part of an effort to implement the basic values of ASN BerAKHLAK which is an acronym for Service-Oriented, Accountable, Competent, Harmonious, Loyal, Adaptive, and Collaborative.

References

[1]   A. Setiyawan, Sabarudin, A. Prastowo, H. 'Aziz, and Suharyanta, "PANDUAN UJI KOMPETENSI LAPANGAN (FIELD STUDY) Semester Gasal 2022/2023," Laboratorium Pendidikan FITK UIN Sunan Kalijaga Yogyakarta, 2022.

[2]   A. Mihrajuddin *et al.*, "Analisa peran Field Study (praktik mengajar) dalam meningkatkan kompetensi mengajar mahasiswa magisiter MPI UIN Sunan Kalijaga," 2022.

[3]   M. Ilham Al Ghifary and A. Arifi, "Persepsi mahasiswa magister PAI terhadap program Field Study dalam meningkatkan kompetensi pedagogik," *Jurnal Tarbiyah Islamiyah* , 2023.

[4]   A. Kadir, "Optimalisasi Pengarsipan Berkas Keuangan Melalui Aplikasi Google Drive pada Badan Kesatuan Bangsa dan Politik Kabupaten Kolaka Utara," 2022.

[5]   D. Kushardiyanti, ; Aan, M. Burhanudin, I. Syekh, and N. Cirebon, "Analisis Core Isu Pada Pelayanan Mahasiswa (Pemberkasan Prasyarat Ujian Akhir Berbasis Digital)," *DIMASEJATI*, vol. 3, no. 2, p. 198, 2021.

[6]   Wahyudi, "'Upaya menumbuhkan minat olahraga siswa kelas V melalui pengenalan dan praktek seni olahraga tradisional (Gobak Sodor) di SDN 4 Wakorumba Selatan kabupaten Muna,'" Muna, 2022.

[7]   M. Rofiuddin, "Optimalisasi laboratorium komputer sebagai center of statistical development di Fakultas Ekonomi dan Bisnis Islam Iain Salatiga," 2021. [Online]. Available: https://journal.nurscienceinstitute.id/index.php/penamas

[8]   P. A. Unsulangi, "Digitalisasi Pengarsipan Resume Kasus Pertanahan di Kantor Wilayah BPN Provinsi Sulawesi Utara)," 2022.

[9]   M. B. Miles, A. , M. Huberman, and J. Saldaña, *Qualitative data analysis: a methods sourcebook*. USA: Arizona State University, 2014.

[10]   S. , M. R. and F. , A. Hamied, *Research Method: A Guide for First Time Researcher,*. Bandung: UPI Press, 2014.

The Implementation of Character-Building Training Curriculum to Develop Soft Competence of Trainees Through Experiential Learning Approach

Taopik Barkah[1*], Rudi Susilana[2]

[1] Universitas Pendidikan Indonesia, Bandung, Indonesia
[2] Universitas Pendidikan Indonesia, Bandung, Indonesia

*E-mail: taopikbarkah@upi.edu

Abstract. Character building is part of the development of soft skills, which is an activity that needs to be carried out in order to realize superior human resources. Soft skills are non-academic competencies that become a person's capital in order to achieve success in their career life and function in community life. The character-building training curriculum is expected to create a more harmonious, productive, and ethical work environment. This study aims to explain the character-building training education curriculum through an experiential learning approach to develop soft competencies, the impact on employee competence, and factors that affect curriculum implementation. Using descriptive qualitative research, data collection methods include interviews, observation, and document analysis. Character-building training can provide soft competency change, including a better understanding of intrapersonal, interpersonal, organizational, and spiritual competencies. Second, factors such as curriculum design tailored to the conditions of the situation and the characteristics of participants, interactive teaching methods, infrastructure support and support services, participant motivation, and instructor quality have a significant impact on the effectiveness of the training program. In the context of implications for trainees after attending training, it has significant implications for soft skills in the work environment.

Keyword: curriculum implementation, training curriculum, soft competence, character building

1. Introduction

The decline in morals and behavior of the younger generation is one of the issues of concern in the world of education today. Many educational institutions began to be established, both managed by the government and the private sector. The goal is to realize the ideals of national education as stated in the Pembukaan UUD 1945 and Undang-Undang No. 20 of 2003 concerning the National Education System. However, the problem faced is that character problems are increasingly worrying, despite the increasing participation rate of educational units and the establishment of educational institutions.

Much of the spotlight is focused on declining development and moral health in the younger generation. One source said the concern occurred because of the decline in character in the younger generation. No wonder that incidents such as indiscipline, lack of professionalism, and arbitrary actions against fellow humans often occur. The industrial revolution 4.0 requires every individual to have superior competence and wise morals. Education for soft skills development is a strategy to face the competition of the 21st century era. However, there have not been many further and developments that are in line with these demands and needs, which resulted in many human resources not being able to

survive because their character does not match the organizational culture. Soft skills as intrapersonal and interpersonal skills are essential for personal development, social participation, and success in the workplace. These soft skills include awareness, lifelong learning, communication, creativity, and teamwork that are beneficial for success in work and life [9]. Therefore, it is understood that soft skills reflect personal qualities that are not as physically apparent as adaptability, and leadership.

Therefore, a strong educational program is needed to build character, especially in the basic emotional and social aspects of the younger generation who are part of society. This is in line with the statement that education plays an important role in the development of life in society [2]. Education not only teaches knowledge but also ethics, therefore character building education is needed. As well as the conditions of declining moral level, increasing problems in organizations, and the realization of morality have led to the revival of character-building education. Based on these demoralizing problems, it can be understood that until now character education has only explained and taught textually. [7] there is a need for holistic learning so that thoughts about character are not only studied in cognitive aspects but also at the level of implementation which is considered far more important.

The importance of character education so that attitude, behavior, and ethical values become part of the competency dimensions that human resources need to have for life in the future [16][3]. These values, attitudes, behaviors, and ethics need to be aligned in the idea of competence which also consists of knowledge and skills. Character building is needed through character education programs by providing teaching and guiding the development of self-confidence and positive psychological conditions to realize potential abilities in oneself. Character education also contributes to shaping lifelong learning competencies. Character can be formed through example and habituation. The education unit is one of the environments entrusted with shaping individual character. Currently, many educational units have begun to develop programs or curricula based on religious values and ethics to shape character through habituation [5]. Character building is part of the development of soft competency or often called soft skills which is an activity that needs to be done in order to realize superior human resources, where soft skills are non-academic competencies that become a person's capital in order to achieve success in their career life and function in community life.

It is understandable that individuals not only need academic or technical skills only, but need an understanding of ethics, morals and acceptable behavior in their living environment [4]. Soft skills involve interpersonal skills, leadership, effective communication, cooperativeness, adaptability, and the ability to self-manage, such as motivation, perseverance, and time management, while knowledge and technical ability (hard skills) are still important, soft skills are often the main difference in achieving long-term success.

Implementation in education on how understanding and mastery of soft skills aspects can be improved through the learning process, both directly and indirectly. However, to integrate soft skills content into the learning process is not an easy thing, because it is necessary to have a curriculum that can accommodate the development of soft competency. The curriculum is the life of a learning program so that its existence requires design, implementation and evaluation dynamically in accordance with the times. Superior human resources do not solely depend on hard skill competency, but are also determined by soft skill competency, accompanied by a fighter mentality and not easily give up (persistence) obtained through the development of soft skills in the form of character building training that will provide self-development competencies.

The study conducted by the author refers to activities in the character building training curriculum carried out at the Transportation Human Resources Character Building Education and Training Center. The curriculum reinforces the orientation of character development and competence. The four main soft competencies built in the character building curriculum are: (1) the ability to build good relationships with oneself (intrapersonal skills), (2) the ability to build and manage good relationships

with others (interpersonal skills), (3) the ability to build and manage good relationships with work (organizational skills), (4) and able to build and manage a good relationship with God Almighty (spiritual skills).

Experiential learning can be applied, either massively or thoroughly because learning by experiencing visualization of real experiences will make it easier for participants to understand this learning as a whole comprehensively. Thus, character education learning is not only limited by the classroom and guided by reading materials, but it is everyone's responsibility to take part in educating and fostering character outside the classroom environment.

Realizing the importance of the role and increasing the competence of trainees in carrying out their roles as employees, and students of official schools, so that education and training is one of the answers to meet these needs. This study aims to identify the effectiveness of training that has taken place through character building training programs, especially in education centers and character building training, and analyze the impact of training programs on participants who have attended training spread across several regions in Indonesia.

2. Method

This article is carried out through a qualitative approach with a descriptive method, where researchers get information about the implementation of the character building training curriculum. This research was conducted at the Character Building Education and Training Center, Transportation Human Resources Development Agency. This research focus on the implementation of character building training curriculum for the development of employee soft competencies. Data collected through observation of the learning process, interview, analysis of educational unit documents and training materials, as well as literature studies related to the curriculum and appropriate learning approaches. Primary data is obtained from data on the results of training implementation supported by available secondary data. Documentation study using the document that is the focus of the study, namely the character building curriculum. Literature study, researchers trace and sort, collect various information and data using library sources available physically and digitally by reviewing, reading, and recording data relevant to research. Supporting data used in the form of journals/articles, official government documents, and data relevant to researcher studies related to character building.

Qualitative analysis is used to analyze data from interviews and observations, while the results of literature studies will be integrated with findings to provide a more comprehensive understanding. Thus, through this approach, it is hoped that this research can provide an in-depth understanding of the implementation of the character building training curriculum and the impact of training on improving employee soft competencies.

3. Result

3.1 Character building training curriculum

Character education is based on restoring and strengthening goodness (qualities), values (ideals and concepts), and the ability to make wise choices for the life of a knowledgeable and thriving society. Several reasons for the importance of character education: (1) many young people lack awareness of moral values; (2) imparting moral values to the younger generation is one of the most important functions of civilization; (3) the role of educational institutions as character educators becomes increasingly important because each individual obtains some moral teachings from parents, society, or religious institutions; (4) universally accepted moral values are attention, trust, respect, and responsibility [17].

The Government of Indonesia affirms through Peraturan Presiden Republik Indonesia No. 87 of 2017 which explains the Strengthening Character Education, is an educational movement under the

responsibility of education units to strengthen the character of students through harmonization of heart, feeling, thinking, and sports with involvement and cooperation between education units, families, and communities as part of the National Movement for Mental Revolution. The existence of the Presidential Regulation makes character education very important for students, in the application of character in the formal, non-formal or informal sphere.

The character building curriculum at the Transportation Human Resources Character Building Education and Training Centre is developed based on 5 (five) Human Images of the Ministry of Transportation (tough, responsible, skilled, responsive, and devout), and 3 (three) Human Cultures of the Ministry of Transportation consisting of Safety Culture, Security Culture, and Service Culture; and the personality of the Ministry of Transportation personnel, namely physical excellence, professional attitude, and ethics. These parameters will also be combined with the spirit of the Mental Revolution in the form of integrity, work ethic, and mutual assistance. Thus, the curriculum will be very comprehensive in supporting the implementation of character-building training activities to form superior employee personalities based on Peraturan Ka. BPSDM No. PK. 13 - 17 /BPSDMP-2016.

The character building training curriculum studied is a combination of several parameters for the development of apparatus personality within the Ministry of Transportation which has been developed which has been developed consisting of 4 (four) competencies (competency), namely the ability to build good relationships with oneself (intrapersonal skills), the ability to build and manage good relationships with others (interpersonal skills), able to build and manage good relationships with work (organizational skills), and able to build and manage a good relationship with God Almighty (Spiritual skill).

The form of activities in the Character-Building Training Curriculum as carried out according to the concept of experiential learning by doing several outdoor activities or outward bound, which allows training participants to face physical and mental challenges and how they deal with them adjustment and development. Experiential learning provides opportunities for students to see traits in activities, experience them and express their experiences in the real world (reality) contained in the curriculum. According to Mulyadi &; Basuki, examples include learning services, learning to work together, and providing assistance (mentoring to peers). The importance of learning about what life is, so it is especially important for adults to demonstrate positive character traits in the work, home, and community environments. Experiential learning means learning by doing. Experiential learning engages learners in critical thinking, problem-solving and decision-making in contexts that are personally relevant to them [13].

Participation in leadership for anger management and confidence-building training is done with outward bound program activities, which enable people to face physical and mental challenges and how they deal with them. The intensive program in leadership uses humanistic "Ice Breaker" techniques to make people feel calm and form close relationships, as well as problem solving.

When good character education is achieved, every character attribute that must be taught is essential to prove in the appropriate learning environment and activity. Material activities obtained in educational institutions by learners are not all included in the ideal curriculum. These things are an important part of the hidden curriculum. The hidden curriculum has a profound influence on what kind of experience a learner can have, how the learner can engage in physical activity and how he can understand himself and develop his personal perspective on his environment. The hidden curriculum includes everything to train learners indirectly. The hidden curriculum component includes the attribution of values, beliefs, attitudes that individuals have in educational institutions, norms and rules that are an important part of organizational or institutional functioning, ceremonies, and interpersonal communication. Character development should show all aspects of people's thoughts, feelings, beliefs, and behaviors. The hidden curriculum should give learners their personal everyday experience. Learning by doing activities must be valuable to life and determined, organized according to educational

principles. Experiential learning means learning by doing. Experiential learning engages students in critical thinking, problem-solving and decision-making in contexts that are personally relevant to them [8].

3.2 Participant profile of training program

Participants in character building training in the implementation of this curriculum consist of groups of civil servants who have attended the training. The general strategy carried out is to develop curriculum components that are integrated with the characters to be achieved under organizational considerations, be it educational units or human resource development units. The character building training participants in this study were samples from the group of trainees who came from the civil servant group. Each group of participants has their own uniqueness and advantages in mastering soft competencies due to different work environment backgrounds.

3.3 The Improvement of Employe competencies after participating in the character building training program

Character building training is a strategic future investment because through this activity it is expected to be an intermediary towards preparing a nation that is qualified, knowledgeable, and has a competitive advantage as a nation-building capital. Through this training, it is expected to produce human resources who have character, such as having identity, dignity, virtuousness, morality, and having a value system for nation building. In achieving the direction of a quality training program, one of them is the need for an internalization process of the younger generation accompanied by the preparation of professional employees through a quality and accountable education and training system so that the function of human resource development can run optimally.

Character is not just a set of traits or moral values, but rather a manifestation of the values and principles that each individual hold that reflects him. Character building is a lifelong endeavour. Good traits or moral values are learned in the process of making choices and decisions that shape each character (Boon, 2020). Educators as adults need to see opportunities in designing activities to see learners through the challenging experiences they face. Learners themselves must understand and learn from the consequences of decisions and their choices, thus forming the core of the experience that can be reflected when making decisions in the future. In the process, trainees learn to be themselves to be equipped with skills such as forming sensitivity, courage and humanity, it is set to shape character as something to be done alone, the role of educators can help facilitate in shaping character. This young generation is the fulcrum for the future of the nation and state [10] [11].

Character building starts from the heart of each individual. For individuals who can accept the learning process, sincerely find it easy to form a good character education. Moral development is possible in adults, but it is a process that requires continuous maintenance and training. Character education programs aim to in still values, morals, ethics, and virtues that will help learners to be ready to contribute to society [4] [14]. Character building, must start from planning on devices that are able to carry out and then integrated in learning [6].

Essential characters that are ideally built in educational curricula and programs, such as honesty, curiosity, courage, persistence, ethics, discipline and leadership [1]. This is in line with the objectives of national education listed in pasal 3 of Undang-Undang No. 20 of 2003, namely national education functions to develop abilities and shape the character and civilization of a dignified nation in order to educate the nation's life, aims to develop the potential of students to become human beings who believe and fear God Almighty, have noble morals, healthy, knowledgeable, capable, creative, independent and a democratic and responsible citizen. Application and habituation to build one's character can be done through four ways, namely learning, example, strengthening and habituation [15].

The humanistic curriculum has a significant role in character building training, as it focuses on developing participants' potential holistically involving emotional, social, and spiritual aspects. In the

context of character-building training, the role of the humanistic curriculum model can be described as follows:

1) Self-awareness development, helping trainees to better understand themselves, including values, motivations, and life goals. Through self-reflection and introspection activities, trainees can identify their strengths and weaknesses, which is the first step in character building.
2) Development of empathy, the ability to understand and feel the feelings of others. Character training can include activities such as interpersonal simulations and group discussions to improve the empathic skills of participants.
3) Strengthening Interpersonal Relationships, the importance of healthy and efficient interpersonal relationships. Training can include collaborative activities, team projects, or effective communication exercises to improve interpersonal skills and cooperation.
4) Development of Ethics and Values, the importance of ethics, values, and integrity in everyday life. Training may involve ethical discussions, case studies, or simulated situations that test participants' adherence to moral principles and organizational values.
5) Conflict Resolution Skills Development, encouraging employees to develop constructive conflict resolution skills. Training may include conflict and role simulations, where participants learn to manage conflict in constructive ways.
6) Personal Empowerment, personal empowerment and development of maximum potential of participants. Character training can stimulate courage, initiative, and a sense of individual responsibility.
7) Focus on Growth (Growth Mindset)

Through the provision of training can strengthen a positive attitude towards challenges and motivate participants to continue to grow. The form of activities in the Character-Building Training Curriculum as carried out according to the concept of experiential learning by doing several outdoor activities or outward bound, which allows training participants to face physical and mental challenges and how they deal with them adjustment and development. These activities include the following sections:

a. Supporting Material for Character Building Activities (classical)
    1) Self-assessment and Self-Leadership
    2) Vision, Mission and Organizational Culture
    3) Communication and Connectivity Ethics
    4) National Vision and Nationalism
    5) Contextualization of Pancasila Values in Building National Character
    6) Integrity
b. Core activities of Character Building (non-classical/outward bound)
    1) Building Confidence (Individual Challenges)
    2) Team Building
    3) Peraturan Baris Berbaris (PBB) (Kesamaptaan)
    4) Timely Worship (Habituation)
    5) Physical Fitness (Kesamaptaan)
    6) Rappelling (Individual Challenge)
    7) Civil Ceremony (Kesamaptaan)
    8) Abstinence from Complaining (Habituation)
    9) Archery (Team Challenge)
    10) Belay School (Team Challenge)
    11) Final Project (Team Challenge)
    12) Social Project (Team Challenge)
    13) Final Challenge (Team Challenge)

Experiential learning provides opportunities for students to see traits in activities, experience them and express their experiences in the real world (reality) contained in the curriculum. Marr in the book "Future Skills: the 20 skills and competencies everyone needs to succeed in a digital world" explains that today's world is fast-paced which requires to think and act faster. As long as human resources exist, human relationships, emotional intelligence, and empathy will always be needed. Emotional intelligence is the ability to realize, express, and control emotions. Emotionally intelligent people are aware that their emotions affect their behaviour and impact those around them and are able to manage those emotions accordingly. Empathy, or the ability to feel based on another person's point of view, is a key component of emotional intelligence. In addition, interpersonal communication in all its forms (oral, written, non-verbal, and listening) remains an essential skill for success in an organizational environment and it is important to realize that not everyone can communicate the same way due to differences in communication styles.

Social and emotional skills are a set of individual abilities that can be manifested in consistent patterns of thought, feeling, and behaviour that enable participants to develop themselves, nurture their relationships at home, school, work and in the community, and exercise their civic responsibilities. According to the OECD Learning Compass 2030 [12] distinguishes between three types of skills as follows:

a) Cognitive and meta-cognitive skills, which include critical thinking, creative thinking, learning-to-learn and self-regulation;
b) Social and emotional skills, which include empathy, self-efficacy, responsibility and collaboration;
c) Practical and physical skills, which include the use of new information and communication technology devices.

- Evaluation of training outcomes on the improvement of employee competencies
  Evaluating the results of character-building training related to soft competency improvement is an important step to ensure the effectiveness and positive impact of this character-building training program. Evaluation is carried out through several approaches. First, measuring involves observing and analysing performance before and after participating in training activities, such as discipline, time management, leadership, cooperation, communicative, adaptation, decision making, problem solving, creativity, and building relationships with others. Second, the use of assessment instruments used during training to evaluate participants' progress.

  There are four main competencies that must be achieved by each trainee through the activities carried out, namely: intrapersonal (with 4 sub-competencies, and 7 indicators), interpersonal (with 2 sub-competencies, and 5 indicators), organizational (with 4 sub-competencies, and 4 indicators), spiritual (with 3 sub-competencies, and 3 indicators). These four competencies are referenced in the evaluation.

  Evaluation is carried out through two main ways, namely: (1) observation, and (2) self-assessment/reporting. Observations are made by instructors or special officers who are given the task of observing and evaluating the performance of trainees during the activity. Evaluation focuses more on the positive behaviours that participants display than negative things. The results of observations in the initial activities are not the main reference in determining the final value, but become the basis for assessing subsequent activities. Experience is carried out in class presentation activities, habituation, and similarity, in individual activities, and group activities. Self-assessment/reporting is carried out after the initial activity (especially similarity activities) to see the initial conditions, and after the last activity to see changes in the experience that participants get.

  In addition, participant satisfaction surveys provide valuable feedback on their experiences, including satisfaction with facilitators, trainers, presenters, training materials and

methods, infrastructure, health services and benefits openly derived from participants. In addition, evaluation also involves observing or monitoring student learning outcomes, which can be seen through improvements or changes in behaviour and ability through analysis of observation results or self-assessment reporting before and after training. So that it will provide deep insight into changes in direct learning practices (experiential learning) and soft skills development after training.

By using a combination of these evaluation approaches, work units can gain a comprehensive understanding of the impact of training on improving employee soft skills, so as to help provide input or the need to improve training programs in order to achieve better results in the future.

- Factors influencing training effectiveness
The effectiveness of character-building training is influenced by several key factors. First, curriculum design tailored to the needs and characteristics of groups of participants in the field is essential. Curricula that consider the context of differentiation for participants and offer practical skills will be more successful in meeting participant expectations. In addition, interactive and engaging teaching methods, such as group and individual games, role-playing, simulations, coaching-mentoring, problem-solving and case studies, encourage active participant involvement, making learning more effective.

In addition, participant participation and motivation play an important role in the success of the program, as engaged and motivated participants will be better prepared for training activities. The quality of presenters, facilitators and trainers also plays an important role. Competent and experienced facilitators, presenters, and trainers will well support in delivering the presentation effectively and provide effective guidance to trainees. By considering these factors, character building training programs can provide effectiveness and provide maximum benefits for the development of employee soft competence.

4. Discussion

Implications of Research Findings
- Implications for soft competencies in work environment
The evaluation results and factors affecting the effectiveness of training have significant implications for the development of soft competency. First, evaluate the training results that show an increase in participants' competence in intrapersonal, interpersonal, organizational, and spiritual abilities. Participants can participate more through hands-on experience activities in building soft skills through hands-on experience rather than just conveying information. Second, curriculum design that is relevant to the needs of participants in the field will directly affect the retention of participants' abilities in their work environment. In addition, the use of interactive and engaging teaching methods, such as group discussions and case studies, will change group dynamics to be more collaborative and participant-centred. The implications of soft competence in the work environment are obtained based on data sourced from interviews from alumni responses of trainees, alumni superiors, alumni colleagues who have been analysed and synthesized.

The implications of character-building training for alumni trainees according to the participants' superiors, namely: (1) After attending the training, alumni are able to innovate in the implementation of their duties/jobs. (2) Communicative in carrying out job duties. Management in work, giving orders and communication and providing a good overview of work, implementation, and self-management of alumni. (3) Increased self-confidence, good association and good discipline, able to work in a team. (4) The most obedient character, still complete the tasks of the leader even though they are not responsibility, but able to cooperate with friends, discipline has been trained, and more initiative to convey ideas. (5) Increased respect, very tenacious work, work completed on time, and increased discipline. (6) Able to

think about carrying out innovation, improving own and agency performance, increasing morale, increasing discipline and loyalty, and improving communication. (7) Improved communication, coordination, and being able to cooperate with colleagues.

The implications of character-building training on trainee alumni according to their colleagues, namely: (1) Participants are more disciplined after attending the training, able to work together in teams, more initiative, providing the best solution, and flexible in collaborating. (2) Able to adapt to the work environment very quickly so that work can be completed easily. (3) Able to coordinate other colleagues, disciplined, able to embrace and better manage work more regularly and can manage emotions. (4) Provide increased competence to alumni in adapting, communicating, and collaborating with other colleagues.

The implications of character-building training for trainee alumni based on changes felt after attending the training, namely: (1) Contribute to the development of confidence to appear in public as well as time management for personal and organizational interests. (2) Can communicate with colleagues, dare to make decisions, discipline in coming to work. (3) Contribute to leadership ability, discipline, team/crew cooperation, a sense of concern between colleagues. (3) Communication with colleagues and cooperation between colleagues and working regularly with leaders who give orders, and group members who are solid in work. (4) Teach to play an active and adaptive role in collaborating with colleagues. (5) Receive suggestions and opinions for the common good, obey worship, and respect each other. (6) Divide time between work and worship.

Improvement or change in soft skills that occur in the personal lives of employees with various conditions according to the characteristics of their respective work units. Increasing the ability of soft skills in employees after participating in character building training activities does not automatically occur, even does not occur due to many factors such as the culture of the supportive work environment and the willingness from within the individual to become a better person.

- Implications for policy maker human resources development agency related to soft competency development

The evaluation of training outcomes and factors affecting the effectiveness of training in character building training has significant implications for policies related to human resource development, especially those that emphasize the development of soft competence and humanist character.

First, the results of training evaluations that show an increase in participants' competencies can be the basis for assessing the success of the training program and determining the allocation of further resources for employee character development. Second, education policy can strengthen curriculum development, design training guidelines to ensure that programs that have been implemented can accommodate the needs of current trainees at the time of implementation in the field, and emphasize the use of interactive, fun, and humane teaching methods to improve training effectiveness.

In addition, education policy can encourage collaboration between work units, training institutions, and universities to provide ongoing post-training support to trainees by providing opportunities to share best practices in daily life. Finally, continuous evaluation of the effectiveness of training programs can be the basis for education policies to continuously adjust and improve character building training programs for employee soft skills development, so as to maximize benefits for trainee competency development and overall education quality improvement.

5. Conclusion

Based on the results of the study, several conclusions can be drawn. First, evaluation of character-building training programs showed improvements in soft competencies, including a better understanding of intrapersonal, interpersonal, organizational, and spiritual competencies. Second,

factors such as curriculum design tailored to the conditions of the situation and the characteristics of participants, interactive teaching methods, support for infrastructure and support services, participant motivation, and instructor quality have a significant impact on the effectiveness of the training program. In the context of implications for trainees after attending training, it has significant implications for soft skills in the work environment. Participants can apply the soft skills that have been obtained due to the support of coaches, the availability of resources, and support from internal and external parties, but in their application, there are also hindering factors, namely self-motivation in carrying out work, that need to be re-intrinsically strengthened in each individual. Improvement or change in soft skills that occur in the personal lives of employees with various conditions according to the characteristics of their respective work units. Increasing the ability of soft skills in employees after participating in character-building training activities does not automatically occur; it does not occur because of many factors, such as the culture of a supportive work environment and the willingness from within individuals to become a better person and benefit the organization.

Author's Note

The author declares that there is no conflict of interest regarding the publication of this article. The author confirms that the data and content of the article are free from plagiarism.

References

[1] Anita, A., & Fety, N. (2020). The student's characters analysis in learning proces. *JPPPF: Jurnal Penelitian dan Pengembangan Pendidikan Fisika, 6*(1), 75-80.

[2] Bariyah, S. K. (2019). Peran tripusat pendidikan dalam membentuk kepribadian anak. *Jurnal Kependidikan, 7*(2), 228-239.

[3] Barkah, T. & Robandi, B. (2024). Character-building training curriculum activity based on the perspective of a humanistic curriculum and existentialism philosophy. *Inovasi Kurikulum, 21*(2), 983-998.

[4] Beaumont, S. L., & Pernsteiner, C. (2021). Assessing the efficacy of a character development program in non-traditional undergraduate students. *International Journal of Education and Practice, 9*(3), 588-601.

[5] Dewi, W., & Dewi, L. (2024). Analysis of teacher readiness conditions in implementing characteristic school-based curriculum. *Inovasi Kurikulum, 21*(1), 55-66.

[6] Dewi, R. R., Hidayat, M., & Suabuana, C. (2021). Strategi pendidikan nilai sebagai pembentuk kepribadian siswa di sekolah. *Jurnal Bidang Pendidikan Dasar, 5*(1), 9-17.

[7] Hakim, A. L. (2023). Role of character education in national character building: A retrospection noble values of muslim religiosity. *Al-Wijdãn Journal of Islamic Education Studies, 8*(1), 161-182.

[8] Kolb, D. A. (2015). Experiential learning: Experience as the source of learning and development. New Jersey: Pearson Education.

[9] Macqual, S. M., Salleh, U. K. M., & Zulnaidi, H. (2021). Assessing prospective teachers' soft skills curriculum implementation: Effects on teaching practicum success. *South African Journal of Education, 41*(3).

[10] Makhamovna, I. A. (2021). The family as an important factor in the formation of adolescent characteristics. *EJRDS: European Journal of Research Development and Sustainability, 2*(2), 34-36.

[11] Muttaqin, Z., & Wahyun, W. (2019). Pemahaman dan implementasi ideologi Pancasila di kalangan generasi muda. *Civicus: Pendidikan-Penelitian-Pengabdian Pendidikan Pancasila dan Kewarganegaraan, 7*(2), 27-35.

[12] Mulyadi, S., & Basuki, H. (2023). *Pendidikan Karakter: Membangun Generasi Muda yang Cerdas, Berkarakter dan Kompetitif di Era Revolusi Industri 4.0, Pendekatan Psikologi dan Budaya*. Depok: RajaGrafindo Persada.

[13] OECD. (2019). Attitudes and values for 2030. *OECD Future of Education and Skills 2030, 1*(1), 1-18.

[14] Ramesh Babu, A., Arulanand, N., & Satish Chandran, V. (2020). Skill development through experiential learning-a case study for product development scenario. *Procedia Computer Science, 172*(1), 16-21.

[15] Schinkel, A., & De Ruyter, D. J. (2017). Individual moral development and moral progress. *Ethical Theory and Moral Practice, 20*(1), 121-127.

[16] Taulabi, I., & Mustofa, B. (2019). Dekadensi moral siswa dan penanggulangan melalui Pendidikan karakter. *Tribakti: Jurnal Pemikiran Keislaman, 30*(1), 28-46.

[17] Tohri, A., Rasyad, A., Sururuddin, M., & Istiqlal, L. M. (2022). The urgency of Sasak Local wisdom-based character education for elementary school in East Lombok, Indonesia. *International Journal of Evaluation and Research in Education, 11*(1), 333-344.

[18] Wahjusaputri, S. (2018). Human integration of a character-based curriculum and humanistic values as basic initiation of a human rights-friendly school. *Proceeding the 1st International Seminar on Language, Literature and Education, KnE Social Sciences, 1*(1), 427-434.

History Learning Based on Local Wisdom Values Dasaperbakti Sanghyang Siksakandang Karesian Text in High School Ciamis Regency

Yeni Wijayanti[1], Warto[2], Wasino[3], Djono[4]

[1] Universitas Sebelas Maret, Surakarta, yeniunigal@gmail.com
[1] Universitas Galuh, Ciamis
[2] Universitas Sebelas Maret, Surakarta, warto2013@staff.uns.ac.id
[3] Universitas Negeri Semarang, Semarang, wasino@mail.unnes.ac.id
[4] Universitas Sebelas Maret, Surakarta, djono@staff.uns.ac.id

Abstract. History learning based on local wisdom values is currently a fundamental need to be able to instil character in students. Phenomena that occur in society, such as moral degradation, individualism, and environmental damage, are considered important in revitalizing local knowledge owned by past communities and Indigenous communities as an effort to improve character. This research aims to determine (1) the values of local wisdom of the Sanghyang text Siksakandang Karesian and (2) history learning based on local wisdom of the Sanghyang Siksakandang Karesian text in high schools in Ciamis Regency. The research method used in this research is qualitative. Data sources include informants (school principal, deputy principal, history teacher, and students), places and events (learning activities), and documents (learning tools and the Sanghyang Siksakandang Karesian manuscript). The research location is at SMAN 2 Ciamis. Data collection techniques include in-depth interviews, observation, and document study. The sampling technique used was purposive sampling. The data validity technique uses data triangulation and method triangulation. In contrast, the data analysis uses interactive analysis, which includes three stages: data condensation, data presentation, and conclusion drawing, which interact continuously. The results of the research show (1) Sanghyang Siksakandang Karesian is a set of rules as well as knowledge for all Sundanese society, which consists of dasakreta, dasaperbakti, people's behavior (karma ning Hulun) towards leaders/rulers, and complementary actions (panimbuh ning twah); (2) The Implementation of Local Wisdom Values in History Learning in Senior High Schools in Ciamis Regency: 1) Children devotes to the Father (Son's devotion to the Father); 2) Sisya bakti in guru (Students Devote to the Teacher); 3) Ratu bakti di dewata (the king devotes to the god) and the god devotes to Hyang. Students, as human beings, must be devoted to God.
Keywords: History Learning, Local Wisdom, Dasaperbakti, Sanghyang Siksakandang Karesian.

1. Introduction

Society sees education as a moral effort where teachers must convey moral values and improve individual and social behavior (Ismaun, 2012). Therefore, education in the 21st century has complex challenges amidst the rapid era of technology. Technological developments impact the education field in terms of systems and learning models. Advances in educational technology make it easier for students

to find information, but not all information leads to positive things. Therefore, 21st-century education requires a new direction in character development. Several things about character need attention because they relate to value aspects, including students' lack of understanding of local culture and local wisdom values of their region; students are more familiar with global culture than a local culture which has character and meaning; and local values such as tolerance, cooperation, and good manners are fading among students. Therefore, it is essential to implement history learning based on local cultural values, and this research is vital to carry out because local values must be integrated into learning.

The use of folklore to enrich history learning is a creative pedagogy which is different from conventional history learning. Creative learning is needed to meet current needs (Supriatna & Maulidah, 2020). History learning by internalizing local wisdom enriches history learning, strengthens students' imagination about their local history, and makes them aware of the richness of their local culture.

Local wisdom contains values that can address the problem of disharmony in modern society. Local knowledge is also passed down from generation to generation over a long period and is used as a filter against the negative impacts of globalization. Some people consider the basic need for the development of today's society to be the retention and understanding of the past that has meaning and value. Indifference and underestimation of the past are dangerous things that can threaten the nation's character. The internalization of historical values strengthens human integrity and character (Siboro, 2012). Character education is essential to implement in education considering the problems above. History lessons are one of the subjects related to character education. Character education can be taken from the local wisdom of the community. Local knowledge can be integrated into contextual history learning. However, local wisdom has not been applied massively in school history teaching. One of the cultural products of the Sundanese people that has local knowledge and can be integrated into history learning is Sanghyang Siksakandang Karesian.

The Sanghyang Siksakandang Karesian manuscript, seen from its contents, can be interpreted as a life guide to becoming wise based on dharma. This manuscript is one of the manuscripts used as reference material for research related to rules in Sundanese society. The script used in the manuscript is the Old Sundanese script. The Sanghyang Siksakandang Karesian manuscript is a didactic manuscript containing moral, religious, and scientific teachings to provide practical daily life aimed at the people, not the sages (Danasasmita, 1987; Ilham Nurwansah, 2017). Even though the Sanghyang Siksakandang Karesian text is aimed at ordinary people, it is not only for the benefit of the welfare of the people but also to make the people into human beings with dignity and prosperity in this world and the hereafter.

Likewise, the Sanghyang Siksakandang Karesian script contains information to be conveyed, one of which is about the norms that develop in society. In terms of norms, particularly today, people, especially young people, often have disrespectful behavior ethics of less attention towards parents and often do not care about norms in society. Many children do not respect their parents, students do not respect their teachers, etc. This kind of moral degradation makes the conditions in society disharmonious. It all happens because humans have lost their identity and life orientation, even though the most fundamental human need is "orientation." Before getting or doing anything, we must look for orientation in advance. We must know where and in which direction we are moving to achieve our life goals.

So, it is necessary to implement the teachings that come from the traditional norms of the Sundanese society as one way to overcome the disorientation problem in the modern era faced by almost all circles of society; it is necessary to implement the teachings that come from the traditional norms of the Sundanese society. Hal itulah yang membuat peneliti tertarik untuk mengkaji tentang "History Learning Based on Local Wisdom Values Dasaperbakti Sanghyang Siksakandang Karesian Text in High School Ciamis Regency".

2. Research Method

The research method used is qualitative because it describes the conditions that occur in high schools in Ciamis Regency, which implement history learning based on local wisdom values. The qualitative research strategy is a single case study to gain in-depth scientific knowledge of the studied case or theme. Case study research involves a detailed description of the subject and circumstances being studied, followed by data analysis of the theme or case. In this case, the theme explored is about history learning based on the local wisdom values of Sanghyang Siksakandang Karesian.

Data collection techniques used were school observations, interviews with history teachers and students, and the study of the Sanghyang Siksakandang Karesian manuscript documents and other relevant references. Researchers carried out observations by coming to the research location, SMAN 2 Ciamis, to observe the situation of school conditions, infrastructure, curriculum, and learning processes carried out by teachers.

Researchers conducted in-depth interviews to get as detailed a picture as possible of the learning. Researchers create semi-structured questions so that questions can be developed to explore further information from the informants' answers. Interview activities were carried out directly and via WhatsApp. Researchers give informants the freedom to answer questions according to what they know without any direction or influence from the researcher.

Data was collected using a document study in this research by tracing and reviewing the Sanghyang Siksakandang Karesian manuscript, school profile, and RPP. Other data was collected using a questionnaire distributed to the deputy principal for curriculum, history teachers, and students, and the answers were sent directly to the researcher's email.

Internal data validity uses triangulation. The triangulation process was carried out continuously throughout the data collection and analysis process until there were no differences and nothing further needed to be confirmed by the informants. The triangulation used in this research is two triangulations, namely data triangulation and method triangulation. Data triangulation is used because various data sources are used to explore similar data. Data originating from one source can be compared or tested from other data sources. Data triangulation involves the use of different data sources. Method triangulation was used in this research because it can be correlated with various methods to obtain the validity of the data. The triangulation methods used in this research are observation, interview, and document.

The data analysis model used is the Miles and Huberman interactive model, which includes three activity flows: data condensation, data presentation, and conclusion drawing. The data analysis begins by reviewing all available data from various sources, namely interviews, observations written in field notes, personal documents, official documents, pictures, etc. The next step is data condensation after everything has been read and studied. Data condensation is the analysis part, which involves sharpening, classifying, directing, and discarding unnecessary data and then organizing the data to verify the conclusions. Data condensation occurs continuously during qualitative research. Before going into the field, the researcher conducted a preliminary study by analyzing the translated book Sanghyang Siksakandang Karesian and articles about the Sanghyang Siksakandang Karesian manuscript, as well as school documents in the form of RPP (Learning Implementation Plan).

Data display is a collection of structured information that provides the possibility of conclusions and taking action. Data presentation can be in charts, short descriptions, or category relationships. Miles and Huberman stated, "The most frequent form of display data for qualitative research data in the past has been narrative text." The researcher presented the data by designing the entire data obtained in the form of notes, which were condensed into matrix columns in the form of narrative text for each point.

The next stage of analysis is concluding. The researcher draws these conclusions while maintaining openness and scepticism, but the conclusions remain unclear, increasingly explicit, and well-founded.

Conclusions may not emerge until data collection is complete, depending on the size of the corpus of field notes methods used in coding, storage, and retrieval. Concluding is part of an entire configuration activity. During the research, the conclusions are also verified. Repeated reviews are carried out on conclusions to confirm their correctness.

3. Result and Discussion

a. Dasaperbakti of Sanghyang Siksakandang Karesian

This manuscript of Sanghyang Siksa Kandang Karesian is stored in the Jakarta National Museum and is registered as the manuscript series MSB (Manuscript Soenda B) with kropak number 630 (I Nurwansah, 2013). The drafting process of the Sanghyang Siksa Kandang Karesian manuscript was not based on the original script but based on the translation of Drs. Atja is stored as a stencil in the Padjadjaran University library. Previously, the publication belonged to Lembaga Kebudayaan Universitas Padjadjaran (LKUP). LKUP itself has not had the chance to work on it further. The difficulty of the language causes the result of the manuscript translation to be rarely touched and explored.

1981, the West Java Museum Development Project published the manuscript's results and translation. Not only were the numbers minimal, but both from a technical point of view and the content processing could be terrible. The translation needs improvement. Since this manuscript is one of the pillars for exploring the situation of Sundanese culture in the past, especially in the 16th century, its reproduction will significantly assist in the research and study of Sundanese history and culture (Danasasmita et al., 1987).

According to Nurwansah (2017), the rules contained in the Sanghyang Siksa Kandang Karesian consist of three main parts, namely 1) opening, which explains the ten rules (dasa kreta & dasa prebakti), 2) human behavior (*karma ning hulun*) towards the king in state, 3) complementary deed (*pangimbuh ning twah*).

1) Dasakerta

Dasakerta is a set of ten rules or guidelines that function as people's guidance. Whoever intends to establish the means of welfare (*sasana kreta*) to have a long life, succeed in livestock, succeed in agriculture, and always excel in war, the source lies in the multitude. Prosperity can be realized by caring for the world (*retaken bumi lamba*).

Dasakerta is also mentioned as a reflection of the dasasila, the sanghyang dasamarga, and the embodiment of dasaindra (ten senses), which functions to welfare life in the broader world. The ten senses mentioned are ears (*ceuli*), eyes, skin (*kuril*), tongue (*létah*), nose (*irung*), mouth (*sungut*), hands (*leungeun*), feet, breast (*payu*), and genitals (*baga purusa*). If the senses are misused, they become the door to disaster. If it is used correctly so that the senses are awake and nurtured, then we will get the virtue of it. If the ten doors in the ten senses are maintained, then the people's deeds will be perfect.

2) Dasaperbakti

Dasaperbakti is the ten rules about devotion (giving dedication). In this section, the structure and levels for devotion are mentioned, from the lowest, the son, to the highest, hiyang. Here is an excerpt. *Nihan sinangguh dasa prebakti ngaranna (*this is called dasaprebakti)*:

a) *Anak bakti di bapa* (children devote to father)

b) *Éwé bakti di laki* (the wife devotes to the husband)

c) *Hulun bakti di pacandaan* (servant devotes to the master)

d) *Sisya bakti di guru* (student devoted to the teacher)

e) *Wang tani bakti di wado* (the farmer devote to *wado)*

f) *Wado bakti di mantri* (*wado* devotes to mantri)

g) *Mantri bakti di nu nangganan* (mantri devotes to *nu nangganan)*

h) *Nu nangganan bakti di mangkubumi* (*nu nangganan* devotes to mangkubumi)

i) *Mangkubumi bakti di ratu* (mangkubumi devotes to the king)

j) *Ratu Bakti di Déwata, Déwata Bakti di Hyang.* (The king is devoted to the god; the god is devoted to Hiyang).

3) *Karma Ning Hulun*

As stated by Atja & Danasasmita (1987), the content of the teachings stated in the SSKK mainly were aimed at groups who were not resi, especially in terms of carrying out the duties of the people for the benefit of the king. The part that regulates people's behavior has the most significant portion of the other rules mentioned in the text. It seems that this text can be said to be a device for the legitimacy of rules by the government (Pajajaran) on the behavior of its people. This is clearly stated in the scope of karma ning hulun (people's work/behavior), such as:
1. Behavior towards the king
2. Good behaviour for the crowd
3. Behavior in front of *Menak*:
4. Behavior when keeping the secret
5. Unfaithful *human* behavior

b. Implementation of Local Wisdom Values of Dasaperbakti Sanghyang Siksakandang Karesian in History Learning

The dasaperbakti Sanghyang Saksakandang Karesian includes:

a) *Anak bakti di bapa* (the children devote to their father)

Today's teenagers are seemingly facing more complicated and numerous demands and hopes, as well as danger and temptation, than teenagers of the past generation. The data shows that Indonesian teenagers are currently experiencing moral decline, character, and emotional maturity, which can be seen from the increasing number of cases of promiscuity, lifestyle, rarely listening to advice from parents, and so on. In the Sanghyang Siksa Kandang Karesian manuscript, the child's primary task, to serve/devote to the father or parents, is used as the first point of dasaperbakti.

Children must pay attention to their parents' norms or ethics, such as shaking hands before and after school, listening to what their parents advise, and asking for permission to leave the house.

b) *Éwé bakti di laki* (wife devoted to husband)

The teaching that a wife must obey her husband is also stated in Dasaperbakti. A wife must be obedient to her husband. To get a harmonious, happy, peaceful, and complete household and assist a less-income husband, a wife works to help the household economy.

The implication for domestic harmony arising from a working wife can be positive or negative. It can be said positively if a working wife can meet the criteria of a career woman, where the wife can manage her time between household work and her work, and there is an understanding between the two partners that prioritizes the understanding of the husband when the wife decides to work. It can be said to be harmful when a wife starts to be careless about her duties and role as a housewife.

c) *Hulun Bakti di Pacandaan* (servant devoted to the master)

In the manuscript of Sanghyang Siksa Kandang Karesian, it was instructed that a servant or enslaved person must still devote to his enslaver not only to the excellent and angry but also to the cruel, even though the rights of being a slave are often ignored by their masters. Today, a servant can be said to be a household assistant.

d) *Sisya Bakti di Guru* (the student devotes to the teacher)

The teacher is the second parent at school or after the mother and father. It is appropriate for children to respect and always carry out their orders as long as they do not conflict with religious norms or teachings. Even today in Sundanese society, especially in schools and even universities, the attitude or behavior of students who are devoted to teachers is still reflected in the behavior of students, namely students/students always respect and are polite to teachers/lecturers, for example, some of the students still do 5S culture (*senyum, salam, sapa, sopan, santun*).

e) *Wang Tani Bakti di Wado* (the farmer devotes to *Wado*)

A wado is a soldier who leads the peasants to do community service or work for the ruling king (Ilham Nurwansah, 2017). In today's context, a wado is a rice field owner. A rice field owner needs the service of another person to work on his fields when facing rice field processing or harvest season, and sometimes, the farm workers always compare the pay or wages they receive with the one received from another rice field owner. The behavior of the Sundanese people today, which reflects *wang tani bakti di wado*, is a farm worker who always respects the owners of the rice fields they work on.

f) *Wado Bakti di Mantri (Wado* devotes to Mantri)

Compared to today's era in Sundanese society, the custom that reflects wado bakti in mantri is that the land owner must obey, respect, and respect village officials or superior positions, either in regulations or behavior.

g) *Mantri Bakti di Nu Nangganan (*Mantri devotes to *Nu Nanggangan)*

In today's context, nu nangganan can be assumed to be a minister, and his position is under the coordinating minister. In this case, there is a relationship between the minister and the coordinating minister in carrying out their duties and authorities; they must work together under the president's leadership as the executive leader (Arion, 2016). Ministers in Indonesia include ministers of forestry, minister of agriculture, minister of trade, minister of environment, and so on.

h) *Nu Nangganan Bakti di Mangkubumi (Nu Nanggangan* devotes to Mangkubumi)

In the present context, the coordinating minister is mangkubumi in the past. Therefore, the coordinating minister must synchronize their policies in their respective fields to avoid conflict.

i) *Mangkubumi Bakti di Ratu (*Mangkubumi devotes to the king)

The king can be assumed to be several other countries' president or prime minister.

j) *Ratu Bakti di Déwata* (The king devotes to the god)

A president who is a leader or has the highest power must still devote and obey God Almighty for the benefit of life.

The text above of Sanghyang Siksa Kandang Karesian explains the dedication a lower party must show to a higher party. This is in line with society's condition, which is based on social stratification in rank, power, and influence.

Implementing history learning by integrating the values of local wisdom of the Sanghyang Siksakandang Karesian community in the classroom is essential. Learning is packaged following the development of the times and the psychology of students. The history teacher of SMAN 2 Ciamis, Heri Heryana, seemed to implement the values of local wisdom from a religious aspect when the learning hour was not finished (less than 15 minutes), the sound of the Duhur call to prayer was heard, he ended the learning and invited students to rush to perform the Duhur prayer in congregation at the school mosque.

Dasaperbakti local wisdom values are relevant in history learning in high school: a) The children devote themselves to their father; b) The student devotes to the teacher; c) The king devotes to the god. The process of internalizing the local wisdom values of Sanghyang Siksakandang Karesian dasaperbakti is implemented in various ways. For example, SMAN 2 Ciamis teachers always remind students to respect their parents and teachers and carry out their obligations as people to their God by worshipping.

4. Conclusion

The manuscript of Sanghyang Siksa Kandang Karesian, also called the Kropak 630 Manuscript, is a manuscript that includes the date of writing, namely 1440 Saka (1518 AD), so it is estimated that this manuscript was written during the reign of Sri Baduga Maharaja, the ruler of Pakuan Pajajaran (1482-1521 AD). The general description of the Sanghyang Siksa Kandang Karesian manuscript contains the rules of life: dasakreta, dasaperbakti, *karma ning hulun*, and complementary actions. Dasakerta is a means of achieving world order by controlling the desires of the ten human senses, while dasaperbakti are ten devotional teachings. People's behavior, government regulations regarding the behavior of its people.

Implementing Local Wisdom Values in History Learning in Senior High Schools in Ciamis Regency: 1) Children devotes to the Father (Son's devotion to the Father). The behavior of children, especially teenagers today, has experienced moral degradation. Children's ethics or norms towards their parents are not given enough attention; therefore, in the manuscript of Sanghyang Siksa Kandang Karesian, the main task of the child, namely devotion/devotion to the father or parents, is used as the first point in Dasaperbakti. 2) Sisya bakti in guru (Students Devote to the Teacher). Nowadays, children's behavior, especially teenagers, has seen a decline in social morality, especially respect among students for their teachers, which is different from the past. 3) Ratu bakti di dewata (the king devotes to the god) and the god devotes to hyang. Students, as human beings, must be devoted to God. The text of

Sanghyang Siksa Kandang Karesian about Dasaperbakti explains things related to the dedication that must be carried out by the lower party to the higher party.

References

[1] Arion, T. (2016). Kedudukan Menteri Koordinator Dalam Sistem Ketatanegaraan Indonesia Menurut Undang-Undang Nomor 39 Tahun 2008 Tentang Kementerian Negara. *Diponegoro Law Journal*, *5*(3), 1–16.

[2] Danasasmita, S. (1987). *Sewaka Darma, Sanghyang Siksakandang,Amanat Galunggung*. BP3 Kebudayaan Sunda Depdikbud.

[3] Danasasmita, S., Ayatrohaedi, Wartini, T., & Darsa, U. A. (1987). *Sanghyang Siksakandang Karesian (Kropak 630)* (E. S. Ekadjati (ed.)). Bagian Proyek Penelitian dan Pengkajian Kebudayaan Sunda (Sundanologi) Direktorat Jenderal Kebudayaan Departemen Pendidikan dan Kebudayaan.

[4] Ismaun. (2012). Nilai-Nilai Pendidikan Sejarah dalam Rangka Pembinaan Jati Diri Bangsa Menuju Masa Depannya. In H. Kamarga & Y. Kusmarni (Eds.), *Pendidikan Sejarah untuk Manusia dan Kemanusiaan*. Bee Media Indonesia.

[5] Nurwansah, I. (2013). Naskah Lontar Sunda Kuna Sanghyang Siksakandang Karesian: Sebuah Anomali pada Pernaskahan Sunda Kuna. *Jumantara*, *4*(1), 151–164. https://ejournal.perpusnas.go.id/jm/article/view/004001201308

[6] Nurwansah, Ilham. (2017). Hukum dalam Naskah Sunda Kuna Sanghyang Siksakandang Karesian. *Manuskripta*, *7*(1), 31–61. http://journal.perpusnas.go.id/index.php/manuskripta/article/view/81

[7] Siboro, J. (2012). Internalisasi Nilai-Nilai Sejarah dan Pembentukan Karakter. In H. Kamarga & Y. Kusmarni (Eds.), *Pendidikan Sejarah untuk Manusia dan Kemanusiaan* (1st ed.). Bee Media Indonesia.

[8] Supriatna, N., & Maulidah, N. (2020). *Pedagogi Kreatif: Menumbuhkan Kreativitas dalam Pembelajaran Sejarah dan IPS*. Remaja Rosdakarya.

Analysis of the Tanggon Aspect of the Taruna Gemilang Program Using Soft System Methodology at the Air Force Academy

Abdul Haris Pujiantoro[1], Shawn Asher Caleb Mongan[2] and Gagat Riano[3]

[1,2,3] Department of Industrial Management Engineering, Air Force Academy, Indonesia

E-mail: abdulharis240601@gmail.com, sonmama687@gmail.com, gagat.riano@aau.ac.id

Abstract. The Taruna Gemilang program is a research-based program in which there is a consistent determination and effort to change destructive negative traditions into constructive traditions that form a new culture with a modern and positive life. The coaches and cadets must transform into individuals who are committed to coaching to prepare competent and characterized Air Force officers. This research is descriptive qualitative in nature with the aim of analyzing the problem situation with the Soft System Methodology (SSM) method.

1. Introduction

The Air Force Academy (AAU) as one of the official military educations in Indonesia, has an important role in preparing human resources at the first officer level of the Indonesian Air Force. These officers are expected to be able to carry out their duties as TNI AU soldiers well, and show reliable character and behavior. This could be implied in one of the targets of the Trisakti Viratama education philosophy, namely tanggon, which means a moral attitude that is reliable, ~~resilient~~ and resilient, by having a mentality based on Pancasila and the 1945 Constitution, the national fighting spirit, the Sapta Marga code of ethics, a soldierly character and TNI leadership [1]. To support these targets since May 2019, AAU has a Taruna Gemilang program, which is a research-based program aimed at changing destructive negative traditions, into constructive traditions that form a new culture with a more modern and positive life, to create cadets with character and prioritize personality (Tanggon) in every aspect of daily life at the Air Force Academy.

This research offers Soft System Methodology (SSM) as a framework to analyze and formulate suggestions for the implementation of the Taruna Gemilang program. The use of SSM in this study is expected to provide an overview of the problem situation faced in the implementation of the Taruna Gemilang program, as well as provide suggestions for action in overcoming these problems

2. Taruna Gemilang Program

The Taruna Gemilang program is designed to explore character values and competencies from various sources, to then be translated into leadership and management models that cadets are expected to have [1]. So it is hoped that AAU graduates will be able to apply the values of truth in their capacity as multi-dimensional leaders in the future. The essence of the Taruna Gemilang model is to become a person who is able to use Godly values as inspiration and strength in building character and competence, as part of ideal leadership and managerial abilities. The Taruna Gemilang program was implemented

as a solution to the cadet problems that have occurred so far. For this reason, the strategy of this program focuses on the staffing of cadet coaches, which consist of caregivers, educators and trainers. Coaches who have high integrity will be the optimal leading sector in the formation of cadets to become young officers with brilliant capabilities.

3. Research Method

This research uses the Soft System Methodology (SSM) approach, which is a method that prioritizes the search for information and desires from stakeholders in the real world, as a consideration for formulating suggestions for improvement of the problem situation of the object of research [2]. The purpose of this type of research is not only to find solutions by making changes to a problem situation, but also to generate new insights and knowledge about the activities under study [3]. SSM is a method developed by Peter Checkland in the 60s at Lancaster University in the UK. This method was originally used as a modeling tool to facilitate understanding of problems through "real" depictions, then developed its use for learning and interpretation activities. [4]. Nugroho further said that SSM was developed from the theory of system thinking, which is the concept of thinking using a conceptual framework. It is intended to be able to view a problem as a whole system (holistic), and identify the situation that occurs as a dynamic process and not just see the system partially. SSM is often used to develop the vision and mission of an organization as well as plan all activities, including analyzing problems that occur and offering solutions Checkland & Scholes [5] state that SSM is conducted within a conceptual framework, where the complexity of the problem will be described using seven stages, as shown in Figure 1 below.

Figure 1. Research Thinking Framework [3]

4. Results/Model Implementation and Discussion

The systematic discussion will follow the seven steps of SSM, with the following explanation :

4.1 Situation Considered Problematic.
Data on the problem situation that occurred was carried out by conducting a Focus Group Discussion (FGD) which was held in the AAU Trengginas room on February 8, 2023. The results of the initial study in the field found that the Taruna Gemilang Program has not been able to be implemented optimally due to the lack of knowledge of the Taruna Gemilang program from both caregivers, lecturers and cadets, and has not scheduled an effective and efficient time for the Taruna Gemilang Program in the Tanggon Aspect, causing the Taruna Gemilang program not to be able to run optimally in its implementation. In detail, the problem situations that occured in the Taruna Gemilang Program at the Air Force Academy are as follows:

a. The lack of software and socialization of the implementation of this program has led to differences in perception and understanding among existing stakeholders. The absence of standardized parameters for implementation and evaluation standards has led to different interpretations of implementation and assessment, which in turn has led to conflicts of interest.

b. The number of unscheduled protocol activities made it difficult for lecturers, instructors and trainers to develop learning and training plans for cadets, this caused the lack of awareness and respect of cadets towards lecturers, instructors and trainers who are not from caregivers, created the impression of underestimating what is taught or trained to them.

c. The number of aspects and indicators that must be assessed every day made it difficult for caregivers, lecturers, instructors and trainers to conduct assessments. The lack of a common perception of how to assess caused unfair assessments for cadets.

d. The lack of socialization of the implementation of the Taruna Gemilang Program has created confusion in the life of the Cadet Corps Wing, especially for senior cadets, about the pattern of senior and junior relationships and coaching that may or may not be implemented. On one hand, this insecurity then led to the apathy of senior cadets and fear of "trouble" in providing guidance to juniors, and on the other hand slightly eliminated the respect and loyalty of junior cadets to their seniors. It is feared that this will affect life in the unit later. Some senior cadets argued that the tougher basic education model in the Candradimuka Regiment has a more positive effect on the formation of cadets' mentality and attitude than the implementation of the Taruna Gemilang program. The restriction of senior cadets' guidance to their juniors reduces the opportunity for senior cadets to practice their leadership skills.

4.2 Problem Situation Expressed
This stage is a depiction of the problem situation that occurs using a rich picture, as can be seen in Figure 2 below.

Figure 2. Rich Picture

4.3. Root Definition (RD) of Relevant Systems
It is a stage to define the root of the problem based on the rich picture that has been created. RD is then described with CATWOE to make it easier to understand the problem situation that occurs. In this study, RD is limited to caregivers , with the following explanation:

a. Root Definition : A method of coaching AAU cadets based on research (X) with the aim of forming officers with integrity and excellence in the field of Tanggon (Y) whose implementation has not been accompanied by software and equalization of perceptions of all stakeholders, unclear implementation and assessment parameters (Z).

b. CATWOE can be seen in table 1.

Table 1. CATWOE Table

Customer	:	Caregiver
Actor	:	AAU cadets, caregivers, officials and Antap
Transformation	:	Provide understanding, cultivation and implementation of moral values, character and leadership to cadets.
Worldview	:	Forming a coaching pattern that is far from negative and destructive traditions, by adjusting to the latest dynamics and optimizing the potential of each cadet in upholding the noble values of warriorship.
Owner	:	AAU
Enviromental	:	The absence of software that regulates the parameters of implementation and evaluation has led to differences in perception, conflicts of interest between stakeholders and unscheduled protocol activities, aspects and assessment indicators that are difficult to understand and implement

4.4. Conceptual Models of Describe of Root Definition
The Conceptual Model is developed based on the existing root definition, to explain the transformation process that occurs. This model is built based on ideas and does not refer to the real situation in the field. The conceptual model in this research can be seen figure 3

Figure 3. Conceptual Model of Caregiver Daily Activities

4.5. Comparison of Models and Real Word.
 Comparisons are made to find differences between the current state of affairs to get possible changes that are expected in the new system. The results of the comparison of the conceptual model for both the daily activities of caregivers and cadets with the facts found in the real world can be described in three aspects, namely organization, attitudes and procedures, with an explanation can be seen in table 2.

Table 2. Comparison Of The Conceptual Model With The Real World

ASPECT	FOSTER	CADET
Organization	Upgrading the rank of cadet caregivers aimed at increasing motivation to become caregivers is not followed by the ability of binprof (profession development agency) of each corps to send its best officers to become caregivers. Appointment of caregivers for Dan elements many of Setukpa graduates who do not understand the life of Cadet Corps Wing.	With the changes in the education curriculum, especially at level IV, making Cadet Corps Wing, as a forum for cadet organizations is not manned by cadets who have the appropriate and expected capabilities and competencies. Of course, this has an unfavorable influence on the cadet coaching pattern.
Attitude	There are still caregivers who are not confident and hesitant to reprimand or give direction to cadets. This is exacerbated by the fact that many parents of cadets are TNI / TNI AU officials who often intervene in coaching	The mindset of senior cadets who get privilege is a handicap in the implementation of the Taruna Gemilang program, which builds character through training and practice so that it becomes a habit.
Procedure	Many aspects and indicators of the Tanggon field assessment and the absence of socialization and common perception of the assessment, make it difficult for caregivers to carry out the assessment, especially if it is related to the number of cadets who must be assessed every day.	1. Changes in coaching patterns that have not been socialized make Senior Cadets "Apathy" to avoid trouble. 2. Foster family mechanisms that have not been maximized. 3. Placement of cadets only as objects in the ALO assessment system

4.6. Changes: Systematically Desirable, Culturally Feasible

This is the sixth stage of SSM, which provides recommendations for improvements or changes to resolve the problem situation that occurs. Recommendations for improvement can be seen in table 6.

Table 3. Recommendations For Improvement And Change

ASPECT	FOSTER	CADET
Organization	1. Supervision of caregivers from AAU alumni on a rotating assignment (BP) basis for 1 to 2 semesters at least 1 person for each level who serves as a mentor for other caregivers. 2. Caregivers have instructor and gumil qualifications so that they can act as instructors and lecturers to maximize care. 3. Engage caregivers from Flight instructors to maintain cadets' motivation to become aviators.	1. Supervision of caregivers from AAU alumni on a rotating assignment (BP) basis for 1 to 2 semesters at least 1 person for each level who serves as a mentor for other caregivers. 2. Caregivers have instructor and gumil qualifications so that they can act as instructors and lecturers to maximize care. 3. Engage caregivers from Flight instructors to maintain cadets' motivation to become aviators..
Attitude	1. A short course for AAU caregivers, to equalize perceptions and mentally prepare caregivers, as well as introduce the culture and traditions of Cadet Corps Wing life. 2. Streamline the AAU communication forum with cadets' parents to reduce parental intervention in AAU education. All information about education and life at AAU is conveyed through this forum.	1. Equalization of perceptions of cadet coaching patterns that will be implemented from all stakeholders. 2. Standardization and strictness in the application of press and perduptar rules 3. Socialization of coaching patterns through discussions with cadets to obtain a uniform understanding of the application of the rules.

ASPECT	FOSTER	CADET
Procedure	1. It is necessary to form a working group to prepare the ALO assessment, which currently does not have a legal authority and is different from the assessment system of other Force Academies. 2. The assessment system is structured based on cadet activities, making it easier for caregivers and stakeholders to assess the Tanggon aspect, without causing different perceptions.	1. Socialization to all AAU officers about joint responsibility in fostering cadets. 2. Make the role and relationship of foster families effective in the development of seniors and juniors through asah, asih and asuh. 3. Make cadets not only objects, but also act as subjects in the ALO assessment system.

4.7. Action To Improve The Problem Situation.

This final stage is a recommendation of activities that can be carried out to support the changes or improvements that have been recommended in the previous stage.

a. Optimizing the Character Development Center (CDC) which functions as a forum for the development and character building of cadets to match expectations, with the following explanation:

1) The CDC can invite all stakeholders who play a role in shaping the character of the cadets of the gemilang tanggon aspect to hold discussions in a working group (pokja) that discusses the pattern of coaching in the tanggon field, starting from determining the goals and objectives achieved, the methods used and the division of tasks and roles of each stakeholder.
2) The CDC formed a working group to develop the required tanggon assessment standards, including inviting all user units (in this case the Corps Supervisor.
3) CDC can carry out a working group to develop an ALO assessment system that is more user friendly, namely assessment points based on activities carried out by cadets and easily observed / assessed and not based on indicators or aspects only.

b. Currently, the mechanism for recording achievements and trouble is done through the cadet pocket book. To support the proposed changes, it is necessary to improve the function of this cadet pocket book by creating a digital pocket book application. The explanation is as follows:

1) This pocket book is a web-based information system that can be used to record all cadet activities in the field of tanggon, both positive and negative.
2) The system also allows cadets to act as subjects of assessment, for example by giving themselves a target score to achieve that day (adopting Colonel Tek Herman's suggestion). This will train cadets to recognize their potential and learn to motivate themselves to achieve.

References

[1] Akademi Angkatan Udara, Program Taruna Gemilang, 1 ed., Yogyakarta, 2021.

[2] S. Hardjosoekarto, Soft Systems Methodology (Metodelogi Serba Sistem Lunak), Jakarta: Universitas Indonesia Press, 2012.

[3] Marshal, Peter and J. McKay, The Dual Imperatives of Action Research Information Technology & People, vol. 14, MCB Universitu Press, 2001.

[4] H. Nugroho, "PENDEKATAN SOFT SYSTEM METHODOLOGY UNTUK MEMBANGUN SEBUAH SISTEM INFORMASI PROYEK AKHIR," in *Konferensi Nasional Sistem Informasi 2012At: STIKOM BALI*, 2012.

The 5ᵗʰ International Conference on Teacher Education and Professional Development (InCoTEPD)
in Collaboration with SEAMEO and JETA

[5]   P. Checkland and J. Scholes, Soft Systems Methodology in Action : A 30-year Retrospective, UK: John Wiley & Sond, Ltd., 1999.

[6]   R. d. P. Francisco and A. L. Azevedo, "An SSM-Based Approach to Implement a Dynamic Performance Management System," in *IFIP Advances in Information and Communication Technology*, 2009.

The Using of Multi-tier Diagnostic Test in Science Education: A Systematic Review

Nurdiyanti[1*], Jumadi[1], Siti Maryam Ulfa[1], Abidaturrosyidah[1], Febri Tia Aldila[1]

[1]Department of Physics Education, Faculty of Mathematic and Science, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

[*]E-mail: nurdiyanti.2023@student.uny.ac.id

Abstract. This study aims to review various research on multi-tier diagnostic tests from 2018 to 2023. This systematic review identified 35 articles from Scopus. The search keywords were focused on multi-tier diagnostic tests in science education. The findings revealed that the most common trend in diagnostic testing was to detect student misconceptions using the three-tier diagnostic test. Technology was also utilized in various diagnostic test studies, such as android-based assessment applications, Moodle-based e-learning media, digital tests, and websites.

Keywords: diagnostic test, misconception, multi-tier, science education, technology

1. Introduction

Science is a field that involves the process of integrating education with the understanding of scientific concepts. Generating effective science learning requires high-quality assessment. Assessment holds significant power in the field of education [1], not only as a tool to measure students' learning progress but also as an instructional instrument influencing the teaching-learning process. [2] posit that assessment in science education not only measures students' knowledge but should also be capable of evaluating their understanding of scientific concepts and their ability to apply them in real-life situations. The aspects measured in science will also determine the learning strategies and types of assessments employed [3].

Education assessment has become a major agenda both internationally and nationally. Implementations such as Trends in International Mathematics and Science Studies (TIMSS), Progress in International Reading Literacy Study (PIRLS), and Program for International Student Assessment (PISA) continue to evolve and drive the emergence of assessment innovations at the national level. The progress in assessments also highlights several shortcomings in assessment practices, such as prolonged time between test administration and feedback, limited usefulness of summative test results in personal interventions, and a lack of general student feedback [4]. This impacts a pattern of learning solely oriented toward tests and test score inflation [5],, as well as posing a detrimental influence on the educational atmosphere in schools and stress among educators [6].

The shortcomings in assessment have driven a shift in learning assessment patterns. Assessments now lean more towards formative assessment or diagnostic assessment rather than summative assessment [4]. There isn't a sharp distinction between formative and diagnostic assessments, and there's no universal definition for diagnostic assessment. However, it's commonly described as an assessment type that focuses on issues, explores potential difficulties, evaluates whether students are ready for learning tasks, and consequently, can measure prerequisite knowledge as well. Additionally, diagnostic assessments are often followed by a form of "therapy": compensatory instructions to remove barriers

and offer various forms of supportive activities (e.g., in mathematics: [7]), facilitating data-driven decision-making (e.g., in reading: [8])).

The development of diagnostic tests has evolved beyond single-answer questions. However, there have been numerous advancements in the form of layered or multi-tiered questions. This is due to limitations in single-tier models where measurement data cannot further diagnose students' abilities. To further diagnose student abilities, at least a two-tier (answer - reasoning) test model is required, and it can extend to three tiers (answer - reasoning - confidence level), four tiers (answer - confidence level for answer - reasoning - confidence level for reasoning), and even five tiers (answer - confidence level for answer - reasoning - confidence level for reasoning - relationship between answer and reasoning) [9].

Numerous studies have explored the use of diagnostic tests in education. However, the primary focus often lies on a specific type of diagnostic test. [10] conducted a review on the use of four-tier tests to detect misconceptions in physics education. Other research on diagnostic tests discusses more general aspects aimed at evaluating research related to diagnostic testing for educational assessment, potential future developments, and the impact of assessment implementation on education [11]. Meanwhile, the review study by [12] provides insights into common topics frequently experienced by students in scientific misconceptions and the diagnostic assessments used to identify these misconceptions in science. This review, derived from a systematic content analysis of empirical research articles in science education, aimed to address the following questions:

- What is the use of multitier diagnostic tests in science education?
- How is technology utilized in the application of multitier diagnostic tests in science education?

2. Methods

This research employs the systematic literature review method. Systematic literature review is a critical and transparent method used to identify, select, and synthesize information sources from published empirical evidence in order to answer the research questions at hand. It's a research method based on credible evidence that has gained prominence across various research disciplines recently, including in the field of education [13]. To conduct a systematic review, adhering closely to guidelines is crucial. Here are key reasons why researchers should adhere to guidelines: i) It enables systematic reviewers to carefully anticipate potential issues; ii) It allows reviewers to compare protocols to complete audits (i.e., identifying selective reporting), replicate audit methods, and evaluate the effectiveness of planned methods; iii) Prevents arbitrary decisions regarding inclusion criteria and data extraction; iv) Reduces duplication and enhances collaboration [14], [15]. The process of a systematic literature review involves two stages: identifying articles and analyzing procedures. In this study, the systematic review stages are illustrated as shown in figure 1 below.
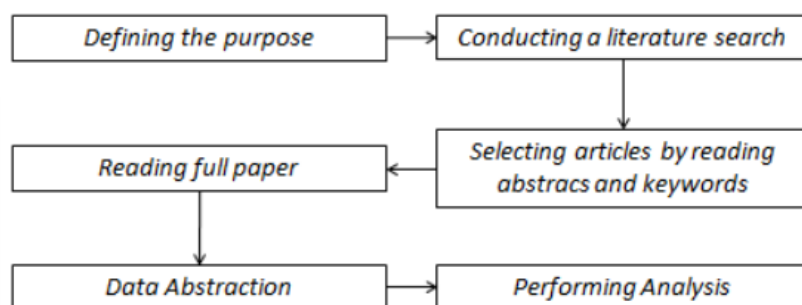
Figure 1. The procedure of systematic review [14]

2.1 Article Identification

The research articles utilized were those published in English-language journals concerning diagnostic tests within the scope of science education. These articles were gathered from electronic databases such as Scopus, covering the period from 2018 to 2023. The search utilized keywords including "tier diagnostic test," "science education," or related to science subject learning, such as physics, chemistry, biology, and mathematics. Articles associated with diagnostic terms outside science education (Health and social applications) and those that didn't exhibit the use of multitier were excluded. Additionally, inclusion criteria consisted of: the document type being research articles (not reviews), final publication stage, source type being a journal (not conference proceedings/books/trade journals), and the articles being in English.

Various information required was collected from each article, including article titles, journal names, publication years, authors, research locations, methodology (participants, data types, research methods, instruments), types of diagnostic tests used, and the research findings. Research methods were categorized as development, qualitative, and quantitative studies. Data collection methods encompassed observation, testing, interviews, and surveys. The classification of diagnostic test types was based on the tier usage of the instruments and the role of diagnostic tests in science education. The overall review findings were presented to comprehend the various types of multitier diagnostic tests used and their roles in science education.

2.2 Analysis Prosedure

This study determines the use of diagnostic tests in science learning and aims to support further research in the future. Therefore, the study presents several aspects: the types and authors of the study (country, and year of publication), the methods used, types of multitier diagnostic tests, and findings regarding the usefulness of multitier diagnostic tests. The research results are categorized based on research questions. Finally, the researchers explain why this review is crucial for further research and how research on diagnostic tests in the field of science education can be beneficial for learning.

3. Results and Discussion

The final number of articles utilized in this study amounted to 35, and a codification process was carried out. Subsequently, the researchers delved deeper into the content of each article to process it into easily comprehensible data. Firstly, the distribution of the reviewed articles from 2018 to 2023 is illustrated in Figure 2.
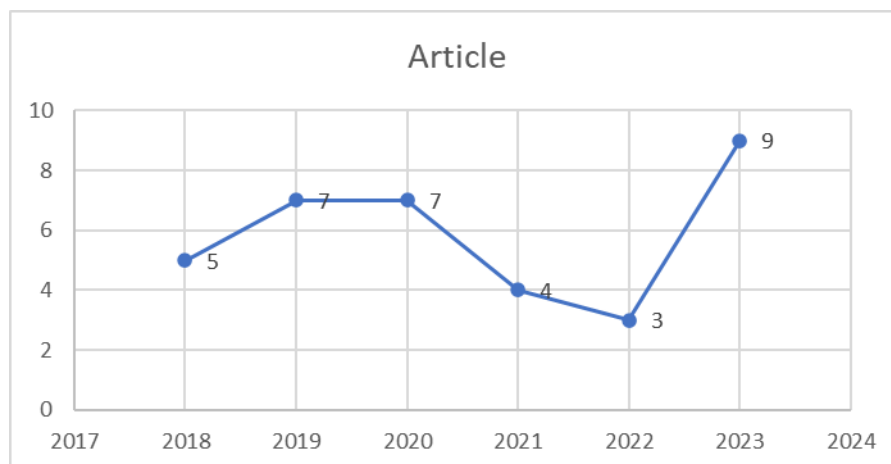
Figure 2. Classification of Publication Years of Multi-tier Diagnostic Tests

Research on multi-tier tests in 2023 has shown significant growth. These studies comprised developmental research on diagnostic tests [16], a quantitative cross-sectional survey to evaluate item bias in a four-tier diagnostic test on heat and temperature [17], and a cross-sectional survey to explore pre-service basic science teachers' misconceptions using a six-tier diagnostic test [18]. The smallest number of articles published was in 2022, aiming to reveal misconceptions about liquid pressure [19] and global warming [20], and to identify scientific conceptual cognition regarding ecosystems and corresponding alternative conceptions by students [21].

The distribution of countries researching the use of multi-tier diagnostic tests is depicted in Figure 3. Indonesia stands as the country with the highest number of publications (n=21), followed by Turkey (n=4), while Malaysia and Taiwan each have 2 studies. Other countries have only one publication each, such as the United States, Colombia, Philippines, Singapore, Slovenia, Thailand, and Greece.
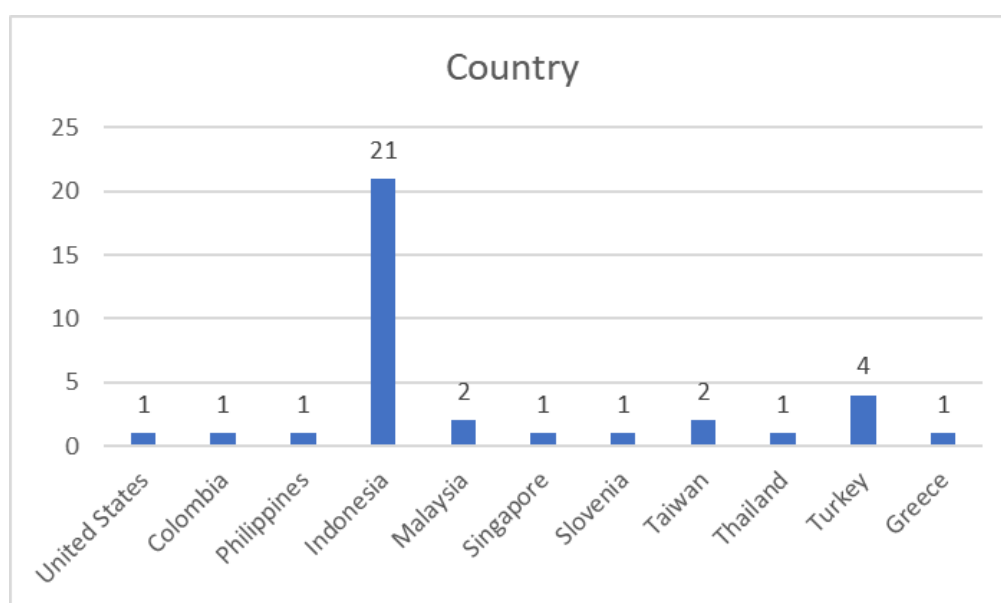
Figure 3. Distribution of Research Location Countries

The topics covered in various studies reviewed are presented in the following table:

Table 1. Topics Covered in Review Articles

Subject	Topics
Physics	Newton's laws, particle dynamics, work and energy, harmonic motion, power, sound, light, force, earth and cosmos, heat and temperature, liquid pressure, kinetic energy, thermodynamics-thermal energy, atoms and molecules, impulse and momentum, free fall motion, density, electricity, heat transfer concepts, kinematics, global warming.
Biology	Molecular biology, human body systems, cells, breathing, feeding relationships, microbes, and diseases, diffusion and osmosis, the environment, ecological footprint concepts, atmospheric environment.
Chemistry	Chemical compounds, substances, and chemical reactions, redox reactions, hydrocarbons, chemical equilibrium, electrolyte and non-electrolyte solutions, ionic and covalent bonding, ionization energy, acids and bases, reaction kinetics.
Mathematic	Geometry, calculus

3.1 Types of Multi-tier Diagnostic Test

Based on the findings of this study, several types of multi-tier diagnostic tests have been identified. Each diagnostic test below originates from various types of research, such as instrument development studies for three-tier, four-tier, five-tier, six-tier, and two-tier diagnostic test types.
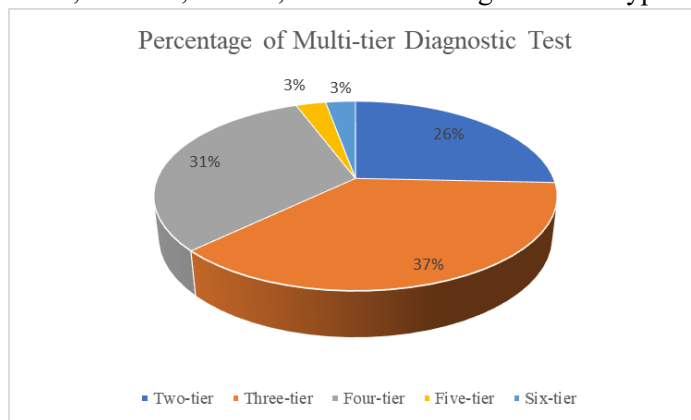
Figure 4. The Diagram Types of Multi-tier Diagnostic Test

Each type of developed multi-tier diagnostic test has its own specifications. The research by Yang (2019) regarding the two-tier web-based diagnostic test was designed to assess students' performance in evaluating the success of computational outcomes. This test consists of a first-tier assessment to evaluate students' answers related to Number Sense-related questions, and a second-tier test to examine students' reasoning behind their answers in the first-tier test. This test has proven to be efficient and convenient for collecting large-scale data on students' NS performance and the methods used to solve problems, while also identifying students' misconceptions related to NS.

The three-tier diagnostic test emerges as the most widely utilized assessment in this review's findings. One such study by [23] focused on a three-tier diagnostic test. This test comprises three sections: an explanation of the concepts of ionic and covalent bonding, reasoning behind these concepts, and the students' confidence levels in their chosen answers. The instrument consists of 21 items and has been validated by two experts. Students select one answer from two options in each section, resulting in three answer combinations for each question. This instrument is used to identify the level of students' misconceptions in comprehending chemical concepts.

Next, there's the four-tier diagnostic test, which is also widely used. According to [16], the four-tier multiple-choice diagnostic test consists of the first-level answer choices, similar to conventional multiple-choice tests. The second level contains the confidence level in the first-level answers. The third level includes the reasoning, and the fourth level indicates the level of confidence in that reasoning. The four-step multiple-choice diagnostic test can expand on the three-step diagnostic test by adding confidence levels to each answer and rationale. The third stage encompasses related concepts that authenticate the first-stage answers, while the fourth stage ensures the reliability of the third-stage answers.

The development of multi-tier diagnostic tests has reached levels five and six. The five-tier diagnostic test developed by [24] uses multiple-choice questions with several levels (four levels) and adds one more level, namely the depiction level. This instrument can diagnose students' conceptions in more detail and can serve as a window into students' thinking, assisting teachers in diagnostic, formative, and summative assessments. The research results indicate that the developed five-tier diagnostic test aids in identifying students' misconceptions in greater detail, especially in sub-microscopic representations. This suggests that this test can be used to deepen students' understanding and assist teachers in evaluating students' comprehension more profoundly.

The six-tier diagnostic test was used in the study [18] to explore misconceptions among prospective science teachers. The study revealed that the conceptual mastery condition is predominantly dominated by the Misconceptions (MSC) category. Among basic science teacher candidates, the conceptual mastery condition with the most frequent scientific misconception category pertained to material changes (CIM), while the condition showing the least frequent scientific misconception category related to material classification (COM). These results can map out the conceptual mastery conditions of basic science teacher candidates, allowing for the design of strategies to address emerging misconceptions.

3.2 Technology in Diagnostic Tests

Technological advancements have significantly influenced the development of diagnostic tests in science education. Several developmental studies utilize various tools. For instance, [25] developed an Android-based assessment application featuring a four-tier diagnostic test instrument capable of early detection of students' physics misconceptions. Furthermore, [26] utilized Moodle-based e-learning media to assess the reduction in misconception percentages through the use of narrative feedback, e-learning modules, and realistic videos. Digital tests and email also serve as tools for diagnostic assessments to understand the level of students' misconceptions regarding ionic and covalent bonding [23]. Lastly, in [22], a website was used to administer a two-tier web-based diagnostic test to evaluate students' performance in assessing computational outcomes. The test was conducted online, and responses were collected using computers.

In terms of subject matter, the majority of the diagnostic tests studied are predominantly focused on physics education. This indicates the limitation of the authors in uniformly reviewing all subjects. However, on the other hand, it provides a more comprehensive overview for research on diagnostic tests in physics education and can be further utilized by future researchers. Moreover, the number and efficiency of multitier diagnostic tests need to be increased.

4. Conclusion

This study has examined the use of multi-tier diagnostic tests in science education. The types of diagnostic test instruments used include two-tier diagnostic tests, three-tier diagnostic tests, four-tier diagnostic tests, six-tier, and five-tier diagnostic tests. Diagnostic tests play a significant role in identifying students' misconceptions, recognizing students at risk of low achievement, testing the reduction of misconception levels using narrative feedback, e-learning modules, and realistic videos. The use of technology for diagnostic tests is highly feasible, including through android-based assessment applications, Moodle-based e-learning media, digital tests, and websites.

Acknowledgments

References

[1] I. N. Z. Day, F. M. van Blankenstein, M. Westenberg, and W. Admiraal, "A review of the characteristics of intermediate assessment and their relationship with student grades," *Assess Eval High Educ*, vol. 43, no. 6, pp. 908–929, Aug. 2018, doi: 10.1080/02602938.2017.1417974.

[2] J. Osborne and J. Dillon, "Science Education in Europe: Critical Reflections," 2014. [Online]. Available: https://www.researchgate.net/publication/252404504

[3] W. Puji Astuti, A. Priyono Budi Prasetyo, and E. Suwarsi Rahayu, "Pengembangan Instrumen Asesmen Autentik Berbasis Literasi Sains Pada Materi Sistem Ekskresi," *LIK*, vol. 41, no. 1, 2012, [Online]. Available: http://journal.unnes.ac.id/nju/index.php/LIK

[4] B. Csapó and G. Molnár, "Online diagnostic assessment in support of personalized teaching and learning: The eDia system," *Front Psychol*, vol. 10, 2019, doi: 10.3389/fpsyg.2019.01522.

[5] D. Koretz, "Moving Beyond the Failure of Test-Based Accountability," 2017. [Online]. Available: www.press.

[6] N. P. von der Embse, L. L. Pendergast, N. Segool, E. Saeki, and S. Ryan, "The influence of test-based accountability policies on school climate and teacher stress across four states," *Teach Teach Educ*, vol. 59, pp. 492–502, Oct. 2016, doi: 10.1016/j.tate.2016.07.013.

[7] J. L. Brendefur, E. S. Johnson, K. W. Thiede, S. Strother, and H. H. Severson, "Developing a Multi-Dimensional Early Elementary Mathematics Screener and Diagnostic Tool: The Primary Mathematics Assessment," *Early Child Educ J*, vol. 46, no. 2, pp. 153–157, Mar. 2018, doi: 10.1007/s10643-017-0854-x.

[8] M. J. Filderman, J. R. Toste, L. A. Didion, P. Peng, and N. H. Clemens, "Data-Based Decision Making in Reading Interventions: A Synthesis and Meta-Analysis of the Effects for Struggling Readers," *Journal of Special Education*, vol. 52, no. 3. SAGE Publications Inc., pp. 174–187, Nov. 01, 2018. doi: 10.1177/0022466918790001.

[9] I. Meutia, D. Maulidiansyah, and E. Istiyono, "Identifying the Drawbacks of the Problem-Solving Skills by Using a Three-Tier Diagnostic Test with Google Form Assistant," 2021.

[10] N. Ö. Çelikkanlı and H. Ş. Kızılcık, "A Review of Studies About Four-Tier Diagnostic Tests in Physics Education," *Journal of Turkish Science Education*, vol. 19, no. 4, pp. 1291–1311, 2022, doi: 10.36681/tused.2022.175.

[11] S. Maulana, A. Rusilowati, S. E. Nugroho, and E. Susilaningsih, "Universitas Negeri Semarang ISSN," 2023. [Online]. Available: https://proceeding.unnes.ac.id/index.php/iset698

[12] Soeharto, B. Csapó, E. Sarimanah, F. I. Dewi, and T. Sabri, "A review of students' common misconceptions in science and their diagnostic assessment tools," *Jurnal Pendidikan IPA Indonesia*, vol. 8, no. 2, pp. 247–266, 2019, doi: 10.15294/jpii.v8i2.18649.

[13] A. Afikah, S. Rejeki, D. Astuti, S. Suyanta, J. Jumadi, and E. Rohaeti, "Mobile Learning in Science Education to Improve Higher-Order Thinking Skills (HOTS) and Communication Skills: A Systematic Review." [Online]. Available: www.ijacsa.thesai.org

[14] N. Aznam, R. Perdana, J. Jumadi, H. Nurcahyo, and Y. Wiyatmo, "Motivation and satisfaction in online learning during COVID-19 pandemic: A systematic review," *International Journal of Evaluation and Research in Education*, vol. 11, no. 2, pp. 753–762, Jun. 2022, doi: 10.11591/ijere.v11i2.21961.

[15] L. Shamseer *et al.*, "Preferred reporting items for systematic review and meta-analysis protocols (prisma-p) 2015: Elaboration and explanation," *BMJ (Online)*, vol. 349. BMJ Publishing Group, Jan. 02, 2015. doi: 10.1136/bmj.g7647.

[16] E. Istiyono, W. Sunu Brams Dwandaru, K. Fenditasari, M. R. S. S. N. Ayub, and D. Saepuzaman, "The Development of a Four-Tier Diagnostic Test Based on Modern Test Theory in Physics Education," *European Journal of Educational Research*, vol. 12, no. 1, pp. 371–385, Jan. 2023, doi: 10.12973/eu-jer.12.1.371.

[17] J. Jumadi, M. I. Sukarelawan, and H. Kuswanto, "An investigation of item bias in the four-tier diagnostic test using Rasch model," *International Journal of Evaluation and Research in Education*, vol. 12, no. 2, pp. 622–629, Jun. 2023, doi: 10.11591/ijere.v12i2.22845.

[18] M. Imaduddin, M. M. Shofa, M. F. Riza, and A. A. Fikri, "Exploring the pre-service basic science teachers' misconceptions using the six-tier diagnostic test," *International Journal of Evaluation and Research in Education*, vol. 12, no. 3, pp. 1626–1636, Sep. 2023, doi: 10.11591/ijere.v12i3.24603.

[19] T. Taban and S. A. Kiray, "Determination of Science Teacher Candidates' Misconceptions on Liquid Pressure with Four-Tier Diagnostic Test," *Int J Sci Math Educ*, vol. 20, no. 8, pp. 1791–1811, Dec. 2022, doi: 10.1007/s10763-021-10224-8.

[20] A. C. A. Aksoy and S. Erten, "A Four-Tier Diagnostic Test To Determine Pre-Service Science Teachers' Misconception About Global Warming" *Journal of Baltic Science Education*, vol. 21, no. 5, pp. 747–761, 2022, doi: 10.33225/jbse/22.21.747.

[21] J.-H. Yeo, H.-H. Yang, and I.-H. Cho, "Using A Three-Tier Multiple-Choice Diagnostic Instrument Toward Alternative Conceptions Among Lower-Secondary School Students In Taiwan: Taking Ecosystems Unit As An Example," *Journal of Baltic Science Education*, vol. 21, no. 1, pp. 69–83, Feb. 2022, doi: 10.33225/jbse/22.21.69.

[22] D. C. Yang, "Performance of Fourth Graders When Judging the Reasonableness of a Computational Result," *Int J Sci Math Educ*, vol. 17, no. 1, pp. 197–215, Jan. 2019, doi: 10.1007/s10763-017-9862-y.

[23] A. K. Prodjosantoso, A. M. Hertina, and Irwanto, "The misconception diagnosis on ionic and covalent bonds concepts with three tier diagnostic test," *International Journal of Instruction*, vol. 12, no. 1, pp. 1477–1488, Jan. 2019, doi: 10.29333/iji.2019.12194a.

[24] R. S. Anam, A. Widodo, W. Sopandi, and H. K. Wu, "Developing a five-tier diagnostic test to identify students' misconceptions in science: an example of the heat transfer concepts," *Elementary Education Online*, vol. 18, no. 3, pp. 1014–1029, 2019, doi: 10.17051/ilkonline.2019.609690.

[25] I. A. D. Astuti, Y. B. Bhakti, R. Prasetya, and Zulherman, "Android-based 4-tier physics test app to identify student misconception profiles," *International Journal of Evaluation and Research in Education*, vol. 12, no. 3, pp. 1356–1363, Sep. 2023, doi: 10.11591/ijere.v12i3.25536.

[26] A. Halim, E. Mahzum, M. Yacob, I. Irwandi, and L. Halim, "The impact of narrative feedback, e-learning modules and realistic video and the reduction of misconception," *Educ Sci (Basel)*, vol. 11, no. 4, Apr. 2021, doi: 10.3390/educsci11040158.

Designing a Measuring Tool for Lecturer Performance Assessment Based on Workload Using the Integrated Performance Measurement System Method as Evaluation Material in the Air Force Academy

Aditya Kurniawan[1], Rifat Elav Prasatya Ramli[2] and Gagat Riano[3]

[1,2,3] Department of Industrial Management Engineering, Air Force Academy, Indonesia

[1]E-mail: sonmama687@gmail.com,
[2]E-mail: elavkz2004@gmail.com
[3]E-mail: gagat.riano@aau.ac.id

Abstract. Performance measurement is important for business organizations in both manufacturing and service and education industries. Performance measurement considers all activities and satisfying stakeholder requirements. The aim of the research is to design performance measurements at the Air Force Academy using the Integrated Performance Measurement Systems (IPMS) method. IPMS is a performance measurement method that considers stakeholder needs and measures performance integrally. The IPMS method produces Key Performance Indicators (KPI) from stakeholder requirements in four steps, namely; identifying stakeholder requirements, developing external monitors, establishing objectives, and identifying KPIs. Each KPI has different significance to the performance of the measurement system.

1. Introduction

As one of the main factors in determining the success of education at AAU, AAU teaching staff or lecturers are required to have various competencies which include pedagogical competence, professional competence, social competence and professional competence [1]. Whether or not lecturers are successful in carrying out their duties cannot be seen in their daily activities, but must go through a series of assessment indicators that can be measured, and can be used as an evaluation of lecturers' performance in implementing the Tri Dharma activities of higher education which include education, research and community service, with the aim of improving internal quality in a sustainable manner [2]. Good performance assessment must be carried out continuously and integrated for all activities and cover all stakeholder needs, in this case AAU as an institution and lecturers as the object being assessed. This research attempted to design a lecturer performance assessment system using the Integrated Performance Measurement Systems (IPMS) method. IPMS is a performance measurement method that formulates the identification of Key Performance Indicators (KPI) based on stakeholder needs. KPI is an indicator/measure to be achieved to measure performance achievements against predetermined organizational strategic targets. The KPI that will be used in this research is based on indicators for assessing the workload of the Indonesian Air Force [3] which are adapted to the functions of the Tri Dharma of Higher Education which must be implemented by all AAU lecturers.

2. Integrated Performance Measurement Systems (IPMS) method

IPMS is a new performance measurement system (PMS) created at the Center For Strategic, University of Strathclyde, Glasgow with the aim of describing in precise terms the form of integration, effective and efficient [4]. Designing PMS using the IPMS model begins by dividing the business level of an organization into 4 levels, namely: Business (Corporate – Main Business), Unit (Business Unit), Business Process (Business Process), and Activity (Business Activity). The IPMS method itself consists of seven steps, namely identifying stakeholders and requirements, carrying out External Monitoring (Benchmarking), setting business objectives, defining measures/Key Performance Indicators (KPI), validating KPIs, specifying KPIs and making measurement scoring.

3. Research Framework

This research tries to develop a performance assessment system that was developed from combining measurements of workload as a lecturer, which is related to the Republic of Indonesia Law on teachers and lecturers [5], and workload as Indonesian Air Force military personnel. The workload assessment as military personnel is taken based on the Workload Analysis of the Indonesian National Army [6]. The rationale can be seen in figure 1. as follows:
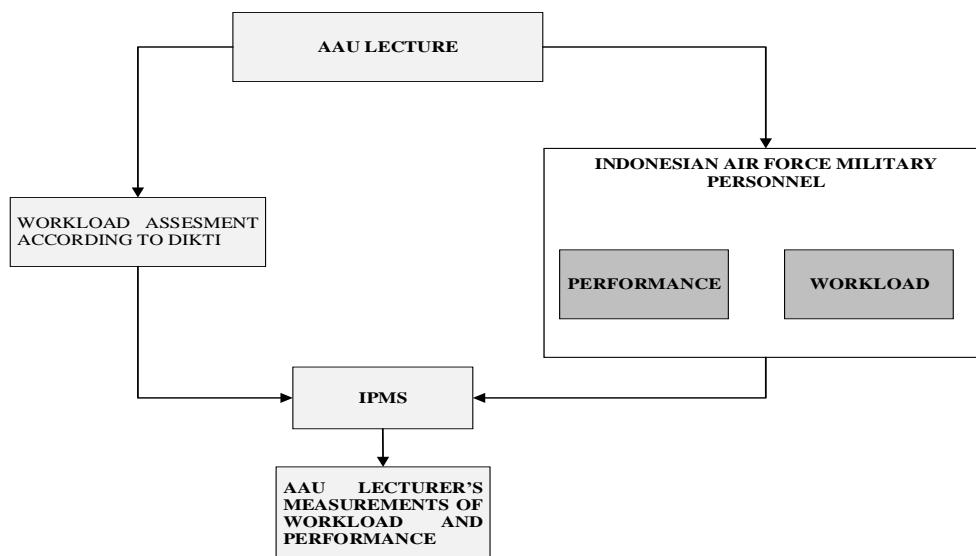
Figure 1. Research Thinking Framework

4. Performance Measurement System (PMS) Design

The PMS design process is carried out based on the IPMS framework for compiling a performance assessment system (PMS) for AAU Lecturers and can be described as follows

4.1 Identify stakeholder requirements.

Before identifying stakeholder requirements, the business/organization level is first divided into four business levels in accordance with the IPMS framework and departmental organizational system approach as shown in Figure 2.
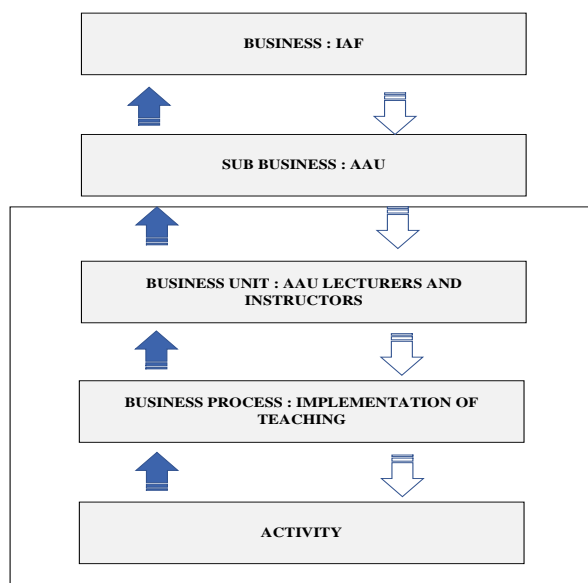
Figure 2. Division of Organizational Levels

From Figure 2, it can be seen that the stakeholders of this research are the AAU Institution and AAU Lecturers and Instructors. From each stakeholder, their requirements were then identified through focus group discussions (FGD). The results of the FGD can be seen in table 1

Table 1. Stakeholder Requirements and Objectives

NO	REQUIREMENT	OBJECTIVE
1	WORKLOAD OF TNI AU PERSONNEL	MAIN TASK
		ROUTINE TASK
		ADDITIONAL TASK
2	TEACHING LECTURER WORKLOAD	TEACHING
		RESEARCH
		COMMUNITY SERVICE
3	PERFORMANCE ASSESSMENT	

4.2 External Monitoring.

External Monitoring is carried out by reviewing several regulations related to assessing workload and performance both as members of the TNI and lecturers in the Higher Education environment, which include TNI Commander Regulation Number 13 of 2021 concerning Analysis of the Workload of the Indonesian National Army, Regulation of the Chief of Staff of the Air Force Number Perkasau/ 124/XII/2012 Dated 3 December 2012 concerning the Indonesian Air Force Technical Instruction Book concerning Assessment and Calculation of Workload, Decree of the Chief of Staff of the Air Force Number Kep/131/V/2019 Dated 31 May 2019 concerning Instructions for Individual Performance Assessment and Law Number 14 2005 concerning Teachers and lecturers.. These documents show that assessing the workload and performance of lecturers is necessary both as members of the TNI and as part of the Higher Education.

4.3 Goal Setting

After the stakeholder requirements are determined, then the objectives are determined. From the results of the FGD, 6 objectives can be determined as part of the PMS that will be prepared, as can be seen in table 1.

4.4. Determination of KPIs

KPI is determined as a measure to determine the level of achievement of each objective. The determination of the KPI is taken from a combination of the Workload Analysis of the Indonesian National Army [6] and the Republic of Indonesia Law on Teachers and Lecturers [5]. The KPIs that have been identified are arranged in the form of a SPK hierarchy, with the top level assessing the performance of AAU lecturers, the level below is workload as TNI AU personnel and as AAU lecturers and the lowest level. The form of the SPK hierarchy can be seen in Figure 3.
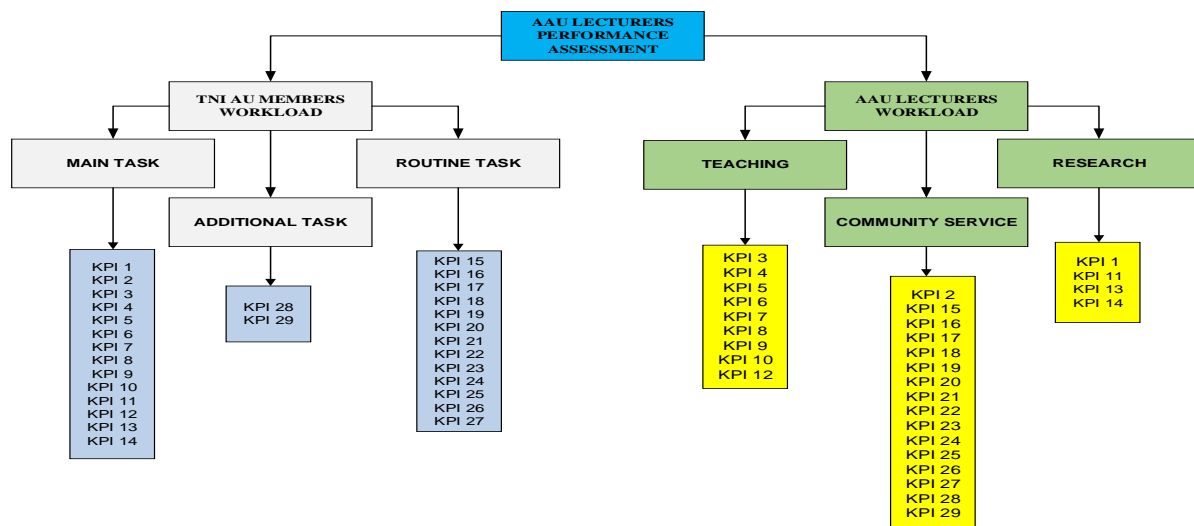
Figure 3. KPIS Hierarchy

4.5 Validation of KPI.

This KPI validation is carried out to obtain KPIs that truly present performance in accordance with the requirements of each stakeholder and the organization's objectives. This validation process is carried out by returning the PMS hierarchy to the decision maker, namely the Koordostur, to provide an assessment of whether the existing KPI and PMS hierarchy are appropriate or not in the sense of being valid or need improvement. Based on the validation process carried out, it turns out that the compiled KPIs are declared valid based on the organizational system requirements approach.

4.6 KPI Specifications.

This KPI specification process is carried out to find out a clear description of the KPI, objectives, relationship to objectives, formula/how to measure KPI, measurement frequency, review frequency, who measures, and data sources, as in the example in Figure 4

KPI Number	2
Nomenklatur	Academy Council
Deskription	activities related to the structural position held by each lecturer, for example attending Academy Council meetings, attending homeroom teacher invitations, etc
Aim	measure lecturer activities outside of teaching and research, but still related to the activities of the Cadet Academy
Formula	the average length of time activities are carried out
Measurement Frequency	Calculated Per Activity Based on the Invitations Received
Frequency of Reviews	Per Month, Quarter, Semester and Year
Who Measure	Each Lecturer and Compiled at Taud Dostur
Data Source	Activity Invitations, Teaching Calendar

Figure 4. Example of KPI Spesification

4.7. KPI scoring.

The tool used to determine the weight is a questionnaire which is distributed to lecturers to get the weight of each KPI. This is done to get KPI weight values that are fairer to measure, because they are in accordance with what lecturers experience/do on a daily basis. The initial amount of KPI was developed from the average capability standard (SKR) for TNI personnel which was calculated based on time where the annual workload for lecturers was 1248 hours or 120.4 hours/month (TNI Headquarters, 2021). So KPI scoring can be explained as follows:

4.7.1. Workload. The value of the lecturer's workload is obtained by calculating the total value of all the quantities reported, so the calculation formula per month is

$$Workload_{Month} = \frac{score_{month}}{120,4} \, x \, 100\%$$

The assessment categories are Less than 60% units in the poor category, 60% -100% in the Standard category and Greater than 100% in the Good category. Display of the application see Figure

Figure 5. Display of Lecturer Workload Calculation

4.7.1. Performance Calculations. Developed from a workload assessment, which gives weight to three aspects of the Tri Dharma of Higher Education. Weighting was carried out through questionnaires to all lecturers and instructors, where the results were 40% for teaching and community service aspects and 20% for research. This weight is then used as a performance achievement by multiplying it by 120.4 hours/month, resulting in 48 hours for teaching and community service aspects and 24 hours for research. The lecturer's performance score is then obtained from the average of the performance achievements of these three aspects. The display can be seen in Figure 6.

Figure 6. Display of Lecturer Perforance Measurement

5. Conclusion

With this method, 29 KPIs can be identified which are used to measure the workload of AAU lecturers, both as members of the TNI and as part of Higher Education. The PMS design was developed from workload calculations by giving weighting to the three aspects of the Tri Dharma Performance, namely 40% each for teaching and community service aspects and 20% for research to obtain performance achievements for each aspect. The performance assessment obtained is the average of the performance achievements of these three aspects.

References

[1] Irianto, "Pengaruh Kompetensi Pedagogik, Profesional, Kepribadian Dan Sosial Yang Dimilki Dosen Terhadap Hasil Belajar Mahasiswa (Studi Empiris Pada STIIE AMM Mataram)," *Jurnal Bisnis dan Kewirausahaan,* vol. 11, no. 1, pp. 46 - 58, 2015.

[2] I. A. Permana, "ANALISIS PENILAIAN KINERJA DOSEN MENGGUNAKAN METODE BALANCE SCORECARD (STUDI KASUS STT SANGKAKALA)," *Jurnal Riset Ekonomi dan Bisnis,* vol. 13, no. 2, pp. 89 - 99, 2020.

[3] Mabesau, "BUKU PETUNJUK TEKNIS TNI AU TENTANG PENILAIAN DAN PERHITUNGAN BEBAN KERJA," *Peraturan Kasau Nomor Perkasau/124/XII/2012 tanggal 3 Desember 2012,* 2012.

[4] P. Suwignjo, "Sistem Pengukuran Kinerja: Sejarah Perkembangan dan Agenda Penelitian ke," in *Proceeding Seminar Nasional Performance Management*, Hotel Wisata, Jakarta, 2000.

[5] Sekneg, Undang-undang Nomor 14 Tahun 2005 tentang Guru dan Dosen, Jakarta: Sekretariat Negara, 2005.

[6] Mabes TNI, "Peraturan Panglima TNI Nomor 13 Tahun 2021 tentang Analisis Beban Kerja Tentara Nasional Indonesia," 2021.

Development of Garment Product Innovation Work Assessment Instruments and Fashion Student Boutiques

Sri Wening[1*], Emy Budiastuti[2], Widihastuti[3], Putu Diah Ari Kusumadewi[4]

[1,2,3,4] Department of Food and Clothing Engineering Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: sri_wening@uny.ac.id

Abstract. The objectives of this study are to: (1) develop a set of instruments for the Assessment of Garment Product Innovation Works and Fashion Student Boutiques which include: assessment sheets, assessment criteria (rubrics), and assessment guidelines; (2) knowing the characteristics and quality of the Garment Product Innovation Work Assessment instrument and Fashion Student Boutique; and (3) implementing the Garment Product Innovation Work Assessment instrument and Fashion Student Boutique. The development of the Garment Product Innovation Work Assessment instrument and Fashion Student Boutique is a development research. The development model refers to the assessment instrument development model which starts from setting assessment goals to its implementation in assessing the work of fashion product innovation of fashion students. The instruments developed consist of process and result assessment instruments. The validity of the instrument is evidenced by the validity of the content and construct. Instrument reliability with between rater and alpha cronbach. The study population was fashion students who were taking the Fashion Product Innovation Work course with a concentration in garment industry and boutique clothing consisting of 75 students and the research sample was taken by simple random sampling. Data collection techniques with assessment sheets and questionnaires. Data analysis techniques are carried out qualitatively and quantitatively. The product development is in the form of a set of assessment instruments for fashion product innovation works both for garment and boutique fashion classifications according to their respective criteria, consisting of assessment sheets, rubrics and assessment guidelines that have met good quality criteria and are suitable for use.

1. Introduction

Facing the agreement of the ASEAN Economic Community (AEC) which will be enforced from the end of 2015 turned out to have an impact on the world of education, including fashion education in universities. Along with this policy, skilled human resources are needed to meet national and international needs and be able to compete in the 21st century.

Related to the above, fashion education in universities has a very strategic role in preparing human resources (HR) who are able to compete and have 21st century competencies, including creative and innovative so that they are ready to independently enter the world of work and industry according to their fields. Along with this, Yogyakarta State University (UNY) as one of the education in universities that organizes education in the field of fashion must also be able to Preparing graduates who have 21st century competencies, namely being able to think critically, creatively and innovatively, communicate, and collaborate or work in teams well.

Related to the above, one of the characteristics of fashion education in universities that is able to equip students with 21st century competencies and especially the ability to think creatively and innovatively is that students are able to produce or create innovative works of fashion products as a form of manifestation of their competence in the field of fashion. Therefore, in the Fashion Engineering Education curriculum of PTBB FT UNY, the Fashion Product Innovation Work course is included with a total of 3 credits that are practical. This course is intended to train and equip students to be able to create innovative works of fashion products both in the category of clothing in the garment industry or in the direction of boutique clothing according to the concentration of the field of expertise taken.

In addition to the above, the learning of the Fashion Product Innovation Work course is also intended to equip students to be independent and able to compete in this 21st century. Therefore, to find out whether the learning has succeeded in achieving its goals or not, assessment activities are needed. Assessment activities in learning the work of fashion product innovation certainly require a set of assessment instruments that are feasible and appropriate to be used to assess student work, both process assessment and results.

For this reason, it is necessary to have an efficiency of the education program, a standard reference that leads to effectiveness and job training that refers to the international standard Indonesian National Work Competency Standard (SKKNI). This standard contains the requirements / qualifications of work competencies needed in carrying out a task / job properly and correctly.

The garment industry is listed as a fairly large employment provider industry in Indonesia, in other words a labor-intensive industry, a large enough employment provider in Indonesia. This reflects that the garment industry is still one of the main drivers for the national economy. Therefore, the development of quality and utilization of human resources / labor of the garment industry will be the basic capital for the development of a sustainable national garment industry.

According to developments to date, what is meant by "Custom-made" can be done based on individual orders for both men and women in single or more quantities that are usually done in fashion, boutiques and fashion houses of Adi Busana standard. The manufacturing process is carried out by fitting one or more times to the customer. The scope of "Custom-made Women" includes: (1) Tailoring clothing for women, the sewing technique process starts from cutting, fitting and finishing for fitting according to the customer's body shape by taking into account design needs, the use of coating materials, furing and finishing techniques for seams and pressing. Design characteristics with firm and simple lines (simple clear-lines), (2) Couture and haute couture clothing for women Couture is a French term used in the fashion industry (fashion industry) which describes fashion styles / patterns, the most luxurious in high level sewing techniques and made of expensive / luxurious materials from fashion designers (designers). Usually, fashion designers will exhibit their designs twice a year, namely in the spring / summer and rainy / cold season. Haute couture clothing is women's clothing made by designers using prime / expensive materials (exclusive / special quality) and done with techniques in adi clothing (high level or special techniques), (3) Indonesian National Clothing is a variety of traditional clothing that contains traditional values found in the archipelago such as: brackets, kebaya clothes, bodo clothes, and so on, (4) International Bridal Clothing is bridal clothing used by brides from other nations / countries, (5) Traditional Bridal Clothing is clothing worn by the bride and groom and has traditional values from a region / nation.

Based on the above, through this research the research team intends to conduct research on the development of instrument assessment instruments for garment product innovation works and fashion student boutiques. The set of assessment instruments to be developed consists of assessment sheets, assessment criteria (rubrics), and assessment guidelines. Therefore, the problems in the research are formulated as follows: 1) How to develop a set of assessment instruments for garment product innovation works and fashion student boutiques which include: assessment sheets, assessment criteria

(rubrics), and assessment guidelines?, 2) What are the characteristics and quality of assessment instruments for garment product innovation works and fashion student boutiques developed?, 3) How to implement assessment instruments for garment product innovation works and a fashion student boutique?

2. Method

This research is a type of research development that aims to develop a set of assessment instruments that will be used to assess the innovative work of student fashion products both in the classification of garment and boutique fashion concentrations. The development model used in this study is a procedural model with the intention of a descriptive model in describing the steps designed and implemented to be able to develop instruments for assessing the work of garment product innovation and boutique products in fashion education in universities. The steps taken follow the stages of instrument development and the steps of developing an assessment indicator system.

The assessment instrument development model consists of 8 steps, namely: (1) Setting the purpose of making assessment instruments; (2) Conduct curriculum analysis; (3) Create a grid of assessment instruments; (4) Prepare signs for assessment instruments; (5) Review the assessment instrument theoretically; (6) Conduct trials and analysis of the results of assessment instrument trials; (7) Revise the assessment instrument; and (8) Implementation of assessment instruments in the Fashion Product Innovation Work course.

The research was conducted in the Fashion Engineering Education study program, majoring in Food and Fashion Engineering Education, Faculty of Engineering UNY. The population of this study is all students of the Fashion Engineering Education study program PTBB FT UNY, and the sample is students of the Fashion Engineering Education Study Program (S1) semester 6 who are taking the Fashion Product Innovation Work course. The sampling technique is carried out by Purposive Sampling.

Data analysis techniques in this study are descriptive analysis techniques, which describe: 1) the process and procedure for developing instruments for assessing the work of garment and boutique fashion product innovation; (2) characteristics and quality of the assessment instruments developed; and (3) the results of the implementation of assessment instruments in the Fashion Product Innovation Work course.

3. Results

3.1 Results of the Stage Set the Purpose of Making Assessment Instruments
This stage aims to set the goal of making assessment instruments that are relevant to the vision and mission that exist within the Fashion Engineering Education study program in order to produce professional graduates in the fashion field. The purpose of making this assessment instrument is to produce measuring instruments that can be used to assess students' ability to create fashion product innovation works, both garment and boutique concentrations. Tools to measure this will be used by the internal assessment team and the external assessment team.

This assessment instrument is realized from activities to describe the completeness of mastering learning competencies for fashion product innovation works that must be owned by students within a certain period of time, namely one semester and the study period at university. Mastery of learning competencies of fashion product innovation works by students, measured through the results of fashion product innovation work on the creation of innovation works for garment fashion and boutique fashion. Each type of clothing has a different character of fashion products. Therefore, the assessment instrument

developed has the aim of describing the completeness of mastering the competence of fashion product innovation works in the creation of garment clothing and the creation of fashion in boutiques.

3.2 Curriculum Analysis Results

This activity was carried out to analyze needs through preliminary study assessment activities on the curriculum (syllabus, lesson plans, learning materials, and assessment systems) in the fashion product innovation work course. This goal was achieved to obtain initial information by conducting interviews with lecturers and practitioners in the fashion sector as well Focus Group Discussion (FGD) on the curriculum for learning in the fashion sector in the Fashion Product Innovation Work course.

Based on the results of the discussion through the FGD mentioned above, two measuring instruments can be established in the form of instruments for competency assessment to create innovation works for garment clothing and competency assessment to create boutique fashion innovation works that will be used by internal appraisers and external appraisers. Meanwhile, to get information about relevant theories and research results carried out through theoretical studies and research results related to concepts, principles, characteristics to support the development of assessment instruments. Based on the synthesis of theories about the concepts and variables to be measured, then the instrument construct can be formulated by the research team. Based on these constructs, dimensions and variable indicators can be developed which have been explicitly stated in the formulation of variable constructs.

3.3 Results of compiling the instrument grid

This step is the preparation of draft 1 assessment instruments. Compiling instrument grids is part of the stages of designing and developing instruments for the creation of Fashion Product Innovation Works. This stage is an activity to describe the character aspects of expertise competence in the creation of garment fashion product innovation works and aspects of expertise character competence in creating boutique fashion product innovation works.

The elaboration of this aspect is developed in the following steps: (1) conducting studies and deductions of various theories on aspects of expertise in creating garment fashion product innovation works which include design, production, and promoting clothing, (2) conducting studies and deductions of various theories about the garment fashion business and boutique fashion business, (3) conducting discussions in three rounds in January and February 2024, in order to draw up measuring instrument specifications.

Discussions are carried out with lecturers who teach courses that are relevant to the work course Fashion product innovations include fashion design, textile technology, fashion patterns, fashion technology, garment fashion production, and fashion adi busana. The result of the discussion with lecturers held on February 23, 2024 is a step to carry out content validity in the development of assessment instrument grids and produce assessment instrument grids in the form of specification tables containing conceptual dimensions, assessed aspects, indicators, item numbers and number of items for each dimension and indicator.

3.4 Results of Compiling Instrument Signs

This activity is an activity to design and develop draft 1 assessment instrument items which can be in the form of statements or questions, regarding characteristics or conditions, attitudes or perceptions, and compiling instrument signs that are ready to use, as well as assessment instrument signs. The description of the points of this instrument was developed in the following steps: (1) conducting studies and deductions of various theories on aspects of expertise in creating innovative works of garment fashion products which include design, production, and promotion of clothing, (2) conducting studies and deductions of various theories about the garment fashion business and boutique fashion business,

(3) conducting discussions in two rounds in January and February 2024, in order to draw up measuring instrument specifications.

The discussion was conducted with lecturers who taught fashion design, textile technology, fashion patterns, fashion technology, garment fashion production, and fashion adi courses. The result of the discussion with the lecturers is a step to carry out content validity in the development of assessment instrument grids, to find and find answers to how well existing instruments can represent all fashion product innovation expertise content. The result is a draft instrument consisting of 2 instruments to measure the competence of expertise in creating innovative works of garment and boutique fashion products which include design, production, and promoting fashion. Each draft instrument is equipped with an assessment rubric.

Assessment rubrics are standards needed in performance appraisals to clearly identify what students should know and what students should be able to do. So that the rubric is a form of scoring guide that shows a number of performance criteria in the process or expected results. The rubric consists of gradations of the quality of student performance ranging from the worst performance to the best performance accompanied by a score for each of these quality gradations. The provisions in the preparation of the rubric are specifications in writing down all the key elements of performance and defining sequential performance for each element, for example starting with writing down the best, worst and among other performance qualities.

3.5 Results of theoretical instrument review through FGD

This step is included in internal and external validation activities of experts in the field of garment fashion creation and boutique fashion creation which is a continuation of instrument prototype design activities, which is intended to strengthen the grid and indicators of the aspects and characteristics of expertise in creating innovative works of garment fashion and boutique fashion products as a hallmark of someone who has professional expertise in creating fashion product works. This activity was carried out by experts from academics and experts in the field of clothing, namely two evaluation experts and two material experts in the field of clothing, especially industrial clothing and customade clothing.

The involvement of experts in this instrument study activity is packaged in the form of Delphi. This activity is also intended to test the readability of the instrument format to determine the construction of items on the instrument in terms of language in the use of words, terms, sentence structure, clarity of instructions, item structure and item substance can be understood appropriately by the test subjects. Thus information can be obtained, whether the format and language used are clear enough, so that it can be understood according to what is meant by the researcher. As a result, there are several items that need to be fixed so as not to cause double interpretation.

Readability tests performed for observation guide sheets and how to fill them, rubric sheets for scoring guidelines for measured aspects. This activity is carried out through discussions by expert judgment experts consisting of lecturers / observers in the form of FGD (Focus Group Discussion). The results of the readability test show that lecturers and observers have understood the purpose and method of filling out the assessment instrument.

The procedure carried out is a draft assessment tool which includes assessment objectives, assessment instrument grids, and assessment instruments are consulted simultaneously with lecturers in the fields of fashion design, textile technology, fashion patterns, fashion technology, garment fashion production, and fashion production, and simultaneously discussions with 3 expert reviewers in the field of garment clothing and 3 expert reviewers in the field of boutique fashion. Expert reviewer in the field of garment fashion is Mr. Goet Poespo as a fashion book writer and pattern maker, Mrs. Pratiwi Sundarini, M.Ikom, as a consultant in the garment sector, and Mrs. Dra. RR. Ani Sri Mulyani serves as the head of the clothing and leather industry section. While the expert reviewers in the field of boutique fashion are Mr. Ramadhani A. Kadir as a fashion designer, Mr. Philip Iswardono as a fashion designer,

and Mr. Agung Purwandono as a journalist for KR Online. There was a lot of input from experts related to the instruments developed and the need for the development of the Garment Product Innovation Work Assessment instrument and the Fashion Student Boutique.

The results of discussions with the research team and based on several considerations, it is necessary to improve the instrument according to the suggestions and input of experts in the FGD activities mentioned above, including improving statements in the assessment indicators. Based on the results of the instrument review through expert validation, discussions were then held with the lecturers, manuscript revision and preparation of instrument draft 2. At this stage the draft is fixed, so there is some reduction in indicators. In draft 2, an assessment instrument model is established, namely in the form of a performance appraisal guide for the creation of garment fashion product innovation works and a performance appraisal guide for the creation of boutique fashion product innovation works.

3.6 Instrument Test Results and Analysis of Test Results

The main purpose of this step is to determine the implementation and functioning of the instrument model empirically on a limited and expanded scale. Instrument trials for internal assessment were carried out by 2 lecturers for garment clothing assessment instruments and 2 people for boutique fashion assessment instruments.

The instrument trial for this external assessment was carried out by a limited group of 3 respondents as expert practitioners in the field of garment clothing and 3 expert practitioners in the field of boutique clothing who were not involved in the preparation of the instrument, limited trial respondents were asked to provide input on the content or language improvements in the instruments that had been developed.

This trial activity was carried out using a summative assessment approach as well as an implementation of the use of instruments in learning Fashion Product Innovation Works. Thus, at this trial level, weaknesses that occur can be simultaneously analyzed and evaluated the results to determine the effectiveness of the assessment instrument model, so that it can be used for the next stage of improvement.

3.7 Instrument Revision Results

Based on the results of validation from a limited group, and consultation with supervisors who are considered experts, then revision and writing of instrument draft 3 are carried out. This draft is a description of several aspects of garment clothing and boutique clothing, which are described from aspects of fashion design, textile technology, fashion patterns, fashion technology, marketability and wearability of clothing produced in accordance with the characteristics of garment clothing and boutique clothing. Each aspect is divided into several sub-aspects. This step also resulted in a determination that this assessment instrument was filled by lecturers as an assessment team and expert practitioners in the field of garment clothing and boutique clothing.

3.8 Results of Implementation of Assessment Instruments

This step aims to ensure the construct validity and reliability of the assessment instrument. After the results of the instrument review, the assessment of fashion product innovation works shows characteristics that are in accordance with the assessment indicators of garment and boutique fashion products. In this stage, the instrument is implemented during the assessment of fashion product innovation works for students in the first semester which will be held in May 2025 in internal and external assessment activities.

4. Disscussion

The development of assessment instruments for fashion product innovation works has been successfully carried out through several stages ranging from reviewing the curriculum to trials and implementation. Several times the revision of the draft instrument has been carried out based on input and suggestions from experts starting from draft 1, draft 2, and draft 3 to form an appropriate and suitable instrument for assessing the work of fashion product innovation.

The revision of indicators carried out is adjusted to input and suggestions when the agreed FGD refers to the characteristics of each type of product, namely garment fashion products and boutique fashion products. Each has 4 aspects of assessment with 12 indicators. The instrument consists of a grading sheet, an assessment rubric, and a scoring. After the instrument has been revised, a review is then carried out to assess its feasibility in content, and the results are stated that the instrument for assessing the work of fashion product innovation has been feasible to be used to assess the work of fashion product innovation, both in the boutique and garment fashion categories. This shows that the stages carried out in the development of this instrument have succeeded in producing a set of instruments for assessing the work of fashion product innovation that has good and decent categories based on the results of studies and assessments of experts.

5. Conclusion

Based on the results of research and discussion, the following conclusions can be drawn:
a. The development of a set of assessment instruments for garment product innovation works and fashion student boutiques which include: assessment sheets, assessment criteria (rubrics), and assessment guidelines has been successfully developed through several stages ranging from curriculum assessment and analysis to trials and implementation.
b. The characteristics of the assessment instrument for the work of garment product innovation developed are adjusted to the specifications of garment clothing which include drapshape, technology, fusing and pressing, as well as marketability and design. While the characteristics of the assessment instrument for boutique fashion innovation works developed are also adjusted to boutique fashion specifications which include design, decoration, sewing techniques, and wearability. The quality of the assessment instrument for the work of garment product innovation and fashion student boutiques developed has met the feasibility for use in terms of content validity and reliability.
c. The assessment instrument for garment product innovation works and fashion student boutiques can be implemented directly in internal and external assessments in the fashion product innovation work course well.

References

[1] Barak, M. & Dori, Y.J. (2009). Enhancing higher order thinking skills among inservice science teachers via embedded assessment. Published online: 28 July 2009. Springer Science+ Business Media, B.V. 2009: J Sci Teacher Educ (2009). 20: 459-474. DOI: 10.1007/s10972-009-9141-z.

[2] Boston & Carol. (2002). The concept of formative assessment. Journal of Practical Assessment, Research & Evaluation, 8(9). Retrieved October 1, 2009 from http://PAREonline.net/getvn.asp?v=8&n=9 CEA. (2003). Quality statement on assessment practice (secondary). Diakses tanggal 1 Februari 2006 darihttp://www.aaia.org.uk

[3] Cotton, K. (1993). Developing employability skills. School Improvement Research Series. Research You Can Use. Close-up#15. Diakses pada tanggal 6 Januari 2012 dari http://www.nwrel.org/scpd/sirs/8/c015.html

[4] Davies, A. (2000). Making classroom assessment work. Cortenay: Connection Publishing. Delisle, R. (1997). How to use problem-based learning in the classroom. Alexandria: ASCD.

[5] Edwards, M.C. & Briers, G.E. (2000). Higher-order and lower-order thinking skills achievement in secondary-level animal science: Does block scheduling pattern influence end of course learner performance?Journal of Agricultural Education, Volume 41, Number 44, pp.2-14. DOI.10.5032/jie.2000.04002.

[6] Field, A. (2000). Discovering statistics using SPSS for windows: advanced techniques for the beginner. Thousand Oaks: Sage Publications. Gareis, C.R. & Grant, L.W. (2008). Teacher-made assessments: How to connect curriculum, instruction, and student learning. New-York: Eye on Education.

[7] Havelock, R.G. (1976). Planning for innovation: Through dissemination and utilization of knowledge. Michigan:Institute for Social Research. The University of Michigan.

[8] Kerka, S. (1992). Higher order thinking skills in vocational education. Columbus Ohio: ERIC Clearinghouse on Adult, Career, and Vocational Education. Center on Education and Training for Employment. Journal ERIC DIGEST No. 127.

[9] Moore, B., & Stanley, T. (2010). Critical thinking and formative assessment. New-York: Eye on Education.

[10] Nevin R.F., Jr. (1997). The identification of national trends and issues for workplace preparation and their implications for vocational teacher education. Digital Library and Archieves Virginia Polytechnic Institute and State University: Journal of Vocational and Technical Education (JVTE). Volume 14 Number 1, Fall 1997.

[11] Nitko, A.J., & Brookhart, S.M. (2007). Educational assessment of student. New Jersey: Pearson Merrill Prentice Hall.

[12] Office of Outcomes Assessment. (2006). Critical thinking as a core academic skill: A review of literature. University of Maryland University College, Spring 2006.

[13] Richey, R.C. & Klein, J.D. (2009). Design and development research. USA: Routledge Taylor & Francis Group. 270 Madison Avenue New York, NY 10016.

[14] Robinson, J.P. (2000). What are employability skills the workplace: a fact sheet, Article Journal Alabama Cooperative Extension System Volume 1 Issue 3, September 15, 2000. Diakses pada tanggal 6 Januari 2012 dari http://proquest.umi.com/pqdweb

[15] Rose, C. & Nitcholl, M.J. (2000). Accelerated learning for the 21st century. Bandung: Nuansa.

[16] Thomas, A. &Thorne, G. (2010). Higher order thinking. mailto: athomas@cdl.org. Diakses pada tanggal 15 Nopember 2010 dari http://www.cdl.org/ resource-library/ articles/higherorderthinking.php.

[17] Thomas, R.G. & Litowitz, L. (1986). Vocational education and higher order thinking skills: An agenda for inquiry. Minnesota University: St. Paul Minnesota Research & Development Center for Vocational Education.

Machine Learning Bibliometric Analysis of Science Direct Publisher Using VOSviewer

Ade Dwi Cahyanti[1*], Anisa Tri Utami[2], Farij Ibadil Maula[3], and Jaka Nugraha[4]

[1] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia
[2] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia
[3] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia
[4] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia

[*] E-mail: ade.22161@mhs.unesa.ac.id

Abstract. Writing scientific papers plays an important role in improving critical thinking skills. One of the fields that gained special attention for research is Machine Learning, which is an integral part of Artificial Intelligence that has the ability to utilize available data to improve the intelligence of the system without the need to explicitly define each step in an algorithm. In conducting research it is important to understand the theoretical foundations and basic concepts in each category and have access to relevant scientific literature. In the era of emerging information technology especially in the field of computing and data analysis, VOSviewer has emerged as a tool and method that allows researchers to explore the potential of information in the scientific literature more effectively. The purpose of this paper is to determine the development of Machine Learning from 2023-2024 in the ScienceDirect international scientific journal database through visual bibliometric interpretation of VOSviewer.

1. Introduction

Writing scientific papers plays an important role in improving critical thinking skills. In the ever-evolving information age, critical thinking skills are becoming increasingly crucial in ensuring that the information we obtain is truly accurate and valid. Through the process of writing scientific papers, we are naturally encouraged to explore different points of view, interpret data carefully, evaluate arguments, and draw strong conclusions. This activity not only helps us in understanding the topic more deeply, but also strengthens our critical thinking skills, allowing us to become more skilled and critical readers and researchers [1]. Through technological advancements, especially in the field of computing and data analysis have emerged new tools and methods that allow researchers to unearth the potential of information hidden in the scientific literature more efficiently and effectively. One area that has received special attention is Machine Learning, which has become an integral part of Artificial Intelligence. In conducting research in the field of Machine Learning, it is important to understand the theoretical foundations and basic concepts behind each category, as well as to have good access to relevant scientific literature. For this reason, databases of international scientific journals such as ScienceDirect maintained by Elsevier, and bibliometric network visualization tools such as VOSviewer, are critical to support research in this field.

The importance of a deep understanding of Machine Learning, as well as easy access to relevant scientific literature, cannot be ignored. With ever-evolving technological advancements, especially in the context of data analysis, knowledge of various Machine Learning methods and applications is becoming increasingly valuable. As such, this paper aims to provide a comprehensive understanding of Machine Learning, as well as to present information on important resources such as ScienceDirect and VOSviewer that can support research in this field. This research brings new contributions in the form

of discoveries or findings that have never been revealed before in the field under study which in turn will contribute to the development of knowledge and research in the future. Future researchers are expected to expand their knowledge and utilize the findings and methodologies of this research to develop the field further.

1. How the development of machine learning in 2023-2024 in the science direct journal?

2. Literature Review

2.1 Machine Learning

Machine learning is an integral part of artificial intelligence that allows systems to learn automatically and improve their performance based on experience, without the need to be programmed directly. In this context, computer programs are not statically defined. The main concern of machine learning is in the development of computer programs that are able to access data and learn from it. Alternatively, machine learning can be understood as the branch of science that allows computers to exhibit human-like behavior, with its ability to improve understanding over time or through experience automatically. The essence of machine learning is its ability to leverage available data to improve system intelligence without the need to explicitly define every step or rule in an algorithm or computer program [2]. In the context of Machine Learning, there are three main categories that define the approaches and techniques used, namely Supervised Learning, Unsupervised Learning, and Reinforcement Learning. Supervised Learning, which is one of those categories, leverages fully labeled data sets. This means each instance in the exercise data has a label indicating the desired class or output. Using this exercise data, models built in Supervised Learning can learn the relationship between the corresponding input and output features, so that it can classify or predict classes from new data that has no labels. Meanwhile, Unsupervised Learning takes a different approach by using data sets that don't have labels. The main goal of Unsupervised Learning is to find hidden structures or patterns in data without the aid of labels. One of the main tasks in Unsupervised Learning is clustering, where the system seeks to group data into groups that have certain similarities, as well as associations, where rules or relationships between entities in the data are identified. On the other hand, Reinforcement Learning is inspired by animal learning theory and deals with the way in which agents learn to interact with their surrounding environment. In reinforcement learning, agents learn iteratively through trial-and-error, receiving feedback from the environment in the form of rewards or punishments, and correcting their behavior over time to achieve specific goals. This approach does not require prior knowledge of the environment, but rather allows the agent to independently develop optional policies by incorporating new experience gained through interaction with the environment [3].

2.2 Science Direct

ScienceDirect, maintained by publisher Elsevier, is the world's largest database of international scientific journals. Scientific publications are not only a valuable contribution to the development of knowledge, but also play an important role in improving the careers of researchers by giving credit for scientific papers (KTI) published, both at national and international levels. Along with advances in information and communication technology, scientific journals are not only available in print format, but can also be accessed electronically. One of the electronic scientific journal databases accessible through library subscriptions is ScienceDirect, maintained by Elsevier. Access to this platform requires an internet-connected computer device and a password provided by the service provider to the subscribed library. The use of such passwords is governed by an agreement between the library and the service provider. Most of the scientific journals contained in ScienceDirect have been indexed by Scopus. Scopus is one of the largest databases in the world that includes bibliographic data (including citations) and is equipped with abstracts from scientific literature research results that have gone through

a peer review process. The database covers a wide range of fields of science, technology, social sciences, arts, and literature, providing broad access for researchers to explore diverse scientific literature from around the world [4].

2.3 VOSviewer

VOSviewer is software specifically designed to build and visualize bibliometric networks. These networks can include various entities such as journals, researchers, or individual publications, and can be built on a variety of factors such as citations, bibliographic merging, co-authoring, or co-authoring relationships. In addition, VOSviewer also provides text mining functionality that allows users to build and visualize networks of shared events from important terms taken from the scientific literature. VOSviewer software is available for free and is specifically designed to map and explore bibliometric knowledge maps. One of its main advantages is the use of text mining functions that can identify relevant noun phrase combinations for mapping, as well as an integrated clustering approach to examine network data co-citation and co-occurrence. Unlike other analysis applications, VOSviewer's advantage lies in its powerful visualization capabilities. The interactive options and functions provided by the program make it easily accessible and explored by users, especially in exploring bibliometric data networks such as the number of citations or co-occurrence relationships among key terms and relevant concepts [5].

3. Method

First of all, the researcher identifies the main source of scientific publications used in bibliometric analysis, namely Science Direct. After that, the authors developed search keywords that would be used in search strings in online databases, focusing on different variations of words related to "Machine Learning". By getting 40 relevant Journals in the last 5 years. This study adopts quantitative methods using VOSviewer software version 1.6.20, researchers can take advantage of various features and functions provided by the software to carry out two main approaches: bibliometric visualization and bibliometric analysis. Bibliometric analysis, as a quantitative method, utilizes evaluative and descriptive approaches to describe research trends and publication characteristics within a field [6]. Using bibliometric analysis, researchers can measure various parameters such as publication frequency, citation patterns, researcher collaboration networks, and so on. The evaluative approach allows researchers to assess the impact and relevance of publications within a research domain, while the descriptive approach helps in describing the distribution and properties of bibliographic data in detail. Meanwhile, bibliometric visualization methods are used to visualize the structure of a particular research area. Using visualization techniques such as network maps, scatterplot diagrams, or treemap graphs, researchers can illustrate relationships between various entities in the research domain, such as relationships between researchers, journals, or key concepts. This visualization helps in intuitively understanding complex patterns and interactions in bibliometric data, as well as in identifying areas of research that may need further research. The place of this research was carried out at Surabaya State University, where researchers accessed the ScienceDirect platform https://www.sciencedirect.com/ Through the wifi network provided by the university. By searching using the keyword "Machine Learning" in the span of the last five years.

4. Result and Discussion

4.1 Co-Authorsip Method

   The co-authorship analysis aims to evaluate the authors' recent achievements in working together to produce scholarly publications, taking into account variations in their skills, organizational

affiliations, and countries of origin. Through this analysis, we can understand how strong the attachment is between the authors, their organizational affiliations, and the countries involved in developing a field of study. This allows us to identify established patterns of collaboration, as well as understand the dynamics of cross-border cooperation that may occur within them [7].

I. Network Visualization

The visualization of the co-authorship network created through VOSviewer provides an idea of the connectedness between authors in a research domain, in this case, the machine learning domain. Each node in the network represents an author, while the edge (the line connecting the nodes) indicates collaboration between two authors. In this context, the network shows how often authors work together on machine learning research. By paying attention to this network, we can identify groups of authors who collaborate frequently and gain an understanding of the structure of collaboration within the machine learning research community.
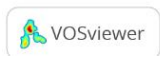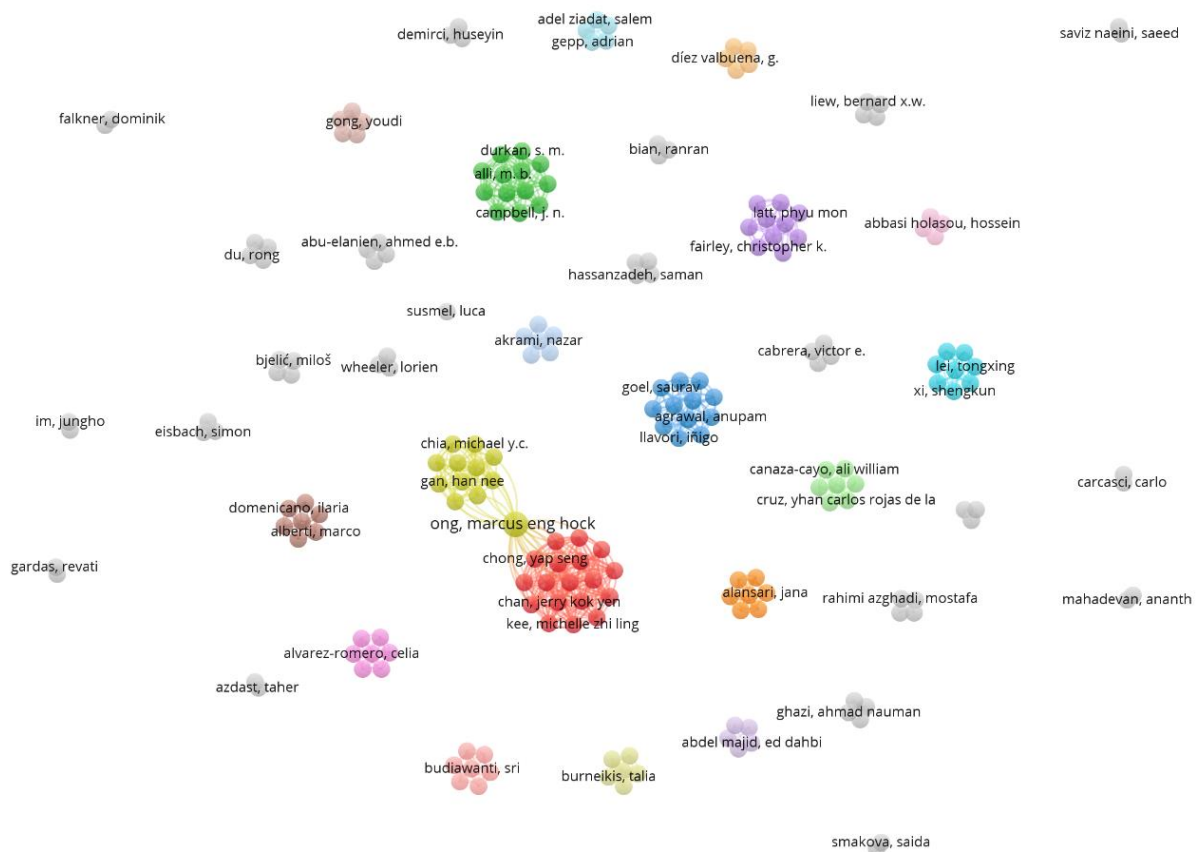
Source: VOSviewer (2024)

Figure 1. Not Connected

After searching the data and analyzing the visualization of the co-authorship network, it was found that no connections were formed between authors in the network. This phenomenon indicates that each author worked independently in the context of "Machine Learning" research and never engaged in collaboration with other authors in the analyzed dataset. This

suggests that in the context of the study, no trace of collaboration or connectedness between authors could be identified through co-authorship network analysis.
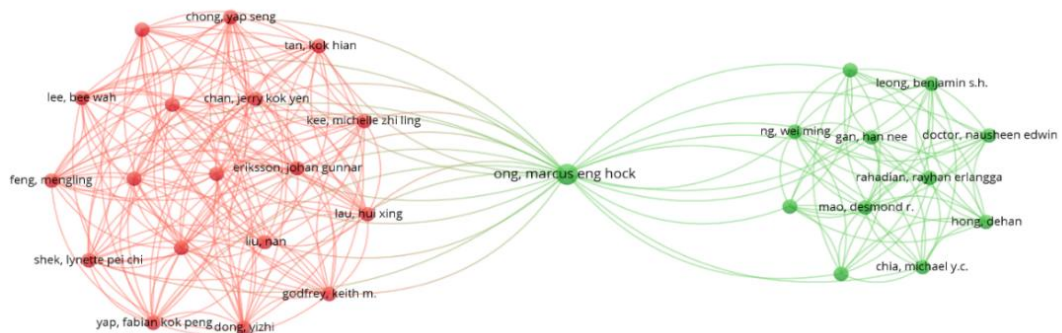
Source: VOSviewer (2024)

Figure 2. Connected

Based on the figures given, there are 208 authors involved in the research. In the minimum step of selecting authors in each document, only 1 author is selected. With a total of 208 authors selected, they all met the threshold to engage in mapping bibliometric analysis that illustrates the visualization of connected co-authorship networks. Thus, from the picture, it can be concluded that all 208 authors involved in the study are connected to each other through co-authorship networks. This indicates that each author has at least one connection or collaboration with other authors in the network. Therefore, this study has a connection between its authors and qualifies to be depicted in the visualization of the co-authorship network.

II. Overlay Visualization
Overlay visualization in the context of folder creation with the co-authorship method in VOSviewer provides additional insight into the attributes or metadata associated with each author in the network. For example, the color of nodes can represent the author's institutional affiliation or the geographic region in which they work. In this way, overlay visualization allows us to see the interrelationships between the collaboration structure (co-authorship network) and author attributes. This can provide a deeper understanding of the dynamics of collaboration between institutions or countries in machine learning research.
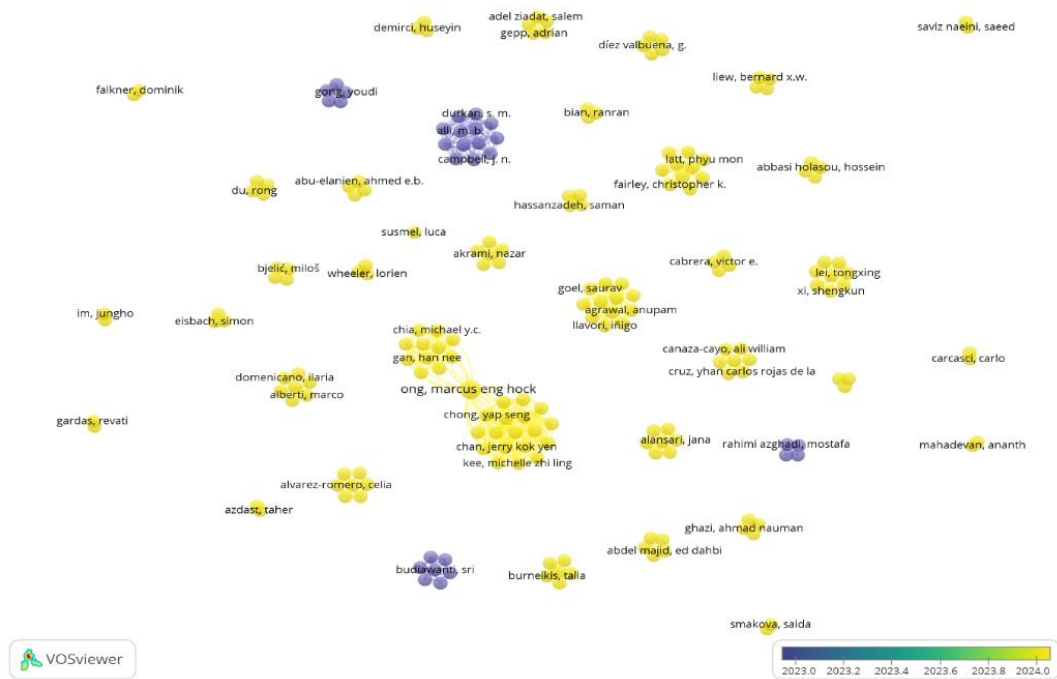
Source: VOSviewer (2024)

Figure 3. Not Connected

Based on the data presented, overlay visualization co-authorship shows that no connection or relationship is formed between authors in the co-authorship network. This indicates that there are no additional attributes or metadata associated with each author in the context of their collaboration in the study. In other words, no patterns or trends can be observed in terms of institutional affiliation, geographic region, or other attributes associated with collaborating authors. It can also be seen the year of the data released according to the color classification.
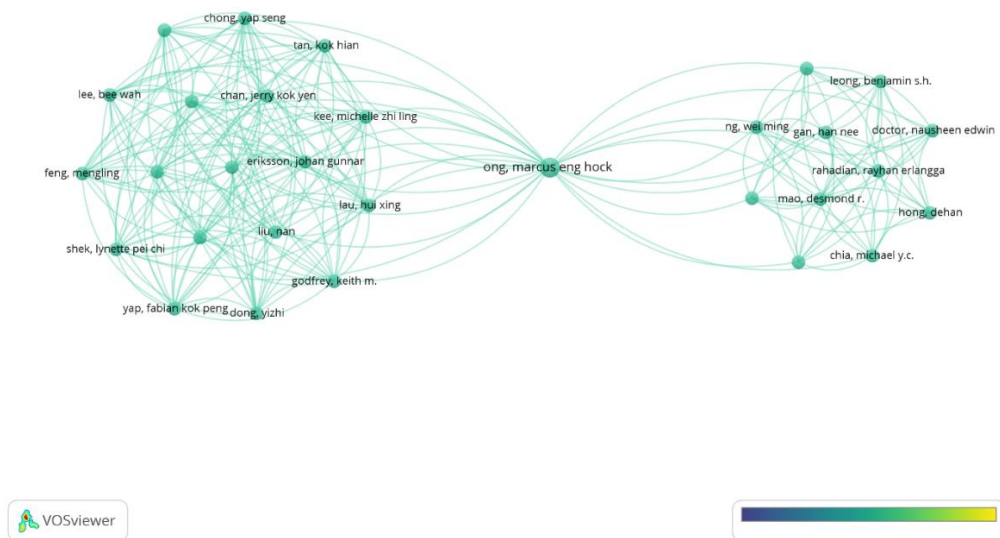
Source: VOSviewer (2024)

Figure 4. Connected

Based on the data presented, overlay visualization co-authorship shows the existence of a connection or relationship between authors in the co-authorship network. This indicates that there are additional attributes or metadata associated with each author in the context of their collaboration in the study. For example, overlay visualizations can describe the author's institutional affiliation, the geographic region in which they work, or other relevant attributes. Given the connections in overlay visualization co-authorship, we can observe certain patterns or trends related to collaboration between authors, which may provide additional insight into the dynamics of collaboration in the study.

III. Density Visualization

Density visualization in map creation with the co-authorship method in VOSviewer describes how dense the connection or collaboration between authors in the network. High-density areas suggest that there is a lot of collaboration taking place among authors in the region, while low-density areas suggest that collaboration may be less common or more scattered. By looking at density visualization, we can identify important collaboration centers in the network and understand how active collaboration is in the machine learning domain in different regions.
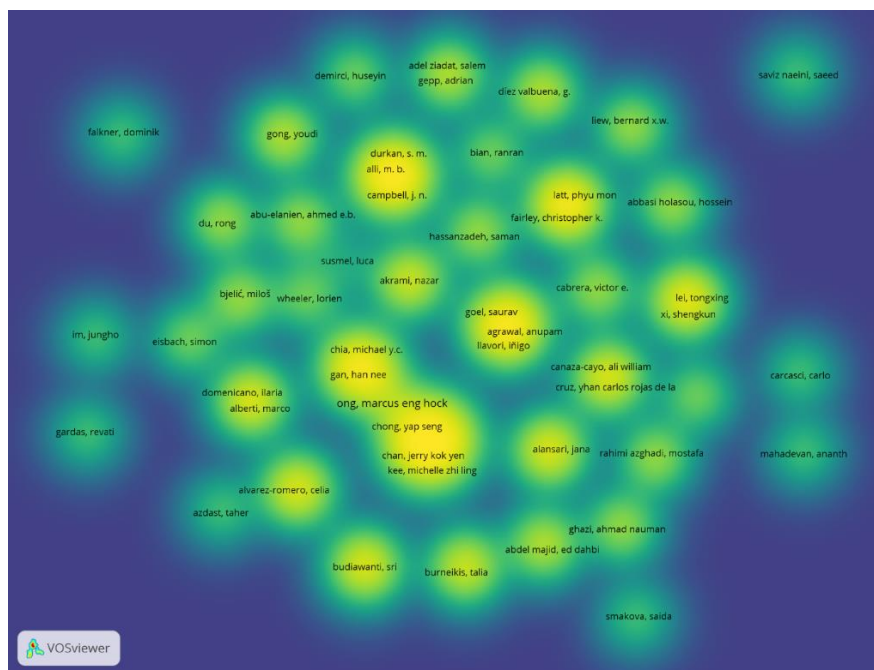
Source: VOSviewer (2024)

Figure 5. Not Connected

Based on the data presented, density visualization of co-authorship shows that no connection or collaboration is formed between authors in the co-authorship network. This indicates that there are no areas or regions in the network that exhibit high levels of density, which usually illustrates the presence of intense collaboration between authors. In other words, writers do not engage in dense or centralized collaboration around some specific group of writers. Therefore, density visualization co-authorship does not provide an indication of the pattern or level of collaboration between authors in the study.
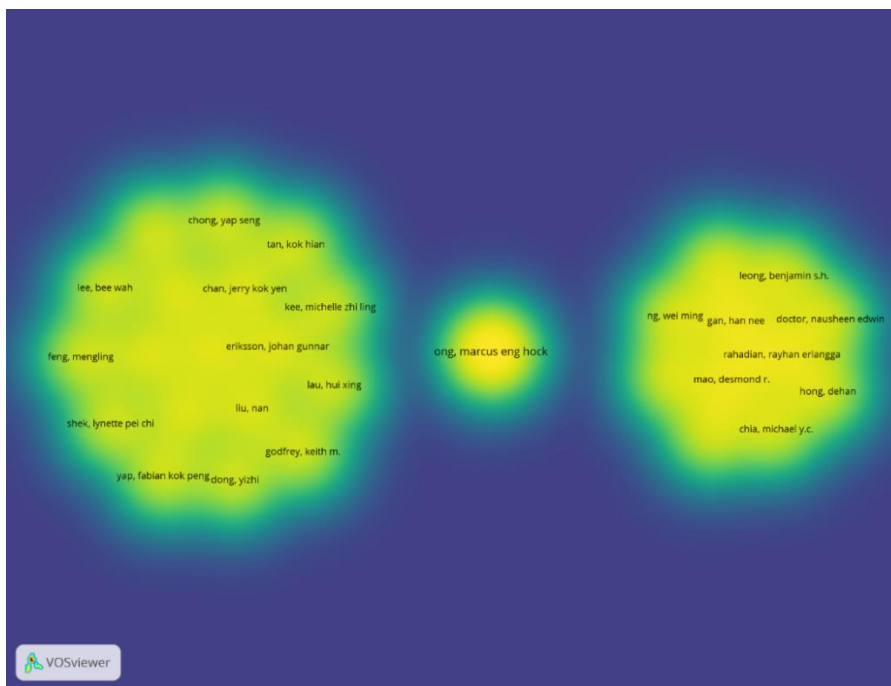
Source: VOSviewer (2024)

Figure 6. Connected

Based on the data presented, density visualization co-authorship shows the connection or collaboration formed between authors in the co-authorship network. This can be seen from the presence of areas or regions in the network that show a high level of density, which indicates an intense collaboration between the authors. Given the relationship in density visualization co-authorship, we can observe that authors engage in dense, centralized collaboration around some specific group of authors. Therefore, density visualization co-authorship provides a clear picture of the pattern and level of collaboration between authors in the study.

4.2 Co-Occurance Method

Keyword co-occurrence analysis is used to gain an up-to-date understanding of emerging domains or themes in a field of study based on the co-occurrence of interrelated keywords. Using this method, researchers can identify relationships and patterns of occurrence between various keywords, allowing them to evaluate current trends and research focus in the field [9].

I. Network Visualization

Figure 7 shows the network visualization of keywords that are not connected to the subject of machine learning. The analysis findings yielded a total of 116 keywords, with 100 keywords having a relationship with machine learning. The remaining unconnected keywords are shown in the figure, characterized by nodes that are scattered and have no network with other nodes. It can be seen that unconnected variables include university ranking, plastic waste, building energy monitoring, etc.
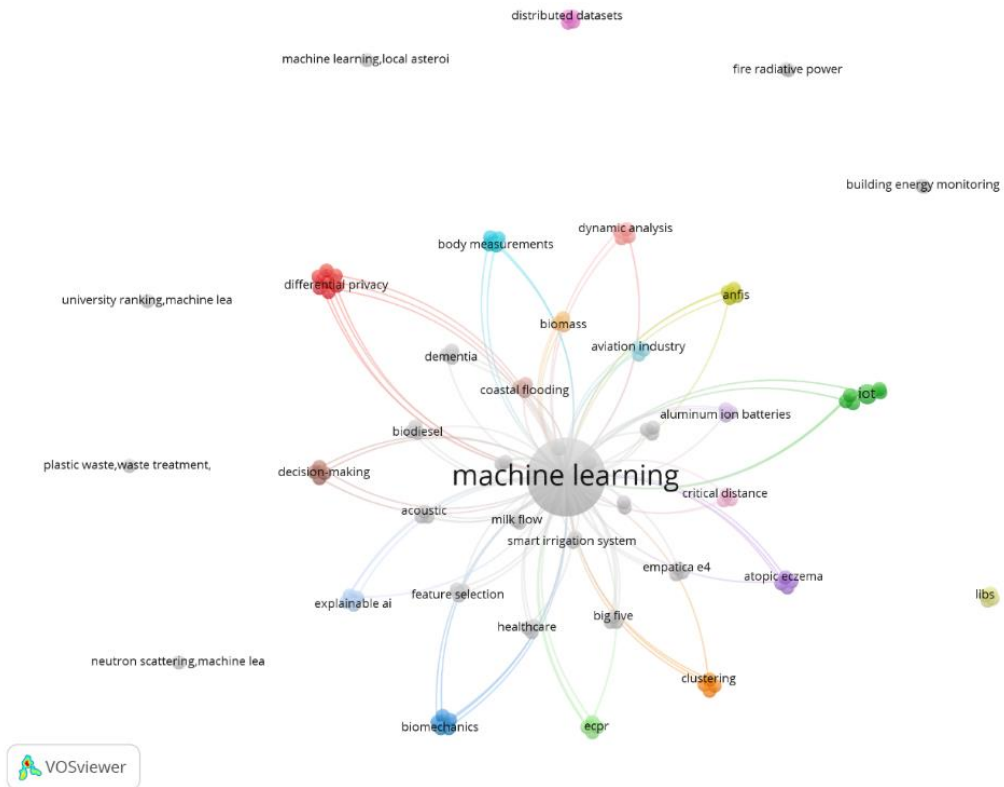
Source: VOSviewer (2024)

Figure 7. Not Connected
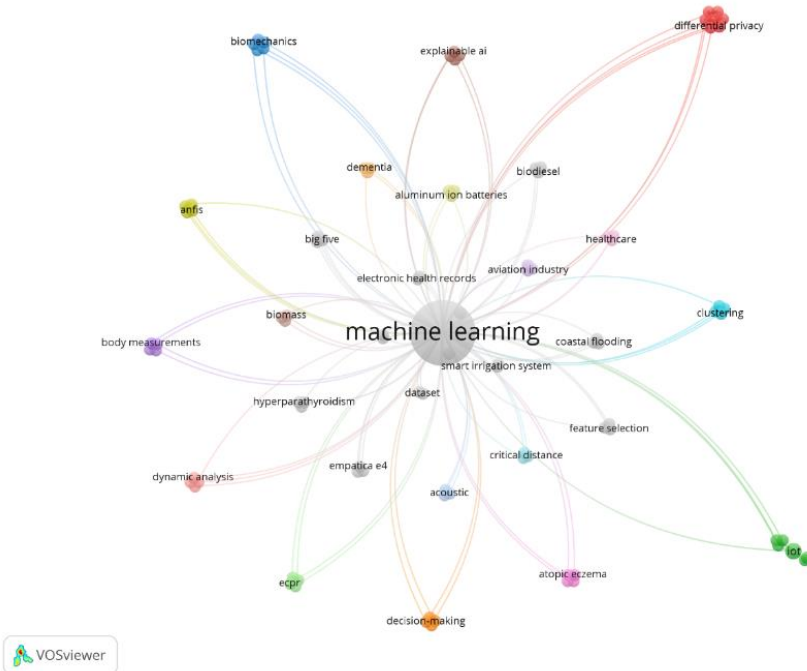
Source: VOSviewer (2024)

Figure 8. Connected

Based on the data presented, visualization of co-occurrence networks using the co-occurrence method shows connections or relationships formed between key concepts or terms in the topic "Machine Learning". This indicates that there is a significant correlation between various topics or sub-fields within the topic of "Machine Learning". Given the relationship in network visualization co-occurrence, it can be concluded that the key concepts or terms that appear in the topic of "Machine Learning" are interconnected or have significant dependencies on each other. Therefore, co-occurrence network visualization provides a clear picture of the relationships and patterns that exist between various topics or concepts in the study. This explains that machine learning related research can be linked together with connected keywords. The closer the node is to the machine learning keyword, the more often the keyword is associated with research on machine learning topics.

II. Overlay Visualization
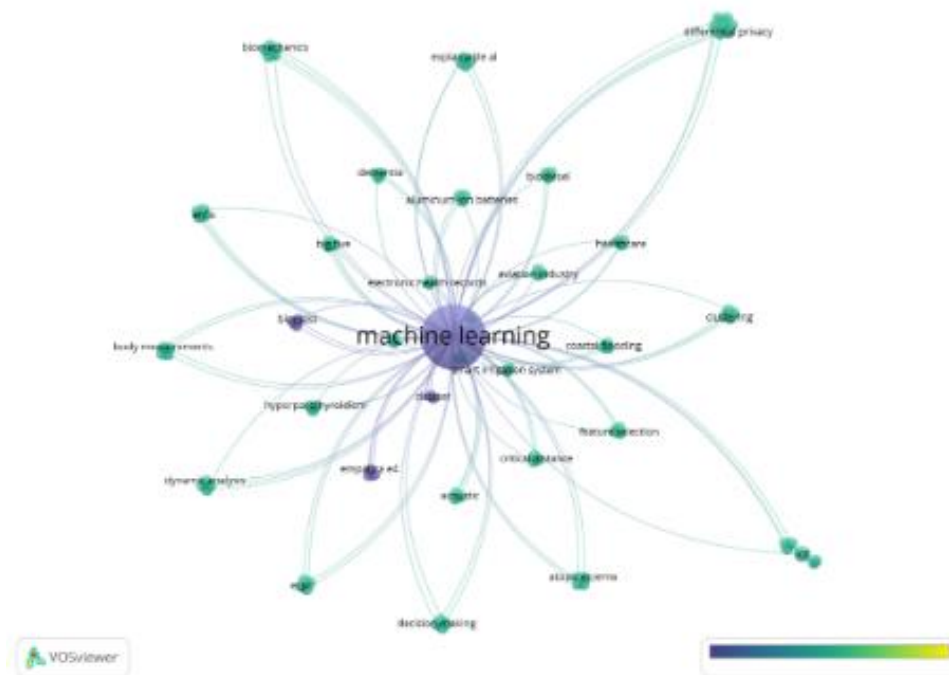
Source: VOSviewer (2024)
Figure 9. Connected

Figure 9 shows the co-occurrence results based on the overlay visualization, which includes the development of keywords in articles published from year to year in ScienceDirect metadata. Each year is denoted by a cluster that has a purple to yellow color, the older the publication year of the article, the more intense the color. Conversely, the lightest color indicates the youngest or most recent year. Based on the visualization results, machine learning keywords tend to be researched in 2023.

III. Density Visualization
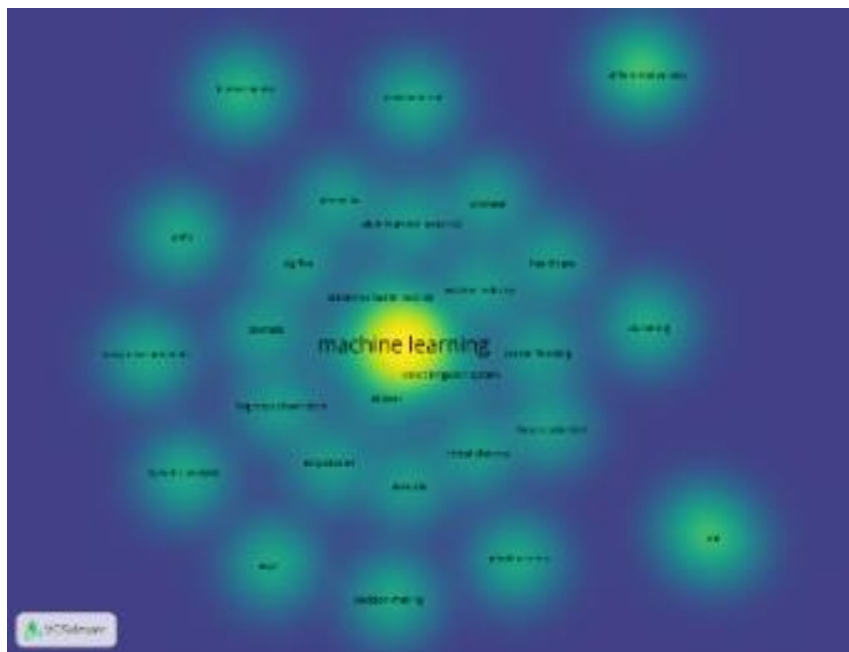
Source: VOSviewer (2024)
Figure 10. Connected

Figure 10 shows the results of the density visualization on co-occurrence with machine learning topics. This VOSviewer graphical representation uses yellow and green base colors to display visualizations related to the depth of the topic under study based on the keywords of the research article. It can be seen that dense areas are shown with many nodes close to each other. Meanwhile, the yellow color indicates the level of saturation of keywords that are often used in research.

5. Conclusion and Limitation

Conclusion

Machine Learning variables are closely related to Resource-aware Computing, Datasets, Smart Irrigation System, Electronic Health Records, etc. This research aims to examine the development of machine learning topics based on the year 2023-2024 analyzed by bibliometric methods. This method is analyzed based on co-authorship and co-occurrence, with each method including network visualization, overlay visualization, and density visualization. Based on the analysis results, the development trend in the field of machine learning is still not widely researched in 2024 in Science Direct metadata. This proves that the interest of researchers to discuss in the field of machine learning is getting lower. In Co-authorship through 40 collected articles, there are 208 unconnected networks and there is the largest connected network of 30 items. In density, it can be seen that some authors have strong social networks compared to other authors and contribute more by having multiple research articles published. While in Co-occurrence there are 116 unconnected networks, and have 100 items that are interconnected. It can be seen in the density visualization that Machine Learning has been discussed by many researchers and causes saturation.

Limitation

Some people may think that many limitations in a study can reduce the value of the findings. However, this view can actually be wrong. When a researcher is writing their dissertation, it is important to remember that no research is perfect. Every study has its own limitations, and the final conclusions of a study are based on a range of evidence collected, not just on a single investigation [10]. Although the research has taken into account literature from 2023-2024, there may still be relevant works published before or after this period. Therefore, expanding the literature coverage is an urgent need. Future researchers are expected to expand the literature coverage by including references from a wider period, so as to provide a more comprehensive insight into the research topic.

References

[1] R. Hariyani Susanti, "Penulisan Karya Ilmiah sebagai Salah Satu Tools Meningkatkan Kemampuan Berpikir Kritis," *J. Inov. Edukasi*, vol. 6, no. 1, pp. 1–11, 2023, doi: 10.35141/jie.v6i1.652.

[2] M. J. Thomas, V. Lal, A. K. Baby, M. Rabeeh VP, A. James, and A. K. Raj, "Can technological advancements help to alleviate COVID-19 pandemic? a review," *J. Biomed. Inform.*, vol. 117, no. April, p. 103787, 2021, doi: 10.1016/j.jbi.2021.103787.

[3] Dr. Purba Daru Kusuma, *MACHINE LEARNING Teori, Program, dan Studi Kasus*. [Online]. Available: https://books.google.co.id/books?id=4k3sDwAAQBAJ&lpg=PP1&ots=E_zo6PLVMR&dq=Machine learning adalah&lr&hl=id&pg=PP1#v=onepage&q&f=false

[4] A. Roihan, P. A. Sunarya, and A. S. Rafika, "Pemanfaatan Machine Learning dalam Berbagai Bidang: Review paper," *IJCIT (Indonesian J. Comput. Inf. Technol.*, vol. 5, no. 1, pp. 75–82, 2020, doi: 10.31294/ijcit.v5i1.7951.

[5] E. Andriaty, "Analisis Karya Tulis Peneliti Pertanian dalam Jurnal Ilmiah Internasional pada Basis Data Sciencedirect," *J. Perpust. Pertan.*, vol. 28, no. 1, p. 16, 2020, doi: 10.21082/jpp.v28n1.2019.p16-24.

[6] F. Effendy, V. Gaffar, R. Hurriyati, and H. Hendrayati, "Analisis Bibliometrik Perkembangan Penelitian Penggunaan Pembayaran Seluler Dengan Vosviewer," *J. Interkom J. Publ. Ilm. Bid. Teknol. Inf. dan Komun.*, vol. 16, no. 1, pp. 10–17, 2021, doi: 10.35969/interkom.v16i1.83.

[7] L. Ardito, V. Scuotto, M. Del Giudice, and A. M. Petruzzelli, "A bibliometric analysis of research on Big Data analytics for business and management," *Manag. Decis.*, vol. 57, no. 8, pp. 1993–2009, 2019, doi: 10.1108/MD-07-2018-0754.

[8] I. Muhammad, F. Marchy, H. K. Rusyid, and D. Dasari, "Analisis Bibliometrik: Penelitian Augmented Reality Dalam Pendidikan Matematika," *JIPM (Jurnal Ilm. Pendidik. Mat.*, vol. 11, no. 1, p. 141, 2022, doi: 10.25273/jipm.v11i1.13818.

[9] E. M. Margo Purnomo, A. Zaki, and D. Fordian, "STATE OF THE ART OF DIGITAL ENTREPRENEURSHIP IN FAMILY BUSINESS : CO-AUTHORSHIP AND CO-OCCURRENCE ANALYSIS," vol. 12, no. 1, pp. 187–193, 2021.

[10] I. G. A. A. O. Dewi, "Mendiskusikan Hasil Pengujian Hipotesis Penelitian Dalam Penyusunan Disertasi : Sebuah Kajian Teoritis," *KRISNA Kumpul. Ris. Akunt.*, vol. 13, no. 1, pp. 31–39, 2021, doi: 10.22225/kr.13.1.2021.31-39.

Empowering Students through AI: Integrating Artificial Intelligence (AI) Tools in Academic Writing Classes

Adhan Kholis[1]*, Khusnul Harsul Lisan[2], and Ulul Azmi[3]

[123]Department of English Language Education, Universitas Nahdlatul Ulama Yogyakarta, Yogyakarta, Indonesia

*E-mail: adhan@unu-jogja.ac.id

Abstract. This study explores the transformative potential of integrating Artificial Intelligence (AI) technologies into academic writing classes as a means to empower students and enhance their writing skills. By utilizing some AI tools and resources, the students can receive personalized feedback, access tailored learning materials, and develop essential writing skills in a more efficient and engaging manner. This study used mix method to explore and define the use of AI tools in academic writing class even the students' perception. The sample used was the students of English Education Department, Universitas Nahdlatul Ulama Yogyakarta and Universitas Terbuka semester six joining academic writing subject. To collect the data, the researchers employed interview, questionnaire, and documentation. The results highlighted the benefits, challenges, and implications of integrating AI in academic writing instruction, aiming to provide insights for educators and researchers seeking to harness the power of technology to enrich learning experiences and invest students' success.

1. Introduction

The emergence of artificial intelligence (AI) has signified a transformative era in a variety of fields, including education. AI technologies are rapidly being used in educational contexts, promising to improve learning experiences and outcomes. In the last decade, there has been a notable enthusiasm in research and development focusing on the application of AI in education [1]. The utilization of Artificial Intelligence (AI) in higher education (HE) has rapidly increased over the past five years [2]. AI integration in education offers personalised learning experiences, automated administrative activities, and creative teaching tools. These advancements create opportunities for more personalised, efficient, and interesting learning environments. In academic writing, AI may provide immediate feedback, propose revisions, and even develop content models, assisting both students and educators. These AI-driven systems enable interactive and genuine conversations, allowing learners to engage in realistic dialogue scenarios and dynamically improve their language skills [3].

Academic writing, a critical ability for students, especially in higher education, looks to profit greatly from AI applications. The academic writing class becomes one of the compulsory subjects of English Education Department in the sixth semester that must be taken. Academic writing differs from other types of writing as it is structured based on findings derived from research conducted through an empirical and systematic process. The sentences presented are very formal and grammatically structured, requiring a considerable amount of thinking time to produce high-quality academic writing. Both the writing and content must at least adhere to the established rules or standards of scientific writing. Writing an academic essay is a detailed process combining thorough research, well-organized arguments, and clear communication to contribute to academic discussions [3]. To establish a strong foundation for effective writing, students need to engage deeply with essential concepts of scholarly

writing. This involves creating clear and concise titles that accurately reflect the core of the work [4], and formulating engaging abstracts that concisely summarize the main ideas, methodologies, and findings of the study [5].

Referring to the writing activities in the classroom, several difficulties and challenges faced by the students when beginning to write academically were identified. After analyzing the initial learning needs, several factors were found, including: (1) lack of understanding of research methodology; (2) lack of academic writing skills; (3) low literacy in academic fields; (4) low interest or motivation in academic writing; and (5) poor grammar proficiency. For the first lack, students still do not have a strong grasp of research design, whether qualitative or quantitative. The research methods course still becomes very unfamiliar in their learning process. Students are encouraged to try something new where they begin to learn how to collect data, analyze data, and formulate a hypothesis. Secondly, poor academic writing skills make students less confident in their writing, especially when coupled with the difficulty of determining the main ideas and concepts for each paragraph. Students often find it challenging to start writing the first sentence of a paragraph. Even if students have written a paragraph, inconsistencies between the main idea and the supporting sentences are frequently found. Other challenges students find difficult include generating ideas or topics for writing, organizing the correct structure of the text, using academic language, and citing relevant sources. Thirdly, undeniably, Z generation spends more time using gadgets, updating their status, and playing games than reading books or scientific articles in their daily life. This lack of literacy negatively impacts the quality of students' academic writing. The more students read scientific articles, the more they will indirectly adopt good academic writing styles. Fourthly, the lack of interest and motivation in academic writing is a major concern for educators. This is also related to the habits of Z Generation, who prefer spending their time on gadgets rather than writing academic papers. Academic writing may be perceived as having little impact on their current success. Lastly, the final finding is the students' poor grammar skills. Correct grammar rules are an essential and integral part of academic writing. There are still students who incorrectly place the subject and predicate in a sentence. Incorrect sentence structure affects the meaning and context of the sentence.

From the above, it is clear that the presence of AI in academic writing can at least boost students' motivation and assist in quickly finding relevant sources. AI can help students quickly identify and correct writing errors. AI-powered tools provide essential support in various aspects of writing academic essays, including language correction, grammar checking, and proofreading [6]. From an instructional perspective, AI can act as a tutor by monitoring students' learning processes, evaluating their performance, and allowing instructors to eliminate repetitive and tedious teaching tasks [1], [7].

Previous studies have explored the use of AI in various educational contexts, highlighting its potential to improve learning outcomes and student engagement. However, there is a lack of comprehensive research specifically focused on the integration of AI tools combination in academic writing classes. This study aims to fill this gap by examining how AI tools can be effectively incorporated into academic writing curricula, assessing their impact on student performance and confidence.

Understanding AI's impact on academic writing classes is critical for educators, curriculum developers, and policymakers. This study provides insights into best practices for integrating AI in educational settings, aiming to enhance the overall quality of academic writing instruction. By empowering students through AI, educational institutions can better prepare them for the demands of academic and professional writing.

2. Method

This study used mix method to explore the potency and benefits offered by Artificial Intelligence (AI) tools toward students' writing skills and the students' perception. The sample used was the students of Department of English Language Education, Faculty of Education, Universitas Nahdlatul Ulama Yogyakarta and Universitas Terbuka semester six joining academic writing subject. The total number of students joining the class was 36 students including 22 students of UNU Yogyakarta and 14 students of Universitas Terbuka. To collect the data, both interview and questionnaire were employed. The interview was used to obtain the qualitative data such as the students' perception, needs, and lacks during learning to write using combination of AI tools. Google Form was administered to survey the use of AI in academic class. Then, the obtained data were analyzed using qualitative and quantitative analysis. To validate the data, triangulation was applied as a method to compare the results.

3. Results and Discussion

This section presented the findings, along with the discussion of each finding. These findings were based on several data collection techniques employed, including interviews and questionnaires. Also, this part addressed the previously determined research questions including: (1) What was the students' academic writing ability?; (2) how to integrate AI tools in the academic writing classes; (3) what were the roles of AI tools in assisting students in academic writing?; and (4) what are the students' perceptions of using AI tools in academic writing?.

Firstly, it was related to the students' ability in writing articles. The data were obtained from the questioannaire. These data can be seen from the students' responses to the question of how often they write academic papers in their daily lives. A total of 55.6% of students said they rarely write academic papers. Meanwhile, 33.3% said they write them quite often, and the remaining 11.1% said they never write academic papers. Based on the survey, this indicated a low level of motivation among students to write academic texts during their learning processes. Other supporting data can be seen from the results of peer review activities of their article manuscripts. Almost all student writings were found to have several grammatical and structural errors. Additionally, inappropriate word choices were often used. The frequent use of repetitive words indicated a low vocabulary knowledge. There is also often discrepancy between the main ideas and the supporting sentences in each paragraph.

Secondly, it referred to the integration of AI tools in the students' writing processes. In the classrrom practice, the researchers combined several AI-based tools, each with its own function, to perform tasks based on commands. The selection of these AI tools was suited to the complex needs of academic writing, including paraphrasing, translation, reference searching, correct citation methods, idea or topic selection, and editing. Also, integrating these AI tools into the academic writing process can significantly enhance the quality and efficiency of students' work. These AIs included *Quillbot AI*, which primarily helped students paraphrase sentences. Secondly, *Grammarly* served as a tool for accurately grammar checking. Thirdly, *Publish or Perish* (PoP) was also utilized for quickly and accurately finding reference sources besides *Google Scholar*. Additionally, *Zotero* and *Mendeley* were used as tools for automatically and accurately creating references and citations. Finally, *ChatGPT* was available as an alternative for the students to generate sentences when they face challenges with ideas and concepts. In detail, the sequence of using these AI tools was adjusted to the writing process, which can vary. It typically started with searching for research ideas or concepts. Then, the initial drafting of the writing was begun. If students had difficulties during writing directly in English language, they can use Google Translate. Afterwards, the results were then checked grammatically using Grammarly tool. For references and citation searching, a combination of Publish or Perish (PoP) and a reference manager

like Zotero and Mendeley can be utilized. Students can also utilize Quillbot AI to help rephrase source texts to reduce similarities and plagiarism in their writing.

Thirdly, it referred to the use of AI in academic writing classes. There were ten questions in the questionnaire as follows

1. *How often do you use AI tools for writing academic assignments?*
   Based on the survey, 44.4% of students frequently used AI tools in their academic writing tasks. Additionally, 37% of students reported using AI tools occasionally. The remaining 18.5% of students always use AI tools in their academic writing.
2. *Which AI tools do you use?*
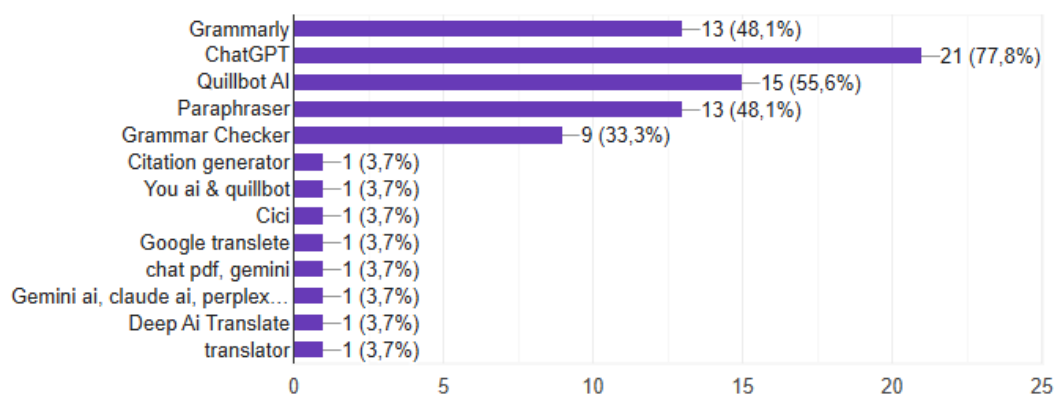
Based on the survey, it was very clear that the use of ChatGPT in academic writing was dominant at 77.8%. Following closely was the use of the paraphrasing application, Quillbot AI, at 55.6%. Grammarly and Paraphraser both ranked third with the same percentage, 48.1%. About 3,7% the students the others like Citation Generator, You ai.com, Cici AI, Google Translate, Chat Pdf, Gemini, Claude AI, Perplex, Deep AI Translate, and Translator.

3. *For what purposes do you use AI tools in academic writing?*
   Some choosen items including checking grammar and spelling, finding ideas or topics, making first drafts, editing last drafts, translating texts, and finding references. The survey responses aligned with the students' interview answers. Mostly, the students used AI tools for several purposes including helping in finding research topics, grammar checking, and translating texts. These uses demonstrated how students leverage AI tools to enhance various aspects of their academic writing process. This result was supported by the research [3] who found a favorable response to AI-driven writing tools, with students recognizing their advantages in grammar correction, plagiarism detection, language translation, and creating essay outlines. Moreover, AI offers efficiency, productivity, and accuracy benefits in grammar checking, reference management, writing assistance, and plagiarism detection [7]. In addition, taking a broader perspective on AI in higher education, [8] conducted a systematic review focusing on AI in online higher education, analyzing literature from 2011 to 2020. Their findings indicated that the primary functions of AI applications in this field were performance prediction, resource recommendation, automatic assessment, and enhancement of learning experiences.
4. *How effective do you use AI tools in assisting your academic writing?*
   According to the survey, the use of AI in academic writing classes was considered effective with the percentage 33.3%. Those who chose neutral represented 33.3%. 25.9% of students stated that AI was very effective in academic writing. The remaining 7.4% said it was not effective at all.
5. *How much do you agree with the following statement: "Using AI improves the quality of my academic writing."*

Based on the students' responses, 55.6% of students agreed that AI can improve the quality of academic writing. 29.6% of students chose to remain neutral. The remaining 14.8% of students strongly agreed.

6. *How much do you agree with the following statement: "AI makes me more confident in academic writing."*
   Based on the students' responses, 59.3% of students agreed that AI can make them confident in academic writing classes. 22.2% of students chose to remain neutral. 14.8% of students strongly agreed. The remaining 3.7% disagree.

7. *Do you feel that using AI could decrease your ability to write academic papers manually?*
   Based on the results of the students' survey, 55.6% of students said there was a possibility that the use of AI could reduce their ability to write scholarly works manually. 22.2% of students said yes and no.

8. *Do you feel comfortable using AI in Academic Writing classes?*
   Based on the level of comfort of students in using AI in academic writing classes, 70.4% of students felt quite comfortable. 25.9% of students said they were very comfortable using some AI tools. The remaining 3.7% stated that they were less comfortable.

9. *How important do you feel teaching academic writing using AI tools?*
   Furthermore, regarding the importance of using AI tools in teaching academic writing, 48.1% of students considered it important for instructors to use AI as a tool in the teaching process in class. 25.9% of students said it was very important, while others were neutral.

10. *Does the presence of AI in Academic Writing classes reduce the quality of classroom learning?*
    The final survey results regarding whether the presence of AI would reduce the quality of classroom learning or not showed that 66.7% of students stated that AI did not reduce the quality of learning. 25.9% indicated there might be a reduction in quality. The remaining 7.4% of students answered yes.

The following were the findings from several students' interviews regarding their perceptions, suggestions, and feedback on academic writing with AI integration. Relatively, most students appreciate the assistance of AI provided in academic writing, but they emphasized the importance of maintaining their original ideas, reviewing AI output, and using AI as a supportive tool rather than a substitute.

Student 1: "*AI use was permitted, but primarily to get an overview or to ensure correct grammar. Writers must first understand the basics of writing*"

Student 2: "*I can simplify the writing process but should retain the original ideas of the author. It was very helpful for me in generating ideas and finding new ones that were previously difficult to discover. However, AI should be used appropriately, such as adjusting material and themes.*"

Student 3: "*AI had significant potential in academic writing but requires a careful and responsible approach. It was also important to review the work produced by AI.*"

Student 4: "*Technology was designed to make human tasks easier, and thus it should be utilized in learning. However, the use of AI can sometimes lead to negligence. Therefore, it was recommended to use AI with reasonable limits and not entirely rely on it for all tasks, while maintaining personal intellectual input as an editor for the final result.*"

Student 5: "*AI should be seen as an assistant rather than the main actor. We still need to review and correct the output from AI to ensure that it does not suppress our original ideas and creativity.*"

Student 6: "*AI was very helpful for academic writing, as it allowed us to check if our sentence structures were correct. However, we should review the output because it might not always meet our expectations. AI was useful in generating initial ideas or concepts in academic writing. It helped to find ideas that can be further developed and to verify their accuracy.*"

Student 7: "*Use AI as a tool to assist and collaborate with, not as a replacement for completing academic writing tasks. AI was a learning medium that can help identify and correct mistakes in writing. Learning from AI corrections can enhance our knowledge and writing skills.*"

Student 8: "*AI in academic writing was beneficial but should be seen as an aid, not a replacement. In the future, it was hoped that more free applications will be available to minimize costs and maximize results, making it easier for students who struggle to find ideas.*"

Some findings from the students' responses also corresponded with the research results by [9], who used systematic literature review method to analyze 24 research studies related to AI in academic writing. They identified 24 studies, revealing six core domains where AI assists in academic writing and research including: 1) aiding in idea generation and research design, 2) enhancing content and structure, 3) supporting literature review and synthesis, 4) improving data management and analysis, 5) facilitating editing, review, and publishing, and 6) assisting in communication, outreach, and ethical compliance. ChatGPT has shown significant potential in these areas, though challenges such as maintaining academic integrity and balancing AI use with human insight persist. Moreover, it was equal to research results conducted by [3]. The findings revealed a positive reception of AI-powered writing tools, with students recognizing their benefits in grammar checking, plagiarism detection, language translation, and creating essay outlines. AI has been shown to increase students' writing skills, self-efficacy, and knowledge of academic integrity.

4. Conclusion

Based on several findings, there are several conclusions. Firstly, students' academic writing skills are still considered relatively low, as evidenced by the findings from peer-review activities and the students' surveys. Secondly, AI tools integration in the academic writing process can vary depending on students' thinking methods. These AI tools are used to enhance the quality and efficiency of writing. AI tools provide the students with the opportunity to analyze writing errors in terms of both content and grammar. Moreover, AI assists the students in research idea generation, grammar checking, manuscript editing, text translation, and source reference searching. Thirdly, AI plays a significant role in academic writing without reducing the quality of students' manual writing. Lastly, students' perceptions are generally positive and diverse. Mostly, the students strongly support and agree with the use of AI in academic writing classes. Additionally, AI is capable of providing encouragement and motivation to students.

References

[1] G.-J. Hwang, H. Xie, B. W. Wah, and D. Gašević, "Vision, challenges, roles and research issues of Artificial Intelligence in Education," *Comput. Educ. Artif. Intell.*, vol. 1, p. 100001, 2020, doi: 10.1016/j.caeai.2020.100001.

[2] H.-C. Chu, G.-H. Hwang, Y.-F. Tu, and K.-H. Yang, "Roles and research trends of artificial intelligence in higher education: A systematic review of the top 50 most-cited articles," *Australas. J. Educ. Technol.*, vol. 38, no. 3, pp. 22–42, 2022.

[3] A. R. Malik *et al.*, "Exploring Artificial Intelligence in Academic Essay: Higher Education Student's Perspective," *Int. J. Educ. Res. Open*, vol. 5, p. 100296, Dec. 2023, doi: 10.1016/j.ijedro.2023.100296.

[4] F. A. Maiorana and H. F. Mayer, "How to avoid common errors in writing scientific manuscripts," *Eur. J. Plast. Surg.*, vol. 41, no. 5, pp. 489–494, 2018, doi: 10.1007/s00238-018-1418-z.

[5] S. Altmäe, A. Sola-Leyva, and A. Salumets, "Artificial intelligence in scientific writing: a friend or a foe?," *Reprod. Biomed. Online*, vol. 47, no. 1, pp. 3–9, 2023, doi: 10.1016/j.rbmo.2023.04.009.

[6] W. Alharbi, "AI in the Foreign Language Classroom: A Pedagogical Overview of Automated Writing Assistance Tools," *Educ. Res. Int.*, vol. 2023, pp. 1–15, Feb. 2023, doi: 10.1155/2023/4253331.

[7] X. Chen, H. Xie, and G.-J. Hwang, "A multi-perspective study on Artificial Intelligence in Education: grants, conferences, journals, software tools, institutions, and researchers," *Comput. Educ. Artif. Intell.*, vol. 1, p. 100005, 2020, doi: 10.1016/j.caeai.2020.100005.

[8]   E. N. Rabbianty, S. Azizah, and N. K. Virdyna, "AI in academic writing: Assessing current usage and future implications," *INSANIA J. Pemikir. Altern. Kependidikan*, vol. 28, no. 1a, pp. 14–35, Dec. 2023, doi: 10.24090/insania.v28i1a.9278.

[9]   F. Ouyang, L. Zheng, and P. Jiao, "Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020," *Educ. Inf. Technol.*, vol. 27, no. 6, pp. 7893–7925, Jul. 2022, doi: 10.1007/s10639-022-10925-9.

[10] M. Khalifa and M. Albadawy, "Using artificial intelligence in academic writing and research: An essential productivity tool," *Comput. Methods Programs Biomed. Update*, vol. 5, p. 100145, 2024, doi: 10.1016/j.cmpbup.2024.100145.

Development of T-Morf Game as a Digital-Based Learning Media for Morpheme Classification

Ariva Luciandika[1*], Novi Eka Susilowati[2], and Kusubakti Andajani[3]

[1] Indonesian Department, Universitas Negeri Malang, Malang, Indonesia
[2] Indonesian Department, Universitas Negeri Malang, Malang, Indonesia
[3] Indonesian Department, Universitas Negeri Malang, Malang, Indonesia

[*]E-mail: ariva.luciandika.fs@um.ac.id

Abstract. Morphology is an important component in the study of linguistics. Morphemes are components of word formation and serve to help understand word classes, sentence structure, and grammatical analysis. Based on preliminary analysis, there is not much media available that focuses on learning morpheme classification. The specific objective of the research is to develop the T-Morf game with APK extension as a learning medium for morpheme classification that is feasible to implement in terms of (1) content, (2) systematic presentation, (3) language, and (4) visual aspect. The development design used in the research is the 4D model. The stages in this method consist of 5 parts, namely (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. Based on the results of expert test validation with Indonesian language learning experts and media experts, the game product is categorized as feasible to implement. The game has an average feasibility score of 85.2% on the content component, 83.2% on the systematic presentation component, 85.5% on the language component, and 87.3% on the visual aspect component. The product has been implemented in learning morphology.

1. Introduction

Morphology is a basic study form of language and the study of word formation, including the ways new words were created in the languages of the world (Yule, 2010). The study of morphology refers to morphological units and processes. The morphological units referred to are morphemes and words, while the morphological process involves several components, including basic components, forming tools (affixes, duplication, composition), and grammatical meaning (Chaer, 2008).

Morphology has a relationship with the four basic language skills, especially in writing, because students are required to be able to arrange words and their forms, and arrange them into sentences. (Zuhri, Suwandi, & Fitriati, 2022). In addition, morphology is also becomes an important part of the discourse analysis process. The linguistic elements included in discourse consist of words, phrases, clauses, and sentences (Sumadi & Susilowati, 2016). Therefore, morphology is an important part studied in the study of language sciences in higher education.

Research related to morphology has been conducted several times. For example, the process of word formation in online mass media (Luthfiyati, Kholiq, & Zahro, 2017). This study aims to identify the most common types of words used in the headlines of education articles on the "Jakarta Post Website". In the academic context, research has been conducted specifically examining common errors

made by students, such as placing the plural form when the singular form should be used, or errors in the selection of certain affixes (Zuhri, Suwandi, & Fitriati, 2022).

The research on morphology learning has been carried out, including *lesson study* activities in learning Indonesian morphology (Bakri, 2016). The study aims to describe the process of morphology learning and it indicates a tendency that its implementation has not shown maximum results. Another research that has been conducted, namely on the analysis of language errors at the morphological level, and found errors of affixation, reduplication, and fusion. (Utami, 2017).

Research on morphology teaching materials has been conducted previously, specifically a morphophonemic analysis of the Jambi Malay language as a development of Indonesian morphology teaching materials (Akhyaruddin, Agusti, & Yusra, 2019). Based on the results of the research, teaching materials for Indonesian Morphology courses were produced, including the nature of morphology, types of morphemes, types of affixation, morphophonemic rules, affixation processes, reduplication processes, composition processes, and abbreviation processes. However, the teaching materials have not been equipped with supporting media integrated with digital technology.

Based on the results of previous research, the proposed research is important to conduct because it requires a set of adequate resources, materials, and supporting media to optimize morphology learning, especially those that can be used in distance learning. The urgency of this research is to develop digital-based morphology learning media, especially on morpheme classification. The specific objectives of the research are (a) to develop the *T-Morf* game with APK extension as a suitable learning media for morpheme classification that can be effectively implemented in terms of content, (b) to develop the *T-Morf* game with APK extension as a suitable learning media for morpheme classification that can be effectively implemented in terms of structure, (c) to develop the *T-Morf* game with APK extension as a suitable learning media for morpheme classification that can be effectively implemented in terms of language, and (d) to develop the *T-Morf* game with APK extension as a suitable learning media for morpheme classification that can be effectively implemented in terms of visual aspect.

2. Method

The research entitled *Development of T-Morf Game as a Digital-Based Learning Media for Morpheme Classification* is a type of development research. This is because the research aims to produce products and test the effectiveness of these products (Sugiyono, 2013). The development design uses the 4D model, which is a simple instructional design used by researchers in designing products to help learners improve their abilities (Irawan, Padmadewi, & Artini, 2018). The 4D model is used for various types of learning media (Johan, Iriani, & Maulana, 2023) which consists of 4 stages, namely (*1) define, (2) design, (3) development,* and *(4) dissemination.*

In the *define* stage, it is done by observing the situation and field conditions. Data collection techniques with questionnaires filled by students as a non-test instrument for needs analysis. At the *design* stage, the game design was carried out by paying attention to the focus of the study that had been determined. In the game, there is a multi-level interactive game for learning morpheme classification. Each level will train the ability to classify morphemes based on (1) the ability to stand alone, (2) productivity, (3) the possibility of joining other morphemes, (4) relations between elements, (5) meaning, (6) source, and (7) number of phonemes.

At the *development* stage, validation tests and limited trials were carried out to ensure product feasibility. The validation test stage was carried out with Indonesian language learning experts and learning media experts. The data collection technique is a questionnaire filled out by the validator and will be described qualitatively. The limited trial stage was conducted on students majoring in Indonesian Literature taking the Morphology course. This research has reached the dissemination stage, which involves disseminating the research findings to obtain feedback or evaluation.

3. Result and Discussion

3.1 Data Exposure

The expert test was conducted with two validators, namely validators (a) Indonesian language learning experts and (b) learning media experts. The expert validation included components of (1) content, (2) systematic presentation, (3) language, and (4) visual aspect. The eligibility parameters were classified into four score based on the Likert scale, namely 4 (very good/very appropriate/very feasible/very clear), 3 (good/appropriate/feasible/clear), 2 (less good/less appropriate/less feasible/less clear), and 1 (not good/not appropriate/not feasible/not clear). The Likert scale itself is highly dependent on the research instrument variables that are derived from the research theoretical construction objectives (Joshi, Kale, Chandel, & Pal, 2015). In addition to a score scale of 1-4, feasibility is also classified in the form of a percentage based on the criteria in Table 1 (Arikunto, 2011).

Table 1. Product Feasibility

Product Eligibility Criteria	
Percentage Score	Eligibility Criteria
0%-40%	Not worth it
41%-60%	Less feasible
61%-80%	Worth
81%-100%	Very worthy

If the average of the validation test results is more than equal to 61%, the product is declared feasible and can be implemented. Code X is the expert test answer in one item, Xi is the maximum score in one item, HU is the percentage of test results, TL is follow-up, I is implementation, and R is revision. Below is the presentation of data from expert product testing, which details nonverbal data in the form of scores for assessment components, namely (1) content, (2 systematic presentation, (3) language, and (4) visual aspect.

Table 2. Validation test results on the content component

ASSESSMENT INDICATORS	ASSESSMENT ITEMS	ASSESSMENT			
		X	Xi	HU	TL
A. Appropriateness of game content with learning outcomes	1. The suitability of the game content with the learning outcomes of understanding BI morpheme types.	4	4	86%	I
	2. The suitability of the game content with the learning outcomes of understanding the form of BI morphemes.	4	4	90%	I
	3. The suitability of the game content with the learning outcomes of understanding the basic concepts of morphological processes in BI.	3	4	80%	I
	4. The suitability of the game content to the learning outcomes of analysing the types of BI morphological processes.	4	4	84%	I
B. The accuracy of the content of the questions presented in each level	1. The accuracy of the content of the question about the classification of morphs based on the ability to stand alone.	4	4	85%	I
	2. The accuracy of the content of the question about the classification of morphs based on productivity.	4	4	86%	I
	3. The content accuracy of the question on categorising morphemes based on the possibility of combining with other morphemes.	4	4	86%	I
	4. The accuracy of the content of the question about categorising morphs based on the relationship between their elements.	4	4	87%	I
		4	4	85%	I

ASSESSMENT INDICATORS	ASSESSMENT ITEMS	ASSESSMENT			
		X	Xi	HU	TL
	5. The accuracy of the content of the question about the categorisation of morphs based on meaning.	4	4	87%	I
	6. The accuracy of the content of the question about the categorisation of morphs based on the source.	4	4	85%	I
	7. The accuracy of the content of the question on categorising morphs based on the number of phonemes.				
C. Supporting learning materials	1. The suitability of various levels with learning outcomes.	4	4	87%	I
	2. Continuity of content of questions presented in each level.	3	4	80%	I
	3. The variety of questions presented in each level.	4	4	85%	I
D. Up-to-date CONTENT	1. The suitability of the game to the development of science and technology.	4	4	87%	I
	2. Library up-to-dateness	3	4	83%	I
	Average game feasibility			85,2%	I

Table 3. Validation test results on the systematic presentation component

ASSESSMENT INDICATORS	ASSESSMENT ITEMS	ASSESSMENT			
		X	Xi	HU	TL
A. Completeness of systematic presentation	1. Completeness of presentation of questions about morpheme types.	4	4	89%	I
	2. Completeness of presentation of questions about morpheme form.	4	4	86%	I
	3. Completeness of presentation of questions about the basic concepts of morphological processes.	3	4	80%	I
	4. Completeness of presentation of questions about the types of morphological processes.	3	4	80%	I
B. Systematic order of presentation	1. Systematic order of presentation.	3	4	80%	I
	2. The order of presentation of questions from easy to difficult.	4	4	85%	I
	3. The appropriateness of the order of presentation with the coherence of the train of thought.	3	4	83%	I
	Average game feasibility			83,2%	I

Table 4. Validation test results on the language component

ASSESSMENT INDICATORS	ASSESSMENT ITEMS	ASSESSMENT			
		X	Xi	HU	TL
A. Accuracy of sentence usage	1. Completeness of sentence structure in the game.	4 4	4 4	88%	I I I
	2. Effectiveness of sentences in the game.	4	4	89%	
	3. Inter-sentence cohesion in the game.			85%	
B. Accuracy of linguistic gifts	1. Correct use of spelling.	4	4	87%	I I I
	2. Accuracy in the use of punctuation.	4	4	87%	
	3. Standardisation of terms.			85%	
C. Readability of the message	1. Clarity to instruct the in-game stages.	3	4	84%	I
	2. Ease of understanding the language in each level.	3	4	83%	I
	3. The language used is communicative.	3	4	81%	I
	Average game feasibility			85,5%	I

Table 5. Validation test results on the visual aspect component

ASSESSMENT INDICATORS	ASSESSMENT ITEMS	X	Xi	ASSESSMENT HU	TL
A. Game user interface design	1. The attractiveness of the game's *user interface* design illustrations.	4	4	95%	I
	2. Attractiveness of *user interface* design colour selection	4	4	88%	I
	3. The attractiveness of the game name selection.	4	4	90%	I
	4. The attractiveness of the illustrations in the game.	3	4	80%	I
B. Typography	1. The attractiveness of the font selection.	3	4	83%	I
	2. Appropriateness of font size selection.	4	4	87%	I
	3. The attractiveness of the layout.	4	4	90%	I
	4. Consistency of numbering or symbols used.	4	4	85%	I
Average				87,3%	I

3.2 Discussion

Game content is the first component that needs to be considered. The average obtained in this component is 85.2%, with the maximum score in the section on the suitability of content content with the learning outcomes of understanding the form of Indonesian morphemes. At the grammatical level, morphemes are the smallest units and are part of words. Words have some kind of internal structure, but this structure can only be found by comparing words with each other (Manova, Hammarström, Kastner, & Nie, 2020). The different notions of words include words that are called (a) phonological, (b) lexemes, and (c) grammatical (Akbar, 2015).

Words form units of phrases, clauses, sentences, paragraphs, and discourses. Words are composed of one or more morphemes. Morphemes are the smallest elements, each of which has a meaning in the speech of a language (Rumilah & Cahyani, 2020). The term morpheme is used to refer to the smallest unit that has meaning or has a grammatical function (Novita, 2014). Morphemes are the smallest grammatical units, cannot be subdivided into smaller grammatical units, and are distinguishing in meaning. The game is designed for learning morpheme classification, so the content has been focused on the types and forms of morphemes.

Experts classify morphemes based on certain categories. However, in general, morphemes can be categorised based on (1) the ability to stand alone (free, semi-free, and bound); (2) productivity (productive and improductive); (3) the possibility of joining other morphemes (open and closed); (4) the relationship between elements (whole and split); (5) meaning (lexical and grammatical); (6) source (native Indonesian and applied); and (7) number (monophonemic and polyphonemic). (Sumadi, 2012). The following is the game display which consists of 3 levels with different difficulty levels.

Figure 1. Level 1 view Figure   2. Level 2 viewFigure   3. Level 3 view
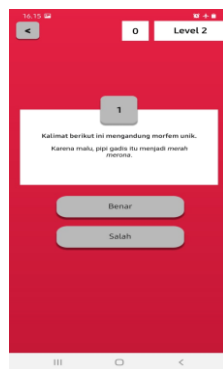
Systematic presentation is the second component that needs attention. The average obtained in this component is 83.2%, with the maximum score in the completeness of the presentation of questions about morpheme types. In learning morphology, it is necessary to give basic concepts and varied examples, because there are many variants, word classes, and word formations. The game is a media that provides a fun learning environment and is developed based on the needs of the learners. (Pratami, Nitiasih, & Budiarta, 2023). In the T-Morf game, questions about morpheme classification are presented completely and tiered at each level according to the learner's needs. The difficulty level of the game is from easy to difficult. Each level trains learners to choose morpheme types, apply morpheme type theory in sentences, then pair morpheme pairs and their morpheme classifications.

Language is the third component that needs attention. The average obtained on this component is 85.5%, with the maximum score on the effectiveness of the sentences in the game. The game is used as a medium for learning morphology, which is the study of systematic variations in the form and meaning of words, as well as the study of combinations of morphemes to produce words (Rugaiyah, 2018). Therefore, the instructions provided in the game must refer to the correct linguistic features. Moreover, the dimension of language use also pertains to the appropriateness of utilizing language forms to achieve communication goals. (Utami, 2017).

Visual aspect is the fourth component that needs attention. The average obtained on this component is 87.3%, with the maximum score on the attractiveness of the *user interface* design illustrations. When science and technology develop rapidly, teachers need to enhance their skills' quality by using a variety of engaging learning media that align with technological advances (Lestari, 2018). Creativity and learning innovation are important for teachers in dealing with the increasing complexity of education (Kelly, 2017). In language learning, for example, there are many media that can help teachers teach vocabulary, such as films, songs, or interactive games (Bawawa, 2020). Therefore, game media design is suitable for distance learning that is easy, flexible, and fun. Digital media content will transform physical space into virtual space, build temporal space, and expand connections, as information technology has an exponential impact on the way society connects (Lawrence, 2017).

4. Conclusions

Morphology is an important component in the study of other linguistic sciences. Therefore, morphology is studied in higher education within the field of linguistic sciences. The proposed research is important to conduct because there is currently a lack of digital-based media available for learning morphology. The urgency of this research lies in developing digital-based morphology learning media, particularly focusing on morpheme classification. The specific aim of the research is to develop the T-Morf game with an APK extension as a learning medium for morpheme classification that is feasible to implement in terms of (1) content, (2) systematic presentation, (3) language, and (4) visual aspect.

The game specification is to present a multi-level interactive game for learning morpheme classification. The game is formed in APK extension format so that lecturers and students can install it on mobile phones. The appearance, fonts, and images were designed by an illustrator to make the game's *user interface* attractive to users. The development design used in the research is the 4D model which consists of 4 stages, namely *(1) define, (2) design, (3) development,* and *(4) dissemination.* Based on the results of validation tests with Indonesian language learning experts and media experts as well as limited trials with students, the game is categorised as feasible and ready to be implemented. The game has an average feasibility of 85.2% in the content component, 83.2% in the systematic presentation component, 85.5% in the language component, and 87.3% in the visual aspect component.

References

[1] Akbar, M. A. (2015). Acquisition of Indonesian Affix Morphemes for 2-6 Year Old Children in Paud Buana, Banyu Urip Village, Central Lombok Regency. *RETORIKA: Journal of Language Science, 1*(2), 250-257.

[2] Akhyaruddin, Agusti, A., & Yusra, H. (2019). Morphophonemic Analysis of Jambian Malay Language as a Teaching Material Development for Indonesian Morphology. *Pena: Journal of Language and Literature Education, 9*(2), 56-67.

[3] Arikunto, S. (2011). *Research Procedure: A Practical Approach.* Jakarta: Rineka Cipta.

[4] Bakri, M. (2016). Lesson Study Activities in Learning Indonesian Morphology for Semester IV Students of Indonesian Language Education Study Programme, Cokroaminoto University Palopo. *Proceedings of the National Seminar.* Palopo.

[5] Bawawa, M. (2020). Teaching English Vocabulary Using Songs to Develop Students' Vocabulary Mastery. *Journal of Linguistic Studies, 8*(1), 1-12.

[6] Chaer, A. (2008). *Morphology of Indonesian Language.* Jakarta: Rineka Cipta.

[7] Irawan, A. G., Padmadewi, N. N., & Artini, L. P. (2018). Instructional materials development through 4D model. *SHS Web of Conferences* (pp. 1-4). EDP Sciences.

[8] Johan, J. R., Iriani, T., & Maulana, A. (2023). Application of the Four-D Model in the Development of Video Media for Small Group and Individual Teaching Skills. *Journal of West Science Education, 1*(6), 372-378.

[9] Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert Scale: Explored and Explained. *British Journal of Applied Science & Technology, 7*(4), 396-403.

[10] Kelly, R. (2017). Creative Development in Teacher Education. In &. M. J. B. Cummings, *Creative Dimensions of Teaching and Learning in the 21st Century.* Rotterdam: Sense Publishers.

[11] Lawrence, G. (2017). Integrating the "Human Feel" into Online Second/Additional Language Teaching Approaches. In &. M. J. B. Cummings, *Creative Dimensions of Teaching and Learning in the 21st Century.* Rotterdam: Sense Publishers.

[12] Lestari, I. D. (2018). The Role of Teachers in the Use of Information and Communication Technology (ICT) Based Learning Media at SDN RRI Cisalak. *Susunan Artikel Pendidikan, 3*(2), 137-142.

[13] Luthfiyati, D., Kholiq, A., & Zahro, I. N. (2017). The Analysis of Word Formation Processes in the Jakarta Post Website. *Linguistic, English Education and Art (LEEA) Journal, 1*(1), 30-36.

[14] Manova, S., Hammarström, H., Kastner, I., & Nie, Y. (2020). What is in a morpheme? Theoretical, experimental and computational approaches to the relation of meaning and form in morphology. *Word Structure, 13*(1), 1-21.

[15] Novita, D. (2014). The Use Of Morphemes: An Alternative Way To Increase The Mastery Of Students' Vocabulary. *Educate, 3*(2), 13-20.

[16] Pratami, I. G., Nitiasih, P. K., & Budiarta, L. G. (2023). Development of Educational Games as Learning Media for English Learning for Primary Students. *Language Circle: Journal of Language and Literature, 17*(2), 317-324.

[17] Rugaiyah. (2018). Derivational and Inflectional Morphemes: A Morphological Analysis. *J-SHMIC, 2*(2), 73-86.

[18] Rumilah, S., & Cahyani, I. (2020). Language Structure: Word and Morpheme Formation as Morphemic and Morphophonemic Processes in Indonesian. *Journal of Indonesian Language Education, 8*(1), 70-87.

[19] Sugiyono. (2013). *Quantitative, Qualitative, and R&D Research Methodologies.* Bandung: Alfabeta.

[20] Sumadi. (2012). *Morphology of Indonesian Language.* Malang: State University of Malang.

[21] Sumadi, & Susilowati, N. E. (2016). The Appropriateness of Preposition Use in the Wreaths of Students in Grades III, IV, V, and VI. *Language and Arts: Journal of Language, Literature, Art, and Teaching, 44*(1), 99-110.

[22] Utami, S. R. (2017). Learning Grammar Aspects in Indonesian Language Textbooks. *Aksis: Journal of Indonesian Language and Literature Education, 1*(2), 189-203.

[21] Yule, G. (2010). *The study of language: 4th edition.* Cambridge: Cambridge University Press.

[22] Zuhri, M. S., Suwandi, & Fitriati, S. W. (2022). Morphological Process of Morphemes Through Word-Formation Process in Students' Writing. *English Education Journal, 12*(3), 301-309.

Strategies and Implications of Utilizing AI for Inclusive Informatics Teaching by PPG Pre-Service Informatics PPL Teachers

Astina Hotnauli Marpaung [1*] , Nurotul Wafiroh [2]

[1] Nonformal Education, Universitas Negeri Yogyakarta , Yogyakarta, Indonesia
[2] Nonformal Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

[*] Email: astinahotnauli.2023@student.uny.ac.id
　　　　 [2] nurotulwafiroh.2023@student.uny.ac.id

Abstrak. This study aims to examine the strategies and implications of utilizing AI in teaching inclusive informatics by informatics PPL teachers at PPG Pre-service wave one of Universitas Pendidikan Indonesia. This research used a descriptive qualitative approach. Data were collected through in-depth interviews, participatory observation, and document analysis. The results showed that the use of AI in inclusive informatics teaching can improve accessibility and personalization of learning for students with various special needs. Informatics PPL teachers adopt various strategies, including the use of adaptive learning applications, AI-based learning platforms, and interactive aids to facilitate more inclusive and effective learning. The implications of this AI utilization include improved teacher digital competencies, more flexible curriculum development, and increased student participation and learning motivation. This research provides insights for the development of educational policies that support the integration of AI technologies in the learning process to create a more inclusive and adaptive learning environment.

Keywords: artificial intelligence (AI), informatics teacher, Pre-service PPG

1. Introduction

In the ever-evolving digital age, education in informatics faces significant challenges. Informatics teaching requires not only a strong theoretical understanding but also practical skills in ever-changing technologies. One promising solution to address these challenges is the utilization of artificial intelligence (AI) in the teaching process. However, the implementation of AI in informatics teaching has not been fully optimized, especially in the context of inclusive education. Learner diversity includes various aspects such as differences in abilities, learning styles, cultural backgrounds, and socio-economic conditions. Teachers are required to be able to adapt teaching methods to meet the individual needs of diverse students. In the current revolutionary era, more emphasis is placed on artificial intelligence models, digital economy, robotics, and others known as disruptive innovation (Rahman, 2019). One of the Industry 4.0 technologies that can be applied to education is artificial intelligence technology (Mardhiyana et al., 2018). Artificial Intelligence is carried out using robots to replace human labor so that it becomes cheaper, more efficient and effective (Rudyanto et al., 2019). Simple robots can be made using software or commonly referred to in the form of applications that are currently widely

used on smartphones. Smartphones can be filled with educational content applications and this can be used as an interesting and fun learning experience for students (Prilistama, 2021).

In the context of the Pre-Service Teacher Professional Education (PPG) Program, especially in Informatics, it is important to explore how prospective teachers utilize AI technology to overcome these challenges. This research focuses on the strategies and implications of utilizing AI for inclusive informatics teaching by informatics PPL teachers in the UPI Pre-Service Teacher Professional Program (PPG). When informatics field experience teachers from the Preservice Teacher Professional Program (PPG) teach in the classroom, they are often faced with various challenges that affect learning effectiveness. Within a single class, students' informatics skill levels can vary widely, with some students already having a strong foundation in technology use while others are just beginning to learn. This disparity makes it difficult for teachers to design one effective teaching method for all students. In addition, not all students have equal access to technology devices and the internet outside of school, which is a major obstacle especially when learning has to be done online or when students need to do assignments that require the use of computers and the internet. Informatics PPL teachers often see that this inequality of access hinders students' learning progress, especially those from economically disadvantaged backgrounds. Lack of time and the tight curriculum also require teachers to deliver a lot of material in a short amount of time, making it difficult for them to give individualized attention to students who need it. As a result, students who need more time to grasp concepts are often left behind. In addition, conventional teaching methods are often not adaptive enough for students with special needs, such as those with attention disorders or learning disabilities who may need a different approach to keep up. Without the right tools, teachers find it difficult to ensure that all students can engage and learn effectively. Informatics PPL teachers also face challenges in quickly identifying student learning difficulties. Without the right tools to monitor students' learning progress in real-time, these difficulties can go undetected until students' learning outcomes drop dramatically. From these challenges, informatics teachers realize that there is an urgent need to adopt new approaches that can help them overcome these issues.

According to UNESCO (2020), access to quality education remains a major challenge in many developing countries. AI can help bridge this gap by providing learning materials that are widely accessible and adapted according to student needs. Every student has unique needs and learning styles. Adaptive learning theory (Shute & Zapata-Rivera, 2012) emphasizes the importance of customizing learning materials based on students' individual needs to improve learning effectiveness. AI can play an important role in personalizing learning by analyzing student data and adjusting learning content in real-time.

Artificial Intelligence (AI) is perceived as a practical future in the science and technical community, where people communicate, understand, and share thoughts and perspectives with the help of soft and hard technology (Housman, 2018).. Pre-service PPG programs attempt to equip teachers with the necessary competencies, but many still require further training in AI utilization. Research by Holmes et al. (2019) shows that AI can improve student learning outcomes by providing a more interactive and personalized learning experience. However, this effectiveness is highly dependent on teachers' ability to apply the technology. Appropriate use of AI can help in identifying student learning difficulties early and providing timely interventions.

The implementation of AI in education faces various challenges, including inadequate technological infrastructure and resistance to change. In the context of educational technology, we need to acknowledge that the utilization of technology in the learning process is still uneven. Amidst the increasingly fierce competition in the current era, there are still educational institutions that have not fully adopted technology in their teaching practices. Therefore, in the current era, schools should actively use the latest technology that can provide convenience for teachers and students. This includes

the use of applications or platforms that can automate a number of tasks, such as providing feedback, selecting appropriate learning materials, and tailoring the curriculum to students' individual needs. (Tjahyanti, et al., 2022).

Based on this background, this study formulates several main issues: what are the strategies implemented by ITE teachers in utilizing AI for inclusive ITE teaching, what are the implications of AI utilization on the learning process and student learning outcomes, and what are the challenges and opportunities faced by ITE teachers in integrating AI in their teaching.

Various studies have shown the great potential of AI in education. Holmes et al. (2019) found that AI can be used to personalize learning, allowing students to learn at their own pace and learning style. In the context of learner diversity, AI can help teachers to develop more inclusive and effective learning strategies (Luckin et al., 2016). Woolf (2020) also pointed out that AI-based learning tools can assist teachers in identifying students' learning difficulties earlier and providing timely interventions. In line with these findings, research conducted by Zawacki-Richter et al. (2019) shows that AI has great potential to improve learning effectiveness, especially in highly diverse environments.

Recent theories in education and technology, such as adaptive learning theory and multimedia cognitive theory, support the utilization of AI in education. Adaptive learning theory (Shute & Zapata-Rivera, 2012) emphasizes the importance of customizing learning materials based on students' individual needs. Cognitive multimedia theory by Mayer (2009) highlights how the use of interactive media and technology can improve students' understanding and retention of information. Inclusive education aims to ensure all students, including those with special needs, have equal access to education. Florian and Black-Hawkins (2011) state that inclusive education is not only about including students with special needs into regular classes but also about adapting teaching methods so that all students can learn effectively.

This research is expected to make a significant contribution to the understanding of how AI can be effectively integrated in inclusive informatics teaching, as well as the implications for students' learning processes and outcomes.

2. Research method

This study used a descriptive qualitative approach to explore the strategies and implications of utilizing AI in teaching inclusive informatics by UPI wave one pre-service PPG informatics PPL teachers. According to Sugiyono (2021: 9), qualitative research methods are research methods based on the philosophy of post-positivism, used to research natural objects, (as opposed to experiments) where the researcher is the key instrument. Data collection techniques were carried out by in-depth interviews and participatory observation.

The participants in this study were PPL Informatics teachers who were undergoing the Pre-Service PPG program at the Indonesian Education University. A total of 18 teachers were purposively selected to provide representative variation in terms of educational background, teaching experience, and level of proficiency in using AI technology.

Data were collected through in-depth interviews conducted in a semi-structured manner to enable in-depth exploration of participants' experiences and views regarding the use of AI in learning. Each interview lasted between 45 to 60 minutes and was recorded with participants' consent. In addition, participatory observations were conducted in several classrooms using AI to see first-hand how this technology is applied in teaching.

In the data collection process, the researcher applied observation, interview, and discussion techniques. Observations were made by recording all information that occurred during the research. After observation, the researcher interviewed the teachers of PPG Pre-service informatics PPL wave one of Universitas Pendidikan Indonesia to understand the strategies applied by the teachers.

Furthermore, researchers held discussions to find out the implications of using AI in the context of learner diversity. This research focused on preservice PPG Informatics PPL teachers.

3. Discussion

Based on in-depth interviews with 18 PPL Informatics teachers in the pre-service program, it was found that the teachers implemented various strategies to use artificial intelligence (AI). PPG program, it was found that the teachers implemented various strategies for utilizing artificial intelligence (AI) for inclusive informatics teaching and the implications of AI utilization for the learning process and the learning proces for inclusive informatics teaching and the implications of AI utilization on learning processes and student learning outcomes. The following strategies were implemented by the PPL teachers in the PPG Informatics program during class:

a. Use of AI-based Adaptive Learning Applications
An inclusive teaching strategy utilizing AI begins with the identification of student needs and learning objectives. PPL teachers conduct an in-depth evaluation of students' abilities and identify areas that require special attention. Next, the teacher selects AI application or software that suits the needs and availability of resources in the school. For example, applications such as Canva AI are used to create attractive and easy-to-understand which can be downloaded not only on Android or iOS but also on the on the Microsoft Store.

b. Student Needs-Based Learning
Learning materials are tailored to student needs. When the multimedia material is about video animation, students are free to use applications that they understand capcut, canva, viggle, and kinemaster. This selection is adjusted to the level of student ability. So as to create inclusive learning that can accommodate student diversity. Teachers integrate AI into students' learning plans. Teachers design learning activities that involve use of AI applications as an integral part of the learning material. Implementation of learning is conducted with the help of the selected AI.

c. Teachers provide guidance to students in using AI applications for interactive exploration of informatics concepts interactively. For example, using Scratch to learn programming through creating animations or interactive games. In addition, teachers also use AI for interactive learning such as kahoot, quizlet, and quiziz.

Of all the AI applications or software, the one most often utilized by PPL informatics teachers pre-service PPG teachers is the AI-based Canva to create interesting learning media, having design in the form of animated videos that can also speak with several voice overs. Informatics teacher PPL informatics teachers also allow their students to use the AI-equipped CapCut pro application to complete tasks related to interactive multimedia learning.

Figure 1. PPL teacher is teaching one student who excels in C++ programming because this student is seen to have more ability in C++ so that it will be prepared to take part in the KSN Informatics Olympics.

The utilization of AI in informatics teaching has significant implications for improving teachers' digital competencies, learning effectiveness, which has an impact on improving student learning outcomes. With the development of technology and artificial intelligence, teachers are more adaptive and responsive in preparing learning methods to be more efficient. So that teachers are required to be digitally literate.

High school PPL informatics teachers often use various AI applications such as Canva AI, DeepL, Scratch, Kahoot, Quizziz, CapCut, Chat GPT, and Gemini. Canva AI is used to create attractive visual designs and learning materials, while DeepL helps translate text or learning materials into various languages. Scratch is used to learn programming through creating animations or interactive games. Meanwhile, apps like CapCut are used for learning through video creation and editing, while Chat GPT and Gemini are used for conversation-based learning experiences and collaboration between students without 100% copying from chat gpt or gemini.

The use of AI apps such as Kahoot, Chat GPT, Gemini, CapCut and Quizziz increases student engagement in learning by providing interactive quizzes, conversation-based learning experiences and video editing-based learning. This creates a more engaging and dynamic learning environment.

In addition, the use of AI also enhances the personalization of learning by allowing the adaptation of learning materials according to each students needs and level of understanding. Another example is the use of Canva AI to create learning materials tailored to students' learning styles, such as infographics or engaging visual materials.

The utilization of AI in informatics teaching offers many benefits, but also faces various challenges and opportunities. First, limited technological infrastructure is a major obstacle as not all schools have adequate access to technology. This includes the necessary hardware as well as a stable internet network to support the use of AI in learning. Second, many teachers still lack skills and knowledge in using AI applications. To overcome this, adequate training and support is needed for teachers to integrate this technology effectively in the learning process. On the other hand, AI opens up great opportunities for more effective personalization of learning. With AI, teachers can customize learning experiences according to students' needs, thus improving learning outcomes. In addition, the use of AI allows teachers to adopt more innovative and interactive learning approaches. This can spark students's interest and motivation in exploring informatics concepts in a more in-depth and fun way.

Figure 2. Students who understand more easily are helping their friends so that they don't miss out on computer practice. Students seem enthusiastic to learn.

4. Conclusion

This study revealed various strategies, implications, challenges, and opportunities related to the utilization of artificial intelligence (AI) for inclusive informatics teaching by pre-service PPG informatics PPL teachers. The strategies implemented by teachers involve identifying student needs, selecting appropriate AI applications, integrating AI in lesson plans, implementing AI-based learning, and monitoring and evaluating learning. Applications frequently used by high school informatics teachers include Canva AI, DeepL, Scratch, Kahoot, Quizziz, CapCut, Chat GPT, and Gemini, each with its specific benefits in facilitating interactive and personalized learning.

The use of AI in informatics teaching has significant positive implications, including more effective personalization of learning, increased student engagement, and improved learning outcomes through more interactive and engaging methods. However, there are also challenges to be faced, such as limited technological infrastructure and lack of teacher skills and knowledge in using AI. Nonetheless, the opportunities are promising, with AI paving the way for innovations in learning approaches and improving teaching effectiveness.

Referensi

[1] Florian, L., & Black-Hawkins, K. (2011). Exploring Inclusive Pedagogy. British Educational Research Journal, 37(5), 813–828.

[2] Holmes, W., et al. (2019). Enhancing Learning Outcomes with Artificial Intelligence: A Systematic Review of Current Trends in Education. Journal of Education and Learning, 8(4), 275–288.

[3] Housman, D. (2018). The Practical Future of Artificial Intelligence. Journal of Science and Technology, 15(3), 45-56.

[4] Luckin, R., et al. (2016). Intelligence Unleashed: An Argument for AI in Education. Pearson.

[5] Mardhiyana, A., et al. (2018). Application of Artificial Intelligence (AI) in Education to Improve the Quality of Learning. International Journal of Scientific & Technology Research, 7(12), 63–65.

[6] Mayer, R. E. (2009). Multimedia Learning (2nd ed.). Cambridge University Press.

[7] Prilistama, B. (2021). Utilization of Smartphone Applications for Educational Content. International Journal of Emerging Technologies in Learning, 16(7), 88–95.

[8] Rahman, M. (2019). Disruptive Innovation in Education: What to Expect in the Digital Era. Journal of Education and Learning, 8(4), 289–294.

[9] Rudyanto, F. R., et al. (2019). The Role of Artificial Intelligence in Education: Opportunities and Challenges. International Journal of Advanced Science and Technology, 28(13), 248–256.

[10] Shute, V. J., & Zapata-Rivera, D. (2012). Adaptive Educational Systems. In R. A. Reiser & J. V. Dempsey (Eds.), Trends and Issues in Instructional Design and Technology (3rd ed., pp. 283–292). Pearson.

[11] Sugiyono. (2021). Metode Penelitian Kualitatif. CV. Alfabeta.

[12] Tjahyanti, D., [et al.] (2022). The Use of Technology in Education: Challenges and Prospects. Journal of Information and Communication Technology Education, 8(2), 123-135.

[13] UNESCO. (2019). Inclusion and Education: All Means All! Accessed from https://unesdoc.unesco.org/ark:/48223/pf0000373878.locale=en on May 20, 2024

[14] Woolf, B. P. (2020). Artificial Intelligence in Education: Promise and Implications for Teaching and Learning. In J. M. Spector et al. (Eds.), The SAGE Handbook of Educational Technology (2nd ed., pp. 297–314). Sage Publications.

[15] Zawacki-Richter, O., et al. (2019). Systematic Review of Research on Artificial Intelligence Applications in Higher Education—Where Are the Educators? International Journal of Educational Technology in Higher Education, 16(1), 39.

Enhancing Vocabulary Learning: The Power of Gamified Media Design

Aulia Hidayati[1*], Sucipto[2]

[1] English Education Study Program, Universitas Ahmad Dahlan, Yogyakarta, Indonesia
[2] English Education Study Program, Universitas Ahmad Dahlan, Yogyakarta, Indonesia
[*]E-mail: aulia2000004017@webmail.uad.ac.id
[*]E-mail: sucipto@pbi.uad.ac.id

Abstract. This study aimed to identify students' needs, design learning media such as a Snake and Ladder board game for learning English vocabulary, and evaluate the validity of the media developed with a gamification approach. The research utilized a Research and Development (R&D) methodology, incorporating both qualitative and quantitative data collected through questionnaires and interviews. The procedure followed Morrison's ADDIE model (2010). Quantitative data were analyzed using percentages and intervals, while qualitative data were analyzed through inference. The results indicated a need for engaging learning media among students. The design and development of the media employed tools such as Canva and Microsoft Word. Media and material experts evaluated the developed media, awarding it a "very good" score based on aggregated interval values for each aspect. Students' responses were also very positive, indicating a favorable reception. The final outcome of this study is a Snake and Ladder board game with a validated gamification approach, deemed suitable for teaching English vocabulary.

*Key words***:** *Learning media, Gamification Approach, Teaching Vocabulary*

1. Introduction

Vocabulary is an important thing in English aspect. A tool for both written and oral communication is language. Speaking in a foreign language, especially English requires not just having a solid vocabulary but also having good grammar. Understanding the meanings of vocabulary is essential because of its importance in language. Language is essentially a collection of words and expressions plus the rules governing vocabulary and grammar, which together form the syntax of a speech pattern, according to Huebener.

Learning media are used to enhance the learning process and help achieve learning objectives. Any material or intangible tool used by educators to assist pupils in learning material more quickly and effectively is referred to as "learning media". in order for students to be drawn in and assimilate the instructional materials intact more rapidly. That's Musfiqon (2012).

Teachers' role a crucial impact in the success of student outcomes in the field of education (Ulfa & Purnamaningsih, 2022). Regretfully, some educators lack the skills necessary to make grammar, which pupils find challenging and dull, enjoyable and engaging (Rustembaevna, 2020). In order to keep students motivated to study English vocabulary, engaging learning resources are necessary, as essential knowledge must be acquired. The use of media in the educational process is crucial (Ramdhani & Muhammadiyah, 2015). Additionally, media can help pupils think more clearly when solving difficulties and coming to judgments (Walker, 2004). Books and whiteboards are examples of media

that can be utilized to provide content that is often used but does not grab students' attention (Ezeh et al., 2021). assessing more productive learning activities so that students don't get bored quickly is one of the teacher's important tasks that requires them to be creative (Isnaini & Ariyanti, 2020).

Gamification in education describes the application of gaming elements to enhance learning in both official and informal settings. In a study of an MCQ-based learning system, Paul Denny examined the usage of badges as a means of motivating students to study English (Denny, 2013). There are components of gamification that can be used in education. According to Katie Seaborn, these components consist of (Seaborn & Fels, 2015): Progress is measured in terms of points. Badges serve as tangible representations of achievements. The ranks of each player are shown on leaderboards. Progress is reaching important objectives. Status to show how things are going. Levels are progressively harder phases. Rewards are desirable and observable objects. The role is that of an elemental character.

According to Kemendikbud, descriptive text is included in the English curriculum in Indonesia, and scholars use gamification as a way to promote the media found in board games (Kemendikbud, 2016).

Need analysis cannot be underestimated because it is the stage where researchers know students' learning conditions, difficulties, and their interests (Kathon, 2016). Because media development requires material or content that makes students interested, analyzing student needs is very important. The media developed not only increases student interest but also helps achieve learning goals. This paper will focus on analyzing the needs of student's grade 7D in SMP Muhammadiyah 7 Yogyakarta to designed and developed Snake and Ladder board game media in learning English Vocabulary.

2. Methodology

This study employed Research and Development (RnD) methodology. Thirty-two students in the 7D grade at SMP Muhammadiyah 7 Yogyakarta serve as the research data samples. This study used qualitative and quantitative approach to collect data, with interview and questionnaire serving as the research tool.

The questions guide of the interview as the instrument of this paper, is based on a number of factors, such as the learner's aim (Graves, 2000: 104), needs, wants, and lacks (Hutchinson and Waters, 1987: 55). The closed-ended questionnaire sheet for students also the instrument of this paper. This instrument refers to an existing instrument in a journal about developing card media by Audia et. al (2021). A portion of the test's questions are drawn from the mandatory book "English in Mind" with the topic Parts of Body, which uses the topic its primary source of information to make the media. The utility has been verified and made available through a sheet of paper.

The questionnaire uses the Likert scale with four points model from Widoyoko (2013) as choices from each question.

Table 1 : Four Point Likert scale from Widoyoko (2013)

1. Strongly agree
2. Agree
3. Disagree
4. Strongly Disagree

So, to analyze and find out the conclusion, each percentage of the four points model will be the data analysis technique.

3. Findings and Discussions

3.1 Findings

Based on the result of the interview students needs analysis from 4 students at grade 7D in SMP Muhammadiyah 7 Yogyakarta, the following results were obtained:

Table 2. Learner's goal to find out the learner's motivation.

Aspects	Answers
Goal (1)	**Student 1:** I like English because it can help me to communicate with foreigners and supporting my study competences. I want to be able to speak English according to English Vocabulary.
	Student 2: I like learning English to support my vision in work digitally with communicating foreigners in another country.
	Student 3: I really like English to support my study to joining the competition then I need to learn more vocabulary.
	Student 4: I like English with the teacher explains. I want to be able to speak English according to simple to learn vocabulary.

Table 3. Learner's needs, wants and lacks to find out the learner's motivation.

Aspects	Answers
Students' Needs	
Necessities (3,4,5)	**Student 1:** I need to improve my vocabulary to learn English.
	Student 2: I need to improve my memory skills to support me learning English with the advanced vocabulary.
	Student 3: I need to improve my understanding of English.
	Student 4: I need to improve my English skill.
Lacks (2,6)	**Student 1:** English is difficult because there is too much aspect to learn it.
	Student 2: English is very difficult because you have to remember many vocabularies correctly.
	Student 3: English is difficult because you have to understand the material and the class is boring.

Aspects	Answers
Wants (7,8, 9)	Student 4: English vocabulary is very difficult because I cannot understand the material in the class if I got uncommon word. Student 1: The media that the teacher usually use is mandatory book. The learning media that I like the most are games such snake ladder board it can more be joyful. Student 2: Teacher usually use English book and live worksheet as learning media and she had ever taught us to make a project family tree. I want to learning media like that such a game. Student 3: I like when teacher taught English with game like puzzle or snake ladder board because I feel it was very fun. Student 4: Teacher usually using a live worksheet, I need fun learning media the form like game board or quizizz.

It is evident from the demands placed on them that students want to improve even in the face of their difficulties understanding the wide range of vocabulary required to study English. After utilizing a range of media, their two favourite types of content are games, none of which are available as physical or digital books on a website. The creation of gamified learning materials for vocabulary instruction, especially for media based on the snake and ladder board games used in English language learning, is the focus of the game, which is one of the most well-liked or essential educational tools for students.

These are the result of the questionnaire that was distributed and filled in by 32 students, the following results were obtained:
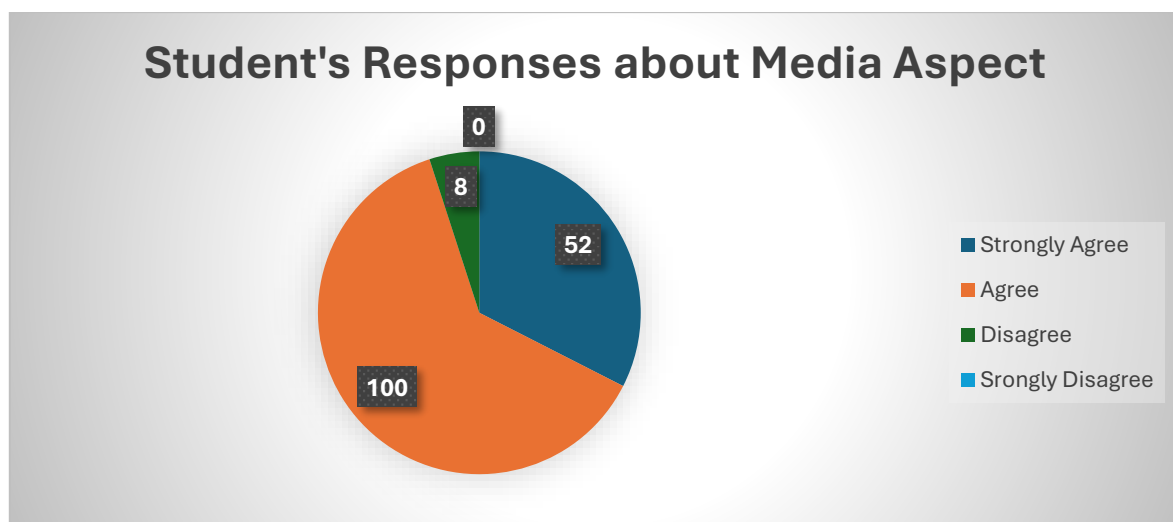
Figure 1. Students responses about the media aspects

Of those in the chart, 11 students strongly agree, 16 students agree that the illustrations used pique their interest; 16 students strongly agree and agree that the media's use of pictures, colors, and fonts is appropriate; 8 students strongly agree, 21 students agree, 3 students disagree that the materials developed relate to their everyday lives; 10 students strongly agree, 19 students agree, 3 students disagree that playing the snake and ladder board game can help them pass the time. Regarding the ease of understanding of snake and ladder board game media, 52 students strongly agree, 100 students agree, and 8 students disagree. In general, the reception from the media has been very good.
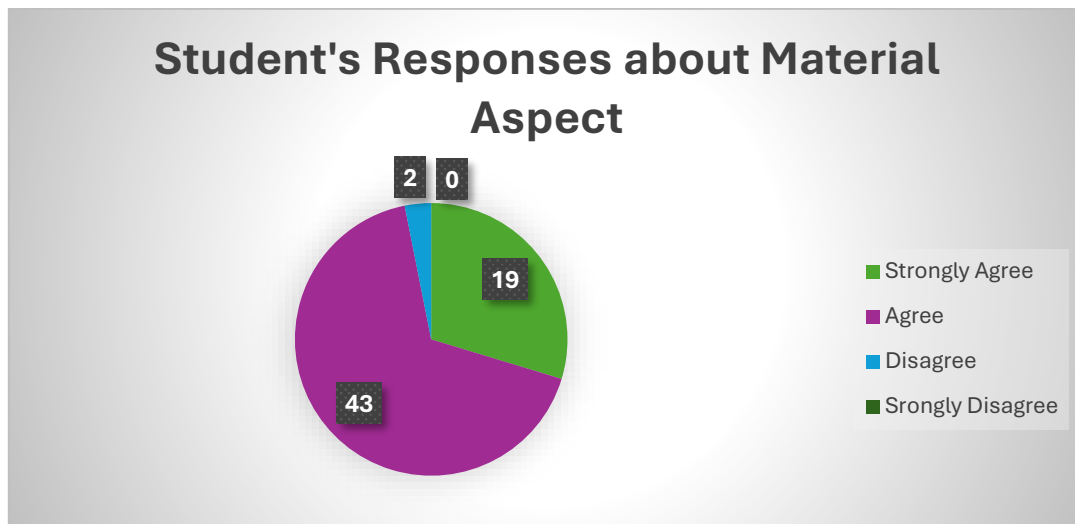
Figure 2. Students responses about the material aspects

According to the table, 9 students strongly agree and 22 students agree, 1 student disagree that the visuals are clear and appropriate for the subject matter, and 10 students strongly agree and 21 students agree, 1 student disagree that the information on the cards aids in improving vocabulary understanding. Overall, the outcomes are favorable when it comes to the tangible components of the snake and ladder board game.
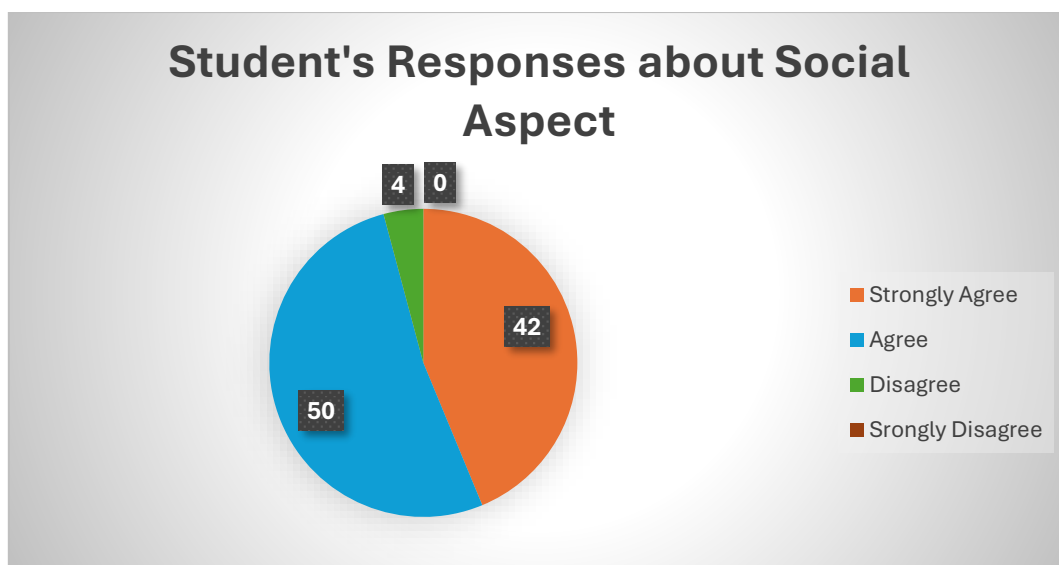
Figure 3. Students responses about the social aspects

According to the chart social aspects, 20 students strongly agree and 10 students agree, 2 students disagree that playing the snake and ladder board game with friends is interesting; 9 students strongly agree and 23 students agree that playing the game can increase enthusiasm and friend interaction; and 13 students strongly agree and 17 students agree, 2 students disagree that using the game in vocabulary lessons is a good idea. The social factor leads to the general conclusion that the outcomes are very good.

3.2. Discussions

From the questions in the interview that had been filled in by 4 students of the grade 7D in SMP Muhammadiyah 7 Yogyakarta, it showed that most of them were interested in learning English Vocabulary because they knew that this was important material in understanding language. Even so, most of them felt they did not understand the vocabulary they had learned. They find it difficult and lack motivation. Regarding the material in the mandatory book, most of them felt they had understood, but experienced difficulties. In addition, they also feel bored because they always use the same methods and media in learning. "Conventional Method of teaching creates boredom to the students who expect new methods and techniques of teaching" (Arulselvi, 2011). Most of them agree that they need new media to increase motivation, interest, and overcome boredom. "Students are motivated at large to put forward their maximum efforts in constructing sentences" (Arulselvi, 2011). While the questions in the questionnaire that had been filled in by 32 students of the grade 7D in SMP Muhammadiyah 7 Yogyakarta, it also showed that most of the students were interested and enjoyed the learning process with using the learning media had been designed and developed.

Due to its ability to pique students' interest, feelings, willingness, and thoughts, learning media has a significant impact on the learning process (Yuliansih et al., 2021). Thus, one of the elements that contribute to a learning process' success is the use of media. In addition to creating useful media, an examination of students' requirements is necessary to strike a balance between enjoyment and the content they must learn. Students' cognitive growth in logical thinking and problem solving depends on engaging and effective learning materials that help them concentrate and comprehend the subject matter (Nofianto et al., 2020). This study helps identify a game that can help students enjoy learning English since it creates a "play and learn" setting that piques their interest (Zakaria et al., 2022).

4. Conclusions

Based on the data and discussions of the analysis of the needs of student's grade 7D in SMP Muhammadiyah 7 Yogyakarta, in developing a Snake and Ladder board game media, it can be concluded that students who already understand and do not understand English material, whether they find it difficult, bored, or even lose their motivation to learn, or those who feel okay with learning using the same methods and media, then, they were need fun learning media. They were enjoyed the learning process while using snake and ladder board game with gamification approach. The process of gamification on this research were made the learning process to be more fun and joyful. The students felt motivated to learning English vocabulary.

References

[1] Arulselvi M, E. (2011). Effect Of Instructional Media In The Learning Of English Grammar On The Achievement Of Teacher Training Students At Namakkal District. I-Manager's Journal on English Language Teaching, 1(3), 23–31. https://doi.org/10.26634/jelt.1.3.1598
[2] Denny, P. (2013). The effect of virtual achievements on student engagement. CHI
[3] '13: Proceedings of the SIGCHI Conference on Human Factors in Computing
[4] Systems, 763–772. https://doi.org/10.1145/2470763
[5] Ezeh, N. G., Anidi, O. C., & Nwokolo, B. O. (2021). Media-support teaching and learning of english language as a second language: eliminating stereotypes. english language teaching, 14(4), 94. https://doi.org/10.5539/elt.v14n4p94 Fitriana,

D., & Maro, R. K. (2018). Teaching vocabulary through Snake and Ladder Board Game in the Tenth Grade of Sma Muhammadiyah 1 Malang. A Journal of Culture English Language Teaching Literature & Linguistics, 3(1), 82. https://doi.org/10.22219/celticumm.vol3.no1.82-93

[6] Graves, K. 2000. Designing language courses: a guide for teachers. Ontario: Heinle & Heinle Publishers.

[7] Hutchinson, T., & Waters, A. (1987). English for Specific Purposes: A Learner-Centered Approach. Cambridge: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511733031

[8] Isnaini, I. D., & Ariyanti, M. P. (2020). Teacher's creativity in the development of learning media fun book in kindergarten. 446(Icli 2019), 71–74. https://doi.org/10.2991/assehr.k.200711.013

[9] Kathon, N. S. (2016). Analysis of student needs: an essential step in syllabus design. International Journal of English Language, Literature and Humanities, IV(VI), 516–529. Retrieved from https://www.academia.edu/

[10] Kemendikbud. (2016). Jendela Pendidikan dan Kebudayaan. Menteri Pendidikan Dan Kebudayaan, 33.

[11] Miles, M.B., A. M. Huberman, and J. Saldana. (2014). qualitative data analysis: a methods sourcebook (3rd edition). California: SAGE publication, Inc.

[12] Morrison, G. (2010). Designing effective instruction (6th ed.). John Wiley and Sons.

[13] Musfiqon. (2012). Development of learning media and sources. Jakarta: Prestasi Pustakaraya.

[14] Ningsih., Soetjipto, B. E., & Sumarmi. (2017). Improving the students' activity and learning outcomes on social sciences subject using round table and rally coach of cooperative learning model. Journal of Education and Practice, 8(11), 30-37

[15] Nofianto, N., Puspitasari, D., & Maulida, C. (2020). Teenagers, digital media, and language development: an exploration of potential and challenges in promoting english skills. Journal of English Teaching and Learning Issues, 3(2), 131. https://doi.org/10.21043/jetli.v3i2.8644

[16] Ramadhani, M., Gafari, M. O. F., & Marice, M. (2019). Development of Interactive Learning Media on Material Writing Short Story Texts Based on Experience. Budapest International Research and Critics in Linguistics and Education (BirLE) Journal, 2(1), 91–102. https://doi.org/10.33258/birle.v2i1.189

[17] Ramdhani, M. A., & Muhammadiyah, H. (2015). The criteria of learning media selection for character education in higher education. Proceeding International Conference of Islamic Education: Reforms, Prospects and Challenges Faculty of Tarbiyah and Teaching Training The Criteria of Learning Media Selection for Character Education in Higher Education, 174–182.

[18] Rustembaevna, B. D. (2020). The importance of grammar in language learning. Journal of Innovation in Language Teaching and Learning, 10 (64), 186–195. Retrieved from https://zenodo.org/

[19] S. Hakak et al., "Cloud-assisted gamification for education and learning – Recent advances and challenges," Comput. Electr. Eng., vol. 74, pp. 22–34, 2019.

[20] S. Hong and E. Kim, Development of Gesture Recognition Education Game for Elementary School Students Personality Education, vol. 850. Springer International Publishing, 2018.

[21] Sugiyono. (2015). Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta.

[22] Ulfa, M., & Purnamaningsih, I. R. (2022). Innovation of learning media through information and communication technology. 5(4), 885–890. Retrieved from https://journal.ikipsiliwangi.ac.id/

[23] Yuliansih, E., Arafat, Y., & Wahidy, A. (2021). The influence of learning media and learning interests on student learning outcomes. JPGI (Jurnal Penelitian Guru Indonesia), 6(2), 411. https://doi.org/10.29210/021064jpgi0005

[24] Zakaria, N., Anuar, N. A. K., Jasman, N. H., Mokhtar, M. I., & Ibrahim, N. (2022). Learning Grammar Using a Card Game. International Journal of Academic Research in Business and Social Sciences, 12(2), 464–472.

EFL Students' Perception toward the Use of Besmart E-learning Platforms as Effective Tools in Learning Activity

Muhammad Deni Irkhamil Maulana[1], Annisa Jihan Salsabil[2], Ilham Saputra[3]

[1,2,3]Master English Language Study Program, Universitas Negeri Yogyakarta, Indonesia
*E-mail: mdeni6539@gmail.com

Abstract. E-learning is a platform that utilizes information and communication technology to facilitate learning, whether traditional, online, or hybrid, through the application of digital technology. This research examines the perceptions of English Language Education Department students at Yogyakarta State University regarding the use of the Besmart E-Learning platform developed by Yogyakarta State University in the English language learning and teaching development course. The number of respondents in this study were 32 master's students' programs in English language education at Yogyakarta State University who were taking the English language learning and teaching development course in the second semester. Meanwhile, this research uses qualitative methods that focus on case studies. The results of this research show that students majoring in English education have a positive perception of the Besmart E-learning platform at Yogyakarta State University as a learning tool for

1. Introduction

Learning a foreign language such as English requires a certain method because it is related to language skills. Just conveying theory is not enough. Effective implementation of a unique method is necessary to improve one's reading, speaking, writing, and listening skills (Creswell & Garrett, 2008). E-learning is a platform that makes use of digital technology applications and information and communication technologies to support traditional, online, and hybrid learning (Berridge & Waterhouse, 2003). One advantage of online learning is that it facilitates contact between teachers and students.

Educators may offer E-learning by giving resources for students to study and further study (Saleem et. al, 2022). E-learning is one of the most extensively used forms of digital learning (Alshammari, 2020). One of the most popular types of digital learning is e-learning (Behl et. al, 2022). Technological learning, or education aided by internet and computer-based devices. Students can learn creatively and actively while actively comprehending the course information thanks to e-learning (Kelly et al., 2006). All electronic internet technology is referred to by the electronic abbreviation "e" in e-learning (Khaldi et al., 2023). These days, teachers can provide instruction using a variety of platforms, including Edmodo, Moodle, and Schoology. Yogyakarta State University has created a platform called Besmart E-learning Yogyakarta State University in addition to these. Using the Moodle platform, Besmart E-learning was created for Yogyakarta State University. A popular learning management system platform in many domains utilized by educational institutions at the national and international levels is Moodle. Moodle can be freely developed in accordance with institutional needs because of its free and open source (free & open source) license. The Moodle system was in use when this article was written. Version 3.6 is the one being utilized, and it has a number of enhancements (new features) over version 3.6.

Yogyakarta State University guarantees all students access through security protocols. On this platform, users can communicate with each other synchronously (via chat) and asynchronously (through

discussion forums). Content in Yogyakarta State University's Besmart E-learning is pertinent to learning goals. This is communicated using engaging materials like words and graphics to convey learning content, as well as instructional strategies like giving examples and exercises. It can also assist individuals and groups in better mastering skills associated with learning objectives. In terms of functionality, features, student evaluation procedures (such examinations or quizzes), and assignment management in accordance with the course schedule are all quite simple to set up. Additionally, a number of supplementary resources are offered to help with the teaching and learning process.

2. Method

In this study, researchers used a qualitative method. Creswell & Garrett, (2008) stated that qualitative research method is as an investigative technique of comprehending a social or human problem based on developing a complex, holistic picture, constructed with words, expressing specific viewpoints of informants, and undertaken in a natural context. Meanwhile, the researchers also used the case study approach in this study. A case study is a type of research methodology that examines a phenomenon in-depth in connection to institutions, society, and the surrounding environment. In terms of education, a case study is an empirical investigation conducted within a restricted time and space into intriguing aspects of an educational activity, system, institution, or program, particularly in its natural environment and within the ethics of respect for humans.

Meanwhile, a questionnaire will be provided by the researcher. The researcher classified the perspectives of the students regarding Besmart E-learning as a useful tool for educational activities. The categories include the following: how students conduct when using the Besmart e-learning platform in an IT for English Language Learning and Teaching Development course; how they perceive Besmart E-learning functionality; and how they perceive IT for English Language Learning and Teaching Development practice when using Besmart E-learning. The research subjects are the second-semester students of the Master's program in English language education at Yogyakarta state University. In the second semester, the researcher intends to interview a select group of students. In order to find out how students feel about the usage of Besmart E-learning in an English Language Learning and Teaching Development course, researchers have designed questions. The forms of learning rewards were determined for the interview by the researcher using a set of 12 question guidelines.

3. Findings and Discussion

2.1 Students' perception and behavior on using Besmart E-learning in learning activity Instructions

ASPECT
Besmart E-learning afford me time to explore learning source
Besmart E-learning enhances my learning motivation
Besmart E-learning helps me to be more independent in my learning
Besmart E-learning increases my confidence in articulating my thought and opinion
Besmart E-learning enhances the enjoyment of learning
Besmart E-learning enhances my interactions with friends and the lecturer
My discipline is improved through online tasks

The findings from the first question show that 31.3% of students chose to strongly agree with the statement that Besmart E-learning gives time to explore learning resources. Most students 40.6% chose to agree with the statement, and 15.6% of them were neutral. The remaining 6.3% of students chose to disagree, and 6.3% chose to strongly disagree with the statement. This is in line with the results of interviews with respondents N1, R3, and O3:

N1: "The operational itself is not that hard to understand as long as I often use it, we can search the subject from the home page and access it right away."

R3: "I think it is good, because there is a lot of interesting material provided by the website itself."

O3: "I think it's very good when I use the online learning process, and also, I will access the materials whenever I am."

Based on the result of the interview above, we can conclude that Besmart E-learning afforded me time to explore learning sources.

The findings from the second question show that 9.4% of students chose to strongly agree with the statement about Besmart E-learning. Besmart E-learning increases my learning motivation. Most students 43.8% chose to agree with the statement, and 21.9% of them were neutral. The remaining 18.8% of students chose to disagree, and 6.3% chose to strongly disagree with the statement. This is in line with the results of interviews with respondents M4, N2, and R3:

M4: "Moreover, I feel that so far, the use has been very effective and motivate me"

N2: "I feel easy when I use e-learning and it engages me to learn English more"

R3: "I can study wherever or whatever and enhance my knowledge"

Thus, this shows that Besmart E-learning provides convenience for students to increase learning motivation for students.

The findings from the third question show that 34.4% of students chose to strongly agree with the statement about Besmart E-learning. Besmart E-learning helps to be more independent in learning. Most of the students 34.4% chose to agree with the statement, and 12.5% of them were neutral. The remaining 12.5% of students chose to disagree, and 6.3% chose to strongly disagree with the statement. This is in line with the results of interviews with respondents A1, O5, and R3:

A1: "We can find many materials easily and in using Besmart E-Learning I feel that my motivation in reading the material in the E-Learning increases because, every meeting we are instructed to read in the learning as well as we can utilize the discussion feature menus there."

O5: "I Think Besmart E-learning help me to review material easier when I study from home"

R3: "Besmart helps me to make a summary about material that already explain by lecturer"

Thus, this shows that Besmart E-learning makes it easy for students to learn independently by accessing materials through E-learning.

The findings from the fourth question show that 25% of students chose to strongly agree with the statement about Besmart E-learning. Besmart E-learning increases confidence in expressing thoughts and opinions. Most students 31.3% chose to agree with the statement, and 25% of them were neutral. The remaining 12.5% of students chose to disagree, and 6.3% chose to strongly disagree with the statement. This is in line with the results of interviews with respondents N2, M4, and R3:

N2: "I feel more confidence after joining the learning process through Besmart E-learning"

M4: "Besmart E-learning can provide an offline mode to make an easy way to learn so that it can enhance my confidence."

R3: "I think it's very good when I use the online learning process, and also, I will access the materials whenever I study from home. Based on that, it also increases my confidence."

Thus, this shows that Besmart E-learning makes it easy for students to be more confident and freer to express their opinions.

The findings from the fifth question show that 25% of students chose to strongly agree with the statement that Besmart E-learning increases learning enjoyment. Most students 46.9% chose to agree with the statement, and 12.5% of students were neutral. The remaining 9.4% of students chose to disagree, and 6.3% chose to strongly disagree with the statement. This is in line with the results of interviews with respondents O5, R3 and N2:

O5: "We feel the convenience during learning without having to come to class".

R3: "The student can get more interested in using the website for studying, and the last is they can learn the material every time they want"

N2: "I enjoy using it because it is quite effective when we want to do our assignment and get information from the lecturers."

In summary, this shows that Besmart E-learning increases learning enjoyment.

The findings of the sixth question show that 15.6% of students chose to strongly agree with the statement that Besmart E-learning improves interaction with friends and lecturers. Most students 43.8% chose to agree with the statement, and 18.8% of students were neutral. The remaining 12.5% of students chose to disagree, and 9.4% chose to strongly disagree with the statement. This is in line with the results of interviews with respondents M4 and N2:

M4: "E-learning also helps us to operate the technology integrated in teaching so that in the future we can have an unforgettable experience based on the use of Besmart."

N2: "The student can get more interested in using the website for studying, and the last is they can learn the material every time they want."

So, this shows that Besmart E-learning improves interaction with friends and lecturers.

The findings of the seventh question show that 28.1% of students chose to strongly agree with the statement that Besmart E-learning improves discipline through online assignments. Most students 40.6% chose to agree with the statement, and 12.5% of students were neutral. The remaining 12.5% of students chose to disagree, and 6.3% chose to strongly disagree with the statement. This is in line with the results of interviews with respondents A1 and O5:

A1: "Every meeting we are instructed to read in the e-learning as well as we can utilize the discussion feature menus there. this is different when only learning from books and through presentations only"

O5: "In addition, in using besmart I find it easier to do every task given by the lecturer"

So, this shows that Besmart E-learning improves discipline through online assignments.

2.2 Students' perception about E-learning operational

ASPECT
I have the capability to access the module
I am able to access the online resources
I am able to view the online resources provided by the lecturer
The lecturer's online instructions easy to understand
Besmart E-learning spends cost a lot

The findings from the first question showed that 31,3% of students choose to strongly agree with the statement about giving students the ability to access E-learning. Most of the students 43,8% chose to agree with the statement, and 9,4% of them were neutral. The remaining 9,4% of students choose to disagree, and 6,3% choose to strongly disagree with the statement. This is in line with the results of interviews with respondents M4 and O5:

M4: "E-learning is very helpful in learning, but it would be better if E-learning is used as a secondary medium because the main learning activity is when we join the class."

O5: "Yes, I really enjoy the learning using E-Learning and gives students opportunity to access the module"

Thus, it shows that E-learning gives students the ability to access the module.

The second statement is about students' perception of access to online resources. From the results, it was found that 34,4% chose strongly agreed. Most of the students 37,5% choose to agree with the statement, and students who choose neutral disagree and strongly disagree had the same percentages of 9,4% each. This is in line with the results of interviews with respondents R3 and N2:

R3: "Yes, I enjoy using Besmart, because I can study wherever or whatever I want and I feel comfort to discuss in that application"

N2: "I enjoy using it because it is quite effective"

Thus, we can conclude that most students feel comfortable and comfortable accessing online resources.

The third statement is that students can view teaching resources or materials by the lecturer. The results of the questionnaire stated that 50% of students choose to strongly agree and 25% of students choose to agree. This is in line with the results of interviews with respondents M4 and O5:

M4: "E-learning also helps us to operate the technology integrated in teaching so that in the future we can have an unforgettable experience based on the use of Besmart and all students can discus in that application as good as possible"

O5: "Of course, E-Learning is effective as a learning tool. And I think the E-Learning helps us to get detail resource"

Related to these results, it can be concluded that E-learning is very helpful for students in viewing teaching resources in Besmart.

The next statement is that students more easily understand the instructions from lecturers by using Besmart. The results of the questionnaire showed that 31,3% of them strongly agree, and the most that was 50% of them choose to agree, and 9,4% choose neutral. The remaining 6,3% of students choose to disagree, and 3.1% choose to strongly disagree with the statement that 50% of students choose to strongly agree and 25% of students choose to agree. This is in line with the results of interviews with respondents R3 and O5:

R3: I think it is good, because there are a lot of interesting material provide by the website itself and help us to easily gives feedback

O5: "In my opinion, I feel comfortable and easily to understand instructions from lecturer"

From these results, we can see that most of them feel more easily understand the instructions from the lecturer.

The last statement is about Besmart E-learning costs a lot of money. The results showed that 21,9% of them strongly agree, and the most that were 28,1% chose to agree, 9,4% of students were neutral, 15,6% of students chose to agree, and the remaining 25% of students strongly disagreed. This is in line with the results of interviews with respondents A1 and N2:

A1: "Moreover, t, I feel that so far, the use has been very effective and it would be better if we have to prepare our connection."

N2: "When we want to do our assignment and get information from the lecturers, we have a good connection."

In conclusion, students must prepare a good connection to access the teaching materials in Besmart E-learning.

4. Conclusion

E-learning can boost their learning motivation and make them more independent in learning due to the availability of several sources and learning instructions, students can more confidently voice their opinions in the discussion forum. Additionally, because the E-learning system's due date structure prohibits them from turning in assignments late, students exhibit greater discipline in finishing their assignments.

References

[1] Alshammari, M. T. (2020). Evaluation of gamification in e-learning systems for elementary school students. TEM Journal, 9(2), 806-813.

[2] Behl, A., Jayawardena, N., Pereira, V., Islam, N., Del Giudice, M., & Choudrie, J. (2022). Gamification and e-learning for young learners: A systematic literature review, bibliometric analysis, and future research agenda. Technological Forecasting and Social Change, 176, 121445.

[3] Berridge, C. W., & Waterhouse, B. D. (2003). The locus coeruleus-noradrenergic system: Modulation of behavioral state and state-dependent cognitive processes. Brain Research Reviews, 42(1), 33–84. https://doi.org/10.1016/S0165-0173(03)00143-7

[4] Creswell, J. W., & Garrett, A. L. (2008). The "movement" of mixed methods research and the role of educators. South African Journal of Education, 28(3), 321–333. https://doi.org/10.15700/saje.v28n3a176

[5] Kelly, S. R., Mazzone, E., Horton, M., & Read, J. C. (2006). Bluebells: A design method for child-centred product development. ACM International Conference Proceeding Series, 189(January), 361–368. https://doi.org/10.1145/1182475.1182513

[6] Khaldi, A., Bouzidi, R., & Nader, F. (2023). Gamification of e-learning in higher education: a systematic literature review. Smart Learning Environments, 10(1), 10.

[7] Saleem, A. N., Noori, N. M., & Ozdamli, F. (2022). Gamification applications in E-learning: A literature review. Technology, Knowledge and Learning, 27(1), 139-159.

Artificial Intelligence (AI) in Islamic Education: Perceptions, Trends, and Potential Academic Violations among Students

Diana Monita[1], Moh. Ferdi hasan[2]

[1] Fakultas Tarbiyah dan Keguruan, UIN Sunan Kalijaga, Yogyakarta, Indonesia
[2] Fakultas Tarbiyah dan Keguruan, UIN Sunan Kalijaga, Yogyakarta, Indonesia

*E-mail: monitadiana18@gmail.com

Abstract. This research aims to explore the impact of the rapid growth of artificial intelligence (AI) in education, focusing on perceptions, trends in AI use, and potential academic misconduct in Islamic Religious Education courses. The research design used concurrent embedded mixed-method, which combined quantitative and qualitative data collection methods. Quantitative data were collected through an electronic survey. Qualitative data was obtained through interviews and document content analysis. The subjects in this study were 32 students from one university in Yogyakarta. The findings showed that most of the students had heard of AI. They see AI-based applications as a time-saving and effective tool in assisting their academic assignments. However, some students expressed doubts about the effectiveness and accuracy of AI. On academic integrity, this research highlights the challenges associated with ensuring honesty and preventing academic misconduct in the AI era. Plagiarism, cheating, and other forms of academic misconduct remain serious problems. This study confirms the relevance of AI in higher education, educators need to provide guidance on the ethical use of AI in academic contexts to ensure that AI complements rather than replaces students' deep understanding, creativity, and critical thinking.

Keywords: Artificial Intelligence; Academic Integrity; Academic Misconduct; Islamic Education.

1. Introduction

Artificial Intelligence (AI) is developing at an unprecedented rate. The use of artificial intelligence systems in various sectors of life has attracted attention from year to year since its emergence. The popularity of AI is predicted to continue to increase, as reported by the Work Trend Index 2023 report launched by Mircosoft, 75% of respondents stated that they would use AI in carrying out their daily tasks and jobs. This puts Indonesia in the 8th position of Asia Pacific countries with the most predicted AI users in 2023 (Yonatan, 2023). Artificial Intelligence (AI) has transformed various sectors, including education (Devi & Rroy, 2023).

Artificial Intelligence (AI) has made significant contributions to education and learning (Chen, Chen, & Lin, 2020). The contribution of AI in learning is demonstrated by adaptive learning platforms, virtual learning environments, content recommendations aligned with learners' interests and goals, AI-powered learning apps offer personalised learning experiences and adaptive content, making learning more accessible and enjoyable for users of all ages. The application of AI in learning environments has led to various innovations and opportunities to enhance the educational experience (Alam, 2021).

The application of AI in learning is an ongoing process that presents both opportunities and challenges (Masrichah, 2023). The potential in the utilisation of AI is significant in the academic realm, where AI can make the work of students easier in writing or doing assignments quickly and effectively. However, while AI has the potential to revolutionise education by making it more personalised, efficient and inclusive, providing opportunities and offering new horizons in education, it also has challenges and concerns and requires careful consideration of various matters (Hadian, Pkim, & Rahmi, 2023), one of which is ethical issues.

The issue of ethics and academic integrity in the field of education is an absolute thing that must be upheld by every academic and learner. As a scientific community that is bound by ethics and norms, it should obey and uphold academic integrity (Khalilurrahman, 2016). Academic integrity is the moral principles applied in the academic environment, especially those related to truth, justice, honesty. The values upheld in academic integrity include six aspects, namely: honesty, trust, fairness, respect, responsibility, and humble (Hafizha, 2021).

The ethical implications that arise as a result of the rapid development and use of AI cannot be ignored. One of the ethical implications that AI users need to be aware of and avoid is academic misconduct. Academic misconduct is dishonest behaviour that results in a violation of academic standards (Mawarti et al., 2021). Academic misconduct is a serious problem in the academic environment. Examples of academic misconduct include plagiarism, cheating, collusion, falsification, and fabricating/changing data findings or fabrication, ghosting or asking other people to do assignments.

Violations of academic integrity and research ethics are very serious problems in education. The continued rapid development of Artificial Intelligence (AI) is often not matched by an adequate understanding of how to use AI (Suprayitno & Wahyudi, 2020). Therefore, it is imperative for academics and students to have in-depth knowledge about the use of AI, recognise its potential benefits, as well as understand the threats and ethical risks that may arise in an academic context. In an academic environment, every individual, be it a lecturer, researcher, or student, is obliged to adhere to the norms of academic ethics. This includes integrity in research, assignment writing, and academic behaviour in general. The success of academia depends on honesty, fairness, and adherence to established ethical principles. The ethical challenges arising in the use of AI in the academic environment is something that must be taken seriously (Aziz, 2018). Awareness of these ethical issues, along with appropriate measures to address the risks, is an important step in maintaining the integrity of education and research.

In the last decade, research related to AI and education has shown a significant increase, with a growth of 69.41% (using the keywords 'Artificial Intelligence' and 'Education') and even reaching 96.29% (using the keywords 'artificial intelligence' and 'Education'). These numbers are much higher compared to ten years ago. The rapid increase in AI-related research in the context of education signals that this topic is attracting strong interest from researchers. As a topic of great interest, AI has been the subject of extensive and diverse research (Sihombing, 2023). Many researchers have previously explored various aspects of AI in education, with a diverse research focus according to technological developments and educational needs, one of which is on the application of AI in Islamic Religious Education courses in Public Universities (PAI PTU).

AI-related issues have recently become a significant concern in the context of education, including in Islamic Religious Education courses at universities, attracting considerable attention (Haug & Drazen, 2023). The development of AI as a trend in Islamic Education education continues to progress, although the level of adoption has not yet covered the entire spectrum of potential uses. This study seeks to provide an overview of the trends and potential uses of AI systems and AI-based applications among university students, especially in the context of Islamic Religious Education courses. In addition, this

study aims to explore the potential for academic integrity violations that may occur in the use of AI by students.

Therefore, studies on AI, Islamic Education, and ethics are still rarely researched, especially in higher education. Departing from this, research related to perceptions, trends and potential academic misconduct from the use of AI among students in Islamic education learning is considered to have more value to be researched. This study seeks to describe the trends and perceptions of the use of AI in Islamic Education (PAI) courses in higher education as well as the potential for academic misconduct in the use of AI among students.

2. Methods

This research is a qualitative-quantitative research with an unbalanced mixed combination model or concurrent embedded with the primary method being quantitative methods. The concurrent embedded research method is a research method that combines qualitative and quantitative research methods by mixing the two methods in an unbalanced but independent manner to answer similar problem formulations (Sugiyono, 2013). This research aims to describe the perceptions and trends in the use of AI in PAI courses in higher education as well as the potential for academic misconduct in the use of AI among students. Therefore, the population of this research is all students studying in one of the universities who are taking Islamic Religious Education (PAI) courses.

In this concurrent embedded research model, quantitative and qualitative data collection is carried out at the same time, and alternates in a not too long interval (Ibrahim, 2015). The main data collection technique is by giving a questionnaire in an electronic questionnaire format or g-form to students. With this data collection technique, quantitative data will be obtained about the description of AI use among university students. Quantitative data collection was conducted using probabilty sampling technique with purposive random sampling method. Purposive random is the taking of sample members from the population that is carried out deliberately on the object (Moleong, 2017).

To complement quantitative data to make it more in-depth, focused, and meaningful, researchers conducted qualitative data collection. Qualitative data collection is obtained through interviews with samples in groups to obtain information and data related to student perceptions and the potential for academic misconduct. Data sources in qualitative data collection were selected using purposive sampling technique (Firmansyah & Dede, 2022). This purposive sampling technique was chosen with the consideration that each sample selected has knowledge of quantitative data so that the data to be obtained meets the criteria, namely complementing the quantitative data that has been obtained.

The data analysis technique used is adjusted to the type of data obtained. Quantitative data obtained from the g-form questionnaire was analysed using simple statistical data analysis. Qualitative data obtained from interviews were analysed through descriptive qualitative analysis according to Mile and Hubberman. This data analysis was conducted interactively through the process of data reduction, data display, and data verification (Miles & Huberman, 1994).

3. Results and Discussion

The discussion of the research results begins with a description of the identity of the respondents who are the object of research. The questionnaire was distributed in the form of a g-form which was filled in by 32 students. Based on gender, there were men and women who filled out the questionnaire from the Faculty of Education and Teacher Training. Based on age, respondents are in the age range of 19-23 years. All respondents were still in semester 4 in the current academic year when the research was conducted.

Based on the data that has been obtained, it can be analysed that in terms of gender, it is quite balanced between men and women, namely 32.2% of men and 67.7% of women. The balanced gender distribution provides a balanced picture of research results regarding perceptions of AI use based on gender representation. In terms of age, the respondents were also balanced and fulfilled the criteria that the respondents were expected to be young people or millennials who are native to the AI era whose age range is 16 - 23 years. Furthermore, based on faculty and semester, respondents came from representatives of the faculty that became the research population, namely one of the universities and while taking Islamic Religious Education lectures in the current semester.

The research results obtained through questionnaires will be presented in the form of graphs for each question asked. Broadly divided into 3 (three) main aspects, namely 1) the perception of the use of AI among students in Islamic Religious Education courses, 2) student trends towards the use of AI, and 3). The potential for Academic Misconduct in the use of AI among students.

Trends in the use of AI by students in Islamic Religion courses
The issue of artificial intelligence (AI) has recently received significant attention and its application in the world of education, including Islamic Religious Education at the university level (Humaeroh, 2023). The description of trends in the use of AI in Islamic Religious Education courses at one of the universities in Yogyakarta is presented in the form of graphs for each question. The following is a graph for each question:

1. Have you ever heard of Artificial Intelligence?
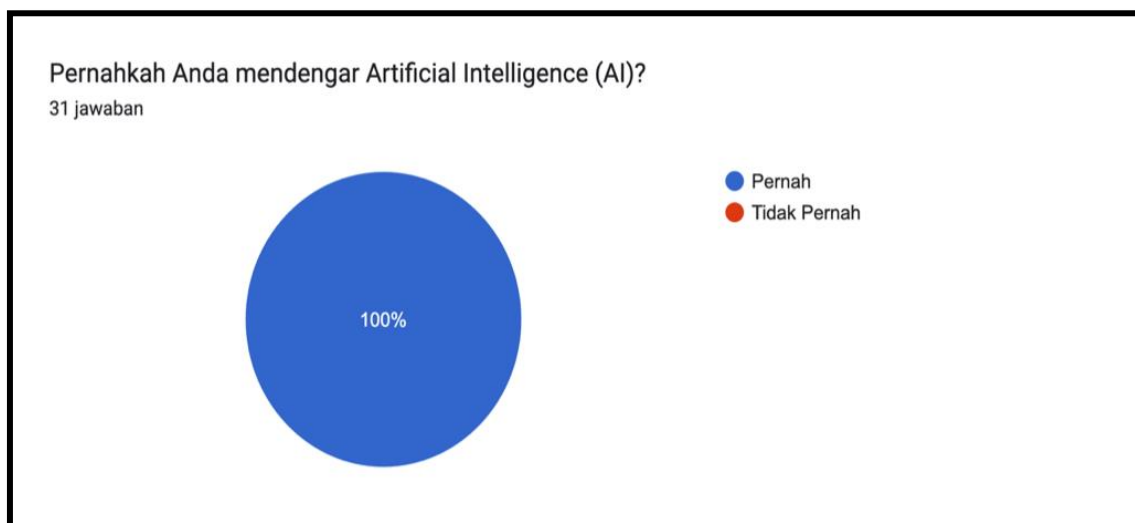
Figure 1. Graph of Respondents' Responses to Question 1 on the trend aspect

Based on the data obtained, it indicates the trend level of AI usage among students from a total of 31 respondents, 100% or 31 students have heard about AI.This reflects a high trend of knowledge among students towards AI technology.A total of 0% or no respondents stated that they had never heard of AI. With a large majority of students (100%) having heard of AI, educational institutions can take steps to capitalize on this level of awareness to support AI-related learning and research.Students who are already familiar with AI may find it easier to adopt and integrate these technologies in an academic context.

2. Where did you hear about AI or AI-based applications?
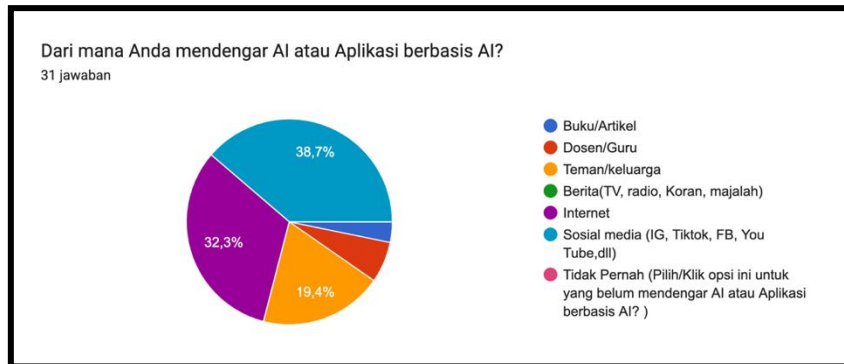
Figure 2. Graph of Respondents' Responses to Question 2 on the trend aspect

Figure 2 shows the sources of information from which students learned about AI. Social media, such as Instagram, TikTok, Facebook, YouTube, and Twitter, are the main sources of information for students (38.7%).

This shows the great influence of social media in distributing information about AI among university students.Social media is often used as a platform to share news, videos, and educational content, which can help in raising awareness about AI technologies.The Internet is also a significant source of information at 32.3%.

Some students (19.4%) gained knowledge about AI from friends/family, suggesting that discussions among friends and family play an important role in the dissemination of knowledge about AI. This may reflect how important social interaction is in learning and information exchange.

3. Have you ever used any of the following AI-based tools/systems to assist with Islamic Religious Education lectures?
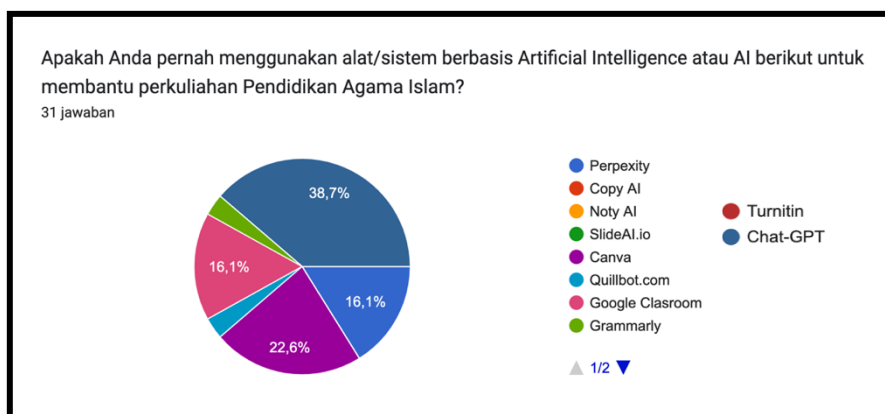
Figure 3. Graph of Respondents' Responses to Question 3 on the trend aspect

Figure 3 shows the types of AI-based tools or systems used to assist lectures. The most used type is Chat-GPT which is an AI-based application, namely 38.7%, followed by the Canva application at

22.6%, the use of Perpexity and Google Classroom applications at 16.1%, and the smallest is the Grammarly and Quilbot.com applications at 3.2%.

The results of this data analysis illustrate the trend of using AI among students in assisting lectures. Here are some important points that can be drawn from this data:

a. Chat-GPT

Chat-GPT is the most widely used AI-based application by students to assist with Islamic Religious Education lectures. Percentage of Use A total of 38.7% of respondents reported that they use Chat-GPT, indicating that almost two in five students utilize Chat-GPT for their academic purposes. Chat-GPT itself can be used for various purposes such as answering questions, providing in-depth explanations on certain topics, and assisting in assignment writing.

b. Canva

Second Most Used is Canva, which comes in second place in terms of frequency of use among students. Percentage of Use A total of 22.6% of respondents used Canva to help them in their Islamic Religious Education lectures. Canva itself is used to create presentations, infographics, and other visual materials that support the teaching and learning process.

c. Perplexity and Google Classroom

Balanced Usage These two applications show the same level of usage among students. Each is used by 16.1% of respondents. Perplexity itself is used for data exploration and in-depth analysis in learning. While Google Classroom serves as a platform for class management, material sharing, and communication between lecturers and students.

d. Grammarly and Quilbot.com

Grammarly and Quilbot.com are the least used apps by students. Only 3.2% of the respondents reported using each of these apps. Grammarly itself helps in grammar and spelling checking, which is useful in writing assignments and reports. Whereas Quilbot.com is commonly used to paraphrase text and help in rewriting content.

This data shows that students use a variety of AI-based tools in the context of PAI lectures. Chat-GPT and Canva are the most popular, while the use of tools for writing improvement and efficiency applications is also quite significant. The use of AI can help students in various aspects of lectures, including assignment management, visual material creation, and writing quality improvement.

4. How often do you use AI-based applications in Learning?
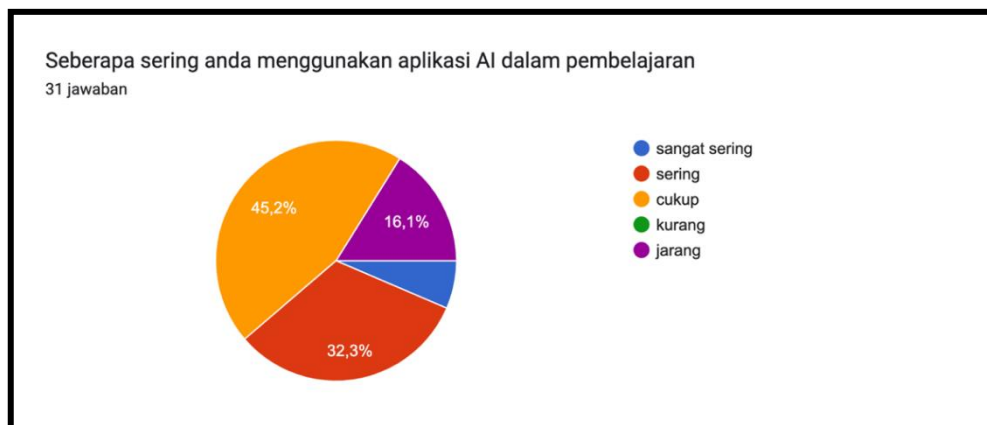
Figure 4. Graph of Respondents' Responses to Question 4 on the trend aspect

Figure 4 shows how often AI-based systems or applications are used in assisting lectures. The results show that the highest percentage is in the moderate option which is 45.2%, in the frequent intensity option is 32.3%, the rare option is 16.1%, and the smallest choice presentation is very frequent intensity which is 6.5%. The results of the data on the intensity of AI use among students reveal that the majority of students use AI-based systems or applications in helping their lectures with varying degrees of use. The following are some analysis points that can be drawn from this data:

a. Moderate (45.2%): "Fair" level of AI usage accounted for the highest percentage, with 45.2% of students. This may reflect that most students use AI quite intensively in their courses.
b. Frequently (32.3%): Although fewer in number, there are still a number of students (32.3%) who use AI "frequently" in the context of lectures. Students rely on AI technologies regularly in various aspects of their studies.
c. Rarely (16.1%): A small number of students (16.1%) use AI "Rarely". Students rarely rely on AI technologies in any stage of their studies.

This data shows the variation in the level of intensity of AI usage among students. The majority of students have not used AI in their lectures as a primary tool. Only a few do so with higher frequency than others.

5. Have you ever used AI-based applications to help you in your Islamic Religious Education lecture activities?

Figure 5: Graph of Respondents' Responses to Question 5 on the trend aspect

Figure 5 shows the intensity of the use of AI-based systems or applications among students. The use of AI-based applications in the context of Islamic Religious Education (PAI) courses can be explained as follows:

1. Never in PAI lecture activities 3.2%
   said that they never use AI-based applications in the context of PAI lectures. This reflects that some PAI students have not adopted or used AI technology in student learning in this course.

2. Yes, for all courses as many as 35.5%

  Only 35.5% of respondents said that they have used AI-based applications for all courses, including PAI. This shows a small group of students who actively integrate AI technology in their entire course experience.

3. Yes, but outside of PAI courses 61.3%

  of respondents indicated that they have used AI-based applications in courses other than PAI. This suggests that most PAI students have adopted AI technologies in their courses, but this use of AI may be more common in non-PAI courses.

  This data shows that the use of AI-based applications in Islamic Education courses varies. Islamic Education courses varies. While most Islamic Education students use AI in other courses, only some use AI in Islamic Education. This may be related to the specific characteristics of the course or the level of awareness about relevant AI applications in PAI. These data can serve as a basis to further integrate AI technologies in the PAI curriculum or to provide better information and training to students on the potential use of AI in the context of Islam.

Students' perceptions of the use of AI in Islamic Education courses

1. Do AI-based applications help you save time and effort in Islamic Religious Education coursework activities?
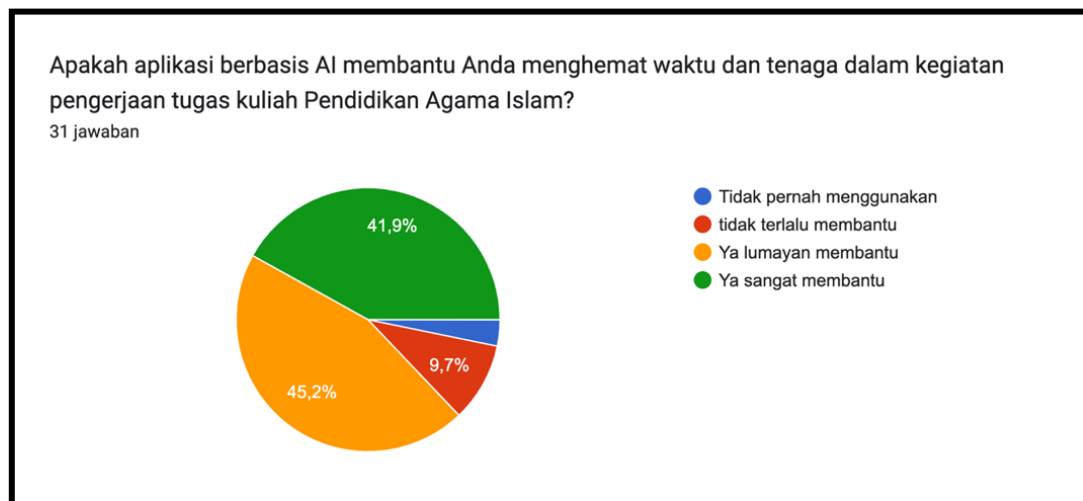
Figure 6: Graph of Respondents' Responses to Question 1 on the perception aspect

  Figure 6 shows the perceptions of students regarding whether AI-based applications help them to save time and effort in coursework activities. The results revealed various levels of views, namely: 1) View Yes Very Helpful. A total of 41.9% stated that AI-based applications are very helpful in saving time and effort in coursework. This reflects that there is a group of students who have experienced great benefits from using AI in their coursework. 2) Yes Somewhat Helpful. A large majority, i.e. 45.2%, found AI-based applications "moderately helpful" in saving time and effort. This suggests that many students see value in the use of AI, although they may not consider it a major factor in their productivity. 3) Not Very Helpful. A total of 9.7% said that AI-based apps were "not very helpful." This could indicate

that some feel AI technology has not provided a significant benefit in their coursework or that they have not found an AI tool that suits their needs. 4). Never Used. 3.2% stated that they have "never used" AI-based applications. This may indicate that a number of students have not utilized AI-based applications in their course context. This data reflects the diversity of student perceptions on the use of AI-based applications. While most see them as tools that provide benefits, a number of students may not have perceived significant benefits or are not yet familiar with the use of AI in their studies.

2. Do you think AI-based applications can be used as tools to support education and learning in higher education?
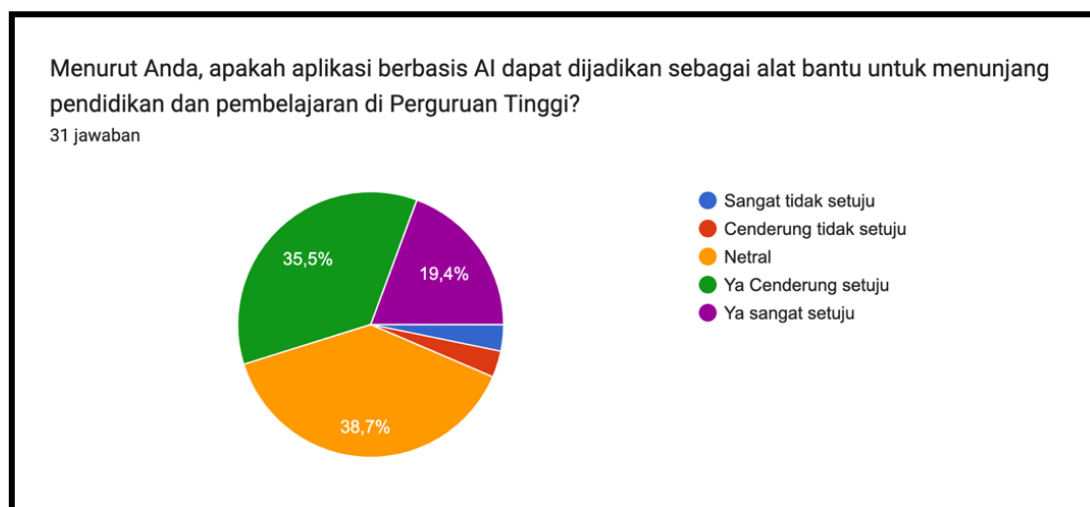
Figure 7. Graph of Respondents' Responses to Question 2 on the perception aspect

Based on Figure 7, 19.4% strongly agreed that AI-based applications can be used as effective tools to support education and learning in higher education. This reflects a positive view of the role of AI in the context of higher education. Some students, 35.5%, tend to agree that AI-based applications can be used as tools in higher education. Although not very convinced, they see positive potential in the use of AI technologies in the academic environment. A large majority, 38.7%, had a neutral attitude. They did not strongly agree or disagree with the role of AI-based applications in higher education. This suggests that there is a large group that may not have a firm view on the role of AI in higher education.

The Tend to Disagree option is 3.2%. Students tend to disagree with the idea that AI-based applications can be effective tools in higher education. They may have doubts or concerns about the use of AI technologies in this context. A small number, 3.2% strongly disagree that AI-based applications can support education and learning in higher education. They have a very negative view of the role of AI in higher education. This data reflects the diversity of student views or perceptions towards the use of AI-based applications in higher education. Although there are positive views, most students do not seem to have a very firm opinion.

3. What types of purposes do you use AI-based applications for?
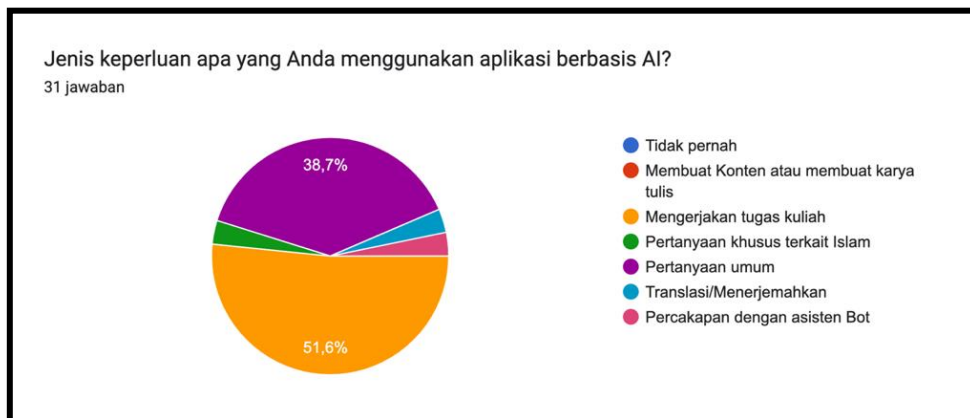
Figure 8: Graph of Respondents' Responses to Question 3 on the perception aspect

Based on Figure 11, it can be seen that students' perceptions regarding the types of purposes for using AI-based applications reveal the various uses of this technology in the context of their education and daily activities.

The main use of AI-based applications by students is to do coursework, with a percentage of 51.6%. This shows that more than half of the respondents use AI technology to help organize, edit, and improve their assignments. Apps such as Chat-GPT and Grammarly are frequently used in this process to search for information, draft essays, and improve grammar and spelling, contributing significantly to the quality of students' academic results.

A total of 38.7% of students use AI-based apps to answer common questions. This reflects the role of AI in providing quick and accurate access to information. Students can easily find answers to various questions, both related to their studies and daily life, thus improving their learning efficiency and ability to acquire knowledge independently.

In addition, there are some more limited but still significant uses of AI. A total of 3.2% of students used AI for conversations with bot assistants, translating, and answering general questions related to Islam. In conversations with bot assistants, AI helps in daily interactions, providing information or simply interacting. For translation, AI applications help translate texts from one language to another, which is very useful for students studying texts in foreign languages. Students also utilize AI to find answers to questions related to Islam, get explanations, and understand religious context.

This data shows that AI-based applications are used by students for a variety of academic and non-academic purposes. The primary use is for doing coursework, which accounts for more than half of all AI usage. Answering general questions is also a significant use, reflecting the role of AI in providing quick and accurate information. The use of AI for conversations with bot assistants, translating, and answering Islam-related questions, while lower, shows the diversification in how students are utilizing these technologies to support their education and daily needs.

4. Based on your experience of using AI, has AI impacted you in terms of learning?

Based on the data obtained, it seems that AI has a fairly significant impact on students' experience in various aspects, especially in terms of helping them with assignments and finding information. However, there are some important notes that need to be taken into account, namely:

a. Ease and Efficiency. Many students state that AI helps them to do their assignments more quickly and efficiently. This includes the ability of AI to look up references, provide information, or assist in creative processes such as graphic design (Muhaemin, 2023).

b. Dependability. Some students expressed concerns about possible dependency on AI. They worry that excessive use of AI may make them lazy to think and search for answers on their own.

c. Quality of Answers. There were some comments suggesting that while AIs such as Chat GPT can be helpful, the answers provided are not always accurate. This suggests that while AI can be a useful tool, it still needs to be understood and used wisely.

d. References and Learning Resources.Some students see AI as a helpful tool in finding references and learning resources that may be difficult to find elsewhere.

e. Mindset and Creativity. Some students feel that the use of AI can affect their mindset and creativity, especially if they rely too much on AI to answer their questions.

Overall, the impact of AI on the student experience seems to vary depending on how it is used and the extent to which students depend on it. It is important for students to use AI as a smart tool, but also to keep honing their own critical thinking skills and creativity.

Potential Academic Misconduct in the use of AI among university students

Academic misconduct is a serious problem in the academic world, and it is important to understand dishonest student behavior that can result in violations of academic standards. Here are some examples of behaviors that can lead to academic misconduct.

a. First, Plagiarism. Students copy someone else's text or ideas without giving proper attribution or sources. This includes copy-pasting text from the internet, quoting without citing sources, or purchasing academic work from writing services (Hardiago & Syafrinaldi, 2023).

b. Second, Cheating during exams, students use cheating tools such as hidden notes, text messages, or cell phones during exams. They can also cooperate with their friends when not allowed (Adriyana, 2019).

c. Third, Falsification of research data: Students or researchers present manipulated or false data in their research reports, assignments, or theses to improve results or achieve specific goals (Gunawan, 2020). Altering other people's files or assignments: students access their classmates' files or assignments and alter them to make them appear as their own work.

d. Fourth, Illegal editing by changing a script or assignment after submission, for example, by adding or changing information to improve grades or avoid punishment (Sidiq, Fitrotul, & Ulfiyani, 2021).

e. Fifth, Signing another student's attendance. Students present their attendance cards or sign their friends who are absent from lectures or exams (Nadeak, 2013).

f. Sixth, Facilitating academic misconduct or helping or telling fellow students how to commit plagiarism, cheating, or other dishonest acts.

g. Seventh, Intentionally losing other students' files: deleting, damaging, or taking away other students' course materials, assignments, or projects to hinder their academic progress.

h. Eighth, Intrusion in examination or assignment submission: entering examination rooms or accessing other students' assignment rooms without permission to steal their answers or work.

i. Ninth, Fraud when submitting an excuse for absence: providing false information or false medical certificates as an excuse to be absent from class or exams.

j. Tenth, Use of fraudulent technological devices such as using electronic devices, such as cell phones or smart devices, to access unauthorized information during exams or assignments.

All of these behaviors violate academic standards and may result in disciplinary action, punishment, or expulsion from the educational institution. Education about academic ethics and the consequences of academic misconduct is essential to reduce such incidents and maintain the integrity of the academic environment.

Based on the data processing results of the questionnaires and interviews, it can be obtained that the potential for students to commit academic misconduct in the use of AI is that most students feel that the use of AI, such as Chat GPT and other applications, helps them in doing coursework and academic work. They felt that AI can shorten the time needed to complete assignments and can help them find references and answer certain questions. However, some students also expressed concerns that overuse of AI could make them less diligent in thinking and searching for references independently. Some also felt that the use of AI in teaching could be harmful due to the possibility of copying answers without proper understanding. So, in general, it can be concluded that the use of AI has the potential to assist students in completing their academic tasks and work, but it needs to be used wisely so as not to reduce the quality of learning and deep understanding. Lecturers and educational institutions also need to consider how best to integrate AI in learning so that it provides the maximum benefit without jeopardizing the learning process.

Maintaining academic honesty in a variety of contexts is essential to ensure that work reflects the researcher's efforts appropriately (Pratiwi et al., 2023). Violations of academic and research integrity are a serious problem. In some cases, the term "academic crime" is used to highlight the seriousness of this problem of academic integrity and honesty. In the academic context, maintaining honesty is the foundation of quality education (Kurniyati, 2019). This means that every researcher or student must take responsibility for their actions and demonstrate strong ethics in all aspects of their work. Without academic integrity, education and research systems can be eroded (Lestari & Masyithoh, 2023), threatening the integrity of science and public trust in research results.

Academic honesty is not just about avoiding plagiarism or fraudulent acts, but also about approaching learning with deep integrity (Husnia, 2018), as it should be. This includes giving credit to relevant sources, reporting data honestly, and committing to building knowledge that is accurate and beneficial to all parties. Addressing issues of academic and research integrity is therefore our collective duty to ensure that the academic world remains a fair, ethical and reliable environment. Academic integrity is the moral foundation for the advancement of science and meaningful education.

4. Conclusion

From the results of this study, it can be concluded that students at one of the universities in Yogyakarta have a fairly high trend of using AI in the context of education, not least in Islamic Religious Education courses. In terms of AI usage trends, the majority of students have heard about AI, and many of them get information about AI through social media. In terms of perception, most students consider that AI-based applications help them save time and effort in doing coursework. They also see AI as an effective tool to support education and learning in higher education. However, there are doubts and disagreements among some students on the effectiveness of AI. In the context of potential academic misconduct, it should be noted that the use of AI brings new challenges in ensuring academic integrity. Plagiarism, cheating during exams, and other acts of academic misconduct are still serious problems that need to be addressed. It is important to provide education on academic ethics and develop clear guidelines on the use of AI in academic contexts.

As an implication in the development of the science and praxis of Islamic Religious Education, this study shows that AI has become a relevant part of higher education. Lecturers and educational institutions need to integrate AI wisely in the curriculum to maximize its benefits without compromising the quality of learning and academic honesty. Students also need to be equipped with knowledge about the ethical use of AI in academic contexts. In addition, there needs to be clear guidelines and rules related to the use of AI in writing assignments and examinations. The use of AI in education can be a valuable resource that can help students in their learning process. However, special care needs to be taken to ensure that the use of AI does not replace the deep understanding, creativity, and critical thinking that every student should have.

References

[1] Adriyana, R. (2019). Pengaruh Orientasi Etika, Rasionalisasi Dan Self Efficacy Terhadap Kecurangan Akademik. *Jurnal Ekonomi Dan Bisnis*, *22*(1), 7–12. https://doi.org/https://dx.doi.org/10.31941/jebi.v22i01.765

[2] Alam, A. (2021). Possibilities and Apprehensions in the Landscape of Artificial Intelligence in Education. *2021 International Conference on Computational Intelligence and Computing Applications (ICCICA)*, 1–8. IEEE. https://doi.org/10.1109/ICCICA52458.2021.9697272

[3] Aziz, M. (2018). Etika Akademis Dalam Pendidikan Islam. *JURNAL TARBIYAH*, *25*(1). https://doi.org/10.30829/tar.v25i1.239

[4] Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, *8*, 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510

[5] Devi, D., & Rroy, A. D. (2023). Role of Artificial Intelligence (AI) in Sustainable Education of Higher Education Institutions in Guwahati City: Teacher's Perception. *International Management Review*, *19*(Special Issue), 111–116.

[6] Firmansyah, D., & Dede. (2022). Teknik Pengambilan Sampel Umum dalam Metodologi Penelitian: Literature Review. *Jurnal Ilmiah Pendidikan Holistik (JIPH)*, *1*(2), 85–114. https://doi.org/10.55927/jiph.v1i2.937

[7] Gunawan, A. (2020). *Metode Penelitian Pendidikan: Penelitian Kuantitatif, Penelitian Kualitatif, Penelitian Tindakan Kelas*. Yogyakarta: Erhaka Utama.

[8] Hadian, T., Pkim, M., & Rahmi, E. (2023). *Berteman dengan ChatGPT: Sebuah Transformasi dalam Pendidikan*. Tasikmalaya: Edu Publisher.

[9] Hafizha, R. (2021). Pentingnya Integritas Akademik. *Journal of Education and Counseling (JECO)*, *1*(2), 115–124.

[10] Hardiago, D., & Syafrinaldi. (2023). Asas Legalitas Dan Self Plagiarism: Antinomi Realitas Empiris Sebagai Proyeksi Pengaturan Tindak Pidana Khusus Di Bidang Hak Cipta. *UIR Law Review*, *6*(2), 01–23. https://doi.org/10.25299/uirlrev.2022.vol6(2).11689

[11] Haug, C. J., & Drazen, J. (2023).). Artificial intelligence and machine learning in clinical medicine, 2023. *New England Journal of Medicine*, *388*(13), 1201–1208. Humaeroh, E. (2023). Islamic Religious Education Learning and Trends in the Use of Artificial Intelligence. *Asian: Indonesian Journal Of Learning Development And Innovation*, *1*(1), 31–35.

[12] Husnia, A. (2018). Pengaruh Sikap, Norma Subjektif, Penalaran Moral, Kreativitas Negatif, dan Kepribadian terhadap Intensi Ketidakjujuran Akademik. *Qiro'ah: Jurnal Pendidikan Agama Islam*, *8*(2), 73–104. https://doi.org/https://doi.org/10.33511/qiroah.v1i2.30
Ibrahim. (2015). *Metodologi Penelitian Kualitatif*. Bandung: Alfabeta.

[13] Khalilurrahman, K. (2016). Internalisasi Academic Cultur Dalam Pencegahan Korupsi Pada Perguruan Tinggi. *Al-Izzah: Jurnal Hasil-Hasil Penelitian*, *11*(2), 91–108. https://doi.org/https://dx.doi.org/10.31332/ai.v11i2.456

[14] Kurniyati, E. (2019). Implementasi Konsep Manajemen Mutu Pendidikan Perspektif Pendidikan Islam. *Rausyan Fikr : Jurnal Pemikiran Dan Pencerahan*, *15*(1). https://doi.org/10.31000/rf.v15i1.1363

[15] Lestari, R., & Masyithoh, S. (2023). Problematika Pendidikan Islam Di Indonesia Abad 21. *Al- Rabwah*, *17*(01), 52–60. https://doi.org/10.55799/jalr.v17i01.252

[16] Masrichah, S. (2023). Ancaman Dan Peluang Artificial Intelligence (AI). *Khatulistiwa: Jurnal*

[17] *Pendidikan Dan Sosial Humaniora*, *3*(3), 83–101. https://doi.org/https://doi.org/10.55606/khatulistiwa.v3i3.1860

[18] Mawarti, R. A., Hakim, S. Al, Habibi, M. M., Pramesti, L. W., Shofa, A. M. A., & Alfaqi, M. Z. (2021). Perilaku Menyimpang Mahasiswa dalam Kinerja Akademik di Perguruan Tinggi. *Jurnal Ilmiah Pendidikan Pancasila Dan Kewarganegaraan*, *6*(1), 210. https://doi.org/10.17977/um019v6i1p210-219

[19] Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An Expanded sourcebook* (Second). London: Sage.

[20] Moleong, L. J. (2017). *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosdakarya. Muhaemin, M. (2023). Analisis Pemanfaatan Artificial Intelligence (AI) sebagai Referensi dalam Desain Komunikasi Visual. *SASAK: Desain Visual Dan Komunikasi*, *5*(1), 71–80. https://doi.org/https://doi.org/10.30812/sasak.v5i1.2966

[21] Muhammad, I., & Triansyah, F. A. (2020). *Panduan Lengkap Analisis Bibliometrik dengan VOSviewer: Memahami Perkembangan dan Tren Penelitian di Era Digital.* Indramayu: Penerbit Adab CV Adanu Abimata.

[22] Nadeak, B. (2013). Plagiarisme Dan Ketidakjujuran Akademis. *Jurnal Manajemen Pendidikan*, *2*(2), 56–62.

[23] Pratiwi, E., Suryani, I., Aulia, I. N., Khairunnisa, Fadilla, P. A., & Hasanah, T. F. (2023). Pentingnya Etika Akademik dalam Konteks Tradisi Islam. *MODELING: Jurnal Program Studi PGMI*, *10*(2), 427–439. https://doi.org/https://doi.org/10.36835/modeling.v10i2.1697

[24] Sidiq, R. Y. B., Fitrotul, R. M., & Ulfiyani, S. (2021). Kesalahan Penerapan Kaidah Antiplagiasi Dalam Penulisan Karya Ilmiah Mahasiswa Universitas PGRI Semarang Tahun 2019/2020. *Prosiding Seminar Nasional Linguistik Dan Sastra (SEMANTIKS)*, 620–631.

[25] Sihombing, S. O. (2023). *Transformasi Penelitian Ilmiah: Mengoptimalkan Metode Penelitian dengan Kecerdasan Buatan.* Pekalongan: PT Nasya Expanding Management.

[26] Sugiyono. (2013). *Metodelogi Penelitian Kuantitatif, Kualitatif Dan R&D [Quantitative Research Methodology, Qualitative Research, and R&D].* Bandung: Alfabeta. Suprayitno, A., & Wahyudi, W. (2020). *Pendidikan karakter di era milenial.* Yogyakarta: Deepublish.

[27] Yonatan, A. Z. (2023). 8 Negara Asia Pasifik dengan Prediksi Pengguna AI Terbanyak 2023, Indonesia Nomor Berapa? Retrieved from GoodStats website: https://data.goodstats.id/statistic/agneszefanyayonatan/8-negara-asia-pasifik-dengan- prediksi-pengguna-ai-terbanyak-2023-indonesia-nomor-berapa-EP1x5

The Effect of Augmented Reality Flashcards towards Learning Results in Computer Networking Subject by Students of Vocational High Schools in Bali Province

Dessy Seri Wahyuni[1*], I Gede Bendesa Subawa[2], I Ketut Andika Pradnyana[3] and Gede Ariadi[4]

[1,2,3] Department of Informatics Education, Universitas Pendidikan Ganesha, Singaraja, Indonesia
[4] Department of Management, Universitas Kristen Satya Wacana, Salatiga, Indonesia

*E-mail: seri.wahyuni@undiksha.ac.id

Abstract. This study examines the prospective potential of flashcards in augmented reality (AR) that deliver a real learning experience for networking coursework. Moreover, we scrutinize the effect of flashcard AR on learning outcomes through the accomplishment of a quasi-experimental scheme comprising both control and experimental clusters by using a post-test-only. The respondents were 50 students at Vocational High Schools in Bali Province. The examination of post-test data exposes a statistically substantial improvement in learning outcomes among respondents in the experimental cluster, thus showing the effectiveness of flashcard AR in improving students' knowledge of computer network coursework. The research results support other empirical evidence that underlines the capability of flashcard AR to deliver collaborative and entrancing learning experiences when enriching understanding. Furthermore, the research results emphasize flashcard AR's capability to convert the didactic atmosphere and increase the quality of instructional interactions.

Keywords: *flashcard augmented reality*; *quasi-experimental design; computer network coursework; learning experience.*

1. Introduction

The technology development has a significant effect on all aspects of life [1]. It is a step in changing life to become more modern. The aspect of education has been developed by utilizing technological developments [2]. The development of this learning is known as digital learning, which is digital-based learning [3]. There are various problems in the development of digital-based learning. However, these can be overcome by creativity, innovation, and knowledge that can have a significant effect on life, especially in education [4]. It is also a background for teachers to be able to develop learning by using technology, which can be in the form of learning applications, sites or websites, learning videos, e-books, and other learning sources [5].

Technology development plays a vital role in developing a more innovative, creative, and modern learning system [6]. The teachers must develop their knowledge, skills, and experience in using technology in the learning process [7]. The problem is that some teachers lack improvement based on technology because there are still teachers who are not ready to implement technological developments in the learning process [8]. It is what causes teachers to understand technology less; as a result, the teacher will need more experience to develop technology-based learning processes. They will continue to use traditional learning methods that focus on the teacher center [9]. Meanwhile, the development of

technology has now prepared learning to be more student-centered, focusing on these students with facilities provided by teachers, especially technological developments. The traditional learning method is a method that only focuses on learning books that are supported by less innovative learning videos [10]. This method is used first and is less effective in learning. It causes students to be less motivated to learn because of the less exciting learning process. Therefore, the teacher has a significant role in developing the learning process by using technology so that students are more motivated to learn [11].

The learning media can support the learning process well and increase student learning motivation [12]. Learning media has developed along with technological developments, one of which is the use of unplugged mode [12]. Unplugged mode focuses on the learning process using 3D visualization, which can provide explanations in the form of innovative and creative images and videos [13]. The students will be interested in learning because they will think that the learning process is exciting and easy to understand, and 3D visualization provides an overview of the learning material. AR can be integrated in unplugged mode in the learning process of Vocational High School students in Computer networking subjects [14].

Augmented Reality (AR) flashcards support the learning process in vocational schools because students gain experience related to industrial work tools that can be visualized so that they are able to develop their knowledge of the learning material [15]. Even though schools do not have facilities in the form of fundamental industrial work tools, AR can provide an overview of the form, type, and function of these industrial work tools [16]. Augmented Reality (AR) flashcards can be integrated with unplugged mode where students do not need to use a computer [17]. They only use their devices to follow the learning process. Learning materials in the form of information about computer networking, telecommunications systems, and computer networking measuring instruments provide factual knowledge.

Furthermore, learning material that focuses on the function and use of measuring instruments in computer networking and telecommunications systems provides conceptual knowledge. Therefore, augmented reality (AR) flashcards play an essential role in providing knowledge that focuses on facts and concepts. Augmented Reality (AR) flashcards are a learning medium that has a vital role in developing student learning results. 3D visualization can provide experience, knowledge, and skills that focus on industrial work tools, especially computer networking. Students will be motivated to learn because of innovative and creative learning media. They are able to gain knowledge that focuses on facts and concepts, which will become their provision before future internships.

2. Research Method

1.1 Research Design

This research focused on the quasi-experimental method, which consisted of groups that were already available and did not use random assignment [18]. Apart from that, this research also used a post-test, which focused on only the control group design. This research was used to know the effect of AR on student learning results, especially in computer networking subjects. It can give information about the comparison of the experimental group and control group towards student learning results. As shown in Table 1, the scheme method for the control group in post-test only is as follows:

Table 1. Scheme Method

Class Category	Treatment	Post-Test
Experimental	X	P_1
Control		P_2

Note:

X: Treatment of Augmented Reality (AR) Flashcards
P_1: Post-test for Experimental Class
P_2: Post-test for Control Class

1.2 Respondents

This research was attended by 50 students of Bali Mandara Vocational High School who focused on Computer Networking. The sample consists of two classes (experimental and control). Each class consists of 25 students who are also respondents to this research. This research used purposive sampling, namely a sampling technique that focuses on the objectives of this research, for which criteria have been determined so that respondents for this research are selected from the population [19].

1.3 Data Collection

This research used tests as a data collection technique that aims to determine students' skills related to knowledge and competence in problem-solving, measuring computer networking, and maintaining computer networking systems. Augmented Reality (AR) flashcards are a learning method in experimental classes that focuses on the use of technology in the form of cell phones and flashcards. This research used an AR-based Android application as a technology-based learning medium. The aim is to develop students' interest in learning in the learning process; students will be more active and creative so that the learning process will be more effective, innovative, and modern.

1.4 Data Analysis

This research used a test as data, which has 20 multiple-choice questions that focus on computer networking literacy skills, remembering tools (C1), and maintaining computer networking(C2). This test was taken by students who were the sample for this research. This research used a paired t-test and post-test scores aimed at assessing significant variations in student learning results. The independent t-test is used to show the average of the post-test. Therefore, the researcher can formulate the hypothesis as follows:

H_0: There is no significant difference of student learning results for computer networking in experimental class and control class
H_1: There is significant difference of student learning results for computer networking in experimental class and control class

3. Result and Discussion

3.1 Normality and Homogeneity Test

This research used normality and homogeneity tests on this research sample. A normality test is used to measure the data distribution of the groups. It can provide an assessment of whether the data distribution is normal or not. Apart from that, the homogeneity test aims to determine the variance in the data. This research obtained data in the form of student scores on end-of-semester tests. In addition, the Kolmogorov-Smirnov method was used to determine a significant degree (α) of 5% as information on sample normality. This result showed that the post-test scores of both classes showed a significant degree at 95%. It means that both classes show a normal distribution. The test results showed that they are from homogeneous populations.

Table 2. The Normality Test Outcome

| | Kelompok | Kolmogorov–Smirnov[a] | | |
		Statistic	df	Sig.
Post_test	Eksperimen	2.140	25	.034[*]
	Kontrol	2.105	25	.041[*]

3.2 Students' Computer Networking Competency

Table 3 shows that the experimental class showed that Augmented Reality (AR) flashcards can have a significant effect on student learning results in computer networking. The experimental class scores were 92 (maximum), 65 (minimum), and 80,88 (average). The control class scores were 84 (maximum), 55 (minimum), and 75 (average). From the results of this data, the experimental class shows a higher average value than the control class. It shows that augmented reality (AR) flashcards can be used as an innovative, creative, and modern learning medium.

Table 3. The Result of Students' Network Literacy

	Kelompok	N	Mean	Std. Deviation	Std. Error Mean
Post_test	Eksperimen	25	80.88	7.607	1.521
	Kontrol	25	75.00	9.443	1.889

3.3 Hypothesis Test Results

This research used a hypothesis test which focuses on the free sample comparative method. The results of computer networking tests by students from both classes were tested by using significance level of 95%. Table 4 shows that Levene's calculated F is 1.119 with a significance level of 0.295. This significant result shows more than 0.05 (0.295 > 0.050), meaning the variances are same. Furthermore, t-test analysis used to know equal variance assumption. Based on the equal variances section, it is assumed that the t value obtained from the data is 2.425, which is a value higher than t_{table} ($t_{count} = 2.425 > t_{table} = 1.960$). It can be concluded that H_0 is rejected and H_1 is accepted. Apart from that, the significance value obtained was 0.019 < 0.050. These results indicate that there is a difference in the average results of students' computer networking competency in both classes.

Table 4. The Hypothesis Test Result

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | 95% Confidence Interval of the Difference | |
		F	Sig.	t	df	Sig. (2–tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Post_test	Equal variances assumed	1.119	.295	2.425	48	.019	5.880	2.425	1.004	10.756
	Equal variances not assumed			2.425	45.918	.019	5.880	2.425	.998	10.762

3.4 Discussion

The factual and conceptual student learning results focus on computer networking engineering tools. The post-test scores showed that Augmented Reality (AR) Flashcards are a learning medium that is used to adapt the curriculum. It can provide development and improvement in the quality of learning.

The experimental class had a significant effect on the learning process by utilizing Augmented Reality (AR) Flashcards with an average of 80.88, which was higher than the control group class of 75. Augmented Reality (AR) Flashcards have a significant effect on learning results [20]. Apart from that, Augmented Reality (AR) Flashcards are a facility for students to develop their skills [21]. Therefore, augmented reality (AR) flashcards are declared a learning medium that can help students develop their skills, knowledge, and experience in the learning process.

The students in the experimental class often interact, communicate, and discuss with other friends. It is supported by Haddock et al. (2022), who state that Augmented Reality (AR) Flashcards motivate students to increase their interactions with each other [22]. It can increase ideas and innovations that can have a significant effect on students. Moreover, AR provides experiences for students to improve learning results. As stated by Bhagat [23], AR can motivate students to follow the learning process well. This research focused on the effect of AR on improving student learning results due to the development of this technology.

Problems that occur in Augmented Reality (AR) Flashcards can be minimized by the role of students in using technology in the learning process. Students should be motivated and aware of the importance of using technology to enhance learning experiences and develop skills and knowledge so that they can benefit from it in everyday life [24]. In addition, Augmented Reality (AR) flashcards can be developed if the technological environment is adequate. However, this research certainly had limitations, namely the existence of sample limits in the experimental and control classes; the intervention needs to be longer, which will affect the research results. Therefore, future research must have a larger sample and vary over a more extended period so that the limitations of this research can be adequately resolved.

The results of this research show a significant effect on student learning results. Augmented reality (AR) flashcards can provide information that allows students to develop knowledge, experience, skills, and activeness in the learning process [25]. Not only in education, but they can develop this in their lives. Furthermore, AR is a learning medium that provides innovations by utilizing technology [26]. The learning process will be more effective, innovative, and modern. It also provides information about learning strategies and rules. Teachers can use Augmented Reality (AR) Flashcards as a learning medium that focuses on the student center, which is able to motivate students to be more active in class and contribute to the learning process. Traditional learning methods can be developed by utilizing technological developments, such as augmented reality (AR) flashcards, which can have a significant effect on students' development of a good learning process.

4. Conclusion

This research provided detailed information that is in accordance with the literature and previous research results, which are proven by the results of the post-tests that have been used in this research. Apart from that, the results of this research also provide empirical information that focuses on the significant effect of AR on student learning results. Furthermore, the experimental class showed a significant effect of Augmented Reality (AR) Flashcards on student learning results. The post-test results showed that students are able to develop their skills in developing ideas that are useful for them in the learning process. Augmented Reality (AR) Flashcards can provide visualization of the learning material. The comparison of the results of the experimental class and control class showed that AR is characterized by students' skills to obtain, store, and manage information.

Technological developments can develop educational aspects, especially in the learning process. Students must be provided with adequate technological facilities so that they can develop their knowledge, experience, and skills regarding learning materials. It is the time for education to become more advanced by utilizing technological developments, such as significantly augmented reality (AR)

flashcards. It provides information about the significant effect of AR in improving student learning results. They are more motivated to learn because learning media is innovative, practical, and modern. So that they are interested in learning and follow the learning process well. The limitations of this research are the limited sample and short intervention. Therefore, future research must expand the sample and scale up the intervention over a more extended period so that the results of further research can provide new information regarding the long-term effect of Augmented Reality (AR) Flashcards. Future research can focus on students' learning styles, learning motivation, and critical thinking and problem-solving skills.

Reference

[1] Z. Ahmed, S. P. Nathaniel, and M. Shahbaz, "The criticality of information and communication technology and human capital in environmental sustainability: evidence from Latin American and Caribbean countries," *J. Clean. Prod.*, vol. 286, p. 125529, 2021.

[2] X. Chen, D. Zou, G. Cheng, and H. Xie, "Detecting latent topics and trends in educational technologies over four decades using structural topic modeling: A retrospective of all volumes of Computers & Education," *Comput. Educ.*, vol. 151, p. 103855, 2020.

[3] R. Fadhli, A. Suharyadi, F. M. Firdaus, and M. Bustari, "Developing a digital learning environment team-based project to support online learning in Indonesia," *Int. J. Eval. Res. Educ.*, vol. 12, no. 3, 2023.

[4] Y. Ramma, M. Samy, and A. Gopee, "Creativity and innovation in science and technology: Bridging the gap between secondary and tertiary levels of education," *Int. J. Educ. Manag.*, vol. 29, no. 1, pp. 2–17, 2015.

[5] K. H. Lau, T. Lam, B. H. Kam, M. Nkhoma, J. Richardson, and S. Thomas, "The role of textbook learning resources in e-learning: A taxonomic study," *Comput. Educ.*, vol. 118, pp. 10–24, 2018.

[6] A. Haleem, M. Javaid, M. A. Qadri, and R. Suman, "Understanding the role of digital technologies in education: A review," *Sustain. Oper. Comput.*, vol. 3, pp. 275–285, 2022.

[7] B. Fahrman, P. Norström, L. Gumaelius, and I.-B. Skogh, "Experienced technology teachers' teaching practices," *Int. J. Technol. Des. Educ.*, vol. 30, no. 1, pp. 163–186, 2020.

[8] S. Ghavifekr and W. A. W. Rosdy, "Teaching and learning with technology: Effectiveness of ICT integration in schools.," *Int. J. Res. Educ. Sci.*, vol. 1, no. 2, pp. 175–191, 2015.

[9] W. Admiraal *et al.*, "Teachers in school-based technology innovations: A typology of their beliefs on teaching and technology," *Comput. Educ.*, vol. 114, pp. 57–68, 2017.

[10] H. E. Vidergor and P. Ben-Amram, "Khan academy effectiveness: The case of math secondary students' perceptions," *Comput. Educ.*, vol. 157, p. 103985, 2020.

[11] L. Sharma and M. Srivastava, "Teachers' motivation to adopt technology in higher education," *J. Appl. Res. High. Educ.*, vol. 12, no. 4, pp. 673–692, 2020.

[12] R. D. Puspitasari and U. Mulkiyah, "An Analysis in Using Learning Media to Increase Student Motivation of Learning Physics," *J. Corner Educ. Linguist. Lit.*, vol. 2, no. 3, pp. 258–264, 2023.

[13] R. Thoma, N. Farassopoulos, and C. Lousta, "Teaching STEAM through universal design for learning in early years of primary education: Plugged-in and unplugged activities with emphasis on connectivism learning theory.," *Teach. Teach. Educ.*, vol. 132, p. 104210, 2023.

[14] A. Threekunprapa and P. Yasri, "The role of augmented reality-based unplugged computer programming approach in the effectiveness of computational thinking," *Int. J. Mob. Learn. Organ.*, vol. 15, no. 3, pp. 233–250, 2021.

[15] Y. O'Connor and C. Mahony, "Exploring the impact of augmented reality on student academic self-efficacy in higher education," *Comput. Human Behav.*, vol. 149, no. 4, pp. 25–32, 2023, doi: 10.1016/j.chb.2023.107963.

[16] M. Bower, C. Howe, N. McCredie, A. Robinson, and D. Grover, "Augmented Reality in education–cases, places and potentials," *EMI. Educ. Media Int.*, vol. 51, no. 1, pp. 1–15, 2014.

[17] Z. Makhataeva, T. Akhmetov, and H. A. Varol, "Augmented Reality for Cognitive Impairments," in *Springer Handbook of Augmented Reality*, Springer, 2023, pp. 765–793.

[18] M. A. Handley, C. R. Lyles, C. McCulloch, and A. Cattamanchi, "Selecting and improving quasi-experimental designs in effectiveness and implementation research," *Annu. Rev. Public Health*, vol. 39, pp. 5–25, 2018.

[19] S. Klar and T. J. Leeper, "Identities and intersectionality: a case for Purposive sampling in Survey-Experimental research," *Exp. methods Surv. Res. Tech. that Comb. random Sampl. with random Assign.*, pp. 419–433, 2019.

[20] R. W. Chen and K. K. Chan, "Using Augmented Reality Flashcards to Learn Vocabulary in Early Childhood Education," *J. Educ. Comput. Res.*, vol. 57, no. 7, pp. 1812–1831, 2019, doi: 10.1177/0735633119854028.

[21] S. K. Howorth, D. Rooks-Ellis, S. Flanagan, and M. W. Ok, "Augmented reality supporting reading skills of students with autism spectrum disorder," *Interv. Sch. Clin.*, vol. 55, no. 2, pp. 71–77, 2019.

[22] M.-H. Wu, "The applications and effects of learning English through augmented reality: A case study of Pokémon Go," *Comput. Assist. Lang. Learn.*, vol. 34, no. 5–6, pp. 778–812, 2021.

[23] K. K. Bhagat, F.-Y. Yang, C.-H. Cheng, Y. Zhang, and W.-K. Liou, "Tracking the process and motivation of math

learning with augmented reality," *Educ. Technol. Res. Dev.*, vol. 69, no. 6, pp. 3153–3178, 2021.

[24] A. B. Cygnet and P. Sivakumar, "Efficacy of augmented reality-based flashcards on learning Basic Tamil words among primary learners during neo-normal period," *Educ. Inf. Technol.*, pp. 1–18, 2023.

[25] A. M. F. Yousef, "Augmented reality assisted learning achievement, motivation, and creativity for children of low-grade in primary school," *J. Comput. Assist. Learn.*, vol. 37, no. 4, pp. 966–977, 2021.

[26] D. S. Wahyuni, G. Ariadi, K. Agustini, and I. N. E. Mertayasa, "Developing a Sustainable Technical Work with Environmental Augmented Reality on Innovative Modul Training," *Econ. Educ. Anal. J.*, vol. 1, no. 1, pp. 91–99, 2023, doi: 10.15294/eeaj.v1i1.77142.

A Systematic Literature Review of Realistic Mathematics Education (RME) Integrated Technology for Elementary School Students in Indonesia

Eni Mulyani [1], Muhammad Firdaus Al Fikri[1], Situs Indrawati[1], Zetra Hainul Putra[1], Dahnilsyah[2], Hadriana[2]

[1] Departement of Elementary Education, University of Riau, Pekanbaru, Indonesia
[2] Departement of English Education, University of Riau, Pekanbaru, Indonesia
[1] Email: eni.mulyani6883@grad.unri.ac.id

Abstract. In the era of the industrial revolution 4.0, technological developments require an educator to innovate in packaging the teaching and learning process to be more efficient, interesting, and meaningful. The learning process must prioritize skills and educators must also understand the development of the alpha generation so that the learning delivered is relevant and in accordance with the needs and characteristics of today's students. Realistic Mathematics Education (RME) has been implemented in Indonesia Since 2001 until now. Research on Realistic Mathematics Education integrated technology is the main concern of many researchers today. Realistic Mathematics Education (RME) was chosen because it is one of the approaches to learning mathematics that focuses on the contextualization and realization of mathematics in everyday life. Therefore, this study began to systematically review several studies on the implementation of RME that have been conducted for elementary school students in Indonesia. This study used research articles from the largest database in Indonesia to collect data, known as the Garuda Portal. The study found 27 research articles on RME integrated technology used by elementary school students in Indonesia. The research results were analyzed based on three categories; mathematical domain, research objectives, and methods. The researcher found that geometry was the common domain that the studies investigated. The reason for conducting research on geometry is because geometry is a basic mathematics that must be learned by elementary school students.

1. Introduction

In the era of the industrial revolution 4.0, technological developments require an educator to innovate in packaging the teaching and learning process to make it more efficient, interesting, and meaningful. The learning process must prioritize skills and educators must also understand the development of the alpha generation so that the learning delivered is relevant and in accordance with the needs and characteristics of today's students. Since 2001 until now Realistic Mathematics Education has been implemented in Indonesia. Elwijaya (2021).

The teaching of mathematics, especially at the primary level, has a fundamental importance because it is the initial foundation for further education. Mathematics needs to be mastered at the primary level so that students can solve everyday problems in their environment, whether at home, school or community. Schools teach math with a focus on everyday life situations.Wahyu (2023).

The mathematics curriculum in primary schools is structured by educators to promote students' mindset in solving problems and improving their own skills. This is in line with Wandi's view (2019:5), which describes mathematics learning as a structured process that utilizes concepts, activities to develop problem-solving skills, and explanations of these concepts. So it is hoped that students will not only passively receive explanations from the teacher, but they can also develop their own learning methods. More than that, students are expected to be able to solve everyday problems in learning mathematics.

Halimah, S., Kurniawati, L. (2022) states that the use of realistic-based teaching materials can product mathematics more interesting, relevant, and meaningful, not too formal and not too abstract. Realistic learning also really considers the level of students' abilities, emphasizes learning mathematics "learning by doing", facilitating mathematical problem solving without using standardized solutions (algorithms) and using context as a starting point for learning mathematics.

The RME approach is a modified approach from the RME approach that has been adapted to conditions in Indonesia. Zulkardi., Putri, 2019. According to Treffers in Saputri, et al (2023) there are 5 characteristics of RME, namely the use of context, the use of models, the use of student's own productions and constructions, the interactive character of the teaching process, and the intertwinement of various learning strands. Revina, S., & Leung, F.K.S. (2019) put forward 6 (six) RME principles, namely: 1) Activity Principle (activity principle); 2) Reality Principle; 3) Level Principle; 4) Intertwinement Principle; 5) Interactivity Principle; and 6) Guidance Principle.

Learning based on ICT (information and communication technologies) is relevant applied in the current era. This effort is given since that all primary school-age children have access to mobile devices such as smartphone or tablet that can be connected to the internet. During this time, students especially elementary school-age children are smart in operating these devices, but in reality, they cannot take the advantage from the mobile devices (Dubé & McEwen, 2017) in Mirza (2019).

2. Methods

The method used to conduct this study was a literature study, specifically a systematic review. As explained in the introduction, we adapted the systematic review process developed by Zawacki-richter et.al. (2020). First, the question of this review study was to find out the spectrum of research with Realistic Mathematics Education in teacher education in Indonesia. The criteria for inclusion in this study were research with Realistic Mathematics Education in teacher education published in journal articles. To find these articles, we used a database from the Indonesian government known as Garda Rujukan Digital (GARUDA) which can be accessed at https://garuda.ristekbrin.go.id/ . We used three keywords, Realistic Mathematics Education (RME), technology, and elementary school students, to find the articles. The available data starts from 2019 to 2024. We found 27 articles with titles consisting of Realistic Mathematics Education and elementary school students. The SLR research procedure according to Zawacki-richter et.al. (2020) is presented in Figure 1.

Figure 1. The SLR research procedure

3. Result

Mathematics Domains Related to Technology-Integrated Realistic Mathematics Education Research in Primary Schools in Indonesia

These studies were mainly concerned with the use of technology-integrated Realistic mathematics education in general. Five different mathematical domains were found in these studies, and geometry was the mathematical domain most favored by the researchers to study. Then there were six number mathematics domains, five measurement mathematics domains, five data analysis mathematics domains, five measurement mathematics domains, and algebra was the mathematics domain that was least researched by researchers.

Learning with the technology-integrated RME approach has a positive influence on the learning process. The application of the RME approach will help students to learn how to solve problems found in everyday life.
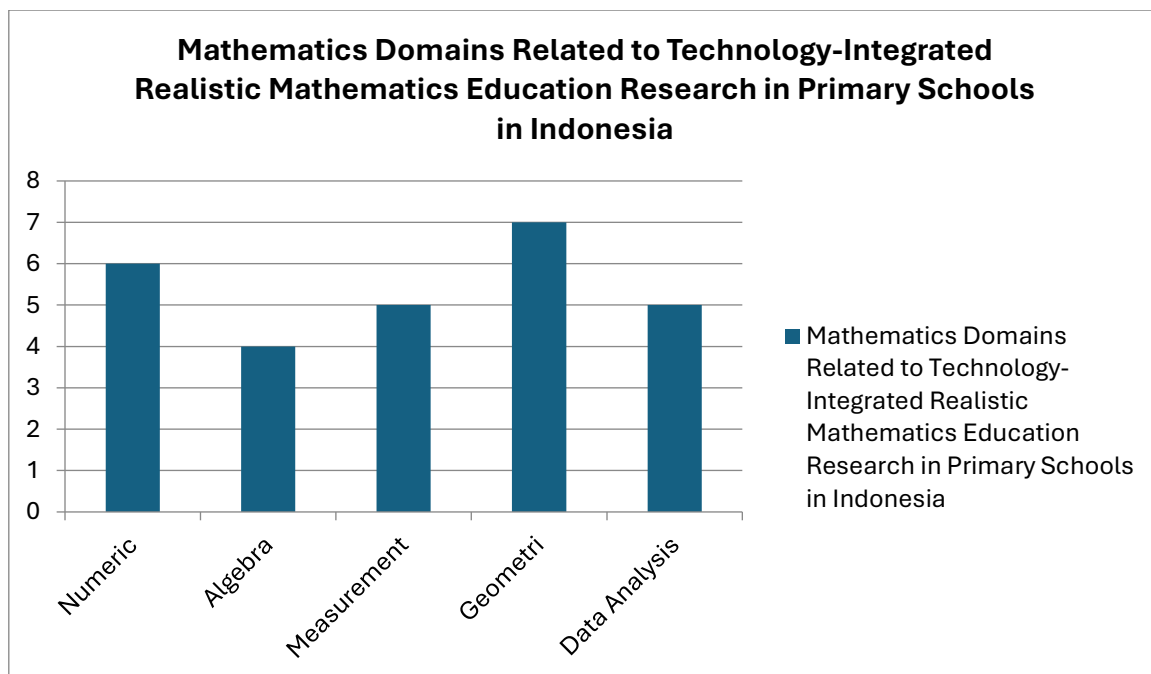
Aims of research related to technology-integrated RME in primary schools

After reviewing 27 research articles from research databases in Indonesia, we found four different objectives (Table 1). The most common objective of the research conducted by teacher candidates in

teacher education in Indonesia was to determine the effect of using technology-integrated RME in mathematics learning. This objective was presented in 9 research papers. An example of this objective is presented in the research conducted by Khotimah to support pre-service teachers' mathematical problem solving through technology-integrated RME-based mathematics learning instruction.

Table 1. Aims of research related to technology-integrated RME in primary schools

No	Purpose of Research	Number
1	To determine the improvement of student learning outcomes	7
2	Develop RME-based learning materials and activities	4
3	To determine the effect of using technology-integrated RME in mathematics learning	9
4	To support teachers in designing learning instructions Mathematics based on technology-integrated RME	5

Research Methods Related To Technology-Integrated RME In Primary Schools
This research using four different methods was conducted in several elementary schools. (Figure 2). Experiment Research was the most commonly used method, followed by research and development. Among those studies on experimentation, quasi-experimentation was used by twelve studies. Then classroom action research was studied by six researchers, and design research was the least studied, at two researchers. This opens up opportunities for future researchers to conduct research using design research methods.
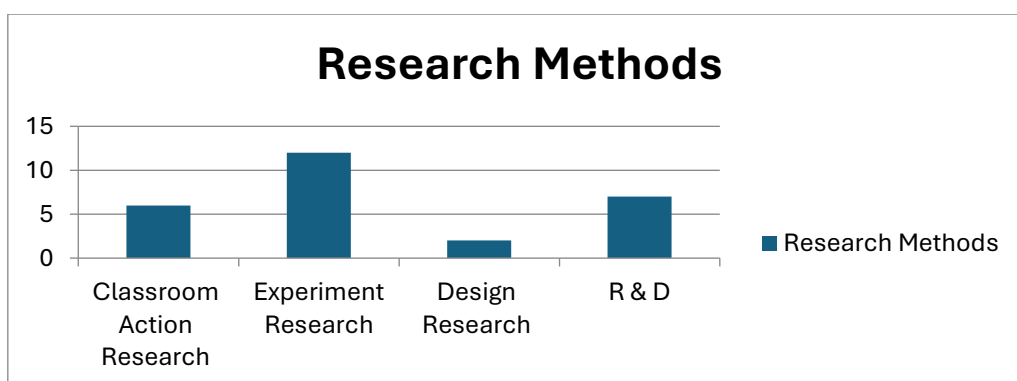
4. Conclusions

The systematic review conducted in this study aims to provide evidence on technology-integrated RME research in primary schools in Indonesia. After investigating 27 research articles from research databases in Indonesia, we found that geometry was the common domain that the studies investigated. The reason for conducting research on geometry is because geometry is a basic mathematics that must be learned by elementary school students in order to develop logical thinking skills, develop intuition, spatial visualization of the real world, impart knowledge needed for advanced mathematics and is expected to teach how to interpret mathematical arguments. Meanwhile, more than half of the studies aimed to find the effect of using technology-integrated RME in mathematics learning and this is also related to the methods chosen by the studies with experimental designs.

The application and development of learning with the RME approach has a positive impact on the development of students' concept understanding on geometry materials. Positive impact on the development of students' concept understanding in mathematics domain materials. Through

technology-integrated RME approach, it can develop a pleasant learning situation for students, because learning activities are oriented to everyday concrete situations. The use of concrete media contributes well in developing students' concept understanding of mathematics learning materials. Thus, RME approach becomes one of the solutions to overcoming problems in understanding concepts in mathematics learning in elementary schools.

Reference

[1] Elwijaya, F., Harun, M., & Helsa, Y. (2021). Implementation of Realistic Mathematics Education (RME) approach in elementary school. Basicedu Journal, 5(2), 741-748.

[2] Halimah, S., Kurniawati, L. (2022). Development Of Mathematics Teaching Material Based On Realistic Mathematics Education In Elementary School. *JIP Jurnal Ilmiah PGMI*, *8*(1), 34-42. https://doi.org/10.19109/jip.v8i1.8109.

[3] Mirza, A. S., Ahmadi, F., & Suminar, T. (2019). Development of Realistic Mathematics Education Mobile Learning in Elementary School. *Journal of Primary Education*, *8*(2), 169-175.

[4] Mulbasari, A., Putri, R., Zulkardi, Z., & Aisyah, N. (2023). Systematic Literatur Review: Kemampuan Berpikir Kritis Dengan Menggunakan Pendekatan Pendidikan Matematika Realisitik Indonesia (RME). *Journal Of Mathematics Science And Education*, *6*(1), 13 - 25. https://doi.org/https://doi.org/10.31540/jmse.v6i1.2611

[5] Saputri, R.R., Hidajat, F.A. (2023). Mathematics Learning Design on Linear Program Topic with Indonesian Realistic Mathematics Education Approach. Journal of School Mathematics Learning Research. 7(2), 12-16.

[6] Revina, S., & Leung, F. K. S. (2019). How the same flowers grow in different Soils? The implementation of realistic mathematics education in Utrecht and Jakarta classrooms. International Journal of Science and Mathematics Education, 17(3), 565-589.

[7] Ulfiana, U., Syamsuddin, A., & Husniati, A. (2022). The Effect of Learning Models Realistic Mathematics Education (RME) on Mathematics Learning Outcomes of Grade IV Elementary School Students. *Indonesian Journal of Primary Education*, *6*(2), 139-144.

[8] Wahyu Naldi, Tatang Herman, & Masnur. (2023). Implementation of Realistic Mathematics Education (RME) Approach to Elementary School Mathematics Problem Solving Ability. *International Conference on Elementary Education*, *5*(1), 693-704. Retrieved from http://proceedings2.upi.edu/index.php/icee/article/view/3154

[9] Warsito, W., Nuraini, Y., & Sukirwan, S. (2019). Mathematics Learning Design on Linear Program Topic with Indonesian Realistic Mathematics Education Approach. Journal of School Mathematics Learning Research. 7(2), 12-16., 8(1), 25-36.

[10] Zawacki-richter, O., Kerres. M., Bedenlier, S., Bond, M., & Buntins, K. (2020). Systematic Reviews in Educational Research: Methodology, Perspectives and Application. Wiesbaden: Springer VS.

[11] Zulkardi, & Putri, R.I.I. (2019). New school mathematics curricula, PISA and RME in Indonesia. In. C.P. Visto.Yu and T.L.Toh (Eds.), School Mathematics Curricula, Mathematics Education- An Asian Perspective (pp. 39-49)

Upgrading Teacher Technology: Teacher Asistance by Chat GPT Towards Learning Efficiency in Pati Regency

Eva Musmala Dewi

Basic Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
*evamusmala.2023@student.uny.ac.id

Abstract: Digitalization has permeated all sectors, including the education sector. The ease offered by technology in the 5.0 era has had a positive impact on the efficiency of teachers' performance. The efficiency related to space and time is felt by teachers at all school levels in Pati Regency.The main objective of this article is to identify the use of one artificial technology product named ChatGPT by teachers to assist administrative tasks and enhance learning effectiveness. This study uses a descriptive qualitative method with literature review and open interview techniques involving 100 randomly selected teachers in Pati Regency.The results of this study show that teachers are not only aware of AI technology and the ChatGPT application, but they are also using it as an assistant to help with administrative tasks such as creating lesson plans and student assessments. The utilization of AI technology in ChatGPT shortens the time required for teachers to complete administrative work. By leveraging AI technology, it is expected that teachers will focus more on student learning and generate innovative teaching methods. In the future, the use of Artificial Intelligence technology products will be massively employed to extend to other areas of education in order to provide technology-based learning effectiveness for students.
Keywords: Artificial Intelligence technology, Chat GPT, Teachers, Learning

1. Introduction

Today's technology has evolved from being perceived as a mere toy to a potentially disruptive innovation. Its success hinges on various factors, and banning or rejecting it will not diminish its impact. Therefore, it is crucial to understand this technology, which is based on large language models, and to recognize its potential benefits, weaknesses, and limitations (Hidayat et al., 2021; Tashtoush et al., 2023). Additionally, it is important to grasp the specific implications that ChatGPT and similar technologies have on sectors such as education. Evaluating how these tools can positively influence teaching and learning, while also identifying any potential negative effects, is vital. This understanding will enable educators and other stakeholders to make informed decisions regabyrding the use of these technologies in educational settings and to develop strategies to maximize benefits and minimize risks (Firat, 2023; Tashtoush et al., 2022a).

This includes individuals who work as teachers. Their essential duty to educate the nation places them in a position where they must stay abreast of contemporary developments, including advancements in technology. Nevertheless, such reactions generally fade as the technology becomes a standard part of most people's everyday routines, especially if it proves to be a versatile tool with multiple applications. Therefore, resistance to change and extreme responses are unlikely to hinder technology from reaching its peak productivity, as evidenced by studies from Alkaissi & McFarlane (2023), De Winter (2023), Deng et al. (2018), Tashtoush et al. (2022b), and Thorp (2023).

Once individuals become familiar with ChatGPT and its capabilities, they can decide whether to harness its potential, while remaining cautious of its possible negative effects. This may require adjusting established processes, which can be challenging due to resistance to change. However, such resistance usually diminishes once the technology becomes a routine part of people's daily lives, especially if it serves as a versatile tool across various application domains. Therefore, resistance and extreme reactions are unlikely to prevent the technology from reaching its peak productivity, as evidenced by studies from Alkaissi & McFarlane (2023), De Winter (2023), Deng et al. (2018), Tashtoush et al. (2022b), and Thorp (2023).

ChatGPT, a technological innovation introduced in 2022, has captured significant attention from both traditional and digital media due to its unpredictable behavior, likened to a black swan event. Although artificial intelligence (AI) has been previously covered, ChatGPT has rekindled public interest in the positive and negative effects of AI on society. Reactions to ChatGPT are mixed; while some innovators and early adopters are enthusiastic about its accessibility and ease of use, others express concerns about its potential dangers, reminiscent of scenarios in the Terminator movie. A major area of debate regarding ChatGPT's impact is in education and academia, as its ability to produce human-like written content raises important questions about its implications. AI has become an integral part of many technology-based products that people use daily in any occasion.

The educational landscape nowadays has significantly transformed due to technological advancements, particularly in AI (Vose et al., 2021). Recent progress in machine learning has led to the development of sophisticated and innovative digital content generation technologies, such as generative artificial intelligence (GAI) (Daqar & Smoudy, 2019). GAI, a machine learning framework, creates artificial outputs using statistics, probabilities, and other methods, and can be either unsupervised or partially supervised (Tashtoush et al., 2022a; Wang et al., 2018). Advancements in deep learning (DL) have enabled GAI to produce synthetic outputs such as text, audio, video, images, or graphics by analyzing and learning from existing digital content (Abukmeil et al., 2021; Gui et al., 2021; Hu, 2022). Currently, the literature identifies two main types of GAI: generative adversarial networks (GAN) and generative pre-trained transformers (GPT) (Abukmeil et al., 2021; Brown et al., 2020; Guo et al., 2023; Hu, 2022; Wardat, 2023).

In summary, although ChatGPT can enhance education and student learning, it is crucial to use it as a complementary tool alongside human teachers and educators. Educators can use ChatGPT to generate personalized content, assess student learning, and provide feedback to students. However, it is critical to understand its limitations and use it in an ethical and responsible manner (Pardos & Bhandari, 2023; Rudolph et al., 2023; Shahriar & Hayawi, 2023).

2. Conceptual Models

The current research sought to investigate two key facets of stakeholders' perceptions—specifically teachers' views on integrating ChatGPT into teaching and alleviating workload administrative. The methodology involved conducting content analysis on interviews and exploring user experiences to ensure a thorough and credible understanding of the study's validity and reliability. The research was

structured into two distinct phases: first, analyzing interview content; and second, investigating user experiences.

  a. Aspect 1: Analysis of interview content
  b. Aspect 2: Investigation of user experiences

The conceptual framework illustrating the interconnection between the two investigated aspects in this study focuses initially on teachers' perceptions. Specifically, it delves into the content analysis of interviews, which explores their perspectives and experiences regarding the use of ChatGPT in teaching and addressing workload administrative. This construct includes aspects identified through content analysis related to the effectiveness of ChatGPT in improving teaching quality and streamlining administrative tasks, as well as its accuracy in addressing identified issues through the use of ChatGPT.

3. Literature Review

3.1 Workloand Administrative

Workload refers to a series of activities that need to be completed by an organizational unit or an individual holding a position within a specific period of time (Sunarso, in Muntasir, 2022). This concept encompasses tasks and responsibilities that need to be carried out within the organizational and work environment context (Manuaba, in Muntasir, 2022). Generally, workload is defined as something burdensome, akin to goods or baggage that need to be carried and are difficult to complete, representing responsibilities that must be borne and undertaken (Muntasir, 2022).

One of the key factors determining the quality of education is the teacher, who serves as an educator (Darmadi, in Nisrina, 2023). The Law of the Republic of Indonesia Number 14 (1) of 2005 concerning teachers and lecturers states that a teacher is a professional educator whose main tasks are to educate, teach, guide, direct, train, assess, and evaluate students in formal early childhood education, primary education, and secondary education. In practice, teachers face workloads such as administrative demands, staffing requirements, and other responsibilities. Consequently, teaching as the primary task is not carried out to its fullest potential. Research conducted by Nisrina (2023) on the impact of non-teaching duties on elementary school teachers in North Kalimantan found that teachers' performance declined due to the demands of tasks outside their primary teaching responsibilities. This decline in performance negatively affected student achievement at the school.

3.2 Chat GPT

It is likely that the administrative workload of elementary school teachers will not decrease. Therefore, a targeted solution is needed. One such solution is the use of Chat GPT technology to assist in completing the administrative tasks of elementary school teachers.

The technology sector is buzzing about ChatGPT, an AI-based text generation tool developed by OpenAI. This tool is designed to understand natural language and provide relevant responses to user queries. Within two months of its launch, it attracted over 100 million users, leading OpenAI to introduce a subscription plan for unlimited access and quicker response times (Halaweh, 2023).

ChatGPT is a versatile educational tool that offers intelligent assistance in grading and language support for teachers, while providing students with an interactive and adaptive learning experience that promotes creativity and engagement. To address ethical concerns and potential biases, careful implementation is required, and ChatGPT should complement traditional teaching methods to ensure a comprehensive educational experience. A pedagogical approach that prioritizes critical thinking and fact-checking, along with a well-defined strategy within educational systems, is essential for fully leveraging the capabilities of large language models in teaching and learning settings. In this context,

Zhai (2022) suggests adjusting learning goals to include the use of AI tools for subject-domain tasks, emphasizing creativity and critical thinking, and designing AI-based learning tasks to assist teachers in solving problems.

4. Methods

4.1 Research methods
This study employs a quantitative descriptive method, analyzing research data in numerical form to produce statements or descriptions of the data. The study aims to describe the benefits of using Chat GPT as a teaching assistant to enhance learning efficiency. The analysis was conducted with teachers at public elementary schools in Pati Regency.

4.2 Research Subject
This research involved 72 elementary school teachers in eight schools which each school has six class teachers. In this study, all the teachers participated in interviews to gather the necessary data initially. Following the interviews, their behavior was observed while teaching and using Chat GPT in the school.

4.3 Research Insturment
Expert validation of research instruments was conducted to ensure the validity of the instruments used to measure the effectiveness of teachers using Chat GPT in enhancing learning efficiency. The validated research instruments included observation tools. Based on expert judgment, the research instruments were deemed valid. The assessment of the instruments is descriptive and should not be assumed. It was concluded that these instruments are suitable for data collection in the field.

The observation tool generated detailed reports focusing on teaching activities, encompassing the utilization of media, teaching materials, worksheets, and strategies. Open interviews were designed to provide teachers with the opportunity to freely express their perspectives. The interview structure addressed various aspects including the use of Chat GPT, evaluation of teachers' activities, and student engagement and participation in learning activities.

4.4 Data analysis
The data analysis employed descriptive statistics, which is a method of analyzing data to reveal and interpret datasets. This technique involves describing the data by categorizing it into tables or diagrams and then providing explanations.

5. Result

5.1 Interview Result
Based on the responses obtained from interviews conducted with 72 elementary school teachers in Pati Regency:

> "Chat GPT has been very helpful for me in completing several school administrative tasks such as lesson planning (RPP), finding teaching materials, creating teaching aids, and formative assessments. Additionally, it is sometimes used for other school administrative tasks like creating tables, summarizing data, and so on. I am slightly relieved by the existence of this Chat GPT AI. Previously, before knowing about Chat GPT, creating school administration took up quite a bit of time. Students were neglected. So, there is now time to focus on students."

Based on the quotes from the interview responses, it is evident that teachers benefit from using Chat GPT. Acting as an assistant, Chat GPT allows teachers to handle additional tasks and reduce the burden of duties beyond teaching. Moreover, having Chat GPT as an assistant also enables teachers to pay closer attention to students' behavior, academic achievements, and character development more deeply than before.

4.2 Observation Result

Observations were conducted in 5 schools, each with 6 classroom teachers. The observations took place during and after lessons, with each observation lasting between 30 minutes to one hour. The observational research instruments were utilized to capture descriptive outcomes. However, the results cannot be finalized at this time. Therefore, the following are preliminary findings from the research observations:

Tabel 1. Result of Observations Teachers Activities

No	Observations grid on Teachers Activities	Details
1	Teaching inside or outside the classroom	Teaching conducted inside or outside the classroom, with teachers positioning themselves as facilitators to the fullest extent, focusing on assisting students and not engaging in other tasks
2	Implementing teaching strategies	The implementation of teaching strategies is adjusted to the material, students' needs, and students' intelligence. Differentiated learning is conducted. The teaching strategies are already outlined in the Lesson Plan (RPP) prepared before the teaching begins
3	Using media	The use of media is tailored to the students' needs, the material, and the school's capabilities. Media is prepared before the learning activities begin. Teachers have sufficient time to create or modify the teaching media themselves.
4	Providing reflection and feedback to students	Teachers provide reinforcement and motivation to each student after the lesson ends. Teachers do not rush to leave the classroom
5	Completing teacher administrative tasks	Creating lesson plans, teaching strategies, instructional materials, and student worksheets are done using Chat GPT
6	Completing school administrative tasks	Creating data summary tables, student progress reports, activity reports, information management, and training modules.

6. Discussion

Th This research utilizes two assessment methods: observation and open interviews. Each method has its strengths in data collection. Findings from interviews with 72 randomly selected elementary school

teachers in Pati Regency reveal that 70% are familiar with Chat GPT, while the remaining 30% are either unaware of it or have never heard of it. Among those aware of Chat GPT, 95% use it for completing both teacher and school administrative tasks. Teachers who utilize Chat GPT for administrative purposes believe it accelerates their work completion.is study employs two types of assessment: observation and open interviews. Each data collection method has its strengths. Findings from interviews with 72 elementary school teachers in Pati Regency, randomly selected, indicate that 70% of teachers are aware of Chat GPT. The remaining 30% either do not know or have never heard of Chat GPT. Among the 70% of teachers who are aware of Chat GPT, 95% use it to complete teacher and school administrative tasks. Teachers who have utilized Chat GPT to assist in completing administrative tasks believe that their work is completed more quickly.

Chat GPT helps teachers streamline crucial administrative duties like crafting lesson plans (RPP). It supports in formulating and designing lesson plans that meet both curriculum requirements and student needs. Additionally, it assists in locating teaching materials by offering pertinent learning resources customized to the subject matter. In terms of instructional materials, Chat GPT aids in creating resources such as presentations, modules, and student worksheets. It also offers guidance on formative assessment questions and proposes assessment strategies for evaluating student progress.

Teachers have noted that these advantages enhance teaching quality. Teaching in the classroom becomes more efficient and student-focused as Chat GPT helps alleviate several administrative tasks. This allows teachers to dedicate ample time to nurturing students' character, addressing their learning needs, assessing individual progress, and designing diverse teaching strategies and media.

On the other hand, from observations outside of teaching hours, when teachers engage in school administrative tasks and use Chat GPT, activities include creating student summary tables, student progress reports, reports on committee accountability for activities, and developing training modules.

7. Conclusion

The rapidly advancing technology in the 21st century should be embraced by all sectors, especially educators. Chat GPT, with its benefits in easing teachers' administrative tasks, serves as an invaluable assistant amidst increasing demands. To ensure that students remain the primary focus of teachers—educating and enlightening the future generations of the nation—widespread adoption of Chat GPT, a product of AI development, among teachers in Indonesia is crucial.

Considering potential shortcomings that may arise from using Chat GPT, researchers hope for further development of this AI application.

Reference

[1] Alkaissi, H., & McFarlane, S. (2023). Artificial Hallucinations in ChatGPT: Implications in scientific writing. Cureus, 15(2), pe35179. https://doi.org/10.7759/cureus.35179

[2] Bewersdorff, A., Seßler, K., Baur, A., Kasneci, E., & Nerdel, C. (2023). Assessing student errors in experimentation using artificial intelligence and large language models: A comparative study with human raters. Computers and Education: Artificial Intelligence, 5(100177). https://doi.org/10.1016/j.caeai.2023.100177

[3] Chen, B., Zhu, X., & Díaz del Castillo H., F. (2023). Integrating generative AI in knowledge building. Computers and Education: Artificial Intelligence, 5(100184). https://doi.org/10.1016/j.caeai.2023.100184

[4] Firat, M. (2023). How Chat GPT can transform autodidactic experiences and open education? https://doi.org/10.31219/osf.io/9ge8m

[5] Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. Contemporary Educational Technology, 15(2). https://doi.org/10.30935/cedtech/13036

[6] Musa Adekunle Ayanwale, Owolabi Paul Adelana, Rethabile Rosemary Molefi, Olalekan Adeeko, Adebayo Monsur Ishola (2024). Examining artificial intelligence literacy among pre-service teachers for future classrooms. Computers and Education Open, 6(100179). https://doi.org/10.1016/j.caeo.2024.100179

[7] Sperling, K., Stenberg, C., McGrath, C., Åkerfeldt, A., & Heintz, F. (2024). In Search Of Artificial Intelligence (AI) Literacy In Teacher Education: A Scoping Review. Computers and Education Open, 6(100169). https://doi.org/10.1016/j.caeo.2024.100169

[8] Wardat, Y., Tashtoush, M. A., AlAli, R., & Jarrah, A. M. (2023). ChatGPT: A revolutionary tool for teaching and learning mathematics. Eurasia Journal of Mathematics, Science and Technology Education, 19(7), em2286. https://doi.org/10.29333/ejmste/13272

[9] Zhang, J., Goyal, S. B., & Rajawat, A. S. (2024). The Informational Role of Artificial Intelligence in higher Education in the New era. Procedia Computer Science, 235, 1008-1023. https://doi.org/10.1016/j.procs.2024.04.096

[10] Zheng Wang. (2024). Artificial Intelligence In Dance Education: Using Immersive Technologies For Teaching Dance Skills. Technology in Society, 77, 102579. https://doi.org/10.1016/j.techsoc.2024.102579

The Indonesia Civil Pilot Academy's Development Model for Using Flight Simulator to Improve Flight Performance for Flight Cadets

Hadi Prayitno[1*], Dimas Hari Cahyo[2]

[1] Department of Aviation Studies, Indonesia Civil Pilot Academy, Banyuwangi, Indonesia
[2] Department of Aviation Studies, Indonesia Civil Pilot Academy, Banyuwangi, Indonesia

[*]E-mail: hadi.stpi@gmail.com

Abstract. The purpose of this study is to assess how cadets participating in aviation vocational education might enhance their Flight Performance skills through flight simulator practice. Because flight performance is so important to aviation safety and decision-making, cadets must learn and improve these abilities during their training. The purpose of this study is to evaluate how well cadets' Flight Performance skills are improved by flight simulator training and to pinpoint any possible areas where the training regimen needs to be improved.

1. Introduction

Professional instruction in flying, especially pilot preparation, plays a crucial part in preparing people for affluent careers within the industry. These programs are outlined to give the basic information, abilities, and down-to-earth involvement that students, or cadets, have to flourish in their chosen callings. The well-organized educational programs coordinate hypothetical lessons with viable preparation to create capable and talented flying experts.

Flying professional instruction programs are custom-fitted for people pointing to ended-up pilots, flying specialists, discuss activity controllers or other related experts. The preparation is serious, centering on building specialized capability, a careful understanding of flying controls and strategies, and the capability to form basic choices in real-time scenarios. A basic aptitude for cadets to create is situational mindfulness.

Flight execution includes seeing and understanding pertinent natural data, getting a handle on its suggestions, and making fitting choices. This expertise is pivotal for pilots and other flying experts because it directly impacts their capacity to reply viably to energetic and challenging circumstances. Improving flight execution through comprehensive preparation is basic for the security and victory of flying operations.

Undergraduate aviation programs use a variety of designs and apparatus to expand aviation expertise, including regular flight checks. This system leaves a manageable and realistic world where starting to grow up can strengthen the intelligence and estimation of finding a way. This system makes it possible for adults to learn about life and safety in various shipping scenarios, emergencies, and descent conditions without any complications depending on the actual shipping. The regular use of checking sleep is believed to strengthen skills from adulthood and provide a way to learn about real navigation.

The purpose of this recording is to calculate the results of experimental flight tests on the growth of sailing skills starting from the undergraduate sailing course. By perceiving parity as part of the field

test case in enhancing situational awareness, this ideology seeks a way to suggest the perception of parity of part leadership sketches in safeguarding aviation graduates.

2. Methodology

This literature review method aims to analyze previous studies to assess the impact of flight simulator practice on improving cadets' flight performance skills in professional flight training. The literature search includes the following steps:

a. Identification of Literature Sources: Conduct searches through academic databases, aviation journals, conferences, and related publications to find relevant literature on the research topic. Keywords may include "flight simulator practice," "situational awareness," "aviation vocational education," and related terms.

b. Determination and Screening of Writing: Surveying and sifting the writing for significance to the inquiry about the subject. Choosing thinks about that particularly addresses the affect of flight test systems on upgrading Flight Execution among cadets in flying professional instruction.

c. Analysis and Assessment of Literature: Carry out a detailed polemic on the selected study. Identify standard insights into the educational balance of travel simulators against situational power increases. Assess the methodological style of the research, including the basis of the sample, the research structure, the measurement tools, and the methodological polemics used.

d. Synthesis and Interpretation: Combining findings from diverse literature sources to create a comprehensive synthesis on the effect of flight simulator practice in improving Flight Performance among cadets in aviation vocational education. Identifying similarities, distinctions, and patterns that emerge from the reviewed literature.

e. Report Writing: Creating a literature review report that encompasses an overview of how flight simulator practice impacts situational awareness, a summary of findings from the reviewed literature, and important recommendations or implications for future research.

This methodology will enable the author to achieve a comprehensive understanding of how flight simulator practice enhances Flight Performance among cadets in aviation vocational education, based on the existing literature.

3. Result and Discusion

3.1 Result

    Table 1. shows a summary of the results and discussion taken from various research reference sources according to the locus of this study:

No	Author identity	Brief description	Ref.
1	Endsley (1995)	We use the doctrine of dynamic orderly flight capabilities. This theory focuses on the importance of understanding and interpreting relevant field facts and adopting correct decisions based on this understanding. a detailed review of the flowering of selected peels. Identification of formal insights about the resultant cruise simulator leads to increased situational knowledge. Assess the methodological capabilities of the research, including the sample base, research structure, measurement tools, and evidence review prescriptions used.	[9]

No	Author identity	Brief description	Ref.
2	Wickens & Hollands (2015)	In the topic of design psychology, we promote the concepts of navigational energy and mental energy in situational observation situations, emphasizing the importance of understanding emotional situations and achieving beneficial attention at work. They emphasize that understanding emerges in a setting and the ability to think through and interpret is essential for optimal team performance in a variety of work tasks. This dynamic theory emphasizes the importance of understanding and connecting relevant facts in the field and obtaining correct information from this understanding. detailed review of selected studies. Identify basic information about the implications of ride simulator instruction for improving situational awareness. Assess the strength of the research methodology, including sampling objectives, research design, measurement instruments, and data analysis rules used.	[15]
3	Maurino et al. (2005)	They emphasize the significance of human variables, counting situational mindfulness, within the security of high-tech frameworks. They depict how solid flight execution can emphatically affect the security of operations inside complex frameworks.	[16]
4	a) CAA (2017) b) CASA (2018) c) FAA (2018) d) ICAO (2021)	give direction and capability measures for flight test system preparing gadgets. These rules highlight the significance of utilizing flight test systems to move forward flight execution abilities and guarantee compelling preparing for yearning pilots and flying experts.	[4] [12] [14]
5	O'Hare & Wiggins (2016)	Assist talk on Flight Execution preparing, especially within the flying setting, emphasizes the significance of progressed preparing to make strides understanding and empower viable reactions to complex circumstances.	[11]
6	Helmreich, Merritt, and Wilhelm (1999)	Provided improvements to Commercial Aviation Crew Resource Management (CRM). They emphasized the importance of participation and effective communication in improving aviation operations and safety.	[8]
7	Van Es, Van Der Veen, and Van Den Bossche (2020)	Inquire about into the included esteem of flight test systems within the improvement of complex aptitudes in professional instruction and preparing uncovers that these apparatuses can improve flight execution and get ready understudies for challenging real-world circumstances.	[10]
8	Stanton, Salmon, Walker, Baber, and Jenkins (2005)	Here's a viable direct to human variables strategies in building and plan. It emphasizes the significance of comprehending human perspectives to attain ideal Flight Execution in high-technology frameworks.	[7] [17]

This outline of comes about and talks emphasize the basic part of Flight Execution in flying operations and the viability of flight test systems in improving these aptitudes. The cited sources give hypotheses, discoveries, and directions that emphasize the significance of preparing and creating Flight Execution inside flying professional instruction.

It is expected that flight simulator practice will positively impact the cadets' Flight Performance skills. Post-training assessments are anticipated to show significant improvements compared to pre-training assessments. Qualitative data from interviews and observations will provide valuable insights into the cadets' perceptions, experiences, and suggestions for further enhancing the flight simulator training program.

3.2 Discussion

The cited references emphasize the importance of flight performance and the positive impact that improvements to the flight test system have had on the development of these skills in professional flight training. Based on the research that has been carried out, therefore, a model scheme for developing flight performance skills that can be applied in flight schools can be prepared. (refer to Graphic 1).
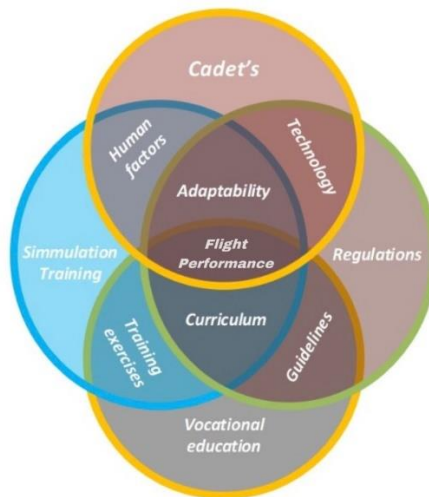
Figure 1. Aviation Performance skills development model in flight schools

In short, constituents such as perception, workload, robotics activity, Crew Resource Management (CRM), human traffic, preparation, and sky conditions influence the pilot's travel capabilities. Understanding and understanding these causes is essential to strengthening the pilot's situational attention, which ultimately contributes to the implementation of a more unified and efficient journey. However, there is friction between congregations and views. However, it is generally agreed in the bibliography that travel capabilities make an important contribution to travel operations.

A pilot's flying performance is influenced by various reasons that affect the pilot's nature in trusting and handling data about his environment. Factors such as judgment, sensory nature and awareness are very important parts in this environment. In addition, the heavy content of the task can discourage your natural urge to examine the world around you, thus affecting your situational knowledge. Distractions and multitasking can also incite situational knowledge. Endsley's hypothesis (1995) lays the foundation for understanding navigational capabilities as it is natural to grasp and gather important data about the earth that is needed to form appropriate commands. This view is supported by Wickens and Hollands (2015), who emphasize the importance of increasing constructive knowledge in a task environment that is similar to air transportation.

References also agreed that flight simulator manuals could significantly strengthen DAP skills. The highest aviation authority guidelines (CAA, CASA, FAA, ICAO) propose the operation of flight simulators to strengthen seafaring capabilities starting from maturity within specific guidelines. Research by Van Es, Van Der Veen, and Van Den Bossche (2020) is more elaborate on ideology This is also based on the ethos of flight simulators to expand the capabilities of human intelligence and enhance flight capabilities.

However, the references listed contain a number of odd parts and emphasis. Maurino and colleagues (2005) generally face the peace of travel implementation in high-tech companies, including travel. They emphasize the basic need for good behavior skills to be able to respond helpfully to dynamic and complex situations. This perspective is an eccentric concept using education and development that is emphasized in other references.

In addition, O'Hare and Wiggins (2016) discuss the importance of increasing waves to the implementation of airline company bestselling. They highlight the need for comprehensive examples that address basic predictions and insights. This approach continues to broaden the preparedness emphasized elsewhere, despite the inherent hostility of the energy and breadth of preparedness approaches.

These variables collectively influence the training of aviation professionals, particularly in improving flight execution skills. A well-trained flight test system is a critical component in providing a comprehensive and practical preparation environment for cadets. Training in simulators allows cadets to develop perception skills, improve perception, and generally increase situational awareness. Training in simulators allows cadets to successfully respond to dynamic and difficult situations, thereby improving decision-making skills and the ability to process information from the natural environment.

Professional instruction moreover plays a basic part by giving organized and comprehensive educational modules that incorporate the advancement of Flight Execution aptitudes. Through professional preparation programs, cadets pick up hypothetical information and down-to-earth hands-on encounters basics for building a solid establishment in flying. The educational modules may incorporate modules and courses particularly planned to upgrade situational mindfulness, centering on checking the environment, recognizing basic signals, and making educated choices.

Additionally, Flight Execution itself could be a principal angle of flying professional instruction, emphasizing the significance of keeping up it all through a pilot's career. By pushing the importance of situational mindfulness, professional instruction points to prepare cadets with the aptitudes required to securely, productively, and viably work flying machines.

In conclusion, flight test system hone, professional instruction, and Flight Execution are interconnected in flying professional instruction. Flight test system hone gives a reasonable preparing environment, and professional instruction coordinating Flight Execution advancement into the educational modules, and the by and large objective is to deliver well-rounded cadets with upgraded Flight Execution abilities. By joining these components, flying professional instruction endeavors to ready cadets for fruitful careers within the flying industry.

4. Conclusion

In conclusion, the references for the most part concur on the centrality of Flight Execution and the useful impact of flight test systems hone in improving this aptitude in flying professional instruction. Be that as it may, there may be a few varieties in center and accentuation, especially concerning varying viewpoints on the part of Flight Execution in security and the profundity of preparation required to develop successful Flight Execution aptitudes.

5. Acknowledgment

We recommend a record of guidance for the Indonesian Aviation Institute Banyuwangi security branch and an important role in this decision. Commitment to the authority of the section in travel guidelines and pilot guidelines is critical to the success of this determination. We rely on the safety, convenience and accessibility of these resources to provide design assistance in our decisions.

In particular, I would like to express my sincere thanks to the aviation industry for their support and commitment to these aspects. Their experience, knowledge and willingness to collaborate is invaluable as they gain a comprehensive understanding of the challenges and advances in the aviation industry. The industry's commitment to safety, development and continuous innovation has always been a source of motivation for our research.

References

[1]   J. Micaelli, S., & Morin, "Vocational Education and Training for Pilots: A Comparative Analysis of the French and Australian Systems," J. Vocat. Educ. Train., vol. 72, no. 2, pp. 173–191, 2020,

[2]   S. V Gudmundsson, "Vocational Education and Training in Aviation: Current Issues and Future Challenges," J. Vocat. Educ. Train., vol. 68, no. 2, pp. 129–146, 2016,

[3]   R. Kloosterman, "Preparing for Aviation: How Vocational Education and Training System Affects Aspiring Pilots," J. Vocat. Educ. Train., vol. 70, no. 1, pp. 85–106, 2018,

[4]   Civil Aviation Authority, *A Guide to Flight Simulator Qualification*, Fifth Edit. 2017. [Online].

[5]   H. Prettner, K., & Strulik, "It's the Way You Think: The Role of Cognitive Abilities and Cognitive Styles in Vocational Education and Training," J. Vocat. Educ. Train., vol. 72, no. 3, pp. 367–389, 2020,

[6]   G. Raybould, M., & Wilk, "A Review of Recent Developments in Pilot Training," Int. J. Aviat. Psychol., vol. 25, no. 4, pp. 247–262, 2015,

[7]   D. P. Stanton, N. A., Salmon, P. M., Walker, G. H., Baber, C., & Jenkins, *Human Factors Methods: A Practical Guide for Engineering and Design*. Farnham, UK: Ashgate Publishing, 2005.

[8]   J. A. Helmreich, R. L., Merritt, A. C., & Wilhelm, "The Evolution of Crew Resource Management Training in Commercial Aviation," Int. J. Aviat. Psychol., vol. 9, no. 1, pp. 13–32, 1999,

[9]   M. R. Endsley, "Toward a Theory of Situation Awareness in Dynamic Systems," Hum. Factors J. Hum. Factors Ergon. Soc., vol. 37, no. 1, pp. 32–64, 1995,

[10]   P. Van Es, A., Van Der Veen, J. T., & Van Den Bossche, "Exploring the Added Value of Flight Simulators for Complex Skill Development in Vocational Education and Training," J. Vocat. Educ. Train., vol. 72, no. 4, pp. 500–520, 2020,

[11]   M. W. O'Hare, D., & Wiggins, "Advanced Flight Performance Training. In M. J. Smith (Ed.)," in *Encyclopedia of Aerospace Engineering*, John Wiley & Sons., 2016.

[12]   Federal Aviation Administration, *Flight Simulation Training Device Qualification Standards for Airplane*. 2018. [Online].

[13]   Civil Aviation Safety Authority, *Flight Simulation Training Devices: Advice for Training Organisations*. 2018. [Online].

[14]   ICAO, *Manual on the Regulation of Flight Simulator Training Devices*. 2021. [Online].

[15]   J. G. Wickens, C. D., & Hollands, *Engineering Psychology and Human Performance*. Pearson, 2015.

[16]   R. B. Maurino, D. E., Reason, J., Johnston, N., & Lee, *Beyond Aviation Human Factors: Safety in High Technology Systems*. Ashgate Publishing, 2005.

[17]   M. Smith, B., & Hertzum, *Flight Performance in Collaborative Work*. In B. C. Berndtsson, A. Moström, T. Gorschek, & R. Feldt (Eds.), *Advances i*. Springer, 2008.

[18]   Prayitno, E. D., & Rahmawati, Y. (2021, November). Pengaruh Pembelajaran Bahasa Inggris Maritime di Kelas terhadap Kemampuan Taruna Berkomunikasi di Simulator. In *Prosiding Seminar Nasional* (Vol. 3, No. 1, pp. 172-176).

[19]   Prayitno, H., Supardam, D., Qiram, I., & Arrafat, B. S. (2023). Pemanfaatan Simulator Terbang Pada Pendidikan Vokasi Penerbang dalam Meningkatkan Minat Bakat Taruna Penerbang. *Langit Biru: Jurnal Ilmiah Aviasi*, *16*(02), 96-106.

[20]   Prayitno, H., Cholik, M., Suprianto, B., & Qiram, I. (2023, November). Impact of Flight Simulator Training on Enhancing Situational Awareness among Aviation Vocational Education Cadets. In *2023 International Conference of Computer Science and Information Technology (ICOSNIKOM)* (pp. 1-6). IEEE.

[21]   Prayitno, H., Cholik, M., Anifah, L., Wardhono, A., & Wicaksono, P. (2024). Improving Pilot Competence Through Flying Practice Learning Using Flight Simulator at the Indonesia Civil Pilot Academy of Banyuwangi. *Journal of Law and Sustainable Development*, *12*(1), e2426-e2426.

Utilizing Technology-Based Formative Assessment to Support Differentiated Instruction in Junior High School

Haryo Aji Pambudi[1*], Hilma Oktaviana Fajrin[2]

[1] English Education Department, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] SMP Negeri 4 Pakem, Yogyakarta, Indonesia

[*]E-mail: haryoaji@uny.ac.id

Abstract. One key element to succeed in differentiated instruction is monitoring the learning progress by conducting formative assessments of students' knowledge and skills at various points during the instructional process. To improve students' performance on these tests, providing prompt feedback is essential for both teaching and learning. This study looks into how well *Plickers*, a formative assessment tool based on technology, may improve student learning in the classroom.. This study is classified as quantitative research since it makes use of a quasi-experimental design. Junior high school students that are split into two groups for the research will be the research sample. One group will receive standard formative assessments, while the other will receive *Plickers*-based formative assessments. The pre- and post-tests make up the data gathering tool. Data analysis software, like SPSS with the t-test, will be utilized. Students' learning outcomes have been found to be greatly improved by the use of technology-based formative assessment. These findings demonstrate the benefits of utilizing digital tools in the classroom, like *Plickers*, and encourage educators to use them to assess students' learning development to facilitate differentiated instruction.

1. Introduction

In education, keeping track of students' progress is crucial, especially when it comes to tailored teaching, known as differentiated instruction. One way teachers do this is through formative assessments, which help them understand how well students are learning along the way. Giving feedback promptly based on these assessments is key to effective teaching and learning. With the use of formative assessments, teachers can determine the stage of students' learning. Through the help of this data, they may determine which subjects their students struggle with and where they excel. Furthermore, the outcomes of the formative assessments provide a basis for developing more successful teaching methods, like organizing instructional materials and methods based on students' comprehension. The feedback that students receive is one of the most important components of formative assessment (Kamara & Dadhabai, 2022). For students to comprehend their errors and come up with solutions, they need criticism that is both explicit and constructive. According to Hendra Saputra & Pasha (2021) and Sobarningsih (2022), it enhances students' comprehension of the course content and motivates them to take ownership of their learning. Formative evaluation has changed dramatically in the era of quickly advancing information and communication technologies. There are now more ways to give students quicker and more accurate feedback when using technology for formative assessment (Yu, J., et al 2022). Technological solutions might be able to give students with tests in a fun and self-directed way, promoting student involvement in the classroom.

One exciting and crucial method of improving student learning is to use formative evaluation with contemporary online classroom response systems. Technologies "support classroom environments that allow students and teachers to assess learning and provide mechanisms to present information about student learning during instructional sequences," according to Irving (2015), assisting in the formative assessment process.

Teachers can improve learning and evaluation by utilizing formative assessment throughout the teaching process with the help of several freshly released, available-for-free technologies and software programs. CRSs, or classroom response systems, are the type of these devices. *Socrative, Kahoot, and Plickers* are just a few of these technologies. The ability to collect formative assessment data in real time, which helps teachers provide feedback at the right time, unites all of these technologies. As stated on page 142, " Technological developments can aid in resolving this issue. " (Beatty and Gerace, 2009). Instructors have a finite amount of time to evaluate student performance and offer comments.

Paper-coded cards are used in online classrooms with Plickers, a technology-based formative evaluation tool. Sometimes people call it "Clickers without clicking.*"* Most notably, students can take part in the evaluation process without the use of any electronic equipment. All the instructor has to do is register for a Plickers.com account. Teachers will need to submit their first and last names, working email addresses, and passwords to register for an account on *Plickers*. After that, with no training or by following the available online instructions, we can easily construct a question bank and start using it for free. This study looked into how well Plickers work as formative assessment tools to improve student learning. The formative assessments based on technology, *Plickers*, will be examined as a potential solution to several issues faced in monitoring the student's progress in supporting differentiated instruction. This study is intended to help address some of the obstacles that teachers experience in providing quick formative assessment results and offer fresh perspectives on how technology can be an effective instrument for raising educational standards.

2. Method

Using a control group for comparison and a quasi-experimental approach, this study was based on the research of Madadizadeh (2022) and Rusmana & Suprihatin (2019). Two junior high school classes were chosen at random from a single school. One group will receive technology-based formative evaluations as part of the experiment, while the other group will receive traditional formative tests. For statistical validity, every group with at least thirty students was included in the research sample. Students will be chosen in a random manner. An English test that will be given to both groups as a pretest and a post-test to gauge their Englishmatics proficiency will serve as the data gathering tool. After the pretest, the experimental group will use Plickers, the control group will continue to use more traditional formative assessment techniques, while the English learning group will use a technology-based formative assessment tool for a defined period of time.

After that, a post-test will be given to each student to gauge any improvements in their performance. Data analysis will involve employing statistical software, such as SPSS, to process the student Englishmatics achievement data from the pretest and post-test. An independent t-test will be used to compare the experimental group, which receives technology-based formative assessment, and the control group, which receives traditional formative assessment. The t-test yields significance (p-value) and t-statistical values. If the p-value is less than a predetermined significance level, usually 0.05, it is thought that there are significant differences in learning success between the two groups.

3. Results and Discussion

Table 1 shows the findings of the analysis results in the post-test

Statistic	Control	Experiment
Mean	65.20	84.79
Median	62	83
Variance	108.42	93.76
Standard Deviation	10.48	9.75
Min.	43	78
Max.	76	93

The homogeneity of variance test and the data distribution normalcy test are two of the initial tests conducted in this investigation. Utilizing IBM SPSS Statistics 21.0 for Windows, the normality test investigation demonstrated that the pretest and post-test data exhibited significant values (Kolmogorov-Smirnov) of 0.200 and 0.200, correspondingly. These results show that the Sig. > 0.05 for all data categories. Given this, one could say that the two data groups' distributions are normal. The significant value (0.096) based on the mean in this inquiry is displayed in the data variance homogeneity test results, which were acquired using IBM SPSS Statistics 21.0 for Windows. It is evident from these data that Sig. > 0.05. It is possible to conclude that the data's variance is homogenous. The Independent Sample T-test analysis can be carried out to evaluate the study hypothesis because all analytical requirements have been satisfied.

Using IBM SPSS Statistics 21.0 for Windows, the results of the Independent Sample T-Test and Correlated Sample T-Test were analyzed. A significant value (2-tailed Sig.) of 0.000 was found. These results clearly show that the Sig. < 0.05. It is therefore possible to state that H0 is rejected but Ha is accepted. In other words, there were some significant differences between the control group (who received a traditional formative assessment) and the experimental group (which received a formative evaluation based on technology).

The experimental group, which got formative evaluations based on technology, considerably exceeded the control group, which got formative assessments based on traditional methods, according to the results. Based on post-test data, students in the experimental group scored better than those in the control group in terms of average exam results. It is in line with earlier studies that demonstrate how technology may make studying English more interesting and successful. According to the data, the experimental group's average English exam results significantly improved after receiving formative evaluations utilizing technology. This indicates that the experimental group outperformed the control group on English examinations after the use of technology-based formative assessments and related learning, as well as after the therapy. This improvement in performance shows that students are understanding the material better (Nurani et al., 2021). Students receive feedback more quickly and easily when they use technology-based formative exams, which helps them recognize mistakes and figure out how to fix them. These results highlight how well students' understanding of the subject matter may be improved by using technology in assessment procedures.

Furthermore, technology-based formative assessments not only enhance conceptual understanding but also foster the development of problem-solving skills among students. It is critical for students to understand and use these ideas in the field of English learning in order to address increasingly complex issues (Ulya, 2016). The findings indicate that learners in the experimental group were more inclined to apply the concepts they had acquired to resolve problems. Incorporating technology into formative assessments may also promote student autonomy in their education. Through the use of technology-based formative assessments, students may take charge of their education and learn how to learn independently by setting aside time to respond to questions and think through the feedback provided by

the platform. Moreover, formative assessments conducted through technology give teachers valuable information. By using this data, educators can more precisely determine each student's specific needs and modify the curriculum as needed (Rahmani, 2020). Teachers can utilize the assessment results to give kids who require more assistance more of it. Long-term effects on students' abilities may result from the improvements in English proficiency that were noted in this study (Khasanah et al., 2021). Students who possess improved conceptual comprehension and problem-solving abilities can succeed in advanced English courses and in real-world scenarios.

The increase in English achievement demonstrates the effectiveness of technology-based formative evaluations. Because these tests provide instant feedback, students can quickly recognize and correct their mistakes (Elmahdi et al., 2018). It shows that the system supports adaptive learning approaches by offering more individualized and engaging evaluations. As a result, the experimental group demonstrated increased motivation to study Englishmatics, maybe as a result of the more interesting and dynamic learning opportunities made possible by technology (Bhat & Bhat, 2019).

Furthermore, it was noted that compared to the control group, students in the experimental group engaged in more active participation in English language learning activities. They actively engaged in class discussions, participated in a variety of learning activities, and asked questions. These findings are in line with earlier research that highlights the importance of formative assessments that are tailored to the needs of both teachers and students. This allows for the accurate and transparent development of students' abilities (Simanjuntak & Mudiono, 2019).

This study, which was supported by more research, sought to determine how students' conceptual comprehension was affected when formative assessment was integrated into science instruction using a scientific method (Sari et al., 2019). The findings indicated that students' conceptual understanding was considerably improved when formal and informal formative assessments were incorporated into instruction and were based on a scientific methodology. In a related vein, Rosyad et al. (2021) examined the impact of utilizing a scientific methodology combined with formative evaluation on the enthusiasm and academic progress of seventh-grade junior high school students. According to the results, seventh-grade students' motivation and learning outcomes were positively impacted by the learning model approach, which was reinforced by formative assessment.

The benefits of utilizing technology to enhance learning as demonstrated by the study's findings are consistent with the claims made by several scholars (Irving 2015, Ramsey & Duffy, 2016). The use of *Plickers* in the classroom, according to the participants, generates excitement and fun, both of which help with learning. *Plickers'* ability to reduce learning time is another significant element mentioned by respondents as one that they thought would enhance pupils' learning. Many teachers believe it is unfeasible to expect every student to participate equally in class for the entire duration of the lesson. Based on the feedback, clickers take away this obstacle and give every student, even the more reserved ones, an equal chance to participate.

When asked about the biggest worries educators may have when utilizing Plickers in the classroom, the majority of participants said it was about technological resources and support. According to certain research (Ali and Elmahdi, 2001; Fawzi, 2010), there is a widespread tendency among teachers who are reluctant to use technology into their lesson plans. The best incentive for instructors to use technology is the availability of technical help. Unless they have just-in-time technical support, teachers do not incorporate technology into their lesson plans. Ali and Elmahdi (2001) stressed the proper incorporation of technology into educational activities. They claimed that the precise objective for which technological tools were made available is thwarted when they are not used for the intended purpose because of difficulties in using them. (p. 72).

The findings of this study carry significant implications for English learning in junior high school. Firstly, the adoption of technology-based formative assessments emerges as an effective strategy for

enhancing student's achievement. Second, using technology encourages more motivated and involved students when learning English. Thus, it makes sense for educational institutions and staff to investigate how to use technology into teaching and learning. However, it is essential to acknowledge the limitations of this research. The focus on English students within specific school settings may limit the generalizability of the findings to broader educational contexts. Additionally, factors like students' socioeconomic backgrounds, which can also impact their achievement, were not extensively examined in this study. Therefore, these characteristics should be taken into account in future study to provide a more thorough knowledge of the elements influencing their learning progress.

4. Conclusion

The value of formative assessment within classroom learning has been highlighted in a large amount of literature. This study's primary objective was to find out how well students' learning may be enhanced by using the classroom *Plickers* formative assessment tool, which is based on technology. Using technology-based tools like Plickers to boost formative assessment and, in turn, student learning is the study's most evident finding. It is also discovered that when teachers use *Plickers* for formative evaluation, students' involvement increases, which results in the creation of a productive learning environment. Additionally, by facilitating tailored instruction and encouraging student participation, these tools contribute to the development of productive teaching and learning environments. The study's participants stressed the value of formative evaluation based on technology. Additionally, utilizing tech-based tools like *Plickers* facilitates feedback-giving and adds excitement, fun, and information to the classroom.

References

[1]   Madadizadeh, F. (2022). A tutorial on Quasi-experimental designs. Journal of Community Health Research, 11(1), 3–4. https://doi.org/10.18502/jchr.v11i1.9089.

[2]   Hendra Saputra, V., & Pasha, D. (2021). Komik Berbasis Scientific Sebagai Media Pembelajaran di Masa Pandemik Covid-19. SJME (Supremum Journal of Mathematics Education), 5(1). https://doi.org/10.35706/sjme.v5i1.4514.

[3]   Sobarningsih, I. and T. M. (2022). Kompetensi Pedagogik Guru Abad Ke-21: Sebuah Tinjauan Peran Guru pada Generasi Z. Jurnal Ilmiah Indonesia, 7(5), 5143–5155. https://doi.org/10.36418/syntax-literate.v7i5.6905.

[4]   Yu, J., Kreijkes, P., & Salmela-Aro, K. (2022). Students' growth mindset: Relation to teacher beliefs, teaching practices, and school climate. Learning and Instruction, 80, 101616. https://doi.org/10.1016/j.learninstruc.2022.101616.

[5]   Irving, K. (2015). Technology-assisted formative assessment. In M. J. Urban and D. A. Falvo (Eds.), Improving K-12 STEM education outcomes through technological integration (380 – 398). http://doi.org/10.4018/978-1-4666-9616-7.ch017

[6]   Beatty, I. & Gerace, W. (2009). Technology-enhanced formative assessment: A research-based pedagogy for teaching science with classroom response technology. Journal of Science Education and Technology, 18(2), 146–162. http://doi.org/10.1007/s10956-008-9140-4

[7]   Kamara, S. S., & Dadhabai, S. (2022). Assessment Factors Influencing Students' Academic Achievement. Journal of Management Information & Decision Sciences, 25(1), 1–13. https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=15247252&AN=154576612.

[8]   Rusmana, N., & Suprihatin, D. (2019). A quasi experiment on group exercises to improve students' resilience. Journal of Physics: Conference Series, 1318(1). https://doi.org/10.1088/1742-6596/1318/1/012128.

[9]   Nurani, M., Riyadi, R., & Subanti, S. (2021). Profil Pemahaman Konsep Matematika Ditinjau Dari Self Efficacy. AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 10(1), 284–292. https://doi.org/10.24127/ajpm.v10i1.3388.

[10]   Ulya, H. (2016). Profil Kemampuan Pemecahan Masalah Siswa Bermotivasi Belajar Tinggi Berdasarkan Ideal Problem Solving. Jurnal Konseling Gusjigang, 2(1), 90–96. https://doi.org/10.24176/jkg.v2i1.561.

[11]   Rahmani, E. F. (2020). The Benefits of Gamification in the English Learning Context. IJEE (Indonesian Journal of English Education), 7(1), 32–47. https://doi.org/10.15408/ijee.v7i1.17054.

[12]   Khasanah, U., Rahayu, R., & Ristiyani. (2021). Analisis Kemampuan Pemecahan Masalah Matematis Siswa Kelas IV Materi Bangun Datar Berdasarkan Teori Polya. Jurnal Didaktika, 1(2), 230–242. https://doi.org/10.17509/didaktika.v1i2.36538

[13]   Elmahdi, I., Al-Hattami, A., & Fawzi, H. (2018). Using Technology for Formative Assessment to Improve Students' Learning. Turkish Online Journal of Educational Technology-TOJET, 17(2), 182–188. https://eric.ed.gov/?id=EJ1176157.

[14]   Vaportzis, E., Giatsi Clausen, M., & Gow, A. J. (2017). Older adults perceptions of technology and barriers to interacting with tablet computers: a focus group study. Frontiers in Psychology, 8, 1687. https://doi.org/10.3389/fpsyg.2017.01687.

[15]   Bhat, B. A., & Bhat, G. J. (2019). Formative and summative evaluation techniques for improvement of learning process. European Journal of Business & Social Sciences, 7(5), 776–785. https://www.researchgate.net/profile/Bilal-Bhat-6/publication/333633265

[16]   Simanjuntak, I. A., & Mudiono, A. (2019). Asesmen formatif perkembangan bahasa anak. Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan, 4(8), 1097–1102. https://doi.org/10.17977/jptpp.v4i8.12686.

[17]   Sari, I. P., Mustikasari, V. R., & Pratiwi, N. (2019). Pengintegrasian penilaian formatif dalam pembelajaran IPA berbasis saintifik terhadap pemahaman konsep peserta didik. JIPVA (Jurnal Pendidikan IPA Veteran), 3(1), 52–62.https://doi.org/10.31331/jipva.v3i1.778.

[18]   Rosyad, S., Diantoro, M., & Kusairi, S. (2021). Pengaruh Scientific Approach Berbantuan Penilaian Formatif terhadap Motivasi Belajar dan Hasil Belajar Fisika Siswa Kelas XI Perempuan pada Materi Elastisitas. Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan, 5(10), 1480–1484. https://doi.org/10.17977/jptpp.v5i10.14134.

[19]   Ramsey, B., Duffy, A. (2016). Formative assessment in the classroom: Findings from three districts. Michael and Susan Dell Foundation and Education, 1. Retrieved from https://education-first.com/wpcontent/uploads/2016/05/MSDF-Formative-Assessment-Study-Final-Report.pdf

[20]   Ali, A. & Elmahdi, I. (2001). The wired Professor: A collaborative learning experience in one-on-one mentoring. Journal of Computing in Teacher Education, 18(2), 68 – 73. http://doi.org/10.1080/10402454.2001.10784436

[21]   Fawzi, H. (2010). Bleeding edge challenges: Limits on using CALL in EFL classrooms at the tertiary level. In Egbert, J. (2010). CALL in limited technology contexts, CALICO, 9, 227-239.

Will ChatGPT Take Over Our Roles?

Herwin Dyastuti[1*] and Sukarno[2]

[1] English Language Education Department, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] English Language Education Department, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: herwindyastuti.2023@student.uny.ac.id

Abstract. The role of artificial intelligence in education, especially ChatGPT, has been growing exponentially. The present research sought to examine how students feel about utilizing ChatGPT in their academic lives. This study used a survey design in which several questions were asked using a Likert scale and an open-ended response. The respondents consisted of 35 master students in the Department of English Language Education obtained through random sampling. The results showed that ChatGPT was perceived as useful by many students who believed it could enrich their learning process. The study showed some dilemmas associated with ChatGPT such as providing helpful information and facilitating learning but posing challenges to its reliability and student overdependence. Students also hesitated that relying too much on ChatGPT might influence their critical thinking abilities. Their views regarding the need for colleges to have policies governing the use of ChatGPT were similar. It can also be argued that AI should play a second role because there is no way teachers' and educators' roles can be substituted or else we should establish guidelines to ensure AI use in educational settings is done responsibly and ethically. Based on these findings, future research should explore the long-term impact of ChatGPT on critical thinking development and evaluate institutional policies that balance the benefits of AI with the preservation of essential cognitive skills in students.

1. Introduction

Wu, T, et al. 2023 stated that ChatGPT is an intelligent chatting robot that can provide a detailed response according to an instruction in a prompt. ChatGPT has shown powerful functions in various language understanding and generation tasks such as multilingual machine translation, code debugging, story writing, admitting mistakes, and even rejecting inappropriate requests according to the official statement (Wu, T, et al. 2023). W. X. Jiao, et al. (2023) also argued that ChatGPT can remember what the user has said earlier in the conversation which helps for continuous dialogue.

ChatGPT brings significant changes in an educational context. It is considered a powerful tool that can contribute to the academic process. This study is pivotal because it attempts to comprehend the integration of ChatGPT in academic settings, especially in higher education. Brown & White (2022) argue that as educators and institutions strive to enhance learning experiences and outcomes, examining the role of AI in supporting students' academic endeavors is crucial for making informed decisions about its integration.

Besides the interest in AI applications in education, there is a gap related to the literature concerning students' perception of the use of ChatGPT in their academic activities. The previous studies focused on the technical capabilities and potential use of AI. There is still limited research that explores how students experience and perceive these tools in a real-world educational context (Smith et al., 2021).

This gap is significant because students' attitudes and experiences can greatly influence the effectiveness and acceptance of new technologies in learning environments. Understanding these perceptions can provide valuable insights for educators and policymakers aiming to use AI to enhance educational outcomes.

Therefore, this study investigates students' perceptions of using ChatGPT in their academic process. By formulating research questions that address this aim, we seek to know the benefits and challenges students face when interacting with ChatGPT for their studies. Specifically, this research will address the following questions:

1.   What are the benefits of using ChatGPT in their learning process?
2.   How are students' experiences in using ChatGPT?
3.   What are the concerns about using ChatGPT for their current knowledge and future career?
4.   What are the challenges for future education related to the use of ChatGPT?
5.   What are the recommendations for integrating ChatGPT tools into the Master's Program of English Language Education?

This study aims to investigate students' perceptions of using ChatGPT in their academic process, exploring its benefits and challenges, implications for future education, and recommendations for its integration into the Master's Program of English Language Education to enhance learning outcomes.

2.   Method

This study employed a survey research design to explore the perceptions of second-semester Master of English Education students regarding the use of ChatGPT in their academic process. The participants for this study were enrolled in the Master's program of English Language Education. Data collection was conducted using a structured questionnaire designed to capture detailed information about the students' experiences, attitudes, and perceptions related to the use of ChatGPT. The questionnaire included a mix of Likert Scale and open-ended questions to gather both quantitative and qualitative data. The data analysis quantitative was using SPSS, meanwhile, for the qualitative data, the researchers carried out the analysis using descriptive qualitative methods, which involved coding and thematically analyzing the responses to identify common patterns and insights. This approach allowed for a comprehensive understanding of the student's perceptions and provided nuanced insights into their interactions with ChatGPT in an academic context.

3.   Findings and Discussion

Demographic Profile

Thirty-five participants responded to the distributed questionnaire. The respondents were second-semester master of English education students. They came from different experiences in using ChatGPT in their academic lives.
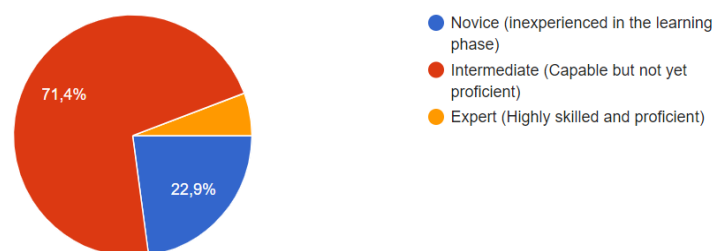
Figure 1. The Level of Experience Using ChatGPT

Based on the chart above, it was shown that the majority of the students are at an intermediate level, which means they are capable of using ChatGPT but not yet proficient. Then, there were 22.9% of the respondents were considered at the novice level or inexperienced in the learning phase. Lastly, only 5.7% of the respondents were considered experts since they are highly skilled and proficient in employing ChatGPT.
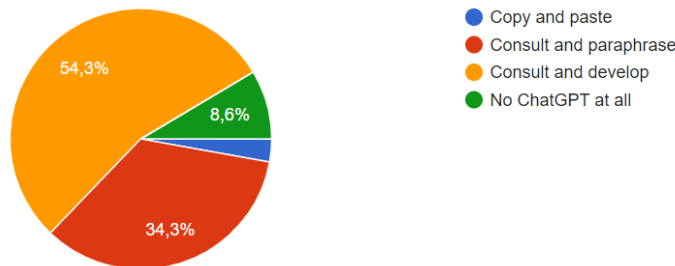
Figure 2. The type of usage

According to the presented data, a small majority used ChatGPT to consult and develop the idea by themselves. A minority used ChatGPT to consult and merely just paraphrase it. Therefore, 2.9% of the respondents used ChatGPT to search for ideas and copy and paste without criticizing the information. Surprisingly, 8.6% of the respondents did not use ChatGPT in their academic lives.

Benefits of ChatGPT

Table 1. Students' Perception of the Benefits of ChatGPT

Items	N	Mean	Std. Deviation
It helps me understand complex concepts in the education field.	35	3.2857	.66737
It helps me to write prompts in difficult situations.	35	3.3714	.54695
It helps me to debug my prompts and explain them clearly.	35	3.1143	.63113
It helps me with college assignments, essays, and exams.	35	3.0857	.85307
It helps me find information faster and more effectively.	35	3.4857	.65849
It is an amazing tool that contributes to my study progress.	35	3.3429	.72529
It produces faster answers than traditional searching methods like (Google, Microsoft Bing, or other sources).	35	3.4571	.78000
The answers it produces are more reliable than other sources.	35	2.4286	.94824
It helps me to save a lot of time finding answers from different sources.	35	3.2286	.49024
Valid N (listwise)	35		

The table summarized the students' perspectives on the benefits of using ChatGPT in their academic process. The majority agreed on the benefits of ChatGPT. It can help them understand materials, complete several assessments, and save time because of its effectiveness. They considered ChatGPT an amazing learning assistant that can help them find the answer faster than the traditional searching methods. Unfortunately, the students disagreed that ChatGPT is more reliable than other sources. It creates another interpretation that the reliability of ChatGPT should be considerable.

Table 2. Students' Experience in Using ChatGPT

Themes	Codes	Script
Utility in Education	Quick Answers and Assistance	S1: *"ChatGPT helps students by giving them quick answers to questions, assisting with homework, and sparking creativity."* S2: *"Help me much to answer every hard question."* S3: *"It provides much faster and more comprehensive information based on our prompts."*
	Brainstorming and Idea Generation	S1: *"It can be a useful tool for brainstorming."* S2: *"I experience using ChatGPT for helping me generate ideas that I can develop more."* S3: *"I consider that this AI can help me when I do not have any idea of some terms."* S4: *"Assist me in arranging subheads in organizing material."*
	Writing Assistance	S1: *"The use of ChatGPT helped complete my assignment by giving me a view of things so that I could study and develop them."* S2: *"The use of ChatGPT helps in writing and other subjects."*
	Efficiency and Convenience	S1: *"Using ChatGPT in the educational sector helps me because using ChatGPT tends to seem much more effective and efficient to use anywhere and at any time."* S2: *"This AI is really helpful in my study progression."* S3: *"GPT is helping me in searching and discovering new things."*
General opinions	Positive Feedback	S1: *"ChatGPT is very useful."* S2: *"Chat GPT is good at serving data."*
	Critical Feedback	S1: *"ChatGPT doesn't fully provide what we ask about."* S2: *"Regardless of its static pattern of explanation and boring vocabulary use."*

The findings revealed that ChatGPT significantly aided students by providing quick answers and assisting with homework. It was valuable for brainstorming, organizing material, completing assignments, and offering a comprehensive view for further development. Its convenience and efficiency made it highly effective in education, supporting study progression and information discovery. However, it sometimes provided incomplete answers and had a static explanation pattern. Despite these drawbacks, ChatGPT was widely considered a very useful tool that enhanced the learning experience.

Concerns of ChatGPT

Table 3. Students' Perception of the Concern of ChatGPT

Items	N	Mean	Std. Deviation
It does not affect my ability to study.	35	2.4857	.78108
I am concerned about the accuracy of ChatGPT's answers.	35	3.1429	.77242
I am worried about not developing important critical thinking and problem-solving skills by using ChatGPT.	35	3.2000	.75926
I use it with caution and don't rely too much on it.	35	3.3429	.63906
I am not worried that ChatGPT will negatively affect my future, instead will be of great help.	35	2.6857	.86675
There are ethical concerns related to ChatGPT use.	35	3.3143	.52979
It creates inaccurate or misleading information.	35	2.5143	.78108
Valid N (listwise)	35		

Furthermore, they realized that ChatGPT brings some attention related to accuracy, negative impact on their critical thinking and problem-solving skills, overreliance, and ethical issues. The data showed moderate concerns about the accuracy of ChatGPT's answers (mean = 3.1429) and its impact on critical thinking skills (mean = 3.2000). Ethical concerns (mean = 3.3143) and the creation of misleading information (mean = 2.5143) were also noted. Despite these issues, students use ChatGPT cautiously (mean = 3.3429) and believe it can be helpful for their future (mean = 2.6857). These findings emphasize the need for proper guidance to balance ChatGPT's benefits and drawbacks.

The Challenges for Future Education

Table 4. The Challenges of ChatGPT in Future Education

Theme	Code	Script
Challenges and Considerations in Future Education	Role of Teachers	S1: *"The educational sector in the future may be more sophisticated, but it needs to be kept in mind that nothing can replace teachers in educating students."* S2: *"In the future, students will be more independent in learning since many tools can help them, so the teacher purely only acts as a facilitator."*
	Critical Thinking and Authenticity	S1: *"To be honest, it is kind of bleak (if we do not adapt). Students may just 'outsource' their tasks to their beloved GPT or other LLMs. However, I'd say that bleakness arises from the fact that many tasks (in which students usually resort to ChatGPT) are not authentic/meaningful to them...or that we may give them too much of it!"* S2: *"I think students will easily gain various knowledge and information provided by the technology and easy to master the learning material, but somehow it will also spoil them and hinder their critical thinking. I think something easy to get will also be easy to forget."*

From the table above, the respondents stated that there will be some challenges and considerations towards the use of ChatGPT in future education. The role of teacher and educator will be irreplaceable because the students need the presence of the teacher and educator as facilitators. Therefore, ChatGPT will affect students' critical thinking if they rely too much on it.

Recommendation for Master's Program of English Language Education
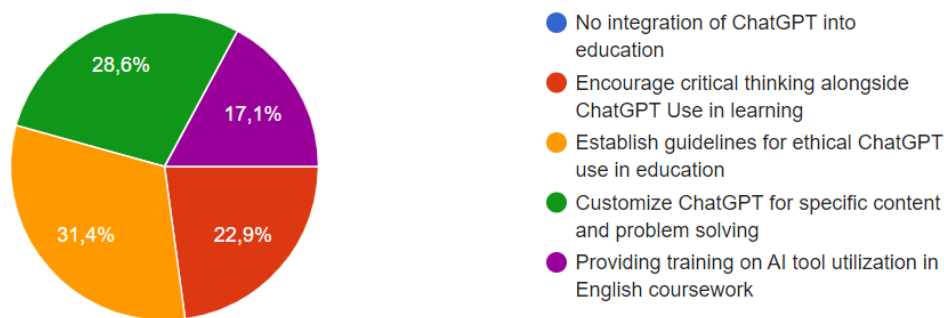
Figure 3. Students' Recommendations

The chart showed that there are four recommendations concerning the use of ChatGPT. They are (a) establishing guidelines for ethical ChatGPT use in education (31.4%); (b) customizing ChatGPT for specific content and problem-solving (28.6%); (c) encouraging critical thinking alongside ChatGPT use in learning (22.9%); and (d) providing training on AI tool utilization in English coursework (17.1%). These recommendations highlight the importance of structured and mindful integration of ChatGPT in educational settings to address concerns and maximize its benefits. Establishing ethical guidelines ensures responsible use, while customization allows for more targeted and effective applications. Encouraging critical thinking alongside AI use helps maintain essential cognitive skills, and training ensures that both educators and students can utilize these tools effectively and responsibly.

4. Discussion

Benefits of ChatGPT

The students' perceptions of ChatGPT's benefits are positive, especially regarding its ability to provide information and help in understanding complex concepts. With mean scores above 3.0 for most items, it is clear that students find ChatGPT to be an effective tool in their academic toolkit. This aligns with existing literature, which posits that AI tools can significantly enhance learning efficiency by providing rapid access to information and facilitating comprehension (Holmes et al., 2019). However, the students expressed skepticism about the reliability of ChatGPT compared to traditional sources, suggesting a need for critical evaluation skills when using AI-generated content (Clark & Chalmers, 1998).

Students' Experience in Using ChatGPT

These findings align with several educational theories. Sweller's Cognitive Load Theory (1988) suggests that tools like ChatGPT can reduce cognitive load by providing immediate access to information and structured guidance, allowing students to focus on higher-order thinking tasks. Additionally, Vygotsky's Social Constructivism theory (1978) supports the use of AI as a mediating tool that facilitates learning by enabling collaborative and interactive learning experiences. The TPACK

framework by Mishra and Koehler (2006) emphasizes the importance of integrating technology effectively into teaching practices, which aligns with the positive feedback on ChatGPT's usefulness.

Concerns of ChatGPT

Despite the benefits, students have concerns regarding the impact of ChatGPT on their critical thinking and problem-solving skills. The data show a mean score of 3.20 for worries about not developing essential skills, reflecting broader anxiety about over-reliance on technology (Turkle, 2011). The ethical concerns and potential for ChatGPT to produce misleading information were also notable, indicating a need for robust guidelines and training to ensure responsible use (Borenstein & Howard, 2021).

The Challenges for Future Education

The thematic analysis from the open-ended questions underscores the irreplaceable role of teachers in the educational process. While AI tools like ChatGPT can facilitate learning and provide valuable support, they cannot replace the nuanced guidance and mentorship provided by educators (Laurillard, 2012). Teachers are essential for fostering critical thinking and ensuring that students engage deeply with the material rather than superficially processing it through AI assistance.

The concern that students might outsource their tasks to ChatGPT and thus hinder their critical thinking is significant. This echoes the sentiments in existing educational discourse that emphasize the importance of authenticity in learning tasks and the potential dangers of technology-induced complacency (Carr, 2010). Therefore, educational strategies should focus on integrating AI in a way that complements and enhances traditional pedagogical methods rather than substituting them.

Recommendations for the Master's Program of English Language Education

Based on the study's findings, several recommendations emerged for the Master's Program of English Language Education. Establishing guidelines for ethical ChatGPT use (31.4%) and customizing ChatGPT for specific content (28.6%) were the top suggestions. These steps would help mitigate the risks associated with AI use and ensure that it serves as a beneficial supplement to students' learning experiences (Luckin et al., 2016). Encouraging critical thinking alongside ChatGPT use (22.9%) and providing training on AI tools (17.1%) were also recommended, reflecting the need for a balanced approach that holds AI's strengths while addressing its limitations.

5. Conclusion

In conclusion, this study highlights the impact of ChatGPT on students' academic experiences, offering substantial benefits in understanding complex concepts and improving efficiency while raising concerns about reliability and critical thinking skills. The irreplaceable role of teachers is emphasized, necessitating clear guidelines for ethical AI use, and a balanced curriculum that integrates AI without compromising essential academic skills. In a nutshell, ChatGPT will not take over our role, but it is a learning assistant tool to support our academic process. Therefore, these findings imply that educational institutions should implement policies or specific rules regarding the use of AI tools to ensure they are used effectively and responsibly in educational settings.

References

[1]   Brown, J., & White, S. (2022). The impact of AI on education: Opportunities and challenges. *Journal of Educational Technology*, 15(2), 45-60.

[2]   Sweller, J. (1988). Cognitive load during problem-solving: Effects on learning. *Cognitive Science, 12*(2), 257-285.

[3]   Turkle, S. (2011). *Alone Together: Why We Expect More from Technology and Less from Each Other*. Basic Books.

[4]   Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

[5]   Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

[6]   Smith, L., Johnson, R., & Lee, A. (2021). Student experiences with AI in higher education: A qualitative study. *Journal of Higher Education Research*, 12(3), 150-165.

[7]   Borenstein, J., & Howard, A. (2021). Emerging challenges in AI and the need for AI ethics education. *AI and Ethics, 1*(1), 61-65.

[8]   Carr, N. (2010). *The Shallows: What the Internet Is Doing to Our Brains*. W.W. Norton & Company.

[9]   Clark, A., & Chalmers, D. (1998). The extended mind. *Analysis, 58*(1), 7-19.

[10]   Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning.* Center for Curriculum Redesign.

[11]   Laurillard, D. (2012). *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology*. Routledge.

[12]   Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education*. Pearson.

[13]   Spector, J. M. (2015). *Foundations of Educational Technology: Integrative Approaches and Interdisciplinary Perspectives*. Routledge.

[14]   Wu, T., He, S., Liu, J., Sun, S., Liu, K., Han, Q. L., & Tang, Y. (2023). A brief overview of ChatGPT: The history, status quo and potential future development. *IEEE/CAA Journal of Automatica Sinica*, *10*(5), 1122-1136.

[15]   W. X. Jiao, W. X. Wang, J.-T. Huang, X. Wang, and Z. P. Tu, "Is ChatGPT a good translator? Yes with GPT-4 as the engine," arXiv preprint arXiv: 2301.08745, 2023.

Acceptance of Artificial Intelligence in Language Teaching: Teachers' Perspective on Using Chat GPT in ELT

I Made Rian Irwanto[1*], Syafruddin[1], and Yuyun Yulia[1]

[1]English Language Program, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: i5246fbsb.2023@student.uny.ac.id

Abstract. This study describes the attitude and behavioral intention of English teachers toward the adoption of Chat GPT in English Language Teaching in Indonesia. A descriptive methodology was utilized, a 4-dimensional Technology Acceptance Model (TAM)-based scale was used to collect responses from 61 English teachers. The findings showed that the English teachers had a positive and high acceptance level toward Chat GPT. It was positively and significantly related to the perceived usefulness, attitude, and the behavioral intention. However, perceived ease of use was not significantly positives. Regarding the predictive power of research models, all combined dimensions of perceived usefulness, perceived ease of use, and attitudes were able to predict 72% of the variance for future behavioral intentions of the teachers in the use of Chat GPT in English Language Teaching (ELT).

1. Introduction

The incorporation of artificial intelligence (AI) in education has significantly transformed teaching and learning methodologies. ChatGPT, an advanced AI tool by OpenAI, has gained prominence for its role in enhancing English Language Teaching (ELT). This model generates human-like text from user inputs, providing personalized educational experiences. ChatGPT's tailored approach enables it to understand students' interests, skills, and career aspirations, thereby aiding career orientation and development planning (Fu et al., 2023). Research highlights both the opportunities and challenges of integrating ChatGPT in ELT, revealing potential benefits and considerations for educators (Govindarajan & Christuraj, 2024). This study explores teachers' acceptance of ChatGPT in their instructional practices, aiming to shed light on the challenges and benefits of employing AI in language education.

The Technology Acceptance Model (TAM) is crucial for understanding teachers' acceptance of AI tools like ChatGPT. TAM suggests that perceived usefulness and ease of use are key factors in technology adoption (Davis et al., 1989). This study will utilize TAM to examine how these variables affect teachers' readiness to integrate ChatGPT into their teaching. Additionally, it will explore the impact of prior technology experience, training, and support. Educators' insights are essential for developing effective training programs and support systems, ensuring smooth AI integration in ELT (Kim et al., 2022).

In conclusion, incorporating AI in education, mainly through tools like ChatGPT, demonstrates promise for enhancing English Language Teaching (ELT). The effectiveness of this integration largely depends on teachers' willingness and preparedness to adopt these technologies. This research explores the factors affecting teachers' acceptance of ChatGPT, utilizing the Technology Acceptance Model as its framework. By understanding teachers' perspectives, the study aims to support the successful implementation of AI in language education, ultimately improving teaching and learning outcomes. The following sections will detail the study's methodology, findings, and implications.

With AI advancements, educational technologies now offer personalized learning. ChatGPT, an AI model, enhances language learning by simulating conversations, providing context-specific responses, and offering feedback. Despite early adoption, understanding teachers' perceptions is crucial for effective integration, highlighting practical applications, usefulness, and implementation challenges in education.

The main objective of this study is to explore English teachers' perspectives of using ChatGPT in their teaching practices. Specifically, the research seeks to answer the following questions:

1. How accepting are English teachers to the employment of ChatGPT in teaching according to the components of the Technology Acceptance Model?
2. What factors influence the effectiveness of using ChatGPT in English Language Teaching given the components of the Technology Acceptance Model?

The study hypothesizes the following:

H1: Perceived Usefulness (PU) positively affects Attitude Toward Use (ATU);

H2: Perceived Usefulness (PU) positively affects Behavioral Intention to Use (BI);

H3: Perceived Ease of Use (PEOU) positively affects Perceived Usefulness (PU);

H4: Perceived Ease of Use (PEOU) positively affects Attitude Toward Use (ATU); and

H5: Attitude Toward Use (ATU) positively affects Behavioral Intention to Use (BI).

2. Methods

The present study utilized a descriptive analytical approach to investigate English language teachers' acceptance of Chat GPT, guided by the Technology Acceptance Model (TAM). Data collection and analysis were conducted using a structured questionnaire. The study's participants included 61 English teachers from diverse educational institutions in the 2023/2024 academic year, varying in age, gender, teaching experience, and familiarity with Chat GPT. The questionnaire comprised demographic details and 20 items measuring Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (ATU), and Behavioral Intention to Use (BI), rated on a five-point Likert scale. Data analysis employed descriptive statistics and Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the reliability and validity of constructs, assess hypothesized relationships, and calculate R-squared values, ensuring a thorough understanding of the factors influencing Chat GPT acceptance among English language teachers.

3. Result and Discussion

The current study sought to answer its research questions and discuss and interpret them in light of the theoritical literature and previous research.

3.1. Result of demographics data analysis

The study included 61 participants. The age distribution was as follows: under 25 years (9 participants), 26-34 years (28 participants), 35-44 years (20 participants), 45-54 years (3 participants), and above 55 years (1 participant). Most participants were female (46), with 15 males.

Teaching experience was varied: less than a year (5 participants), 1-5 years (17 participants), 6-10 years (17 participants), 11-15 years (13 participants), and over 15 years (9 participants).

Regarding ChatGPT experience, 36 participants had used it for less than 6 months, 16 for 6-12 months, 6 for 12-18 months, and 3 for over 18 months.These demographic details are given in **Table 1**. It provide a comprehensive overview of the study sample, highlighting the diversity in age, gender, teaching experience, and familiarity with ChatGPT.

Table 1. Demographic Distribution of Samples

Demographic	Category	Number (n)	Percentage (%)
Age	Under 25	9	14.75
	26-34	28	45.90
	35-44	20	32.79
	45-54	3	4.92
	Above 55	2	1.64
Gender	Female	46	75.41
	Male	45	24.59
Teaching Experience	Less than 1 year	5	8.20
	1-5 years	17	27.87
	6-10 years	17	27.87
	11-15 years	13	21.31
	More than 15 years	9	14.75
Expereince with Chat GPT	Less than 6 months	36	59.02
	6-12 months	16	26.23
	12-18 months	6	9.84
	More than 18 months	3	4.92

3.2. Result and discussion related to the first question

In response to the first question of the study; "How accepting are English teachers to employing ChatGPT in teaching in light of the components of the Technology Acceptance Model?", the results indicated a high level of acceptance among English teachers, with an overall arithmetic mean of 3.758 as shown in **Table 2**.

According to **Table 2**, the attitude factor significantly impacted using Chat GPT in ELT, with a mean of 3.849. This suggested that a positive attitude among teachers greatly enhances the implementation of Chat GPT. Other factors with high impact, in decreasing order, included perceived ease of use with a mean of 3.843. Perceived usefulness followed with an arithmetic mean of 3.770, and behavioral intention had a mean of 3.571. This indicated teachers' actual usage was influenced more by attitudes, ease of use, and usefulness.

These findings aligned with those of Alswilem (2019), which determined that teachers with a positive attitude towards technological tools are more likely to adopt and integrate them effectively into their teaching practices. Their enthusiasm and openness towards Chat GPT can lead to more innovative and engaging language lessons.

Table 2. Distribution of Sample Responses to the Model's Factors

Factor	Arithmetic Mean	Rank
Perceived Usefulness	3.770	3
Perceived Ease of Use	3.843	2
Attitude	3.849	1
Behavioral Intention	3.571	4
Average	3.758	

The high acceptance of Chat GPT among English teachers shows its potential in ELT. Teachers' attitudes greatly impact Chat GPT's effectiveness. The significant impact of teachers' attitudes on the effectiveness of Chat GPT use indicated that it's crucial to foster positive perceptions of AI technology (Kasneci et al., 2023). Training programs can highlight ChatGPT's benefits and uses. This can improve teachers' attitudes. In addition, Moorhouse et al. (2023) found that AI chatbots offer tailored lesson plans, personalized texts, and language exercises. This demonstrated that positive attitudes toward technology can lead to innovative teaching practices.

While the intention to use ChatGPT was slightly less influential, it remains important. This suggested that even if teachers are willing to use ChatGPT, their actual usage depends more on their attitudes. Additionally, ease of use and perceived usefulness play significant roles in adoption. Addressing concerns and providing ongoing support can help turn positive intentions into actual usage.

3.3. Result and discussion related to the second question

Path analysis using SmartPLS 4 software was employed to evaluate the proposed study model **Fig. 1**. This method was used to test relationships between variables to answer the second question of the study; 'What factors influence the effectiveness of using Chat GPT in English Language Teaching given the components of TAM, the study hypothesizes the following:

1) H1: Perceived Usefulness (PU) positively affects Attitude Toward Use (ATU);
2) H2: Perceived Usefulness (PU) positively affects Behavioral Intention to Use (BI);
3) H3: Perceived Ease of Use (PEOU) positively affects Perceived Usefulness (PU);
4) H4: Perceived Ease of Use (PEOU) positively affects Attitude Toward Use (ATU); and
5) H5: Attitude Toward Use (ATU) positively affects Behavioral Intention to Use (BI).

To ensure no multiple correlations between the factors, a simple correlation factor was used. The heterotrait-monotrait (HTMT) ratio test was employed for this purpose. The results in **Table 3** indicated that the simple correlation factor values were below 0.9. This suggested no multiple correlations between variables (Hair et al., 2021). In addition, **Table 4** shows the results of a discriminant validity test using the Fornell-Larcker criterion. To pass this test, the diagonal values (the square root of the AVE) should be higher than the values in the same row and column (Fornell & Larcker, 1981). In this table, all constructs meet this criterion, indicating that they were distinct from one another in this study.

Convergent validity was used to ensure that different indicators of a construct indeed measure the same underlying concept. It helped to confirm that the constructs in this study were reliable and valid for drawing meaningful conclusions. **Table 5** showed the convergent validity results using Cronbach's alpha, Average Variance Extracted (AVE), and Composite Reliability (CR). All constructs had excellent internal consistency, with Cronbach's alpha values above 0.9, indicating strong reliability (Cronbach, 1951). The AVE values were all above 0.5, demonstrating good convergent validity (Fornell & Larcker, 1981). Additionally, the CR values exceed 0.9 for all constructs, further confirming their reliability (Bagozzi & Yi, 1988). These results suggest that the constructs are reliable and valid for this study, ensuring that the measurements accurately reflect the intended theoretical concepts.
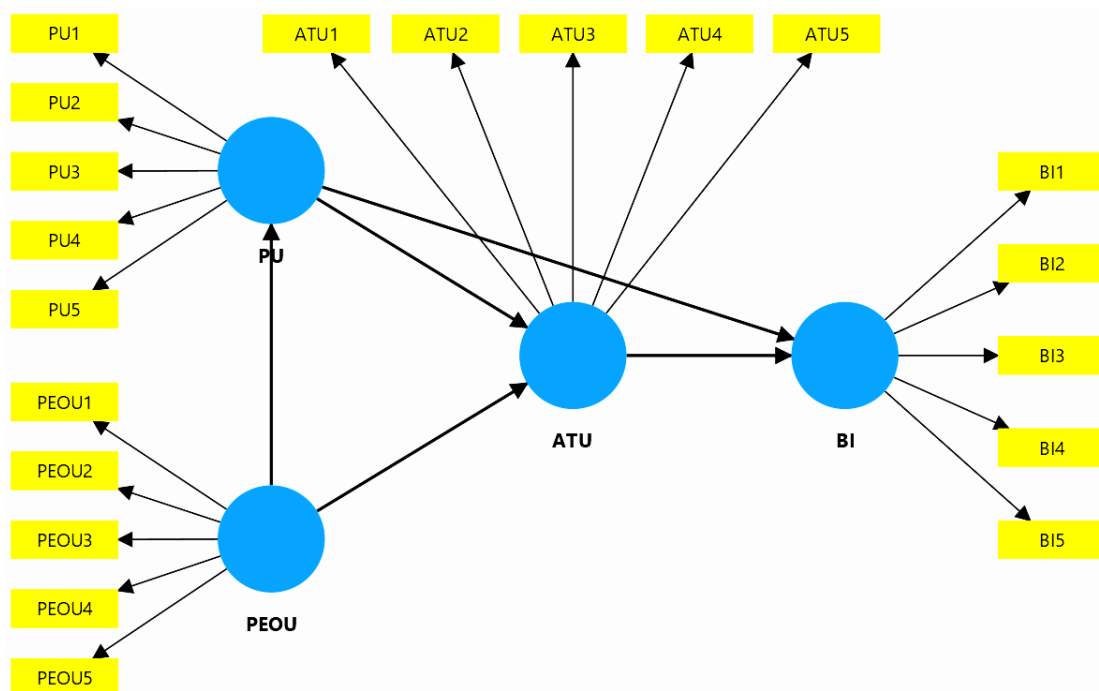
Figure 1. Technology Acceptance Model used in this study.

To evaluate the explanatory power of the model, we examined the R-square and adjusted R-square values for the endogenous latent variables. **Table 6** presented these values for ATU, BI, and PU. The R-square values show that 64.6% of the variance in ATU, 72.0% in BI, and 62.0% in PU are explained by the model. The adjusted R-square values, which account for the number of predictors, are 63.4% for ATU, 71.0% for BI, and 61.4% for PU. These high values suggested that the model has a good fit and the independent variables are strong predictors of the constructs (Hair et al., 2021).

Table 3. Discriminant Validity (HTMT ratio)

	ATU	BI	PEOU	PU
ATU				
BI	0.848			
PEOU	0.736	0.714		
PU	0.831	0.854	0.832	

Table 4. Discriminant Validity (Furnell-Larker criterion)

	ATU	**BI**	**PEOU**	**PU**
ATU	**0.929**			
BI	0.806	**0.891**		
PEOU	0.706	0.676	**0.914**	
PU	0.793	0.801	0.788	**0.892**

Table 5. Convergent validity results (Cronbach's alpha, AVE, and CR)

Construct	Cronbach's alpha	AVE	CR
ATU	0.960	0.862	0.969
BI	0.935	0.793	0.950
PEOU	0.951	0.835	0.962
PU	0.936	0.796	0.951

Table 6. Model fitness score -R2 of the endogenous latent variables

Variables	R-square	R-square adjusted
ATU	0.646	0.634
BI	0.720	0.710
PU	0.620	0.614

As a result, the scale, shown in **Fig. 2**, developed in accordance with TAM, can be considered valid for determining factors influencing behavioral intentional to use Chat GPT in ELT.

Table 7 showed the results of path analysis to determine the factors affecting the intention of English teachers to use ChatGPT in their teaching practices with respect to the components of the Technology Acceptance Model (TAM). The findings indicated that there are 4 out of 5 paths with a statistical standard regression coefficient (path coefficient) that are statistically significant and have a positive correlation: the standard regression coefficient paths are PEOU on PU: 0.788, PU on ATU: 0.623, PU on BI: 0.435, and ATU on BI: 0.461. However, the path from PEOU on ATU (0.215) is not statistically significant.
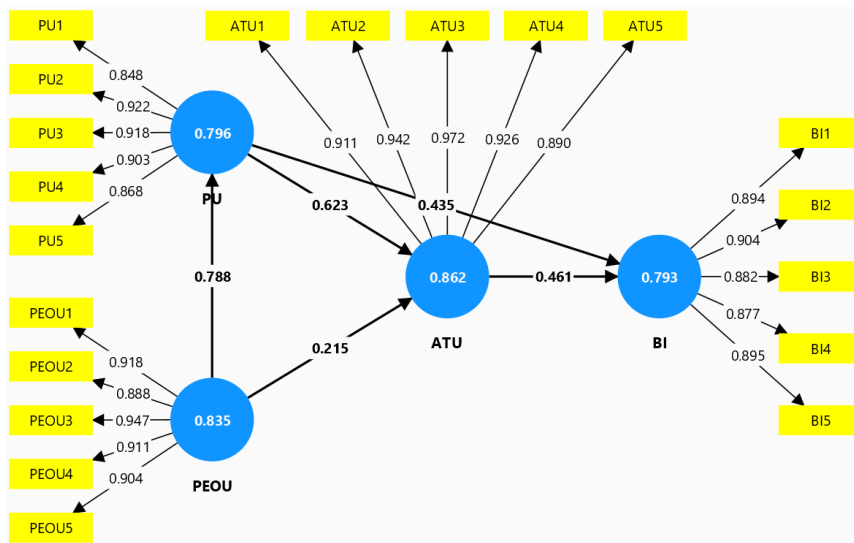
Figure 2. Result of PLS-SEM Analysis

Table 7. Hypothesis testing (Path, T-Value, and P-value)

Relationship	Original sample	T statistic	P values	Decision
PU –> ATU	0.623	4.751	0.000	Supported
PU –> BI	0.435	3.130	0.002	Supported
PEOU –> PU	0.788	14.763	0.000	Supported
PEOU –> ATU	0.215	1.600	0.110	Rejected
ATU –> BI	0.461	3.631	0.000	Supported

3.3.1. Perceived Usefulness (PU) Positively Affects Attitude Toward Use (ATU)

The data supported this hypothesis, as indicated by the T statistic of 4.751 and a P value of 0.000. This significant relationship showed that when English teachers perceive ChatGPT as useful, they are more likely to have a positive attitude toward using it. This finding aligned with existing literature that highlighted the importance of perceived usefulness in shaping user attitudes towards technology (Dahri et al., 2024a). For educational institutions, this suggesteed that demonstrating the practical benefits and effectiveness of ChatGPT can foster positive attitudes among teachers, making them more open to integrating this tool into their teaching practices.

3.3.2. Perceived Usefulness (PU) Positively Affects Behavioral Intention to Use (BI)

This hypothesis was also supported by the data, with a T statistic of 3.130 and a P value of 0.002. The significant impact of perceived usefulness on behavioral intention indicated that teachers who find ChatGPT useful are more likely to intend to use it in their teaching. This underscored the need for institutions to focus on the utility of ChatGPT in enhancing teaching efficiency, providing innovative solutions, and improving student engagement. By doing so, they can increase the likelihood of teachers adopting this technology in their classrooms (Govindarajan & Christuraj, 2024b).

3.3.3. Perceived Ease of Use (PEOU) Positively Affects Perceived Usefulness (PU)

The hypothesis that perceived ease of use positively affects perceived usefulness was strongly supported, with a T statistic of 14.763 and a P value of 0.000. This indicated that when teachers find ChatGPT easy to use, they are more likely to perceive it as useful. This relationship emphasized the importance of user-friendly design and comprehensive training programs to help teachers quickly and efficiently learn how to use ChatGPT. Enhancing the usability of ChatGPT can significantly improve its perceived benefits, encouraging wider adoption among teachers (Barakat et al., 2024).

3.3.4. Perceived Ease of Use (PEOU) Positively Affects Attitude Toward Use (ATU)

Contrary to the hypothesis, the data did not support a significant relationship between perceived ease of use and attitude toward use, as indicated by a T statistic of 1.600 and a P value of 0.110. This suggested that ease of use alone was not enough to shape positive attitudes among teachers towards using ChatGPT. It implied that other factors, such as the perceived benefits and practical applications of the technology, play a more crucial role in forming attitudes (Pan, 2020). Therefore, while usability was important, institutions should also focus on demonstrating the tangible advantages of ChatGPT to foster positive attitudes.

3.3.5. Attitude Toward Use (ATU) Positively Affects Behavioral Intention to Use (BI)

The data supported this hypothesis, with a T statistic of 3.631 and a P value of 0.000, indicating a significant relationship between attitude toward use and behavioral intention. This mean that teachers with a positive attitude toward ChatGPT are more likely to intend to use it. Positive attitudes can be nurtured by sharing success stories, providing testimonials from peers, and offering continuous support. By fostering a supportive and encouraging environment for technology adoption, educational institutions can enhance teachers' willingness to integrate ChatGPT into their teaching practices.

This result can be attributted to the fact that teachers' perceived usefulness of Chat GPT influenc their positive attitude and behavioral intention toward adopting them in the future. While perceived ease of use significantly enhanced perceived usefulness. Positive attitudes towards ChatGPT also directly impact teachers' intention to use it. Educational institutions should focus on enhancing both the usability and the practical benefits of ChatGPT to promote its adoption among English teachers.

4. Conclusion

The study revealed a high level of teacher acceptance for advanced AI tools like ChatGPT, demonstrating significant positive correlations among the factors, with four out of five hypothesized paths supported. PEOU notably influenced PU, emphasizing the importance of user-friendly design and comprehensive training to enhance perceived benefits. When teachers find ChatGPT easy to use, they recognize its usefulness, fostering positive attitudes and a stronger intention to adopt the technology. PU significantly impacted both ATU and BI, suggesting that highlighting practical benefits such as improved teaching efficiency, innovative materials, and personalized feedback can shape positive attitudes and intentions (Dahri et al., 2024b). However, the direct effect of PEOU on ATU was insignificant, indicating the need for institutions to communicate tangible benefits clearly. Positive attitudes influencing BI can be nurtured through success stories, peer testimonials, and continuous support. This study offers valuable insights for policymakers and educators aiming to enhance language education through AI integration.

References

[1]   Alswilem, D. A. M. (2019). Saudi English Teachers' Use of Technology in Secondary Classrooms: Perceptions, Barriers, and Suggestions for Improvement. In *Advances in Language and Literary Studies*. https://doi.org/10.7575/aiac.alls.v.10n.6p.168

[2]   Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74–94. https://doi.org/10.1007/bf02723327

[3]   Barakat, M., Salim, N. A., & Sallam, M. (2024). *Perspectives of University Educators Regarding ChatGPT: A Validation Study Based on the Technology Acceptance Model*. https://doi.org/10.21203/rs.3.rs-3919524/v1

[4]   Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334. https://doi.org/10.1007/bf02310555

[5] Dahri, N. A., Yahaya, N., Al-Rahmi, W. M., Aldraiweesh, A., Alturki, U., Almutairy, S., Shutaleva, A., & Soomro, R. B. (2024). Extended TAM based acceptance of AI-Powered ChatGPT for supporting metacognitive self-regulated learning in education: A mixed-methods study. *Heliyon*, *10*(8), e29317. https://doi.org/10.1016/j.heliyon.2024.e29317

[6] Davis, F., Bagozzi, R., & Warshaw, P. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, *35*, 982–1003. https://doi.org/10.1287/mnsc.35.8.982

[7] Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39. https://doi.org/10.2307/3151312

[8] Fu, P., Zhang, P., & Teng, H. (2023). The Issues and Optimization Strategies in the Modernization of Vocational Education in the Era of Chat GPT. *World Journal of Educational Research*, *10*(5), p251. https://doi.org/10.22158/wjer.v10n5p251

[9] Govindarajan, R., & Christuraj, G. (2024a). OPPORTUNITIES AND CHALLENGES OF USING ChatGPT IN THE ELT SCENARIO OF UTAS, NIZWA, OMAN. In *Journal of Teaching English for Specific and Academic Purposes*. https://doi.org/10.22190/jtesap230529046g

[10] Govindarajan, R., & Christuraj, G. (2024b). OPPORTUNITIES AND CHALLENGES OF USING ChatGPT IN THE ELT SCENARIO OF UTAS, NIZWA, OMAN. In *Journal of Teaching English for Specific and Academic Purposes*. https://doi.org/10.22190/jtesap230529046g

[11] Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM) using R*. https://doi.org/10.1007/978-3-030-80519-7

[12] Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., & Nerdel, C. (2023). *ChatGPT for Good? On Opportunities and Challenges of Large Language Models for Education*. https://doi.org/10.35542/osf.io/5er8f

[13] Kim, J., Lee, H., & Cho, Y. H. (2022). Learning design to support student-AI collaboration: perspectives of leading teachers for AI in education. *Education and Information Technologies*, *27*(5), 6069–6104. https://doi.org/10.1007/s10639-021-10831-6

[14] Moorhouse, B. L., Wong, K. M., & Li, L. (2023). Teaching With Technology in the Post-Pandemic Digital Age: Technological Normalisation and AI-Induced Disruptions. In *Relc Journal*. https://doi.org/10.1177/00336882231176929

[15] Pan, X. (2020). Technology Acceptance, Technological Self-Efficacy, and Attitude Toward Technology-Based Self-Directed Learning: Learning Motivation as a Mediator. In *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2020.564294

Innovation of History Outing Class Learning Method for Critical Thinking of Class XI Students of SMA Negeri 4 Magelang

Imada Cahya Septiyaningsih[1*] Rhoma Dwi Aria Yuliantri[2*]

[1] History Education, Universitas Negeri Yogyakarta, DIY, Indonesia
[2] History Education, Universitas Negeri Yogyakarta, DIY, Indonesia

[*]E-mail: imadacahya.2023@student.uny.ac.id

Abstract. State High School 4 Magelang is one of the schools that has applied out-class learning methods to historical subjects. Unfortunately, this method has not been implemented consistently and optimally, as it is controlled by several factors such as execution time, student conditioning, and accommodation costs. The study uses a qualitative method with a case study approach aimed at finding out the implementation of outing class learning methods. The study involved a history teacher and 27 eleventh-grade students. The results of this study informed that students are more interested in visiting historical places and do not feel bored when Teaching Learning Activities are taking place. Thus, outing classes can be done on a routine and consistent basis to enhance students' motivation and critical thinking through active, contextual, and meaningful learning.

Keywords: History Learning, Outing Class, Critical Thinking

1. Introduction

History is the study of the past, an important source of knowledge. Through studying History, students can take lessons from the past. This can shape students' character education and can foster a spirit of nationalism. Through a contextual approach, learning history can help students relate past events to the surrounding situation to understand current events. Therefore, learning history is expected to enable students to think holistically and wisely to face the dynamics of life occurring now and continue.

Teaching and Learning Activities History in schools aims to develop students' personalities and mental abilities. Through History, students can develop the qualities of honesty, wisdom, love of the nation, and humanitarian attitudes. Through learning history with a contextual approach, teachers can connect history material with real situations around students. This helps students understand and describe past events (Asmara, 2019).

1.1 *The role of history in building national identity and student character*
History also has an important role in forming national identity and student character. Students can gain insight into the historical foundations, values , and customs that shape a nation's identity by studying history. Apart from that, History also plays an important role in shaping individual character by instilling integrity, wisdom, patriotism, and empathy. Armed with a deep understanding of history, students can appreciate their cultural heritage and internalize these principles, cultivating a strong national identity and virtuous character for the future.

1.2 Challenges in learning History in the digital era

Learning History in the digital era presents several challenges, including a lack of student involvement and participation caused by teaching methods that are still conventional, less varied and less interesting. Currently, students are more interested in digital technology or visiting historical sites directly. The still rigid chronological approach increasingly supports the paradigm of students' lack of interest in learning history. Therefore, to overcome this problem, the use of technology by adopting a contextual approach and fostering creativity in conveying historical content is very necessary. These strategies will make history learning more meaningful and can be implemented in students' daily lives.

1.3 The role of critical thinking in history learning

Critical thinking skills are essential in analyzing historical information, evaluating historical sources, and drawing logical conclusions are important points to be instilled in students. Here are some reasons why critical thinking is necessary in historical study:

a. History analysis in historical studies, a lot of data needs to be analyzed to understand the context of a particular event or period. Critical thinking helps sort out relevant information, identify facts from opinions, and evaluate the accuracy of information received.

b. Evaluating historical sources can come from a variety of media such as textbooks, documents, artifacts, and electronic sources. Critical thinking skills allow students to assess the credibility of a particular event. By critical thinking, students can recognize the sources of History and understand the background of the information presented.

Based on the results of the research, history learning at SMAN 4 Magelang is still dominated by the method of lectures, so it tends to reduce interaction and discussion. This school has already implemented the outing class's historical learning innovation, but it hasn't worked optimally and consistently. The disadvantage of such inconsistencies is indicated by the difficulty of regulating the time, the conditioning of students, and the cost of accommodation. As a result, students who have ever felt happy with the method now tend to be less enthusiastic and reduce the essence of the ability to think critically because in Teaching Learning Activities students are more focused on remembering facts without understanding the context in real terms.

2. Research Methods

This study is made by utilizing case studies in research methods that describe and comprehensively analyze phenomena, social activities, attitudes, beliefs, perceptions, and thoughts. By using the case study research method, it is expected that researchers can offer valuable contextual and in-depth insights into the cases being studied. Because case studies involve a thorough examination of one case or several cases.

The focus of this research is 27 students of class XI SMAN 4 Magelang which was conducted on April 24, 2024 s/d May 17, 2024, with the involvement of history teachers at the school. Their research steps begin with observations, interviews, the dissemination of surveys or questionnaires, and the analysis of data through relevant sources such as scientific journals.

3. Results and Discussion

Based on research results, teachers are more likely to use secondary sources than primary sources in learning. Thus, it may limit the ability of students to analyze and evaluate historical information in person. Such phenomena motivate students to ask critical questions and develop evidence-based arguments. However, the time constraints and lack of coordination with some parties resulted in students' difficult conditions turned out to be some of the obstacles or reasons teachers have not held outing class methods anymore. The extra cost of accommodation to be borne by the student is at the sole discretion of the teacher. Such a reality must be a question to be considered and resolved so that students can be motivated again to follow the learning activities of teaching History and can update

their knowledge of History in the day-to-day. Therefore, this approach is contextual and the use of historical resources in the environment should be developed to encourage critical thinking of students.

Outing Class is an out-of-class learning approach, where students are invited to study in the school environment. This outing class activity is designed to enhance student learning motivation and can provide meaningful and holistic learning experiences to students. Thus, they can associate the learning material with everyday life in different environments such as families, schools, communities, and citizens' environments (Kustini Handayani, 2023). Learning by utilizing the environment is a learning that identifies the environment as a source of learning. Based on this, the environment is used as the source of inspiration and motivation in linking student understanding. In this case, the environment becomes a driving factor that is decisive in improving an understanding of the student in the learning process (Alif Kurnia Syam, 2024).

Table 1. Sample data analysis[1]

Emergent themes	Data	Source
Student's Perspective on History Learning	History learning tends to seem boring because teachers only provide material based on textbook sources, lectures, and other conventional methods of delivery.	Interview
Outing Class Method Implementation	The outing class method is very important to implement in history learning because it can potentially train students to think critically. (**purpose**). By visiting historical sites in person, students not only gain a deeper understanding of History but can also develop a strong sense of responsibility and motivation to integrate the values depicted in the History story into everyday life. (**benefit**). Publication of outing class method posters framed and displayed at the corner of the classroom as well as visit reports (**output**).	Interview
Challenges in the Application of the Outing Class Method	The outing class method learning innovation has not been able to run consistently because it takes quite a while to implement it. Lack of communication with the various parties makes it difficult for students to be conditioned. Besides, this method requires no small cost.	Interview

[1] Table footnote. This is from an interview

The results of the study show that, throughout this history learning at SMAN 4 Magelang tends to be conventional. Thus, teachers took the initiative to innovate learning through the outing class method. Based on the information from the table above, it can be analyzed that:

3.1 Students' Perspective on History Learning
According to the students, history learning at the school is boring because, in the presentation, teachers only provide material based on textbook sources, lectures, and conventional methods. Sometimes teachers have been trying to innovate creative learning models, such as Project Based Learning, Inkuiry, group discussions, and so on. But students are still not enthusiastic about taking history lessons. After looking deeper through the interviews, it turns out students are more comfortable using the outing class method and visiting historic places directly.

3.2 Outing Class Method Implementation
According to Miss. Fadhila, a history teacher at SMAN 4 Magelang, the goal of the outing class method is to train students to think critically. Besides, it is also useful to implement into everyday life. Another

benefit is that students can be responsible and motivated to study history further after visiting historical places in person through such learning methods. So far, the publication of the assignment is only a research report and poster making.

3.3 Implementation of Outing Class Learning Methods
When done according to the schedule of lessons only 2 Hours of Lesson is still very insufficient. Thus, the outing class method can be implemented outside the lesson hours by visiting sites or historical places. But as a consequence, teachers can't accompany students optimally, because school schedules vary from one to the other. Practically, students are left to their fields without the accompaniment and supervision of teachers. Besides, another obstacle is that teachers are less communicative and collaborative with various parties, making it difficult for students to be conditioned. Miscommunication is something that happens all the time during the process. Besides, to implement this activity, it takes no small cost. The fee is also fully borne by the student.

Students can visit historical sites and learn the values contained in history stories in person. In this case, can train students to be able to think critically because in addition to learning done outside the classroom, students also have to be capable ofining attitudes and behaviors to blend with society. During the performance, the students felt happy. Still, unfortunately, the teacher did not coordinate with the various parties so at the execution there were students who potentially did not attend the outing class activities because of the lack of supervision from the teacher. This is very detrimental to the student order because students who do not follow such activities automatically do not get knowledge directly. So, in the final assignment report is pointed to the students who are active and follow the activities. Publications or outputs in the above conceptual learning forms, reports, and posters. On occasion, posters of the outing class activities are framed and installed in the corner of the classroom or school corridor.

Figure 1. Poster of outing class learning. Photo Source: Author's Documentation

After finishing class activities, students create posters as the output of the activities. Unfortunately, these posters have not been fully utilized because not all works are displayed in the corner of the classroom or on the school walls due to limited space. Given that we are now entering the digital age, where digital-based learning is a learning approach that uses digital technology as the primary medium in the learning process. In this context, digital technology can cover a variety of devices and platforms

such as computers, the Internet, and specialized applications. So, it's very unfortunate if outing class outputs are published only through posters. It would be more effective and efficient if the work was published on the YouTube channel. So, the students' video assignments can be accessed by a variety of people.

In the digital age, YouTube serves as an effective video platform and aims to provide easy accessibility, a variety of content choices, interactive features, the ability to replay videos as needed, opportunities to collaborate in learning communities, visual aids that enhance understanding, and a rich variety of materials. By using YouTube wisely, students can improve their understanding of the subject matter, expand their knowledge, and independently acquire new skills. Ultimately, YouTube has proven to be an interesting and informative resource for learning in today's technologically advanced society.

Table 2. Sample data analysis[2]

Emergent themes	Respondent	Data	Source
Outing Class	27 students	63% of students stated they wanted to study history further after visiting historical sites or places. 22.2% of students said they were very interested in studying history, and 14.8% said they did not want to study it.	Questionnaire
Chritical Thinking	27 students	81.5% of students said that the values in history are important to be implemented in everyday life, while 18.5% said that they are very important.	Questionnaire
Motivasi Belajar	27 students	81.5% said they wanted to study history further, while 14.8 per cent of students said they were very interested in history.	Questionnaire

[2] Table footnote. This is from a Google form

The next data analysis technique is through the filling of the questionnaire. Of the 27 students or respondents, 63% said they wanted to study history further after visiting historical sites or places. 22.2% of students said they were keen to study history, and 14.8% said they did not want to study it. 81.5% of students stated that the values of history were important to be put into practice and implemented in everyday life, while 18.5% said that it was important to implement historical values, 81.5% said they wanted to study history, while 14.8% expressed a keen interest in studying history in greater depth. It shows that the outing class method has a significant impact on the intellectual capacity of students.

Outing class learning innovations have great potential for history learning, especially in facilitating contextual learning and hands-on experiences of historical places. Because this method allows students to study live in historical places that are the object of learning, by visiting the History site, students can connect the theory learned in the classroom with the reality of History in the field. This can help students understand the context of History more seriously and in-depth. Students are expected to gain hands-on experience in historical places such as museums, historical sites, and so on.

Therefore, by giving students an in-depth understanding through the experience of visiting historical places in person, will enable students to experience the atmosphere and the environment where History took place. This in-person experience can help students be more engaged in understanding history better. By using travel methods to study History, teachers can sketch a more authentic and comprehensive learning understanding for students.

4. Summary

The outing class learning method has great potential to increase students' motivation and intellectual capacity in History subjects. Through direct experience visiting historical places or sites, students can understand the historical context more deeply and authentically. Teachers can also provide real, more authentic, and comprehensive understanding and experience through learning while traveling strategies. Even though there are significant benefits from the outing class method, there are obstacles, namely time limitations, lack of coordination with related parties, and accommodation costs that must be borne by students. This can limit the consistency and optimization of the outing class learning method.

Apart from that, in the current digital era, it is recommended to utilize digital platforms such as YouTube as a means of publishing the output of outing class activities. In this way, student work results can be accessed by various groups and increase effectiveness and efficiency in publishing learning results. Overall, the outing class learning method has a positive impact on students' learning motivation and understanding of history. Efforts to overcome existing obstacles and utilize digital technology wisely, this method can provide breakthroughs that are more effective in improving history learning in schools.

References

[1] Alif Kurnia Syam, S. A. (2024). Effectiveness of Implementing the Outing Class Method on the Ability to Write Descriptions of Class V Elementary School Students. *Journal of Education*, 2. doi:https://doi.org/10.58230/27454312.424

[2] Asmara, Y. (2019). History Learning Becomes Meaningful Through a Contextual Approach. Journal of History Education and Social Humanities Research, 2, Number 2, December *2019*, 5. doi: https://doi.org/10.31539/kaganga.v2i2.940

[3] Azizah, N. (2023). The Role of Educational Innovation in the 21st Century History Learning Cycle. *Thesis Commons*, 3. doi:https://doi.org/10.31237/osf.io/84z6n

[4] Dimas Assyakurrohim, D. I. (2023). Case Study Method in Qualitative Research. Journal of Science and Computer Education, 2. doi:https://doi.org/10.47709/jpsk.v3i01.1951

[5] Dwi Syukriady, D. F. (2023). Challenges for Indonesian Language Teachers in the Era of Digital Transformation and Sustainable Technology in Creating Students with Strong Positive Character. *Innovative: Journal Of Social Science Research*, 2. doi:https://doi.org/10.31004/innovative.v3i4.4339

[6] Indah Tri Kusumawati, J. S. (2022). Literature Study of Critical Thinking Ability with the Application of the PBL Model in the Constructivism Theory Approach. *Jurnal MathEdu (Mathematic Education Journal)*, 2. doi:https://doi.org/10.37081/mathedu.v5i1.3415

[7] Irfan Efendi, M. P. (2021). Implementation of Learning Assessment in the 2013 Curriculum for History Subjects. *Prabayaksa Journal of History Education*, 2. doi:https://doi.org/10.20527/prb.v1i1.3081

[8] Julianti, E. D. (2021). The Role of History Learning in Cultivating Nationalist Character Values. *Osf Preprints*, 2. doi:https://doi.org/10.31219/osf.io/m87k3

[9] Kustini Handayani, S. B. (2023). Contextual Based Learning Strategy Outing Class in Increasing Student Motivation to Realize Freedom of Learning. *Jurnal Pendidikan Sosiologi dan Humaniora*, 3&9. doi:10.26418/j-psh.v15i1.62461

[10] Restu Rahayu, S. I. (2022). 21st Century Learning Innovations and Their Application in Indonesia. *Jurnal Basicedu*, 2. doi:https://doi.org/10.31004/basicedu.v6i2.2082

[11] Saputro, R. A. (2022). The Role of History Learning in Preparing the Golden Generation Through Instilling Nationalistic Character Values. *Social, Humanities, and Educational Studies (SHES): Conference Series*, 3. doi:https://doi.org/10.20961/shes.v5i3.59309

[12] Siti Maisaroh, M. M. (2020). Implementation of a Contextual Approach to Increase Students' Interest in Learning in Islamic Religious Education Subjects. *Al-Ulum Jurnal Pendidikan Islam*, 2. doi:https://doi.org/10.56114/al-ulum.v1i3.92

Teachers' Implementation of Artificial Intelligence Based-Tools in Teaching Writing in EFL Classroom

Intan Fatma Sari[1] and Yuyun Yulia[2]

[1] Magister of English Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] Magister of English Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

intanfatma.2023@student.uny.ac.id, yuyunyulia@uny.ac.id

Abstract. The advances in technology have led to an increase in the use of Artificial Intelligence (AI) in education. AI is a trendy technology that emulates intelligent human behavior, including thinking, learning, and problem-solving. Different AI technologies are being used to automate the assessment of various elements of classroom interactions. However, it does not guarantee teachers' ability to deploy technology in classrooms or ensure teaching quality. These issues underline the need to maintain open communication and use proactive strategies when designing pedagogical policies and strategies for teaching writing in the artificial intelligence era. Through narrative inquiry, the study found that teachers saw AI as a tool for offering personalized learning experiences and supporting students with a wide range of learning needs. The incorporation of AI in language instruction has huge potential, but it also presents a significant obstacle. This study gave an overview of the teacher's side of teaching writing using AI.

1. Introduction

The application of information and communication technology (ICT) to classroom dialogue has gained substantial attention in the past two decades, making it a prominent research issue in dialogic research (Song et al., 2020). Extending one's focus beyond computer-based technologies is imperative to stay abreast of technological trends and advancements, such as artificial intelligence, and their applications within educational settings (Hao et al., 2020). Examining the integration of technology and conversation is crucial for constructing knowledge, fostering critical thinking, and improving learning outcomes.

Artificial Intelligence (AI) refers to machines or computers that replicate "cognitive" capabilities, such as "learning" and "problem-solving," which are often associated with the human mind. The tools encompass grammatical checks, writing aids, and systems capable of autonomously generating written compositions such as essays. These user-friendly and efficient tools save time and energy for both students and educators (Zhao, 2022). Using these tools, students can promptly obtain feedback and support, thereby improving their writing abilities.

In the last few years, an increasing body of study has examined the impact of AI writing tools on students' writing abilities. This research holds significance for the TEFL industry. Several studies have indicated that AI-driven writing tools can potentially enhance students' writing skills (Zhao, 2022). For example, the introduction of ChatGPT and GPT-4, highly advanced AI products, has captured the interest of researchers and educators. This has led to conversations about the significant impact that AI could have on education (Bozkurt, 2023). AI has been increasingly utilized in education due to technological advancements (Chen et al., 2020). AI is a trendy technology that emulates intelligent human behaviour, including thinking, learning, and problem-solving. Wang et al. (2024) also emphasize

the utilization of diverse AI technologies, including AI-based models and systems, for the automated analysis of different aspects of classroom communication. The elements encompass teacher-related conduct and teaching, student-related engagement and knowledge acquisition, collective classroom deliberation, and interaction between humans and computers.

Although AI-enabled learning supports have great potential, it does not guarantee teachers' ability to deploy technology in classrooms or ensure teaching quality (Mercader & Gairín, 2020). Teachers are not fully prepared to implement AI-based education from UNESCO data in 2019. Teachers' attitudes are significant in successfully applying new instructional technology during lessons. Furthermore, it is widely recognized in the literature that digitizing writing education is not without obstacles. According to Duncan & Joyner (2022), educators are confronted with the challenges of digital equity, privacy, and the possibility of distraction. These issues underline the need to maintain open communication and use proactive strategies when designing pedagogical policies and strategies for teaching writing in the artificial intelligence era.

Conducting such a study is crucial to get a more profound understanding of the advantages and constraints of AI technologies in this particular setting, including the elements that either enable or hinder the success of AI in educational settings. Educators, policymakers, and researchers can make well-informed judgments regarding the effective integration of AI into classroom instruction. Using narrative inquiry as the methodology helps to explore how the teacher practices and perspectives AI in their writing classroom. Narrative inquiry studies how people construe and respond to social factors that condition language teaching and learning behavior; the narrative inquiry technique is one of the finest ways to better comprehend the social constraints that condition language learning and teaching behavior. These observations can also inform the creation and advancement of AI-driven educational interventions, guaranteeing that they optimize advantages while efficiently tackling any obstacles or apprehensions that may emerge.

The current study aims to answer several questions: 1. How is the implementation of artificial intelligence (AI) in teaching writing, 2. What are teachers' beliefs about the use of AI in teaching writing. The imperative to address these studies' inquiries arises from fundamental factors. This finding has the potential to ultimately enhance the broader and more efficient utilization of AI in EFL teaching. Furthermore, examining educators' perspectives and implementation of AI writing tools is imperative. If educators perceive these technologies as advantageous, this favorable attitude can increase acceptance, enhancing EFL instruction universally. Nevertheless, if educators exhibit apprehension or skepticism towards these technologies, it becomes crucial to recognize and tackle their worries. Such comprehension would enable adjustments in AI tools or instructional approaches to guarantee the complete realization and appreciation of AI's potential in language learning environments. This study aims to facilitate the integration of artificial intelligence (AI) in EFL classes by addressing the following inquiries.

2. Methodology

This study used narrative inquiry as the research design by Barkhuizen, Benson, and Chick (2013). Through teachers' stories, narrative inquiry could assist us in understanding further the multiplicity of experiences in language learning and teaching. Narrative inquiry was chosen because it is a valuable method for investigating how teachers implement the integration of AI in their classes and how it helps teachers in teaching writing. The present study explored English teachers' implementation of the integration of AI in teaching writing. In writing, teachers instruct students on some steps to compose a written text. First, the teachers were assigned students to write an outline of the text chosen. Second, teachers instruct students to compose a draft. In the process of writing, teachers instruct students to use Grammarly and Quillbot as AI tools to help them check their work. Last, the teacher asked students to

revise the work to integrate AI. The five writing processes were recorded and stored in Google Drive and Google Docs.

In this study, there were two participants. The first participant is an experienced teacher that implementing AI in her teaching writing. The second participant is an inexperienced teacher that not implementing AI in her teaching writing. Both of them have been using AI in their work before. The reason for the chosen participants is to have different experiences and points of view on how the teach writing with and without AI as assistance and how teachers' perspectives on AI in teaching writing context. They were assigned pseudonyms for ethical concerns to conceal the participants' identities.

The techniques used to collect the data were semi-structured interviews. A semi-structured interview was utilized to clarify and ask for more explanation or elaboration (Barkhuizen et al., 2013). The choice of technique took into account the type of research and the focus of this research. Data for this study was collected asynchronously through an online platform. First, participants were asked to write about their experience in teaching writing using AI through Google Docs. Second, the follow-up activities were done to the semi-structured interviews to get detailed information from participants through an online meeting at the Zoom meeting platform.

In analyzing the data, the researcher used thematic analysis to analyze narrative data. It is mostly about categorization and classification; some phenomena are connected to more general concepts. The paradigmatic analysis also uses abstract reasoning to find theoretical connections between concepts resulting from the data. The approach is known as "thematic" analysis in qualitative research. Generally, it includes the reiterated reading of the data, coding and categorizing data extracts, and their reorganization under thematic headings. The study used a triangulation technique to confirm that the data was accurate. The validity of the data was determined via source and theoretical triangulation in this study.

3. Result and Discussion

The data was collected from the written interview and followed up by oral interviews to get deeper information. The data were obtained from participants' stories using the narrative frame, the semi-structured interview, and the artifact to support the primary data. The next part also stated how the results of this study are interpreted and explained in light of the previous investigations. The findings were organized under the research question. The questions were: 1. How is the implementation of artificial intelligence (AI) in teaching writing, 2. What are teachers' beliefs in the use of AI in teaching writing.

3.1 The Implementation of Artificial Intelligence (AI) in Teaching Writing

In this study, the process of teaching writing used the theory from Hyland (2019). The participants of this study were two junior high school teachers with pseudonyms Wita and Kia who have tried AI. Wita is an experienced teacher that implements AI in her teaching writing. On the other hand, Kia is an inexperienced teacher that not implement AI in her teaching writing. Therefore, the different experiences and points of view on how the teach writing with and without AI as assistance could give us a picture of teachers' implementation and perspectives on AI in the teaching writing context.

There are six steps of writing implemented in teaching writing. From the six steps, the teacher applied AI in brainstorming, responding to the draft, and editing.

"I give students feedback and ask peers to give feedback. I ask students to use AI because It will strengthen the feedback from computational basics. I think using AI is important because students can explore such feedback and decide the result of their draft."

(10/05/2023-Wi-Story)

"I ask students to check and correct forms, layout, and evidence using AI. In editing, I think using AI is important because it gives a perfect writing form."

(10/05/2023-Wi-Story)

"I ask students to brainstorm using Bing AI to help them get clear illustrations. After that, we outline without AI. I think using AI in outlining is unimportant because they need to use their creativity, AI is only for checking the quality outline."

(10/05/2023-Wi-Story)

In the process of prewriting, teachers gave a chance to students to find inspiration through AI only for brainstorming the idea. However, in outlining the students were not allowed to use AI so students could think and learn independently. Besides responding to the draft and editing, the teacher also implemented the use of AI. AI helps both students and teachers the most in these two parts. For the students, it helped them to detect any mechanic mistakes, ineffective sentences, and some error content. For teachers, AI helped them to efficiently their time to assess students' writing so they could focus on other things that need to be concerned more.

It also found that there were a problem and a challenge that arose in Integrating AI into teaching writing. In this situation, the teacher also had a strategy for solving problems that arise in teaching writing using AI.

"As a teacher, I need a lot of effort in integrating technology and AI because I need to check and assess the writing of students repeatedly. I feel it is better to make more effort even though it takes time to get the best possible writing according to the student's abilities."

(10/05/2023-Wi- Interview)

"I overcome problems that may occur by creating open-ended questions. I also think that teachers need to limit and supervise students in using AI. Apart from that, as a teacher, teachers need to be aware of the challenges that will arise for students."

(10/05/2023-Wi- Interview)

Integrating AI for junior high school students was not easy. The students still needed more attention from teachers in integrating technology, especially AI as a new tool introduced for them. As a teacher, we need to cope with any problems and challenges that arise. Teachers need to understand what problems and challenges would arise if they implement AI based on the grade or level of the students. The teacher should realize and understand their students' characteristics, behavior, and environment. Therefore, in applying AI in writing classes, AI could help them and the problem can be minimized. It is supported by previous research that teachers face the challenge of adapting pedagogical practices to effectively incorporate these advanced technologies. This necessitates a thorough understanding of the specific skill sets and knowledge domains required for integrating AI tools into teaching practices while also ensuring that educators remain relevant in an increasingly digital world (Simbolon, 2024).

3.2 Teachers' Beliefs in the Use of AI in Teaching Writing

Teachers view AI as very helpful in effectiveness, time-saving, and providing new insight.

"AI gives easy and effective support in terms of feedback and creating content. It helps me to detect some mistakes with less effort and save time with a good result.

(10/05/2023-Ki-Interview)

"Compared to using AI in teaching writing, teaching without AI is more difficult and the teacher's efforts will be harder because there are still many errors since the drafting process. Students' writing results are very different when compared to using AI in teaching writing and teaching without AI. Very time-consuming and the results are not optimal."

(10/05/2023-Wi- Interview)

AI provides sentence recommendations, rewrites or paraphrases the original material, and evaluates grammar and word choice. This tool can help teachers improve their writing and communicate themselves more effectively in English. It can also help users avoid stumbling over difficult English words while writing. Based on the research, digital tools driven by technology could help students become self-directed learners. There is evidence that an online grammar checker is useful for low-proficient L2 learners' writing (Grimes & Warschauer, 2010). Compared to teacher feedback, AI's

significantly reduced writing errors (Vajjala, 2018). This finding is supported by Nazari et al. (2021) study that AI technology could improve knowledge generation and the development of new knowledge.

At the same time, the teachers also had anxiety and worries about using AI in teaching writing. "Behaviorally students will prefer to explore new things so that students better understand the use of AI. AI can blunt students' critical thinking because AI can provide significant feedback instantly. This has an impact on daily learning, students might have a mindset to get instant results. So if students are allowed to use AI without supervision, it will not improve their abilities but instead blunt their critical thinking."

(10/05/2023-Wi- Interview)

"I do not introduce Chat GPT or advanced AI technology because it gives more disadvantageous to junior high school students. I do not want my students to instantly use AI and make it a habit"

(10/05/2023-Ki-Interview)

The teacher worried that the impact of AI could decrease students' critical thinking. The negative implications of GPT Chat for students using this system to do assignments (Hutson, 2024), especially in doing assignments related to creative writing. Consequently, students avoid carrying out the steps and stages in making assignments the teacher gives. In creative writing theory, writing skills are not obtained naturally but passed through learning and practice.

4. Conclusion

This study gave an overview from the teacher's side of teaching writing using Artificial intelligence (AI). AI has become an inherent component in contemporary education, with the potential to change teaching and learning. Perceptions of AI Potential English language educators typically see AI as a viable technique for improving language learning experiences. The findings show that teachers viewed AI as a tool for providing tailored learning experiences and assisting students with a variety of learning requirements. Furthermore, AI is viewed as a tool that may increase efficiency by automating administrative activities and delivering quick feedback on student work. The implementation of AI into language teaching has enormous potential, but it also presents a distinct challenge. English teachers are excited about AI's ability to customize instruction and improve efficiency, but they are also concerned about students' behavior created when they dependently use instant tools.

With a wide variety of meaningful and interesting artificial intelligence, giving learners easier access to the tools can help them develop their language skills. This AI technology can provide learners with more opportunities for interaction beyond the restriction of time and location. It is hoped that language learning can be more fun and more efficient. The suggestion of the research shows that teachers need to give more attention to students' learning behavior. The teacher needs to provide a positive environment to students to create students' positive behavior. In integrating AI, teachers should understand students' capacity and condition to maximize the AI as an assistant in writing. Finally, the recommendation for future research is to take the subject or level outside English writing and specify the AI tools used in a specific context.

References

[1] Ardini, S. N., Sunarya, S., & Latifah, K. (2024). Development of Mobile Application through the Concept of Artificial Intelligence to Enhance Pronunciation Skill in EFL. *KnE Social Sciences*, *2024*, 56-66–56–66. https://doi.org/10.18502/KSS.V9I6.15254

[2] Barkhuizen, G., Benson, P., & Chik, A. (2013). Narrative Inquiry in Language Teaching and Learning Research. *Narrative Inquiry in Language Teaching and Learning Research*, 1–132. https://doi.org/10.4324/9780203124994/

[3] Bozkurt, A. (2023). Generative artificial intelligence (AI) powered conversational educational agents: The inevitable paradigm shift. *Asian Journal of Distance Education*, *18*(1), 2023. https://doi.org/10.5281/zenodo.7716416

[4] Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, *8*, 75264–75278. https://doi.org/10.1109/ACCESS.2020.2988510

[5] Chou, P. H., Jou, T. H. T., Wu, H. T. H., Yao, Y. C., Lin, H. H., Chang, M. C., Wang, S. T., Lu, H. H. S., & Chen, H. H. (2022). Ground truth generalizability affects performance of the artificial intelligence model in automated vertebral

fracture detection on plain lateral radiographs of the spine. *The Spine Journal*, *22*(4), 511–523. https://doi.org/10.1016/J.SPINEE.2021.10.020

[6] Duncan, A., & Joyner, D. (2022). On the necessity (or lack thereof) of digital proctoring: Drawbacks, perceptions, and alternatives. *Journal of Computer Assisted Learning*, *38*(5), 1482–1496. https://doi.org/10.1111/JCAL.12700

[7] Grimes, D., & Warschauer, M. (2010). Utility in a Fallible Tool: A Multi-Site Case Study of Automated Writing Evaluation. *The Journal of Technology, Learning and Assessment*, *8*(6). https://ejournals.bc.edu/index.php/jtla/article/view/1625

[8] Hutson, J. (2024). Rethinking Plagiarism in the Era of Generative AI. *Journal of Intelligent Communication*, *4*(1), 20-31–20–31. https://doi.org/10.54963/JIC.V4I1.220

[9] Hyland, K. (2019). *Second Language Writing*. Cambridge University Press.

[10] Mercader, C., & Gairín, J. (2020). University teachers' perception of barriers to the use of digital technologies: the importance of the academic discipline. *International Journal of Educational Technology in Higher Education*, *17*(1), 1–14. https://doi.org/10.1186/S41239-020-0182-X/FIGURES/5

[11] Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial. *Heliyon*, *7*(5), e07014. https://doi.org/10.1016/J.HELIYON.2021.E07014

[12] Owan, V. J., Abang, K. B., Idika, D. O., Etta, E. O., & Bassey, B. A. (2023). Exploring the potential of artificial intelligence tools in educational measurement and assessment. *Eurasia Journal of Mathematics, Science and Technology Education*, *19*(8), em2307. https://doi.org/10.29333/EJMSTE/13428

[13] Polak, S., Schiavo, G., & Zancanaro, M. (2022). Teachers' Perspective on Artificial Intelligence Education: an Initial Investigation. *Conference on Human Factors in Computing Systems - Proceedings*. https://doi.org/10.1145/3491101.3519866

[14] Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning 2017 12:1*, *12*(1), 1–13. https://doi.org/10.1186/S41039-017-0062-8

[15] Sarwari, A. Q., & Adnan, H. M. (2024). The effectiveness of artificial intelligence (AI) on daily educational activities of undergraduates in a modern and diversified university environment. *Advances in Mobile Learning Educational Research*, *4*(1), 927–930. https://doi.org/10.25082/AMLER.2024.01.004

[16] Simbolon. (2024). Bridging The Gap: Language Teacher Understanding and Responsible AI Implementation in Schools. A Case Study of English Language Educators in Kubu Raya. *Journal on Education*, *6*(3), 16057–16068. https://doi.org/10.31004/JOE.V6I3.5488

[17] Vajjala, S. (2018). Automated Assessment of Non-Native Learner Essays: Investigating the Role of Linguistic Features. *International Journal of Artificial Intelligence in Education*, *28*(1), 79–105. https://doi.org/10.1007/S40593-017-0142-3/TABLES/12

[18] Wang, J., & Yang, M. (2020). A Study on the Relationship Between Preservice STEM Teachers' Beliefs About Migrant Students and Teachers' Roles in Chinese Urban Schools. *Https://Doi.Org/10.1177/0013124520927673*, *53*(2), 206–230. https://doi.org/10.1177/0013124520927673

[19] Yue, M., Jong, M. S. Y., & Ng, D. T. K. (2024). Understanding K–12 teachers' technological pedagogical content knowledge readiness and attitudes toward artificial intelligence education. *Education and Information Technologies*, 1–32. https://doi.org/10.1007/S10639-024-12621-2/FIGURES/4

[20] Zhao, C. (2022). Perspectives on nonstationary process monitoring in the era of industrial artificial intelligence. *Journal of Process Control*, *116*, 255–272. https://doi.org/10.1016/J.JPROCONT.2022.06.011

Exploring the Needs for Digital Reading Media for Interactive Reading for English Education Students

Lia Adila¹, Hesti Tustarina Handayani², and Lilia Indriani³

¹ Faculty of Teacher Training and Education, Universitas Tidar, Magelang, Indonesia, lia.adila@students.untidar.ac.id
² Faculty of Teacher Training and Education, Universitas Tidar, Magelang, Indonesia, hesti.tustarina.handayani@students.untidar.ac.id
³ Faculty of Teacher Training and Education, Universitas Tidar, Magelang, Indonesia, indriani@untidar.ac.id

Abstract: Since interactive reading highlights student engagement with the content, digital reading media is a beneficial tool for making learning more interactive. This study delves into the potential of interactive digital reading media to enhance English reading skills among English education students. Utilizing a qualitative approach using a mixed questionnaire design (closed-ended and open-ended), it explores the perspectives of 106 students. The research focuses on student needs and wants functionalities in digital reading media. The analysis will convey the lack of current options and identify features such as user-friendly, accessibility, and others that provide to student skill sets, including language proficiency, comprehension, and the ability to operate digital media. Based on these findings, it can be used as the basis for the development of digital reading media that is interactive and appropriate for students' needs.

Keywords: need analysis, interactive reading, digital media

1. Introduction

Digital media in education influences digital technology in the learning and teaching process. This encompasses some digital data or digital image that can be processed, accessed, and distributed using digital devices (Sartika et. al, 2021). Digital learning media attempts to facilitate learning and teaching activities while also improving the quality of the process and learning outcomes. The use of digital media can be adapted to the subjects of learning. Here, learning media is important for learning English because it develops students' creativity for those images, words, and sounds that come to the students from various media (Tafani, 2009).

Digital learning media offers some important role in enhancing reading skills among students in today's learning process, as evidenced by several research studies. Digital media help students to improve their ability in verbal interaction, enhance vocabulary and reading comprehension (Craig & Patten, 2007). According to Tobing and Oktaviani (2022), electronic media provides easy access to information in today's digital era that is benefiting EFL students in language learning. Here, digital media enables individuals to access information efficiently to enhance their reading skill. Furthermore, Khusniyah (2022) states that the use of digital learning media in reading comprehension classes has been highlighted as a necessity to meet the evolving needs of students in the digital age. It might be

stated that the use of digital learning media in education has a good impact in enhancing reading skill and fostering better reading abilities and comprehension.

As well as the important role of digital learning media in enhancing reading skills, digital media also contribute to a transformative shift in reading. It transformers the traditional reading practices resulting in innovative and interactive reading practices. Studies have shown that digital media can help students in their learning process by making the learning process more interactive and engaging. In the research by Mardiana (2020), it shows that digital media can make students more interested and motivated in the learning process. This research shows that 90% participants agree that digital media can help them in enhancing their reading skill. Digital media also introduces a number of powerful advantages that are traditionally absent in the print environment, such as interactivity, nonlinearity, immediacy of accessing information, and the convergence of text, images, audio, and video.

However, in learning reading, the use of digital reading media is not yet fully optimized and can still be improved. Antoni & Niati (2022), took a view that students generally do not enjoy reading because they are not interested in reading as reading is boring and spending much time comprehending. As shown by the research conducted by Khusniyah (2022), based on the results of teacher evaluation of teaching and learning technology 2021-2022, digital learning resources in reading are still not used optimally. The data shows that only 30% of students who are downloading the e-book in links provided by the teacher. However, based on the data it can be said that the student's interest in reading using digital media is still low.

Regardless of how digital media offers exciting possibilities for interactive reading learning, some studies have shown that the use of digital media for interactive reading is still not well-used by the students and not always catching the interest of some students as a media to foster the students comprehension. In spite of that, this research aims to find out the digital reading media for interactive reading for English Education students specifically tailored to the students needs, lacks, and wants. By knowing these factors, there will be a chance to know and create effective and engaging digital media for interactive reading that can help students to be more interested in reading, especially using digital media.

2. Methodology

This research aims to understand the needs of English education students regarding digital reading media. It uses a qualitative approach, specifically a need analysis design, to gather in-depth information from the students themselves. The researchers distributed a questionnaire with both closed-ended and open-ended questions to 106 students. The closed-ended data is analysed using a Likert scale with the options in the rubrics of the questionnaire are Strongly Disagree (SD), Disagree (D), Agree (A), and Strongly Agree (SA), while the open-ended responses were chosen for further analysis through random sampling. This combination of methods aims to get a well-rounded picture of the students' needs, wants, and any shortcomings they experience with current digital reading materials.

The data gathered process in two different ways based on the type of questions. The close-ended questions data using the following formula:

$$P = \frac{\Sigma x}{\Sigma x1} \; x \; 100\%$$

Description:

P   = Percentage
Σx = Total number of respondents' answer scores

$\sum \square \square x1$ = Total number of the highest answer scores

Here the data is analyzed one by one using the formula to determine the percentage. And based on the Indriani, et.al (2023), the score obtained is categorized as follows:

Table 1. The category score

Range Score (%)	Category
0 - 34	Negative Perspective
35 – 67	Neutral Perspective
68 - 100	Positive Perspective

Following the data analysis, the questionnaire is tested for validity using Pearson Correlation with N 40, degree of freedom 5%, and the resulting value is 0.573 which is greater than 0.312 which means that this questionnaire is valid.

3. Discussion

This research has the purpose of examining student's perceptions about the use of digital reading media for English Education students. Based on the findings above the authors are trying to break the results of the research findings into necessities, lacks, and wants which is in line with Hutchinson & Waters (1987). Based on the questionnaire, there are closed-ended questions and also open-ended questions that fit in with participants' answers regarding the necessities, lacks, and wants regarding in digital reading media for English Education students.

The questionnaire results indicate positive perceptions regarding the questions. Focusing on the necessities of digital reading media, the questionnaire highlighted some aspects that students must acquire to become proficient in language proficiency, which is important and might influence the students' reading ability to be effective in using digital reading media. The findings show that language proficiency is important to comprehend digital reading media effectively. With high reading proficiency, students believe it will be easier to understand vocabulary and grammar which allows them to encompass the digital reading media. This is in line with the study by Rajovi´c and Deni´c (2023) that argues that English Language proficiency is related to the acquisition of digital competence.

To have a high language proficiency, students agree that they need a learning media platform such as digital reading which is customizable reading settings or features like a highlighter, reading track progress, font style, reading screen mode, etc; interactive learning media like providing images, videos, audio, puzzle, and quizzes; and also user-friendly like easy to access and has a clear function. Students also call attention to the interactive learning media to facilitate them in the reading learning process. Those include discussion and feedback on it.

Following the necessities, there are some flaws in the use of digital reading media that the authors are trying to underline here. The questionnaire points out some aspects such as insufficient resources or features in digital media platforms. The students agreed that digital reading media does not have complete features or resources. Some features like reading mode, highlighter, adjustable font size, and others might help students to read a text or even understand the text. Besides that, features like the availability of suggestions that relate to students' interests are also still not shown in the digital media as digital reading. This feature is important to help the students find relevant information or text that they want to read based on their preferences and interests. Here, it helps students to get some keywords that might relate to what they want to search on digital media platforms. Another aspect that was highlighted in the questionnaire is that the instructions to use digital media as a digital reading are still

not clear. Digital media are overflowing with information, but their quality and credibility can vary widely. Without clear instructions, students struggle to identify trustworthy sources and avoid misleading content. In essence, the lack of clear guidelines leaves students vulnerable to misinformation and hinders their ability to effectively utilize digital media for educational reading purposes.

Students' wants based on the questionnaire can be seen based on students' answers which agree with the statement. Students view digital media as an important educational resource that provides a range of content formats (podcasts, infographics, and articles) to accommodate various learning preferences. They desire interactive elements that encourage deeper comprehension and teamwork, such as discussions and quizzes. This is in line with Schank and Cleary (1995) that interactive elements like quizzes, polls, and discussions encourage active participation, leading to deeper understanding and knowledge retention compared to passive reading. Learning materials could be easily analyzed and arranged with the use of annotation tools. Lastly, reading lists that could be customized depending on interests would improve the efficiency of navigating the information available on digital reading media.

In this study, students recognized the importance of language proficiency and features such as customization and interactivity in digital reading platforms, they also expressed a need for more comprehensive features and clearer instructions. They want interactive elements, personalized reading lists, and annotation tools that highlight the need for a platform that encourages active and engaging learning. By addressing these identified needs, digital media can be transformed from a passive source of information into a powerful tool for enhancing English language learning and understanding in the digital age. Here, the author believes in unlocking the full potential of digital reading media for English language learning and creating a more engaging and effective learning reading experience for students in the 21st century.

4. Conclusion

This study looked at how English education students encountered digital reading media. Students gave a positive view of the benefits of digital resources, emphasizing the importance of accessibility, content relevancy, and clear privacy policies. Also considered necessary were user-friendly interfaces that improve readability and provide additional features. However, the study also pointed out areas that needed improvement. Students expressed the lack of features such as customizable fonts, highlighting tools, and reading modes. Additionally, current platforms don't provide clear guidelines for assessing the accuracy of sources or recommend content based on students' interests. Digital reading media should include a greater range of content forms, interactive components that encourage deeper learning, and configurable reading lists to overcome these shortcomings and better meet the needs of students.

References

[1] Tobing, N. F. M. L., & Oktaviani, L. (2022). An Analysis of the Effectiveness of ElectronicMedia for Reading Comprehension: EFL Students Perspectives. *Journal of Arts and Education*, *2*(2). https://doi.org/10.33365/jae.v2i2.108

[2] Khusniyah, N. L. (2022). Digital Learning Media Needs Analysis for English Reading Comprehension Class. *Al-Ishlah: Jurnal Pendidikan*, *14*(1), 241-248. https://doi.org/10.35445/alishlah.v14i1.1920

[3] Mardiana, W. (2020). Utilizing digital media in EFL classroom: Pre-service teachers teaching practice experience. *Journal of English Teaching, Applied Linguistics and Literatures (JETALL)*, *3*(1), 33-42. http://dx.doi.org/10.20527/jetall.v3i1.7814

[4] Ahour, T., & Mohseni, F. (2015). Investigating Efl Learners'perception Of Needs: Necessities, Wants, And Lacks In Different Language Skills Taught In General English Courses. *Modern Journal of Language Teaching Methods, 5*(1),236.

[5] Wahyono, E., & Puspitasari, D. (2016, January). Students' need analysis of English reading skills for academic purposes. In *Proceeding of International Conference on Teacher Training and Education* (Vol. 1, No. 1).

[6] Harjanto, I. (2021). The preference for English in digital media among Indonesian millennials. *Beyond Words, 9*(1), 16-36. https://doi.org/10.33508/bw.v9i1.3143

[7] Rajović, J., & Denić, N. (2023, March). The Link between the English Language and Digital Competences. *In Proceedings* (*Vol.85*, No. 1, p. 4). MDPI. https://doi.org/10.3390/proceedings2023085004

[8] Indriani, L.,Ekaningrum, R. E., & Rahardi, P. (2023). Powtoon as Digital Learning Media in Academic Writing Class: Students' Perspective and Challenges. *Indonesian Journal of English Language Teaching and Applied Linguistics*, *8*(2), 185-198.

[9] Sartika, S. B., & Wiguna, A. (2024). The Analysis of Students Needed in Digital Teaching Media. *JTP-Jurnal Teknologi Pendidikan*, *26*(1), 44-62. http://dx.doi.org/10.21009/JTP2001.6

[10] Tafani, V. (2009). Teaching English through Mass Media. *Acta didactica napocensia*, *2*(1), 81-95.

A Theatrical Developments: The Role of Digital Media in Boosting Speaking Skills Using Drama

Lilies Youlia Friatin[1*], Margana[2,] Anita Triastuti[3]

[1,2,3] Language Education Science, Universitas Negeri Yogyakarta,Yogyakarta, Indonesia
[*]E-mail: liliesyoulia.2021@student.uny.ac.id

Abstract. This study focuses on boosting speaking abilities in EFL classes at the university level through integrating digital technologies into drama-based pedagogy. Using technology and theatrical methods, it explores how to improve language fluency, reduce speaking anxiety, and increase student involvement. It is based on socio-cognitive theory. Semi-structured interviews were used to gather data, in addition to classroom observations and interviews, with forty students and three teachers. The results indicate that digital tools, such video feedback, increase students' confidence and engagement when speaking English. Drama and digital media can be combined to develop innovative and fruitful language learning environments, as this study suggests. Keywords**:** *drama-based pedagogy, digital tools, speaking skills, socio-cognitive, EFL context*

1. Introduction

Speaking skills can be improved through the use of digital technologies and drama in the constantly changing area of education (Göktürk et al., 2020; Nguyen, 2023; Pishkar et al., 2017) especially in circumstances where English is taught as a foreign language (EFL). This integration is consistent with socio-cognitive theories that highlight the significance of social context and relationships in learning processes (Antón & Dicamilla, 1998; Gural & Shulgina, 2015; Kovač et al., 2021; Wu, 2016), in addition to embracing cutting-edge instructional practices. The integration of digital technology, socio-cognitive learning theory, and drama. Drama, as a teaching method, creates an immersive learning environment in which students can adopt the roles of characters and situations that are different from their own, giving them the opportunity to practice language in many different kinds of social contexts. In EFL contexts, high levels of student engagement and emotional involvement are essential for language acquisition, and this approach fosters both of these.

Scientists have given insight in terms of the integration of components involving virtual scenarios (Delgado et al., 2015; Kessler, 2018; Wang & Michael, 2011), interactive storytelling apps, and online collaborative platforms, the incorporation of technology boosts this learning process. Many aspects of our daily lives, including education, have been impacted as a result of technological advancements. In addition, Irugalbandara (2021), Piriyaphokanont & Sriswasdi (2022) exposedthe accessibility and richness of dramatic interactions are improved by these technologies, which also make them more interactive and, most importantly, more representative of the virtual dimension of today's global interaction landscape.

Moreover, the success of integrating technology and drama in language learning is supported by the socio-cognitive framework. As argued by some scientist such as Gadille et al., 2023; Ji et al., 2023; Silva et al., 2017; Verhoeff, 2017, suggested drama is a millennium art form that has steadily preserved its most essential components over time. Cognitive and language development potential is greatly enhanced in this rich setting, which is why studying

these integrated methods is essential to comprehending the current best practices in EFL instruction.

Teachers in English as a Foreign Language (EFL) utilize digital resources to enhance drama activities and improve student speaking, this is because by considering drama activities can give students the chance to utilize language to express a wide range of emotions, solve issues, and speak English fluently, students practice several approaches including creative drama. (Bora, 2022; Bsharat & Barahmeh, 2020; Bsharat & Behak, 2021). Teachers can provide feedback and assist students observe how they're doing with the use of video tools. Students can videotape themselves speaking in performs, then play it back to see what went well and what requires improvement. After that, students can show their recordings to their peers, who can offer suggestions and encouragement. By utilizing these innovative strategies, teachers can enhance the engagement of speaking exercises and assist learners in developing their English communication skills.

Based on the empirical work of Albert Bandura, socio-cognitive theory asserts that learning takes place in a social setting and requires a dynamic interaction between people, their surroundings, and their actions. This viewpoint emphasizes the significance of modelling, imitation, and observational learning—all of which are especially pertinent to language development (Abdullah et al., 2020; Nabavi & Bijandi, 2012; Poluektova & Smith, 2020). This approach gives legitimacy to the idea that students can improve their speaking skills by interacting with others, receiving criticism from peers, and observing teachers. As argued by (Bsharat & Barahmeh, 2020; Fletcher-Watson, 2016; Mackey, 2016; Mancini, 2018; Nicholson, 2014) drama-based activities offer a rich setting for these processes because of the social connections they involve, which allow students to interact extensively with language in relevant circumstances. These digital experiences combine with the well-established educational advantages of drama to produce a powerful hybrid learning format that greatly enhances socio-cognitive development (Irugalbandara, 2021b).

Speaking is a multifaceted skill that involves more than just making sounds; it also requires the capacity to express thoughts, feelings, and information in a clear, organized manner. In EFL contexts especially in Indonesia, traditional speaking instruction frequently emphasizes imitation and repeated practice (Marques et al., 2024). Drama, on the other hand, provides a dynamic and immersive platform for practicing language use in a range of social circumstances, which can greatly improve these strategies. As mentioned by (Andersen, 2020; Cheng & Winston, 2011; Mohammad Zyoud, 2010) dramatic exercises promote improvisation and imagination by requiring students to actively participate and apply their language skills in the current situation, which improves their fluency and confidence in the language. These experiences can be further enhanced by implementing strategies from other educational theories, such as Vygotsky's idea of the Zone of Proximal Development (ZPD) (Irshad et al.,2021.; Xi & Lantolf, 2021; Zaretsky, 2021) . Teachers can scaffold the learning process in the context of drama-based EFL instruction by assisting students with increasingly difficult speaking assignments that they are unable to do on their own but can handle with appropriate assistance. Dramatic activities become an effective tool for language and cognitive development by utilizing both Goh's principles and Vygotsky's ideas. In addition, Alasmari & Alshae'el, 2020; Planchat, 1994; Ronke, 2005; Sadia et al., 2021 stated that the power of dramatic

approaches, such as role-play, improvisation, and scripted performances, is harnessed by this dynamic and captivating instructional approach to promote learning. Drama-based pedagogy serves effective at reducing affective difficulties because it fosters an encouraging and safe atmosphere in which students can attempt with new words without worrying about being harshly judged. In line with this, (Hendrix et al., 2012; Hulse & Owens, 2019; Irugalbandara, 2020) dramatic activities also help students develop a sense of community and solidarity because they are collaborative in the natural environment. Moreover, (Alasmari & Alshae'el, 2020b; Frydman & Mayor, 2024; Ma & Subbiondo, 2022) claimed that drama also promotes a comprehensive method of language learning.

Technology is a useful tool when teaching speaking through drama since it allows for virtual performances, give users access to a wide range of scripts and interactive activities, and make audio-visual recordings of talks easier to provide input. Some scientists (Asratie et al., 2023; Chaikovska et al., 2022; Mandasari et al., 2020)has explored synchronous learning, where students practice and improve their speaking skills at their own convenience, is made possible by digital tools as well. Additionally, (Kalidas, 2014; Koushki, 2019; Sarem et al., 2018) found that by incorporating online collaborative tools into drama-based activities, educators may help students develop a sense of community and teamwork, which is essential for boosting confidence and lowering language anxiety.

2. Research Method

In this study, we use a qualitative research methodology to explore the intricate circumstances of incorporating digital tools personalized feedback into drama-based activities and its impact on student participation and speaking anxiety decrease in EFL classes at the university level. Our research attempts to discover the intricate interactions between technology, pedagogy, and interpersonal elements in the context of language learning, with a focus on understanding the different experiences and viewpoints of both students and instructors. We highlighted representation across all backgrounds, learning experiences, and competence levels by purposefully selecting a wide range of students from university-level EFL classrooms. The objectives of this research to investigate how integrating digital tools with personalized feedback into drama-based activities affects speaking anxiety in university-level EFL classes and increases student engagement. In order to capture a wide range of experiences and viewpoints, choose a purposeful sample of students from university-level EFL classrooms consisting of roughly 45 students and three English teachers.

To learn more about how teachers and students experience about the usefulness of digital tools with personalized feedback for drama-based activities, conduct semi-structured interviews with participants. Besides, to make the research data rich, take note of interactions, levels of involvement, and the noticeable effects of anxiety on student performance while watch the drama activities in the classroom. Responses obtained from interviews can be contextualized with the support of observational data.

Use thematic analysis to examine the interview transcriptions in order to find recurring themes and patterns around speaking anxiety management strategies, the usefulness of digital resources, and student involvement. Next, create a coding scheme and iterate it based on preliminary themes to explore the data in more detail. Lastly, to strengthen the results' depth and accuracy, triangulate data from several sources (such as observations and interviews).

3. Findings and Discussion

3.1 Findings

After conducting in-depth interviews with forty students from EFL classes at the university level and gathering perspectives from three English teachers, these results provide further illumination on the multiple implications of incorporating digital tools with personalized feedback into drama-based exercises. Several major themes that provide insightful information on teachers' and students' attitudes, experiences, and perceptions of using technology-enhanced methods to improve speaking in English language learning contexts were revealed using thematic analysis. These findings offer valuable insight into the opportunities and difficulties related to integrating digital tools into classroom practice, in addition to illuminating the efficacy of these technologies in promoting engagement, lowering speaking anxiety, and enabling personalized input.

Table 1. Students' responses

Perceptions of digital tools	Students' number
1. Positive	25
2. Neutral	10
3. Negative	5
Feedback mechanisms	Students' number
1. Appreciation of personalized	30
2. Indifference	5
3. Preference of traditional feedback	5
Engagement levels	Students` number
1. Increased	30
2. No significance	8
3. Decreased	2
Anxiety reduction	Students` number
1. Anxiety	25
2. No significant impact	15

To fully comprehend the usefulness and influence of technology in language learning, it is essential to investigate how students perceive and interact with the use of digital tools with personalized feedback in drama-based speaking exercises for improving speaking abilities in EFL classes. Responses from forty students provide varied insights into the intricate environment of digital pedagogy in this study. These responses reveal varying viewpoints on the function of technology, feedback systems, levels of involvement, and lowering anxiety through conceptual categorization. By conducting an in-depth look at these subjects, we can learn important things about the benefits, drawbacks, and implications of using digital tools in language instruction. This investigation provides insight into the views of students toward technology-enhanced learning and offers useful advice for teachers who want to develop engaging and productive learning environments.

Forty students' responses indicate a range of viewpoints regarding the use of digital tools with personalized feedback in drama-based exercises to improve speaking abilities in EFL classes. The majority of students have positive opinions about digital tools and recognize the importance and efficiency of technology in raising student involvement and academic results. A smaller group, on the other hand, expresses neutral opinions, recognizing the advantages and disadvantages of digital tools.

On the other hand, a small percentage of students voice un-favourable opinions, expressing dissatisfaction with the application of technology in language acquisition.

In terms of feedback methods, students recognize the value of receiving personalized feedback through digital tools and generally find it useful in enhancing their speaking abilities. Some students, on the other hand, show disinterest toward feedback, seeing it as only another part of the learning process. Furthermore, some students indicate that they prefer more conventional verbal input, which emphasizes the significance of in-person engagement in giving insightful evaluation.

When it comes to involvement, most students say that using digital tools during drama events increases their level of participation. They take pleasure in the immersive and interactive aspects of experiences enhanced by technology. Some students report lower levels of interest, which could be the result of individual preferences or technical issues. Some students, however, indicate not seeing any change in their anxiety levels, indicating that reducing anxiety may rely on personal circumstances.

Finally, the majority of students adhere to teachers' optimistic perspective regarding the incorporation of digital resources into drama-based learning. They are aware of the potential advantages for improving classroom dynamics and student learning outcomes. Some students do, however, express anxieties or difficulties, such as problems with technology accessibility and implementation. All things considered, these results offer insightful information on how students view, feel about, and feel about using digital resources for language learning. In terms of lowering anxiety, utilizing digital tools during drama activities helps a lot of students feel less nervous about speaking English in front of their peers. They attribute the immersive and encouraging qualities of technology-enhanced experiences for the reduction in anxiety.

3.2 Discussion

There have been a lot of positive impacts from integrating digital technologies with drama-based pedagogy in EFL classes. The majority of students expressed gratitude for the dynamic learning environment facilitated by digital technologies while also feeling more engaged. The socio-cognitive theory, which emphasizes learning through social interaction, is fostered by this approach. Using technology, drama exercises provide students the chance to practice English in appropriate circumstances.

The decrease in speaking anxiety is an important discovery. Using digital tools assisted many students become less anxious about speaking English in front of their peers. Students were able to evaluate themselves and gain confidence with a chance to record and review performances. Personalized feedback delivered through online platforms also helped people become less anxious and become better to speak in public.

These results are supported by similar research. For instance, a study conducted in 2023 by (Chen et al., 2023) discovered that students' speaking skill increased and their anxiety decreased when they learned a language through the use of video recording and playback. An additional investigation conducted by Chaikovska et al., (2022) shown that the incorporation of technology into conventional language education techniques markedly improved learners' speaking and listening abilities. Additionally, students who participated in digital storytelling had increased confidence and improved speaking abilities, based on a study on the impact of employing educational technology tools to improve EFL students' speaking skills conducted by Asratie et al. (2023). The study found a statistically significant difference between the experimental and control groups' students' speaking proficiency. It follows that as compared to students who learnt traditional methods, those who learned using educational speaking technology performed better when speaking. Speaking with more fluency, coherence, and accuracy, as well as greater lexical richness and grammatical range usage and

pronunciation, were the most common traits of students who learnt using educational speaking technology.

In order to close this gap, this study looks at the lack of research on varied student groups and language skill levels. Even as some studies have produced encouraging results, they frequently fail to take into consideration the effects that these tools have on students from diverse backgrounds, with varying learning preferences, and at varying levels of skill. This study, which comprises a wide variety of university-level EFL students, offers insights into how customized feedback and digital tools can be made to fit the unique requirements of various learners.

Subsequent investigations ought to focus on investigating the long-term impacts of incorporating digital tools into drama-based instruction. A more thorough grasp of how to customize digital interventions may also be obtained by looking into the differing effects on various student populations and language competence levels. This study highlights both the promise and the areas that need further attention, adding to the increasing body of research supporting the deliberate incorporation of technology in language teaching.

4.Conclusion

This study shows that using digital tools together with drama-based pedagogy improves speaking abilities and decreases speaking anxiety in EFL classes. Students expressed gratitude for the individualised feedback they received from digital platforms, which helped them become more confident and proficient in language. They also reported feeling more engaged. The benefits of interactive and contextualised learning settings are highlighted by these findings, which provide support to the socio-cognitive theory. But the study also found disadvantages, including varying effects on student engagement and problems with technological access. Adequate accessibility, sufficient assistance, and training for educators and students are necessary to optimise the advantages of digital tools. Subsequent investigations ought be focused on the long-term impacts of digital integration and examine its influence on a variety of student characteristics.

References

[1] Abdullah, N., Syed Hassan, S. S., Abdelmagid, M., & Mat Ali, S. N. (2020). Learning from the Perspectives of Albert Bandura and Abdullah Nashih Ulwan: Implications Towards the 21st Century Education. *Dinamika Ilmu*, 199–218. https://doi.org/10.21093/di.v20i2.2423

[2] Alasmari, N., & Alshae'el, A. (2020a). The Effect of Using Drama in English Language Learning among Young Learners: A Case Study of 6th Grade Female Pupils in Sakaka City. *International Journal of Education and Literacy Studies*, *8*(1), 61. https://doi.org/10.7575/aiac.ijels.v.8n.1p.61

[3] Alasmari, N., & Alshae'el, A. (2020b). The Effect of Using Drama in English Language Learning among Young Learners: A Case Study of 6th Grade Female Pupils in Sakaka City. *International Journal of Education and Literacy Studies*, *8*(1), 61. https://doi.org/10.7575/aiac.ijels.v.8n.1p.61

[4] Andersen, J. (2020). Understanding the artistry of actors who create theatre with and for children. *Research in Drama Education*, *25*(4), 484–497. https://doi.org/10.1080/13569783.2020.1779586

[5] Antón, M., & Dicamilla, F. (1998). *Socio-cognitive Functions of L1 Collaborative Interaction in the L2 Classroom*.

[6] Asratie, M. G., Wale, B. D., & Aylet, Y. T. (2023). Effects of using educational technology tools to enhance EFL students' speaking performance. *Education and Information Technologies*, *28*(8), 10031–10051. https://doi.org/10.1007/s10639-022-11562-y

[7] Bora, S. F. (2022). Drama pedagogy in foreign language learning: investigating the impact of theatre texts and theatre performance on L2 speaking accuracy and complexity. *Research in Drama Education*, *0*(0), 1–17. https://doi.org/10.1080/13569783.2021.2019578

[8] Bsharat, T. R. K., & Barahmeh, M. Y. (2020). A new decade for social changes The Influence of Applying Educational Active Drama in enhancing speaking skills in Teaching-learning English Language: A Theoretical Perspective. *Technium Social Sciences Journal*, *14*, 1–24. www.techniumscience.com

[9] Bsharat, T. R. K., & Behak, F. (2021). The Insights of Using Creative Drama in Learning Speaking Skills for the 7th graders in Jenin city: A case study. *Ilkogretim Online*, *20*(5), 37–51. https://doi.org/10.17051/ilkonline.2021.05.04

[10] Chaikovska, O., Semenyshyna, I., Muliarchuk, O., & Koval, I. (2022). IMPACT OF TECHNOLOGY ON SPEAKING AND WRITING SKILLS OF MASTERS IN ENGINEERING ESP LEARNING. *Engineering for Rural Development*, *21*, 878–883. https://doi.org/10.22616/ERDev.2022.21.TF274

[11] Chen, C. Y., Chang, S. C., Hwang, G. J., & Zou, D. (2023). Facilitating EFL learners' active behaviors in speaking: a progressive question prompt-based peer-tutoring approach with VR contexts. *Interactive Learning Environments*, *31*(4), 2268–2287. https://doi.org/10.1080/10494820.2021.1878232

[12] Cheng, A. Y. M., & Winston, J. (2011). Shakespeare as a second language: Playfulness, power and pedagogy in the ESL classroom. *Research in Drama Education*, *16*(4), 541–556. https://doi.org/10.1080/13569783.2011.617101

[13] Delgado, A. J., Wardlow, L., Mcknight, K., & Malley, K. (2015). Educational technology: A review of the integration, resources, and effectiveness of technology in K-12 classrooms. In *Journal of Information Technology Educa-tion: Research* (Vol. 14). http://www.jite.org/documents/Vol14/JITEv14ResearchP397-416Delgado1829.pdf

[14] Fletcher-Watson, B. (2016). Learning though theatre: the changing face of Theatre in Education; Theatre in Education in Britain: origin, development and influence. *Research in Drama Education: The Journal of Applied Theatre and Performance*, *21*(4), 590–592. https://doi.org/10.1080/13569783.2016.1228451

[15] Frydman, J. S., & Mayor, C. (2024). A Scoping Review on the Use and Potential of School-Based Drama Therapy to Enhance Socio-emotional Skills in Early Childhood. In *Early Childhood Education Journal* (Vol. 52, Issue 4, pp. 669–680). Springer Science and Business Media B.V. https://doi.org/10.1007/s10643-023-01471-1

[16] Gadille, M., Corvasce, C., & Impedovo, M. (2023). Material and Socio-Cognitive Effects of Immersive Virtual Reality in a French Secondary School: Conditions for Innovation. *Education Sciences*, *13*(3). https://doi.org/10.3390/educsci13030251

[17] Göktürk, Ö., Çalışkan, M., & Öztürk, M. S. (2020). THE EFFECTS OF CREATIVE DRAMA ACTIVITIES ON DEVELOPING ENGLISH SPEAKING SKILLS 1. In *JIBA) / Araştırma Temelli Etkinlik Dergisi (ATED)* (Vol. 10, Issue 1). https://orcid.org/0000-0002-2341-0710

[18] Gural, S. K., & Shulgina, E. M. (2015). Socio-Cognitive Aspects in Teaching Foreign Language Discourse to University Students. *Procedia - Social and Behavioral Sciences*, *200*, 3–10. https://doi.org/10.1016/j.sbspro.2015.08.002

[19] Hendrix, R., Eick, C., & Shannon, D. (2012). The Integration of Creative Drama in an Inquiry-Based Elementary Program: The Effect on Student Attitude and Conceptual Learning. *Journal of Science Teacher Education*, *23*(7), 823–846. https://doi.org/10.1007/s10972-012-9292-1

[20] Hulse, B., & Owens, A. (2019). Process drama as a tool for teaching modern languages: supporting the development of creativity and innovation in early professional practice. *Innovation in Language Learning and Teaching*, *13*(1), 17–30. https://doi.org/10.1080/17501229.2017.1281928

[21] Irshad, S., Maan, M. F., Batool, H., & Hanif, A. (n.d.). *Vygotsky's Zone of Proximal Development (ZPD): An Evaluative Tool for Language Learning and Social Development in Early Childhood Education*. *7*(6), 2021. https://doi.org/10.5281/zenodo.4940172

[22] Irugalbandara, A. I. (2020). *Investigation of the development of creative thinking and adaptability skills through process drama techniques in junior secondary school students in Sri Lanka* [Queensland University of Technology]. https://doi.org/10.5204/thesis.eprints.203805

[23] Irugalbandara, A. I. (2021a). The potential of Zoom technology for enabling creativity in the drama classroom through peer-assisted learning and group collaboration in pre service teacher education. *NJ*, *45*(2), 144–159. https://doi.org/10.1080/14452294.2021.2013630

[24] Irugalbandara, A. I. (2021b). The potential of Zoom technology for enabling creativity in the drama classroom through peer-assisted learning and group collaboration in pre service teacher education. *NJ*, *45*(2), 144–159. https://doi.org/10.1080/14452294.2021.2013630

[25] Ji, H., Han, I., & Ko, Y. (2023). A systematic review of conversational AI in language education: focusing on the collaboration with human teachers. In *Journal of Research on Technology in Education* (Vol. 55, Issue 1, pp. 48–63). Routledge. https://doi.org/10.1080/15391523.2022.2142873

[26] Kalidas, C. S. (2014). Drama: A Tool for Learning. *Procedia - Social and Behavioral Sciences*, *123*, 444–449. https://doi.org/10.1016/j.sbspro.2014.01.1443

[27] Kessler, G. (2018). Technology and the future of language teaching. *Foreign Language Annals*, *51*(1), 205–218. https://doi.org/10.1111/flan.12318

[28] Koushki, A. L. (2019). Engaging English learners through literature, fairy tales, and drama. *International Journal of Applied Linguistics and English Literature*, *8*(2), 138–144.

[29] Kovač, G., Portelas, R., Hofmann, K., & Oudeyer, P.-Y. (2021). *SocialAI: Benchmarking Socio-Cognitive Abilities in Deep Reinforcement Learning Agents*. http://arxiv.org/abs/2107.00956

[30] Ma, L., & Subbiondo, J. L. (2022). Integral Drama Based Pedagogy as a Practice of Integral Education: Facilitating the Journey of Personal Transformation. In *Beijing International Review of Education* (Vol. 3, Issue 4, pp. 499–515). Brill Academic Publishers. https://doi.org/10.1163/25902539-03040001

[31] Mackey, S. (2016). Applied theatre and practice as research: polyphonic conversations. *Research in Drama Education*, *21*(4), 478–491. https://doi.org/10.1080/13569783.2016.1220250

[32] Mancini, V. (2018). *Dance / Movement and Drama Therapy Methods to Assess Resistance in Adolescents with Low Sense of Identity and Self-Esteem : Development of a Method*.

[33] Mandasari, B., Aminatun, D., & Id, D. A. (n.d.). *Improving Students' Speaking Performance Through Vlog*.

[34] Marques, W. B. dos S. K., Caldas, V. O., & Oliveira Neto, F. M. de. (2024). Foreign language teaching methods. In *Navigating through the knowledge of education*. Seven Editora. https://doi.org/10.56238/sevened2024.002-015

[35] Mohammad Zyoud, M. (2010). *Using Drama Activities and Techniques to Foster Teaching English as a Foreign Language: a Theoretical Perspective Strategies used by in-service EFL teachers when teaching English for Palestine Curriculum Case Study of Teacher Education Improvement Project View project*. https://www.researchgate.net/publication/297013590

[36] Nabavi, R. T., & Bijandi, M. S. (2012). *Bandura's Social Learning Theory & Social Cognitive Learning Theory Title: Bandura's Social Learning Theory & Social Cognitive Learning Theory*. https://www.researchgate.net/publication/267750204

[37] Nguyen, C. T. (2023). Effects of Applying Drama-Based Activities in Speaking Classes on EFL Students' Speaking Performance. *International Journal of Instruction*, *16*(3), 991–1012. https://doi.org/10.29333/iji.2023.16353a

[38] Nicholson, H. (2014). Theatre and joyful encounters. *Research in Drama Education*, *19*(4), 337–339. https://doi.org/10.1080/13569783.2014.954810

[39] Piriyaphokanont, P., & Sriswasdi, S. (2022). Using Technology and Drama in Education to Enhance the Learning Process: A Conceptual Overview. *International Journal of Information and Education Technology*, *12*(7), 678–684. https://doi.org/10.18178/ijiet.2022.12.7.1670

[40] Pishkar, K., Moinzadeh, A., & Dabaghi, A. (2017). Modern English Drama and the Students' Fluency and Accuracy of Speaking. *English Language Teaching*, *10*(8), 69. https://doi.org/10.5539/elt.v10n8p69

[41] Planchat, J. (1994). *The Usefulness of Educational Drama as a Means of Improving the Communicative Competence of Early French Immersion Students; a pilot study conducted at the third grade two level in St.John's, Newfoundland*.

[42] Poluektova, O., & Smith, C. A. (2020). *SELF-EFFICACY & COPING POTENTIAL 1 Using Bandura's Self-Efficacy Theory to Explain Individual Differences in the Appraisal of Problem-Focused Coping Potential*.

[43] Ronke, A. (2005). *Wozu all das Theater? Drama and Theater as a Method for Foreign Language Teaching and Learning in Higher Education in the United States*. 328. https://depositonce.tu-berlin.de/bitstream/11303/1448/1/Dokument_8.pdf

[44] Sadia, S., Nadeem, R. U., & Sallahddin, A. (2021). *Journal of Arts and Social Sciences Analyzing the Role of Contemporary Teaching Techniques and Importance of Drama in Learning English as a Foreign Language*. https://ojs.jass.pk

[45] Sarem, S. N., Ashok, A., & Priya, A. (2018). *Drama-in-education and its effectiveness in English second/foreign language classess*.

[46] Silva, J. E., Ferreira, P., Coimbra, J. L., & Menezes, I. (2017). Theater and Psychological Development: Assessing Socio-Cognitive Complexity in the Domain of Theater. *Creativity Research Journal*, *29*(2), 157–166. https://doi.org/10.1080/10400419.2017.1302778

[47] Verhoeff, R. P. (2017). The Use of Drama in Socio-Scientific Inquiry-Based Learning. In *Contributions from Science Education Research* (Vol. 3, pp. 117–126). Springer Science and Business Media B.V. https://doi.org/10.1007/978-3-319-58685-4_9

[48] Wang, F., & Michael, J. (2011). *Environments Technology-Enhanced Learning*. *53*(4), 5–23.

[49] Wu, J. R. W. (2016). A socio-cognitive approach to assessing speaking and writing: the GEPT experience. *JLTA Journal*.

[50] Xi, J., & Lantolf, J. P. (2021). Scaffolding and the zone of proximal development: A problematic relationship. *Journal for the Theory of Social Behaviour*, *51*(1), 25–48. https://doi.org/10.1111/jtsb.12260

[51] Zaretsky, V. K. (2021). One More Time on the Zone of Proximal Development. *Cultural-Historical Psychology*, *17*(2), 37–49. https://doi.org/10.17759/chp.2021170204

Teacher's Implementation of Adaptive Learning Technology for Teaching Speaking in "Jago Bahasa English Course"

Ma'rifatul Halimatus Sa'diyah[1], Yuyun Yulia[2]

[1] English Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] English Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: [1] marifatulhalimatus.2023@student.uny.ac.id
            [2] yuyunyulia@uny.ac.id

Abstract. This research explores the implementation of adaptive learning technologies (ALT) by teachers to enhance students' speaking skills. This research employs a qualitative methodology, focusing on how instructors use ALT in teaching speaking and the challenges they face. This research conducted from March to May 2024. Data collection involved observations, interviews, and documentation of English instructors and students from an advance-level program. Data show ALT offers personalized learning experiences and boosts student engagement through multimedia and gamification. However, challenges such as the need for comprehensive teacher training as well as technical issues (unstable internet signals). These challenges are crucial to address for successful implementation. The research underscores the importance of creating an interactive and flexible learning environment, utilizing speech recognition software and AI-driven platforms for real-time feedback and personalized learning paths to improve students' speaking skills and preparing them for communication in a globalized world.

1. Introduction

For many years, the application of information and communication technology (ICT) in education has completely changed the way that people learn and teach (Yilan & Koruyan, 2020). Technology has played a pivotal role in the establishment of a new managerialist and corporatist concept that emphasizes ongoing access to information and learning (Zou & Thomas, 2020). One kind of educational technology called adaptive learning technology (ALT) uses data and algorithms to generate customized learning experiences for each learner (Thi Thanh Ha et al., 2023). ALT aims to give each student a customized learning experience based on their unique requirements. Based on the student's success, it can modify the instruction's content, pace, and degree of difficulty to ensure they are challenged but not overburdened (Ramadhan, 2022). The degree of technology integration in the curriculum and its success have also been found to be significantly influenced by instructors' opinions regarding its use in language classrooms (Al-Mahrooqi & Troudi, 2014).

Unquestionably, adaptive learning technologies have transformed how we search for information, interact with one another, and conduct ourselves, making them an integral component of our daily lives (Delgado et al., 2020). Moreover, we live in the digital era of 4.0. To supply learning content rapidly and massively, the digital revolution has brought about a new trend in the provision of learning resources, which are administered by an online computer system (Rikfanto, 2022). Technology assistance in delivering educational materials is now simple, engaging, and dynamic (Yavani, 2019). Technology usage is now a crucial component of education both inside and outside of the classroom. Most language classes use technology in some situations, such as learning English (Ahmadi, 2018).

Teaching English can be offline and online. When a class is online, the learning environment must be modified by the instructor and the students. Online classes provide several advantages over traditional classroom settings, such as the availability of an infinite number of synchronous or asynchronous resources that can be used for teaching and learning. (Yavani, 2019). Therefore, the Internet and technology have made it possible to develop some learning aids. With the use of these tools, educators can set up an online learning environment in which their pupils can engage. Extending pupils' exposure across time and location is something we never considered before.

In Indonesia, English is taught as a foreign language and occasionally as a second language. But to truly understand English, one must become proficient in its four main language skills: speaking, writing, listening, and reading (Ali Hashim, 2022). Integrating technology into English instruction is crucial, especially for teaching speaking skills. Effective communication and language assessment rely on researching speaking partners (Negara et al., 2021). There have been recommendations made for integrating technology into speaking instruction. Speaking is a form of interpersonal communication that involves applying words vocally (Sahalia et al., 2018). In general, speaking is the act of using spoken language to convey to others one's intentions (thoughts, ideas, contents) in a way that makes those intentions understandable (Endah Kusmartini, 2020). Speaking is the practice of using both verbal and nonverbal cues to create and transmit meaning in a variety of contexts. Speaking is intended to help students become better communicators and able to explain themselves in any situation (Yulfi & Syaprizal, 2020).

In a previous study, Thi Thanh Ha et al., 2023 proposed students' perspectives on using Adaptive Learning Technology (ALT) in writing classes in higher education. Mohamed et al., 2018 stated that EFL students' writing skills improved because of the adaptive online learning environment, and they thought the platform was useful for studying and communicating with the teacher and other students. Adaptive learning has the potential to outperform conventional curricular strategies (Alrawashdeh et al., 2024). The influence of adaptive learning on students' reading achievement is not conclusively assessed in the literature on its efficacy. However, the focus of earlier studies has not always been explicitly tied to the context of learning speaking skill at an advance level, and they have not clearly shown how best to adjust learning resources to enhance speaking abilities. Therefore, new research is essential to fill the gap left by previous research and offer practical answers. This study's primary goal is to provide answers to the following questions: (1) How is the teacher's implementation of adaptive learning technology for teaching speaking, and (2) what are the challenge in the implementing adaptive learning technology for teaching speaking? in one of the online English courses named *"Jago Bahasa English Course"*.

2. Research Method

This research was qualitative research aiming at exploring the use of adaptive learning technology in EFL Education. This research used narrative inquiry research on the use of adaptive learning technology for EFL education, especially for instructors and students. A study method known as narrative inquiry examines a phenomenon by exploring the stories and personal experiences of individuals who have lived through it to understand its deeper meanings (Clandinin, 2006). Although there are many ways to perform narrative inquiry research, they all share common traits, including the importance of the participant-researcher relationship and the use of detailed storytelling and reflective interviews (Dodgson, 2023). To sum up, narrative inquiry provides a rich methodological framework that enables researchers in a variety of fields to investigate and comprehend the complexities of human experience through the narratives of those involved.

The author conducted a qualitative study to investigate how teachers are using adaptive learning technologies to teach speaking. This study was set in the *"Jago Bahasa English Course"*. It was conducted from March 2024 to May 2024. The research subject consisted of students and English instructors in the institutions. A class of an advance level is selected as the subject of this research. Data were obtained by means of observation, interviews, and documentation.

3.Research Findings

After analyzing the data, the researcher finds are explained in the following paragraphs.

3.1 The Teacher's Implementation of ALT

The use of adaptive learning technologies (ALT) in language education represents a pivotal shift towards more dynamic and personalized educational experiences. In the context of the *"Jago Bahasa English Course"*, these technologies are effectively harnessed to optimize learning outcomes and adapt to the varied needs of students. This research provides a systematic approach to incorporating various online platforms and tools in teaching, which underscores the multifaceted roles of ALT in enhancing the instructional process and student engagement.

Firstly, the use of online English applications such as the British Council, Oxford Dictionary, YouTube, and Duolingo for material preparation illustrates ALT's role in resource accessibility. These platforms provide a rich repository of content that is both authoritative and engaging, offering diverse learning modalities from text and video to interactive activities. This variety not only caters to different learning styles but also enriches the curriculum with up-to-date linguistic resources. For instance, Duolingo offers gamified language learning that can significantly boost students' motivation and retention of language skills. Prior to the class, the distribution of meeting links via the Telegram group is an excellent example of using ALT for organizational efficiency. This method ensures that students are well-prepared and can access the learning session without technical hindrances. It highlights the administrative benefits of ALT, facilitating smoother communication between teachers and students, which is crucial in maintaining the structure and flow of online classes.

During live sessions conducted on Google Meet, features such as whiteboarding, hand-raising, and reactions enhance interactivity and mimic a traditional classroom environment. These tools enable real-time engagement and feedback, crucial for language practice where immediacy in correcting speech errors can significantly impact learning. Additionally, the capability to save materials on Google Documents that students can access anytime supports asynchronous learning, allowing students to learn at their own pace and revisit materials as needed. The integration of multimedia, such as showing videos on YouTube and engaging students with quizzes on Kahoot, underscores ALT's role in making learning more enjoyable and diverse. These activities not only break the monotony of conventional lectures but also cater to multimodal learning preferences, enhancing cognitive engagement. Moreover, multimedia resources expose students to different accents, cultural contexts, and real-life language usage, crucial for developing practical communication skills.

The assignment submission process, where students upload their work to Google Drive or post it on social media platforms like Instagram and tag the course accounts, illustrates ALT's role in creating a community of learning. This method leverages social media's widespread use among students to enhance visibility and peer interaction, fostering a sense of community and collaborative learning. Moreover, it provides a platform for informal feedback from peers, enriching the learning experience with diverse perspectives. Finally, the use of the AppSheet application for tracking student achievements highlights the evaluative capabilities of ALT. By digitally tracking progress, instructors can provide personalized feedback and adapt instructional strategies to meet individual student needs more effectively.

In conclusion, The *"Jago Bahasa English Course"* adeptly incorporates adaptive learning technologies, employing a variety of online platforms to revolutionize language education. This approach not only fosters a more engaging and interactive learning environment but also provides unprecedented flexibility in how education is delivered. By utilizing these technologies, teachers transform into facilitators and motivators, roles that are essential in the digital age for effective language acquisition. The strategic use of these tools enhances both the teaching and learning experiences,

making education more accessible and adaptable. Ultimately, this method exemplifies how digital innovations can significantly enrich educational methodologies in language learning.

3.2 Challenges in ALT

Besides, the research analyzed teachers' challenges in implementing adaptive learning technology for teaching speaking. It seeks to identify the main difficulties that teachers face when using adaptive learning technology and how these challenges may impact their learning outcomes. The items addressed several aspects including technical issues and training and guidance. Firstly, it is about technical issues (signal). Tutors found that assigning proficient students as helpers improved students' technology knowledge, saved teachers time, and reduced workload, thereby alleviating multiple student issues simultaneously.

One of the foremost technical challenges in the implementation of adaptive learning technologies is ensuring a stable and robust signal. In the *"Jago Bahasa English Course"*, where the nuance of pronunciation and intonation is crucial, persistent signal issues can severely impede effective teaching and learning. Signal disruptions can degrade the quality of audio and video feeds, which are essential for conveying the subtleties of spoken English. Such interruptions not only hinder the teacher's ability to deliver lessons effectively but also affect students' ability to engage with the content. Regular disruptions can lead to a loss of continuity in learning, critical for language acquisition, where repeated practice and exposure are key. For instance, during a live interactive session in *"Jago Bahasa English Course"*, a teacher might use real-time feedback mechanisms to correct students' pronunciation. However, with poor signal quality, the immediate feedback becomes delayed or unintelligible, reducing the lesson's effectiveness and potentially leading to student frustration and disengagement. Such examples underscore the need for reliable technological infrastructures in online language education.

The second challenge is the need for training and guidance on operating online media platforms. Survey results indicate that tutors often encounter technical issues and lack training opportunities when using applications like google meet, google docs, British council resources, and quizzes. Effective implementation of adaptive learning technologies requires comprehensive training for teachers, covering both technical aspects and pedagogical strategies. This training ensures teachers can fully utilize the technology, integrating it seamlessly into their teaching methods to enhance learning experiences. Without proper training, teachers may feel overwhelmed and underuse the technology, resulting in a less effective learning environment. An example of this challenge can be seen in the *"Jago Bahasa English Course"*. If the tutors are only given a basic tutorial on how to use the platform without detailed guidance on leveraging its adaptive features, they might not use the tools to their full potential. This situation could lead to a standardization of lessons that fails to meet the varied needs of learners, thereby not fully capitalizing on the technology's capabilities to adapt content according to individual proficiency.

The effective use of adaptive learning technologies in teaching speaking skills in online English courses presents numerous challenges, particularly concerning technical signal issues and the need for comprehensive teacher training. Alkan & Bümen, 2020 states that teaching speaking skills online presents challenges, especially related to technical aspects. Ensuring audio and video functionality, navigation, and familiarity with chat boxes are crucial for successful online language classes. Addressing these challenges is paramount for realizing the full potential of these technologies. By investing in robust technological infrastructure and continuous teacher development, educational institutions can enhance the quality of language education, thereby equipping students with the skills necessary to thrive in a globalized world.

4. Conclusion

In conclusion, the implementation of adaptive learning technologies (ALT) in the Jago Bahasa English Course has proven transformative, facilitating a dynamic and engaging educational environment. Teachers, by harnessing these digital tools, effectively transition into roles as facilitators and motivators, thereby enhancing the learning experience and outcomes for students. However, they also face significant challenges. One major hurdle is technical issues, such as unstable internet connections, which can severely impact the quality and effectiveness of teaching and disrupt the learning process. Additionally, there is a pressing need for comprehensive training to ensure that teachers can utilize these technologies to their full potential. Addressing these challenges is crucial for maximizing the benefits of adaptive learning technologies in language education.

References

[1]   Ahmadi, Dr. M. R. (2018). The Use of Technology in English Language Learning: A Literature Review. *International Journal of Research in English Education*, *3*(2), 115–125. https://doi.org/10.29252/ijree.3.2.115

[2]   Ali Hashim. (2022). The Importance of the Four English Language Skills: Reading, Writing, Speaking, and Listening in Teaching Iraqi Learners. *Humanitarian and Natural Sciences Journal*, *3*(2). https://doi.org/10.53796/hnsj3210

[3]   Alkan, H., & Bümen, N. T. (2020). An action research on developing English speaking skills through asynchronous online learning. *International Journal of Curriculum and Instruction*, *12*(2), 127–148. https://orcid.org/0000-0003-1891-6589

[4]   Al-Mahrooqi, R., & Troudi, S. (2014). *Using Technology in Foreign Language Teaching*.

[5]   Alrawashdeh, G. S., Fyffe, S., Azevedo, R. F. L., & Castillo, N. M. (2024). Exploring the impact of personalized and adaptive learning technologies on reading literacy: A global meta-analysis. *Educational Research Review*, *42*. https://doi.org/10.1016/j.edurev.2023.100587

[6]   Clandinin, D. J. (2006). Narrative Inquiry: A Methodology for Studying Lived Experience. *Research Studies in Music Education*, *27*(1), 44–54. https://doi.org/10.1177/1321103X060270010301

[7]   Delgado, H. O. K., de Azevedo Fay, A., Sebastiany, M. J., & Silva, A. D. C. (2020). Artificial intelligence adaptive learning tools: the teaching of English in focus. *Brazilian English Language Teaching Journal*, *11*(2). https://doi.org/10.15448/2178-3640.2020.2.38749

[8]   Dodgson, J. E. (2023). Phenomenology: Researching the Lived Experience. *Journal of Human Lactation*, *39*(3), 385–396. https://doi.org/10.1177/08903344231176453

[9]   Endah Kusmartini, S. (2020). *The Development of Teaching Material Speaking 2 Based on Communicative Approach*.

[10] Mohamed, R., El-Ghool, A., Hamadtoh, R., & Al-Ghait Gohar, A. (2018). *Designing an Adaptive Learning Environment to Improve Writing Skills and Usability for EFL Students at the Faculty of Education*.

[11] Negara, I. M., Literature, E., Program, S., Bahasa, S. T., & Pontianak, A. (2021). Why use Roleplay Method in Teaching Speaking? *Jurnal Ilmiah STBA*, *7*(1).

[12] Ramadhan, C. (2022). The Analysis of Digital Learning Platforms Use in EFL Learning. *Jurnal Literasi Digital*, *2*(2), 139–144. https://doi.org/10.54065/jld.2.2.2022.230

[13] Rikfanto, A. (2022). Adaptive Learning for Improving German-Speaking Skills in the Digital Age. *Jurnal Pendidikan Bahasa Asing Dan Sastra*, *6*(1). https://ojs.unm.ac.id/eralingua

[14] Sahalia, F., Asrori, M., & Sarosa, T. (2018). Improving Students' Speaking Skill by Implementing Student Teams Achievement Division. *English Education Journal*.

[15] Thi Thanh Ha, N., Thi Thanh Huyen, H., Khai, M., Ba Trung, H., & Noi, H. (2023). Exploring The Use of Adaptive Learning Technology in Higher Education Writing Classes: Students' Perspective. *VNU Journal of Foreign Studies*, *39*(4).

[16] Yavani, Z. (2019). Pedagogical Action and Technologies during Online Learning: A Case Study. *ELT- Echo*, *4*(1).

[17] Yilan, S. M., & Koruyan, K. (2020). *ICT-Based Assessment, Methods, and Programs in Tertiary Education A volume in the Advances in Educational Technologies and Instructional Design (AETID) Book Series*. http://www.igi-global.com

[18] Yulfi, Y., & Syaprizal, S. (2020). Developing Suplementry Speaking Material in Digital Media. *Linguistic, English Education and Art (LEEA) Journal*, *4*(1), 150–160. https://doi.org/10.31539/leea.v4i1.1620

[19] Zou, B., & Thomas, M. (2020). *Recent Developments in Technology-Enhanced and Computer-Assisted Language Learning A volume in the Advances in Educational Technologies and Instructional Design (AETID) Book Series*. http://www.igi-global.com

Using Online Learning Websites as a Tool in Teaching Reading for Secondary Students

Muhammad Arsyad

English Language Education Departement, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: maulanaarsyad680@gmail.com

Abstract. The rapid growth of technology in education has significantly influenced learning methods, addressing issues such as low student engagement and limited access to diverse resources. One of the English skills that is very concerning is reading skills where students' interest in reading is still relatively low. This paper aims to demonstrate the effectiveness of online websites as tools for enhancing reading skills and enriching the learning experience. By providing real-time feedback, fostering phonological awareness, and incorporating interactive and critical thinking dimensions, online websites can significantly improve reading skills. This paper deals with literature review on teaching reading to secondary students using online websites, discussing their importance in the educational process and exploring some practical implications and examples of online websites that could be used. Additionally, this paper addresses the challenges teachers face when utilizing online websites for teaching reading in secondary education. By utilizing these technological tools, teachers can significantly improve students' interest and proficiency in reading.

1. Introduction

In the 21st century, there have been considerable developments in the fields of computer technology, the internet, and online communication that have gradually transformed and influenced human communication patterns, work activities, and learning processes [1] the COVID-19 pandemic era in particular, there has been a significant increase in the use of technology in the education sector in response to social distancing and distance learning. Numerous researches have revealed the use of mobile devices as a support tool for educational purposes. [2] revealed that the use of mobile devices is more widely used than traditional methods. The effective and successful use of technology increases greater interest and motivation in learning activities in reading skills [3].

Mastering reading skills is very important for EFL learners because it plays an important role in the communication process. Reading is the main key to acquiring language that is easy to understand. Reading as a receptive skill involves the ability to understand and interpret written language [4]. This skill includes the process of receiving information through written text, comprehending it, and extracting meaning from it. Extensive reading, which involves reading a wide variety of materials on a variety of topics and genres, is a powerful strategy for acquiring information and enriching one's understanding [5]. Through this process, individuals will discover diverse perspectives, concepts, and ideas, thereby broadening their cognitive horizons and increasing their knowledge base. Students who engage in reading activities show better learning outcomes compared to students who only focus on completing practical activities [6].

Teaching reading to secondary students in Indonesia can be tough because many of them do not feel motivated, have little prior knowledge, and know few English words [7]. These problems make it

hard for them to understand what they read. Students often find reading boring and unimportant, with many other distractions around them [8]. Without enough background knowledge, they struggle to link new information to what they already know, making it harder to understand texts. A limited vocabulary means they are unable to grasp the full meaning of more difficult passages [9], [10]. to address the issue, teachers need to find ways to make reading interesting, build their basic knowledge, and teach them more words using a variety of engaging reading materials.

This paper is divided into four parts. The first part deals with a literature review of teaching reading for secondary students using online websites. The second part discusses the importance of using online websites in teaching reading and what ways using them is helpful. The third part investigates the practical implications of using an online website to teach reading including the implementation of an online website and some examples of online websites that could be used to teach reading for secondary students. The fourth part examines challenges teachers face when teaching reading using online websites for secondary students.

2. Literature Review

Reading comprehension consists of three key components: process strategies, prior knowledge, and conceptual abilities [11]. Process strategies involve word recognition and are crucial for beginner readers, who spend most of their effort decoding words and understanding basic sentence structures. As readers become more skilled, they shift focus toward utilizing their prior knowledge and abstract conceptual skills [12]. This advanced stage allows them to efficiently integrate their existing knowledge with new information, making predictions and inferences about the text. [13] supported this view, noted that skilled readers use their conceptual abilities to grasp deeper meanings that improve their overall comprehension. Thus, the transition from their focus on word recognition to utilizing prior knowledge and conceptual abilities became a sign of their progression from beginner to advanced reading comprehension.

Several factors influence Indonesian students' reading comprehension including motivation, vocabulary knowledge, and strategy use [7]. The students typically show little interest in reading and analyzing English texts because it is not a regular part of their daily activities. [14] suggested that this decline in interest derived from students' study habits, which noted that they only engaged with English texts when assigned by the teacher. As a result, students become disinterested in further reading comprehension tasks. Supporting this view, Guthrie (2008) as cited [15] observed that comprehension issues arise when students lose interest and become disengaged from reading.

[16] stated that the type of reading materials students engage with positively influences their comprehension skills. Variability in students' attitudes toward reading as noted by [17] suggested that individual differences play a significant role in reading engagement and subsequent comprehension. [18] emphasized that access to reading materials both at home and in school, along with a student's inherent curiosity, significantly enhances their comprehension abilities. Furthermore, educational researchers, have highlighted the critical role of teachers' behavior in fostering student motivation, underscoring the diverse approaches needed to effectively support reading development [19].

3. Method

This study is categorized as a literature review, which involves examining previous research and theories related to the topic under investigation. The references gathered through this method provide the essential foundation and primary tools for conducting field research. According to [20] a literature review summarizes information from articles, journals, books, and other documents. Additionally, [20] explained that a literature review is a method for collecting data and sources from existing studies. Therefore, the research examines several existing literature reviews and critically analyzes various

academic studies and works. These sources were sourced from a range of outlets, including academic journals and books. The chosen literature was thoroughly discussed and evaluated to extract pertinent information. This information and evidence serve as the foundation for constructing robust arguments within the study.

4. Findings

4.1. The Importance of Using an Online Website For Teaching Reading

Incorporating online websites into the reading classroom is pivotal in fostering students' comprehension abilities. Online websites make it easy for students to get feedback quickly. The website can respond immediately when students submit their work or answer questions online. This immediate feedback helps students understand their mistakes and learn from them faster. It also allows students to improve their work on the spot, rather than waiting a long time. Quick feedback keeps students motivated and engaged, as they can see their progress instantly. [21] they argued that the effect of feedback on students' reading learning is very influential. So, feedback is emphasized for teachers to use online websites in reading learning in the classroom.

According to [22] utilizing web-delivered applications can significantly improve phonological awareness and reading speed among students with reading difficulties. These websites offer exercises and activities specifically designed to target specific areas of difficulty, such as phonemic comprehension, reading ability, and fluency. By practicing on these websites, students can work on their weak points in a targeted way. This specialized approach helps them make significant progress and become better readers.

The utilization of an online website introduces an interactive dimension to learning, offering diverse resources and activities that cater to various learning styles and preferences [23]. Through these websites, teachers can employ multimedia elements such as videos, animations, and interactive quizzes to elucidate concepts in complex materials and captivate students' attention. Besides that, online websites can help students develop critical thinking by providing access to diverse information and perspectives [24]. Students can compare different sources, analyze arguments, and form their own opinions. Interactive activities and discussions on these websites encourage questioning and problem-solving. These activities can improve their ability to think independently and make the most effective choices.

According to [25] introducing online-based learning through websites has emerged as a transformative approach in education, consistently delivering positive results across various performance indicators. [26] stated that integrating of online website into instructional practices correlates with notable improvements in student responses, academic performance, and overall attitudes toward learning innovation.

4.2. The Implementation of Teaching Reading Using Online Website

Teaching secondary students how to use online websites in the classroom involves a step-by-step approach that combines instruction and hands-on practice. Start by introducing the website and explaining its purpose, showing students how it connects to the lesson goals and the specific skills they need to develop. Demonstrate the key features of the website by giving a guided tour, pointing out important sections, interactive elements, and how to find useful resources. The teachers can use digital texts with interactive features, such as annotations, clickable definitions, and embedded quizzes, to engage students more deeply and help students check their understanding as they read. Teachers also can integrate multimedia elements like videos, audio recordings, and animations related to the reading material can make complex concepts more accessible and memorable. Furthermore, gamification elements like reading challenges, badges, and leaderboards can motivate students to engage with the material actively, making the learning process enjoyable and competitive [27].

After the demonstration, let students explore the website on their own or in small groups, giving them specific tasks or goals to help them stay focused. Walk around the classroom to offer help, answer questions, and make sure everyone is on track. Encourage students to write down notes on what features they found helpful or any problems they faced. Finish the session with a class discussion, where students can share their experiences and what they learned. This reflection helps reinforce their understanding and provides you with feedback to make future lessons better. By combining clear instructions with practical activities, you can effectively teach secondary students how to use online websites in the classroom.

4.3. Five Reading Websites That Can be Used in Teaching Reading

The first website for teaching reading is '*Reading Rockets'*. Teachers can use Reading Rockets in the classroom to find strategies and lesson plans for teaching reading. The teacher can start class with a strategy from the website, such as how to make predictions while reading. Teachers also can use the videos to show students different reading techniques. Reading Rockets provides guides that help teachers explain difficult concepts and improve reading comprehension. this website can help students learn new reading strategies that make reading easier and more enjoyable. The videos and guides help the students break down complex ideas into simple steps to improve their understanding and make them more confident readers.

'*Starfall'* is another website that can be used in teaching reading. Although Starfall is primarily for younger students, it can be used with secondary students who need extra help with basic reading skills. Teachers can use the phonics and vocabulary activities during remediation sessions. Using Starfall helps students who have fallen behind in reading by engagingly reinforcing basic skills.

The third website is '*Raz-Kids'* where teachers can set up classrooms in Raz-Kids and distribute books according to each student's reading level. During independent reading time, students can read the eBooks provided. After reading, students can take a quiz to gauge their understanding. Teachers can monitor progress and adjust students' reading levels as needed. using this website helps students to improve without feeling frustrated.

'*ReadWorks'* is the fourth example of using a website for teaching reading. Teachers can use ReadWorks to provide readings that match the topic of the lesson being studied. Teachers can also use various questions to test students' understanding contained in each reading text. During class, teachers can discuss the readings and answers with students, helping them to think critically about the subject matter. The comprehension questions help students think more deeply about the text and can improve their critical thinking skills.

The last website to be discussed is called '*Epic'*. On this website, a wide variety of books are provided that can be used by students for independent reading activities. In the classroom, teachers can create an individual profile for each student and recommend books based on each student's interests and reading level. Epic also provides educational videos that can be used by students to supplement their study materials.

4.4. Challenges of Implementing Online Websites in Teaching Reading

Despite the success of online platforms in teaching reading to secondary students, they present several challenges for both educators and learners. The first challenge faced by teachers when using the website in reading lessons is choosing the right kind of website. Educational websites are very different in terms of quality, and how interactive they are [28]. Some websites with games and quizzes might make learning fun but might not cover all the needed material. On the other hand, websites with a lot of

reading can make secondary students feel bored or have difficulty reading. Therefore, teachers should look for interesting and educational websites that are suitable for students' needs.

Another problem is that teachers need to know how to use digital tools well. [29] stated that when teachers do not know how to use technology, it is very difficult for them to teach it. When teachers use online websites for reading lessons, it takes a lot of time. Secondary school teachers need to spend time finding and checking good websites. They also need to learn how to use these websites and fix any problems. This can be very time-consuming, especially when they need to make sure the content matches the curriculum and is appropriate for their students' reading levels. Additionally, teachers must regularly update these materials to keep them current and engaging.

The cultural disconnect between the reading materials and students' backgrounds is a significant challenge faced by students in learning reading using online websites. When the reading materials do not reflect the cultural identities, experiences, and contexts of the students, it can profoundly affect their engagement and understanding. Online websites may offer a wide range of reading materials, but if these resources fail to resonate with students' cultural backgrounds, they may struggle to connect with the content on a personal level. This lack of connection can lead to disinterest, disengagement, and ultimately, hindered comprehension. Moreover, students may feel marginalized or excluded when they do not see their cultural representations reflected in the reading materials, impacting their motivation to participate in reading activities. Addressing this challenge requires careful selection and curation of reading materials that are diverse, inclusive, and representative of the student's cultural backgrounds

5. Conclusion

Mastering reading skills is fundamental for students because it forms the basis for all other learning. Reading is not just about recognizing words on a page; it is about comprehending and engaging with the world. Proficient readers are better equipped to excel academically across various subjects, as they can effectively gather and interpret information. Moreover, strong reading skills enhance students' abilities to think critically, solve problems, and communicate clearly. In today's information-driven world, being able to read well is more crucial than ever, as it empowers students to access a wealth of knowledge and opportunities. As outlined, there are several benefits to incorporating online learning websites into reading instruction, including real-time feedback, phonological awareness, interactive dimensions, and critical thinking skills. Websites like Reading Rockets, Starfall, Raz-Kids, ReadWorks, and Epic exemplify how digital tools can significantly enhance the learning experience by offering diverse and engaging content.

However, integrating online websites into reading instruction presents several challenges. One major challenge is selecting the right type of website that best suits the needs of students, given the vast array of options available. Teachers must carefully evaluate and choose the most effective tools. Another significant challenge is ensuring that teachers are proficient in using these digital platforms, as effective integration requires teachers to be comfortable with technology. Additionally, there can be a cultural disconnect between the reading materials available on these websites and the students' backgrounds, making it crucial for the content to be relevant and relatable. Despite these challenges, the benefits of using online websites in education, especially in teaching reading, are undeniable, and with careful use of these digital tools, they can significantly improve students' reading skills and overall learning experience.

References

[1] R. O'Dowd, *Online intercultural exchange: An introduction for foreign language teachers*, vol. 15. Multilingual Matters, 2007.

[2]   Y.-T. Sung, K.-E. Chang, and T.-C. Liu, "The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis," *Comput. Educ.*, vol. 94, pp. 252–275, 2016, doi: https://doi.org/10.1016/j.compedu.2015.11.008.

[3]   K. L. Calvin and S. Gray, "Double-Bubble Thinking Maps and Their Effect on Reading Comprehension in Spanish-English Bilingual Middle School Students With Learning Disabilities," *Learn. Disabil. Q.*, vol. 45, no. 3, pp. 212–224, 2022, doi: 10.1177/0731948720958644.

[4]   T. Hartani, E. Sulindra, E. W. Tedjo, and S. Teopilus, "English Oral and Written Receptive Skills of Vocational Lecturers," *J. Educ. Res. Eval.*, vol. 6, no. 4, pp. 712–720, 2022.

[5]   N. A. Boakye, "Extensive reading in a tertiary reading programme: Students' accounts of affective and cognitive benefits," *Read. Writ.*, vol. 8, no. 1, pp. 1–9, 2017.

[6]   P. F. Carvalho, M. Gao, B. A. Motz, and K. R. Koedinger, "Analyzing the Relative Learning Benefits of Completing Required Activities and Optional Readings in Online Courses.," *Int. Educ. Data Min. Soc.*, 2018.

[7]   D. W. Nanda and K. Azmy, "Poor reading comprehension issue in EFL classroom among Indonesian secondary school students: Scrutinizing the causes, impacts and possible solutions," *Englisia J. Lang. Educ. Humanit.*, vol. 8, no. 1, pp. 12–24, 2020.

[8]   G. L. Macklem, *Boredom in the classroom: Addressing student motivation, self-regulation, and engagement in learning*, vol. 1. Springer, 2015.

[9]   E. D. Hirsch, "Reading comprehension requires knowledge of words and the world," *Am. Educ.*, vol. 27, no. 1, pp. 10–13, 2003.

[10]   S. H. Soro, "Analysis of English Vocabulary in the Mind of Students," *Int. J. Nusant. Islam*, vol. 7, no. 2, pp. 220–229, 2019.

[11]   R. Silawi, Y. Shalhoub-Awwad, and A. Prior, "Monitoring of Reading Comprehension Across the First, Second, and Third Language: Domain-General or Language-Specific?," *Lang. Learn.*, vol. 70, no. 3, pp. 886–922, 2020.

[12]   J. T. Guthrie *et al.*, "Increasing reading comprehension and engagement through concept-oriented reading instruction.," *J. Educ. Psychol.*, vol. 96, no. 3, p. 403, 2004.

[13]   W. Grabe, "Current developments in second language reading research," *TESOL Q.*, vol. 25, no. 3, pp. 375–406, 1991.

[14]   B. Y. Cahyono and U. Widiati, "The teaching of EFL reading in the Indonesian context: The state of the art," *Teflin J.*, vol. 17, no. 1, pp. 36–58, 2006.

[15]   K. L. Sanford, "Factors that Affect the Reading Comprehension of Secondary Students with Disabilities," *Dr. Diss.*, 2015, [Online]. Available: https://repository.usfca.edu/diss/125

[16]   L. G. Duncan, S. P. McGeown, Y. M. Griffiths, S. E. Stothard, and A. Dobai, "Adolescent reading skill and engagement with digital and traditional literacies as predictors of reading comprehension," *Br. J. Psychol.*, vol. 107, no. 2, pp. 209–238, 2016.

[17]   Y. Petscher, "A meta-analysis of the relationship between student attitudes towards reading and achievement in reading," *J. Res. Read.*, vol. 33, no. 4, pp. 335–355, 2010.

[18]   S. P. McGeown, C. Osborne, A. Warhurst, R. Norgate, and L. G. Duncan, "Understanding children's reading activities: Reading motivation, skill and child characteristics as predictors," *J. Res. Read.*, vol. 39, no. 1, pp. 109–125, 2016.

[19]   N. Marquez, "Factors affecting the reading comprehension of third year students Of Aurora National High School, Aurora, Zamboanga Del Sur, SY 2006-2007," *Publ. Dr. Thesis, Philipp. Natl. Libr.*, 2008.

[20]   A. Bryman, *Social research methods*. Oxford university press, 2016.

[21]   A. Biresaw and B. Bogale, "Web-based feedback system and the development of reading skills," *Educ. Inf. Technol.*, vol. 29, no. 4, pp. 4745–4761, 2024, doi: 10.1007/s10639-023-12019-6.

[22]   W. Sutherland-Smith, "Weaving the literacy Web: Changes in reading from page to screen," *Read. Teach.*, vol. 55, no. 7, pp. 662–669, 2002.

[23]   G. Sonia, H. Hidayati, and R. Rahmaniah, "The Role of Online Media for Students' Reading Skills: A Case Studies," *Int. Soc. Sci. Humanit.*, vol. 2, no. 1, pp. 300–310, 2022, doi: 10.32528/issh.v2i1.142.

[24]   P. Jakkaphatto and P. Dhammapissamai, "An Online Program to Empower Teachers' Learning to Develop Students' Critical Thinking Skills," *Educ. Q. Rev.*, vol. 5, no. 3, pp. 42–53, 2022, doi: 10.31014/aior.1993.05.03.523.

[25]   S. Carioli and A. Peru, "Teaching Online Reading Strategies Using the Think Aloud Technique," *Ital. J. Educ. Technol.*, vol. 27, no. 3, pp. 279–294, 2019.

[26]   A. S. Lockman and B. R. Schirmer, "Online instruction in higher education: Promising, research-based, and evidence-based practices.," *J. Educ. e-Learning Res.*, vol. 7, no. 2, pp. 130–152, 2020.

[27]   Y. Mert and Y. Samur, "Students' opinions toward game elements used in gamification application," *Turkish Online J. Qual. Inq.*, vol. 9, no. 2, pp. 70–101, 2018.

[28]   D. Kember, C. McNaught, F. C. Y. Chong, P. Lam, and K.-F. Cheng, "Understanding the ways in which design features of educational websites impact upon student learning outcomes in blended learning environments," *Comput. Educ.*, vol. 55, no. 3, pp. 1183–1192, 2010.

[29]   R. Shifflet and G. Weilbacher, "Teacher beliefs and their influence on technology use: A case study," *Contemp. Issues Technol. Teach. Educ.*, vol. 15, no. 3, pp. 368–394, 2015.

Technology Integration in English Learning Materials Development: Do Students Meet Challenges?

Nafisah Endahati[1*], Sri Wiyanah[2]

[1.2] English Language Education Department, Universitas PGRI Yogyakarta, Yogyakarta, Indonesia

[*]E-mail: nafisah@upy.ac.id , sriwiyanah@upy.ac.id

Abstract. Technology integration in learning material development is required to improve students' language education department abilities. It not only stimulates students to participate in classroom activities, but also improves their learning results. The research's immediate goal is to identify the challenges that pre-service EFL teachers confront when developing technology-integrated English materials. A survey method was employed using a questionnaire as an instrument for data collection. A total of 43 EFL students of English Language Study participated in the quantitative part of the study. Online survey using Google Form was conducted. Three sections make up the questionnaire namely insufficiency infrastructure, insufficiency new technology, and insufficiency students' knowledge. It consists of 17 items and used Linkert scale points from 1-4 as the main data retrieval. The findings indicate that the insufficiency infrastructure (M=2,79; SD=0,341) is the highest score which suggests that students experience difficulties in integrating technology in developing learning material.

Keywords: pre-service teachers; learning materials development, technology integration

1. Introduction

The ability to apply logical, critical, systematic, and innovative thinking in the context of developing or implementing science and technology that takes into account and applies humanities values appropriate to their field of expertise is the learning outcome of the learning resources subject taken by pre-service teachers of the English language education department. Pre-service EFL teachers gain experience in creating instructional materials, which helps them to develop logical, systematic, and creative thinking skills. The goal of the faculty of teaching and educational sciences, which is to develop professional teacher candidates, is aligned with this learning outcome.

The development of learning materials must incorporate technology in accordance with the goals and learning outcomes of English language learning. It is impossible to avoid technological advancements in any aspect of life. Creating instructional materials that incorporate technology can enhance student learning outcomes and support psychological aspects of the learner [1].Using technology into instructional materials is one way to improve student learning outcomes. Additionally, incorporating technology into the creation of instructional materials encourages participation and interaction among students in the language classroom[2]. EFL pre-service teachers gain experience developing English teaching materials for school students based on these advantages.

Preliminary studies conducted to reveal how pre-service teachers integrate technology in their teaching practice [3]; [4]; [5]. The integration of technology in the EFL context is concentrated on the creation of instructional models and the classroom learning process [6]; [7]. EFL pre-service teachers perception on technology integration in teaching practices supports this issue [8]; [9]; [10]. According to [11], since technology is utilized in the context of technological pedagogical content knowledge, teaching material development process participants perceive themselves more favorably [11]. Benefits gained from technology integration in teaching and learning English in Indonesia were such as improving scores in English tests as well as listening, speaking, reading or writing activities, encouraging autonomous learning, and engaging collaborative activities [12].

Nevertheless, there have been challenges with incorporating technology into English language instruction. The expense, time, and proficiency with the technology present some challenges when attempting to incorporate it into English language instruction [13]; [12]. Obtaining sufficient infrastructure is another issue with using learning technology [14]. Due to financial constraints, not all educational institutions are able to provide technology-based infrastructure. It is underlined that main factors of barriers in integrating technology in teaching process are students, teachers, educational system and policy makers, and environment [15]; [16].

Teachers can select technology that is suitable for the environment to get around these challenges [17]. Other effots are offered to solve the problems raised int the technological integration of teaching such as enhancing the quality of pre-service and in-service training; (b) freeing up more time for teachers by streamlining and cutting down on the number of courses in the curricula; and (c) providing technology incentives, excellent instructional materials, support services, and IT solutions to educators [18]. Learning materials play a crucial part in the process of learning. Integration of technology is essential in the process of creating educational resources. Prior studies concentrated on identifying obstacles to the use of technology in the classroom, but they did not address obstacles to the development of English learning resources. This study **therefore** focuses on identifying challenges to the technological integration in the development of English learning materials.

2. Literature Review

2.1 The notion of English learning materials development

The availability of instructional materials is one of the processes that makes teaching efficient. Anything that teachers and students use to help with language learning is considered a material [19]. According to Tomlinson, study and practical initiatives fall under the category of materials development. In practical terms, materials development refers to any activity carried out by authors, educators, or students to offer language input sources, to utilize those sources in ways that optimize the possibility of intake, and to inspire intentional output; in other words, the provision of language knowledge and/or experiences in ways that support language acquisition. As a field, it examines the guidelines and practices involved in creating, implementing, and assessing language instruction materials [20]. Learning tools aid students in comprehending the subject matter being taught. The ability of students to produce the target language both orally and in writing can also be enhanced by instructional materials.

There are various methods used in the development of instructional materials. The ADDIE model, which includes analysis, design, development, implementation, and evaluation, is one method for creating instructional materials. [21].The ADDIE model's systematic and ordered the natural world has led to its widespread adoption by developers of educational materials. ASSURE is a different model that has been adopted by a number of companies that create instructional materials. The ASSURE model includes several stages, namely Analyzing learners, Stating the objectives, Selecting the media and materials, Utilizing the media and technology, Requiring learner participation, and Evaluating &

revising [22]. This model includes elements of using technology to produce teaching materials. Each learning material developer can determine what model is referred to as guidance in carrying out this process.

Basically, when creating educational materials, one must keep in mind the guidelines for doing so; (1)materials should achieve impact; (2)materials should help learners to feel at ease, (3) materials should help learners to develop confidence, (4) what is being taught should be perceived by leaners as relevant and useful, (5) materials should require and facilitie learners self-investment, (6) learners must be ready to acquire the points being taught, (7) materials should expose the learners to language in authentic use, (8) the learners' attention should be drawn to linguistic features of the input, (9) materials should provide the learners with opportunities to use the target language to achieve communicative purposes,(11)materials should take into account that learners differ in learning styles, (12) materials should take into account that learners differ in affective attitudes, (13)materials should permit silent period at the beginning of instruction, (14) materials should maximize learning potential by encouraging intellectual, aesthetic and emotional involvement which stimulates both right- and left-brain activities, (15) practices of learning materials development materials should not rely too much on controlled practice, and (16) materials should provide opportunities for outcomes feedback [23]. Therefore, it is advised that technology be incorporated into the creation of instructional materials.

The process of creating English teaching resources has numerous advantages. Teachers create their lesson plans based on the goals outlined in the learning outcomes. As a result, the curriculum and this instructional material are closely related. Curriculum developers make reference to the government-determined policies and curriculum content. It has been demonstrated that developing materials can significantly enhance students' learning outcomes. The use of teaching materials has many benefits; students can practice coding, take online tests or quizzes, get faster at answering questions, improve their English test scores, learn a foreign language, work in teams or independently, engage in online learning, obtain online references, use a variety of computer applications, continue up to date on current events, translate, and employ multimedia presentations in addition to showcasing innovative teaching techniques [12].

2.2 Practce of English learning materials integrated with technology

English laIt is advised to incorporate technology when creating instructional materials. The ASSURE model places technology's role in the fourth stage, which is technology use. The goal of incorporating technology into language instruction is to enhance students' reading, writing, speaking, and listening abilities [24].She continued by saying that task-based learning, media for teaching and learning, and multitasking a real ways that technology is used in language instruction.

In settings where English is being used as a foreign or second language, teachers have been increasingly implementing flip-classroom and mobile assisted learning in recent years [25]. The use of multimedia technology, such as radio and TV shows, may boost language learners' listening comprehension. Learners enhance their reading and writing skills by using electronic dictionaries, computer reading programs, and online newspapers. Artificial intelligence (AI) technology has been adopted by practitioners recently to enhance learners' speaking abilities[17].

2.3 Challenges of English learning materials development integrated technology

A number of factors, including students, teachers, educational systems and policy makers, and the environment, contribute to the obstacles encountered when integrating the development of teaching materials and technology ([26];[16]. The students basically have different characteristics or learning styles. They need different sources and activities of learning.

Teacher is key factor in technology integration in learning process, but teachers have low ability in operating technology [27]. Then, it is related with the third factor, the government as policy maker.

Because teacher found difficulty in operating technology, government should provide field trainers to monitor and help teachers operating technological aids. The lack of supporting media and tools causes limited technology adoption. This justification relates to obstacles to the use of technology in English language instruction.

In a slightly different context from the last explanation, interpersonal conflict is one of the challenges that arise when creating instructional resources which are integrated with technology. A mismatch in the goals and interests of the parties involved in creating the instructional materials may be the cause of this. Generally, the lack of infrastructure and other facilities, interpersonal conflict among stakeholders, particularly teachers and material developers, a lack of motivation, and learners' inadequate background knowledge are the main obstacles to integrating technology into the development of materials [28].

The challenges of pre-service teachers face when developing instructional materials have previously not received much attention. The previous study focuses on the difficulties of teachers encounter when implementing technology in English language instruction. Therefore, this study focuses on the difficulties of pre-service teachers face when creating technologically integrated learning resources. Through examination of 34 participants who completed daily logbook reports, researchers discovered the approaches they taken to address these issues.

3. Methods

This study employed surveys as its approach, which was quantitative in character. The quantitative approach, according to [29], analyzes a concept by creating particular hypotheses and employing data collection to either support or contradict the assumptions. Quantitative methods are used in this research since the data came from a wide number of populations that required quantifying. A quantitative approach using a survey to collect data from participants.

An individual or population is asked to characterize the attitudes, beliefs, actions, or traits of the sample or population in a survey [29]. It was thought that surveys typically provided clear, comprehensive data, making them suitable for use as tools for statistical analysis (descriptive statistics A questionnaire is a tool for gathering survey data in a structured or ordered manner, according to [30]. A questionnaire typically took the form of numerical data, was flexible when the researcher was present, and could typically be completed all the way up to data analysis.

A research in challenge in integrating technology into education that created a questionnaire that was used to collect the data was conducted [31]. The are five categories that were extrated in the questionaire i.e. Undersupply, insufficiency of resources, insufficiency of infrastructure, negative psychological state and difficulty of newer techonoly. In this research study, rather than detemining all categories in integrating technologi in educatioan broadly, some cageories were adopted to get description about students challenging in developing learning material integrated technology that consist of 3 categories such as students' insufficiency knowledge (8 items), insufficieny infrastructure/institution (5 items) and insufficiency of new technology development (4 items).The folllowing table is the list of the questions.

Table 1. Questionnaire form

No	Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Lack of knowledge in technology				
2	Lack of knowledge about how to operate technology for developing teaching materials.				

No	Questions	Strongly Agree	Agree	Disagree	Strongly Disagree
3	Lack of Communication between me and other students in the discussion group.				
4	Lack of materials in the form of soft files that can be input for developing teaching materials.				
5	Lack of time to look for sources or materials from technology-based devices.				
6	Lack of Facilities and infrastructure for devices such as laptops and PC computers.				
7	Lack of Facilities and infrastructure supporting technological operations, namely internet signals				
8	Lack of knowledge how to edit, output and input materials for developing teaching materials				
9	Lack of time in the process of editing, layout and inputting learning materials.				
10	Lack of time in the process of editing, layout and inputting learning materials.				
11	Difficulty in collaborating with fellow students to find materials, process and complete the development of teaching materials from software.				
12	Limited information technology facilities and infrastructure in the form of laptops and PC computers provided by institutions for student academic activities.				
13	The technological supporting facilities and infrastructure in the form of internet provided by the institution are inadequate.				
14	Guidance and training on information technology from the campus community to students is inadequate.				
15	Lack of understanding in the latest technology problems operating new technology features.				
16	Lack of in understanding new technology because of limited time.				
17	Lack in using new technology because it requires a lot of time and money				

The survey consisted Likert-type scale items that addressed students', Technology Integration Challenges (Use a Likert scale from 1 - Strongly Disagree to 4 - Strongly Agree). The questionnaires were constructed in Google form (https://forms.gle/phVui9LRgdWdZdRX8), distributed online and accessible. The participant's national language, Bahasa Indonesia, was employed to ensure proper knowledge of the instrument. The replies of the participants were processed to generate and analyze percentages using descriptive statistics.

A total of 43 EFL students of English Language Study Program in Universitas PGRI Yogyakarta participated in the quantitative part of the study with online survey. These 43 students were enrolled in the learning resources course or learning media, 9 male and 34 female. Some of them have joined microteaching and pre service teacher in some schools. Most were referred to students based on their use of the technology as a learning tool. The participants were contacted by the researcher out of interest in the research because they were invited to participate in the survey.

4. Results and Discussion

4.1 Results

The total humber of participants who participated in the research was 43 students of English department of UPY who took English material development subject in the previous semester. There were 34 female participants and 9 male participants. So the female students dominated in this survey.

The research study has to investigate the students challenge in integrated technology in developing englihs learing materia. Therefore, the questionaire survey was distibuted to participants through online using Google Form. The result of questionaire was ansyzed using descriptive statistics to get the result. The analysis aims to measure the average score of the items.

4.1.1. The ratio of overall categories

Table 1 shows the order of categories from the highest mean to the lowest . The highest mean score is presented by the Insufficiency infrastructure with a mean score of 2,79 and a standard deviation of 0,341, whie the lowest mean score is showed by the Insufficiency students' knowlegde with mean score of2,30 and standard deviation of 0,165.

Table 2. Rangk of the three categories of challenge in integrating technolgy in developing material

Rank	Categories	Mean	Standard Deviation
1	Insufficiency infrastructure	2,79	0,341
2	Insufficiency new technology	2.39	0, 101
3	Insufficiency students' knowlegde	2,30	0,165

ᵃTable footnote.

4.1.2. The result of each categories

In this secction, the result of each category will be explained in detail with the focus on the average and standad deviation dealing with the cheallenge of students in integrating technology in developing learing material.

4.1.2.1 Insufficiency infrastructure

Based on the results, the insufficiency infrastructure hass got the hihest average mean , the item of questionaire is presenetd in the following table.

Table 3. Insufficiency infrastructure

No	Items	Mean	Standard Deviation
1	Lack of Facilities and infrastructure for devices such as laptops and PC computers.	2,34	0,794
2	Lack of Facilities and infrastructure supporting technological operations, namely internet signals	2.56	0, 776
3	Limited information technology facilities and infrastructure in the form of laptops and PC computers provided by institutions for student academic activities.	3,17	0,803

No	Items	Mean	Standard Deviation
4	The technological supporting facilities and infrastructure in the form of internet provided by the institution are inadequate	3,04	0,771
5	Guidance and training on information technology from the campus community to students is inadequate	2,82	0,773

ᵃTable footnote.

Table 3 describes the insufficiency infrastructure categories that cosists of 5 item questions. The highest mean of this item "Limited information technology facilities and infrastructure in the form of laptops and PC computers provided by institutions for student academic activities" with mean score 3,17 and standard deviation 0,803.

4.1.2.2 Insufficiency New Technology
Based on the results, the insufficiency New Technology hass got the medium average mean , the item of questionaire is presenetd in the following table.

Table 4. Insufficiency of New Technology

No	Items	Mean	Standard Deviation
1	Lack of understanding and using new or latest technology	2,26	0,707
2	Lack of understanding in the latest technology problems operating new technology features.	2.36	0, 622
3	Lack of in understanding new technology because of limited time.	2,41	0,669
4	Lack in using new technology because it requires a lot of time and money	2,51	0,675

ᵃTable footnote.

The highest items score for the Insufficiency New Technology category is Lack in using new technology because it requires a lot of time and money with mean score 2,51 and standard deviation 0,675.

1.1.2.3 Insufficiency students' knowledge
Based on the results, the Insufficiency students' knowledge covered the lowest average mean, the item of questionaire is presenetd in the following table.

Table 5. Insufficiency of students' knowledge

No	Items	Mean	Standard Deviation
1	Lack of knowledge in technology in general	2,36	0,581
2	Lack of knowledge about how to operate technology for developing teaching materials.	2.39	0, 542

No	Items	Mean	Standard Deviation
3	Lack of Communication between me and other students in the discussion group.	2	0,5
4	Lack of materials in the form of soft files that can be input for developing teaching materials.	2,24	0,662
5	Lack of time to look for sources or materials from technology-based devices	2,92	0,679
6	Lack of knwoledge how to edit, output and input materials for developing teaching materials	2,46	0,636
7	Lack of time in the process of editing, layout and inputting learning materials.	2,48	0,711
8	Difficulty in collaborating with fellow students to find materials, process and complete the development of teaching materials from software.	2,14	0,691

ªTable footnote.

The highest items score for the Insufficiency students' knowledge category is Lack of time to look for sources or materials from technology-based devices with mean score 2,92 and standard deviation 0,679.

4.2 Discussions

Based on the result of the research presented previosuly, there are three categories of students' cahllenge in integrating technology in developing materials i.e.: insuffiiciency infrastructure, students' knowlegde and insuffiiciency of new technology.

The insuffiiciency infrastructure was the top-raanked categories when it was completed ranked. The mean (M=2,79) and standard deviation (SD=0,341) was presented. The next categories was the insuffiiciency of new technology with mean (M=2,39)) and standard deviation (SD=1,101). The last category was insufficiency students' knowlegde with mean (M=2,30)) and standard deviation (SD=0,165). The students agreed with the assertions made about the students challenge in tecnology integration

4.2.1. Insufficiency infrastructure
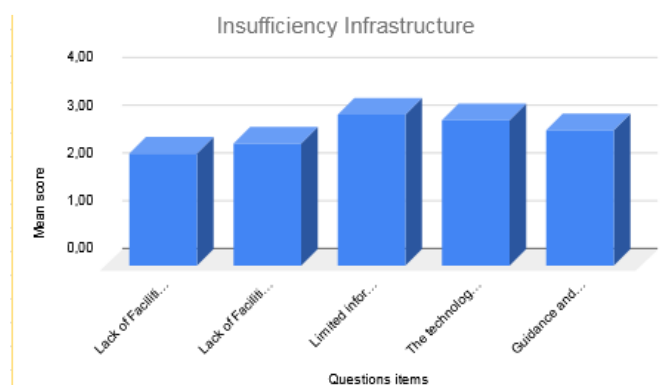
Figure 1. The graph of insufficiency infrastructure

The data in figure 1 paints a clear picture of the significant challenge students face due to insufficient infrastructure when developing technology-integrated learning materials.There are three categories which need to be considered:

a. Inadequate IT Infrastructure and Support (Item 3): emerges as a major obstacle. The highest mean score (3,17) Limited information technology facilities and infrastructure in the form of laptops and PC computers provided by institutions for student academic activities. Here, the role of institution become the most important in facilitating students in developing technology-integrated materials that often requires specific skills in using software, online platforms, and digital tools. Without proper training and support, students may lack the necessary know-how to utilize technology effectively.

b. Unreliable Internet Connectivity. Insufficient internet access presents another significant challenge. Developing technology-integrated materials often requires access to online resources, collaboration tools, and platforms for sharing and publishing. Unreliable internet hinders students' ability to leverage these technological resources.

c. Limited Device Availability. A lack of laptops and computers. Without access to these fundamental tools, students are unable to develop and utilize technology in their learning materials.

Some challenges happened in technology as infrastructural issues such as lack of technology in the classroom, problems with hardware, internet, technology outdated quickly and power outages [32] Teachers mentioned that they had either no technology or lack of technology in their classroom. Such infrastructural problems exist in similar technology integration projects. Another infrastructural problem is that there is either no Internet or slow Internet connection in the classroom.

The issues of challenge of technology use for teaching and learning also found in some previous research findings [33]; [34]; [35], and [36]. Those results were lack of supporting technological facilities (i.e., related to the poor internet connection and electricity) as the main issues that hinder the full integration of technology in schools.

Reviewing those previous research findings, this study expands a similar result of challenge in technology that is insufficiency infrastructure such as Inadequate IT Infrastructure and Support, Unreliable Internet Connect and Limited Device Availability.

The Implications of the challenges need for a multi-pronged approach to ensure students have the infrastructure needed for technology-integrated learning materials development:

a. Increased Resource Allocation: Institutions should prioritize allocating resources towards acquiring a sufficient number of laptops and computers for student use.

b. Improved Internet Infrastructure: Investments in strengthening internet connectivity and ensuring reliable access for all students are crucial.

c. Enhanced IT Training and Support: Providing regular training workshops and dedicated support services can equip students with the necessary skills and knowledge to leverage technology effectively.

d. Alternative Strategies: Developing resource kits with offline tools and activities can provide fallback options when internet access is limited.

By addressing these infrastructure challenges, institutions can empower students to explore the full potential of technology in their learning materials, leading to a more engaging and effective learning experience.

4.2.2. Insufficiency new technology
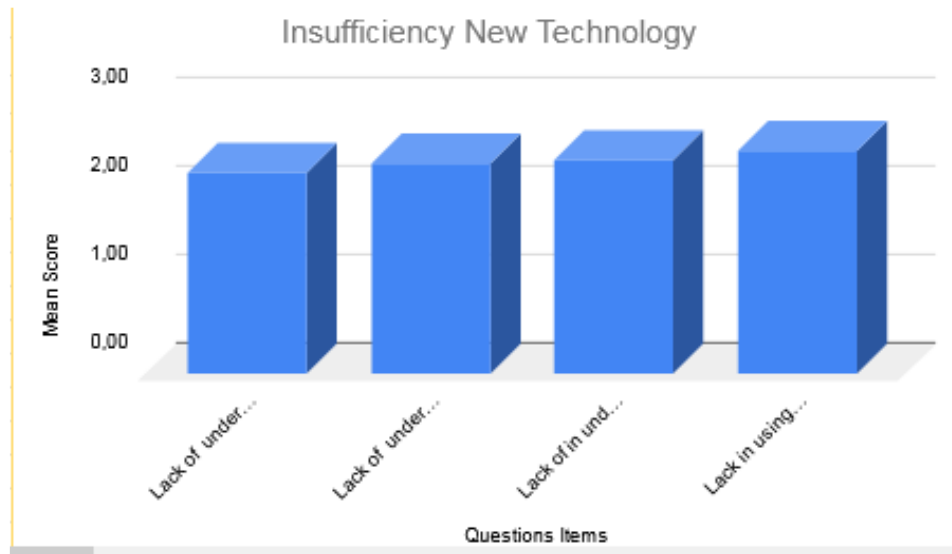
Figure 2. The graph of insufficiency new technology

The bar graph titled "Insufficiency New Technology" suggests that students perceive a lack of new technology as a challenge when integrating technology into their learning materials. While a low mean score might indicate this is a less significant obstacle compared to others. The potential challenges that can be identified i.e.:

a. Limited Access to Cutting-Edge Tools: Students might not have access to the latest software, hardware, or online platforms that could enhance their learning materials. This could limit the creativity, functionality, and overall quality of the materials they develop.

b. Incompatibility Issues: Even if students have some technology available, it might not be compatible with the requirements of the learning materials they want to create. This can lead to frustration and hinder the development process.

c. Steeper Learning Curve: New technology often comes with a steeper learning curve.
Students might struggle to learn and master new tools effectively within the timeframe they have for developing the materials.

The unequal access to technology and resources across different socioeconomic backgrounds. Students from disadvantaged backgrounds might be more likely to lack access to the latest technology, putting them at a disadvantage when it comes to developing technology-integrated learning material.

Viewing new technology solely as a means of accessing knowledge limits chances for beneficial educational reform and can even lead to negative outcomes. To achieve meaningful and cost-effective transformation, we must prioritize addressing the types of new knowledge made available by technology and how it aligns with the requirements of modern citizens. Pachler, 1999.

4.2.3. Insufficiency students' knowledge
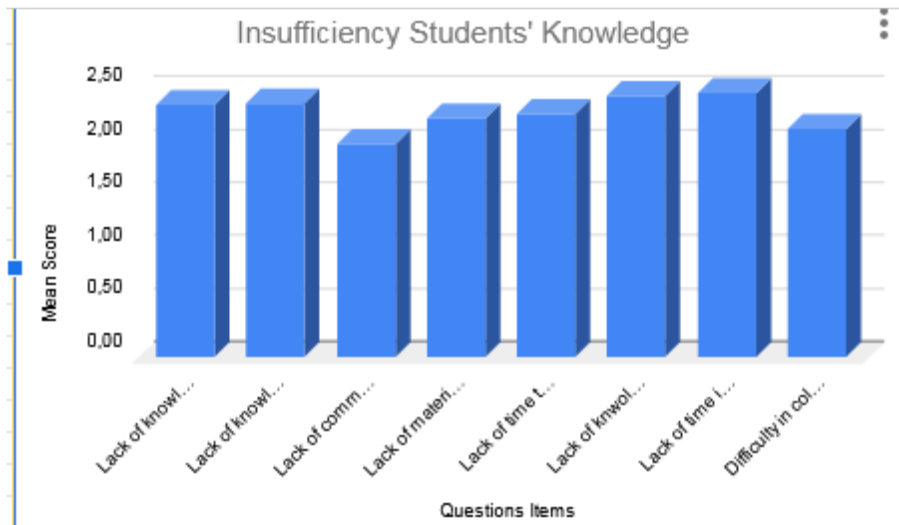
Figure 3. The graph of insufficiency students knwoledge

The image you sent appears to be a bar graph titled "Insufficiency Students' Knowledge". The X axis lists various reasons students lack the knowledge to integrate technology into learning materials, and the Y axis shows the mean score for each reason. The graph highlights several areas where students might struggle with the technological aspects of developing learning materials. Some top three challenges that need to be underlined such as:

a. Difficulty in Applying Knowledge (Lack of knowledge application): This could indicate a gap between students' theoretical understanding of technology and their ability to use it for a specific purpose, like creating educational materials.

b. Difficulties with Collaboration Tools (Lack of communication): This suggests students might lack the skills required to use software or online platforms for collaborative learning material development.

c. Time Constraints (Lack of time). This could be due to various factors, but it highlights the potential challenge students face in managing the time needed to develop technology-integrated materials alongside other academic commitment.

Overall, the data suggests that student knowledge is a key factor when it comes to integrating technology into learning materials development. By addressing the specific knowledge gaps identified and providing targeted support, educators can empower students to leverage technology more effectively in creating engaging learning experiences.

Teachers are aware that competence in technology integration requires specific knowledge and skills. Moreover, those knowledge and skills are strongly believed to be considerably sophisticated and demanding in a way that acquiring them necessitates a higher authority like universities or institutions providing in-service training [31].

4. Conclusion

This research has investigated students who took learning material development subject to explore challenges in integrated technology to support teaching and learning. The lack of insufficiency infrastructure is the main challenge for students in developing learning material to integrate technology into their teaching and learning practices in the next semester. The challenges of insufficiency

infrastructure categories consist of increased resource allocation, improved internet infrastructure, and enhanced IT training and support.

Meanwhile, the second level of challenge is insufficiency new technology as obstacle perceived investigation. The challenges cover limited access to cutting-edge tools, incompatibility issues, and steeper learning curve. In addition, the lack of students' knowledge is the minor challenge that is divided into three categories such as difficulty in applying knowledge, difficulties with collaboration tools of communication, time constraints.

Finally, we offer practical ideas for challenge in integrating technology in developing learning material such as increased resource allocation, improved internet infrastructure, enhanced IT training and support. By addressing these infrastructure challenges, institutions can empower students to explore the full potential of technology in their learning materials, leading to a more engaging and effective learning experience.

References

[1] K. L. Yeung, S. K. Carpenter, and D. Corral, "A comprehensive review of educational technology on objective learning outcomes in academic contexts," *Educ. Psychol. Rev.*, pp. 1–48, 2021.

[2] P. Kawinkoonlasate, "Integration in Flipped Classroom Technology Approach to Develop English Language Skills of Thai EFL Learners.," *English Lang. Teach.*, vol. 12, no. 11, pp. 23–34, 2019.

[3] W. Admiraal *et al.*, "Preparing pre-service teachers to integrate technology into K–12 instruction: evaluation of a technology-infused approach," *Technol. Pedagog. Educ.*, vol. 26, no. 1, pp. 105–120, 2017, doi: 10.1080/1475939X.2016.1163283.

[4] T. Batane and A. Ngwako, "Technology use by pre-service teachers during teaching practice: Are new teachers embracing technology right away in their first teaching experience?," *Australas. J. Educ. Technol.*, vol. 33, no. 1, 2017.

[5] S. İ. Kuru Gönen, "A qualitative study on a situated experience of technology integration: Reflections from pre-service teachers and students," *Comput. Assist. Lang. Learn.*, vol. 32, no. 3, pp. 163–189, 2019.

[6] A. Boonmoh and I. Kulavichian, "Exploring Thai EFL pre-service teachers' technology integration based on SAMR model," *Contemp. Educ. Technol.*, vol. 15, no. 4, p. ep457, 2023, doi: 10.30935/cedtech/13567.

[7] E. Harmandaoğlu Baz, C. Balçıkanlı, and P. T. Cephe, "Introducing an innovative technology integration model: Echoes from EFL pre-service teachers," *Educ. Inf. Technol.*, vol. 23, pp. 2179–2200, 2018.

[8] H. S. Cukur, "Technology Integration Beliefs and Practices of Turkish Novice Efl Teachers After Online Practicum," *Turkish Online J. Distance Educ.*, vol. 24, no. 3, pp. 294–310, 2023, doi: 10.17718/tojde.1138742.

[9] J. M. Fernández-Batanero, M. Montenegro-Rueda, J. Fernández-Cerero, and I. García-Martínez, "Digital competences for teacher professional development. Systematic review," *Eur. J. Teach. Educ.*, vol. 00, no. 00, pp. 1–19, 2020, doi: 10.1080/02619768.2020.1827389.

[10] E. F. Prastikawati, "Pre-service EFL teachers' perception on technology-based formative assessment in their teaching practicum," *ELT Forum J. English Lang. Teach.*, vol. 10, no. 2, pp. 163–171, 2021, doi: 10.15294/elt.v10i2.47965.

[11] E. Wulandari, "LINGUA PEDAGOGIA (Journal of English Teaching Studies) Vol.1, No.1, March 2019 Online: https://journal.uny.ac.id/index.php/lingua-pedagogia/index," vol. 1, no. 1, pp. 29–45, 2019.

[12] R. Rintaningrum, "Technology integration in English language teaching and learning : Benefits and challenges Technology integration in English language teaching and learning : Benefits and challenges," 2023, doi: 10.1080/2331186X.2022.2164690.

[13] W. Liang, "University teachers' technology integration in teaching English as a foreign language: evidence from a case study in mainland China," *SN Soc. Sci.*, vol. 1, no. 8, p. 219, 2021.

[14] R. Singh, "Barriers of technology integration in teaching English," *Int. J. Acad. Res.*, vol. 1, no. 2, pp. 24–37, 2019.

[15] E. Dinc, "Prospective teachers' perceptions of barriers to technology integration in education," *Contemp. Educ. Technol.*, vol. 10, no. 4, pp. 381–398, 2019, doi: 10.30935/cet.634187.

[16] R. Khodabandelou;, J. E. M. That;, M. A. A. S.Selvaraju;, and T. Y. Ken;, "Exploring the Main Barriers of Technology Integration in the English Language Teaching Classroom : A Qualitative Study," vol. 4, no. 1, 2016, doi: 10.7575/aiac.ijels.v.4n.1p.53.

[17] S. Gunuç and N. Babacan, "Technology integration in English language teaching and learning," *Position. English Specif. Purp. an English Lang. Teach. Context*, vol. 1, 2018.

[18] O. Atabek, "Experienced educators' suggestions for solutions to the challenges to technology integration," *Educ. Inf. Technol.*, vol. 25, no. 6, pp. 5669–5685, 2020, doi: 10.1007/s10639-020-10243-y.

[19] F. Mishan and I. Timmis, "Materials development for TESOL," *Mater. Dev. TESOL*, pp. 1–218, 2015, doi: 10.1093/elt/ccx062.

[20] B. Tomlinson, "Materials Development in Language Teaching: Edition 2," 211AD.

[21] L. Iswati, "Developing ADDIE model-based ESP Coursebook," *Indones. EFL J.*, vol. 5, no. 2, pp. 103–112, 2019.

[22] A. M. Almelhi, "Effectiveness of the ADDIE Model within an E-Learning Environment in Developing Creative Writing in EFL Students.," *English Lang. Teach.*, vol. 14, no. 2, pp. 20–36, 2021.

[23] B. Tomlinson, "Materials Development in Language Teaching, Second Edition," Second., Cambridge: Cambridge University Press, 2011, p. 473.

[24] R. Rintaningrum, "WHAT CAN WE LEARN FROM ICT USERS IN ENGLISH LANGUAGE TEACHING AND LEARNING: LECTURERS' VIEWS," 2018.

[25] T. BAŞAR and L. ŞAHİN, "Technology integration in teaching English as a foreign language: A content analysis study," *J. Educ. Technol. Online Learn.*, vol. 5, no. 1, pp. 204–222, 2022, doi: 10.31681/jetol.972577.

[26] Z. N. Khlaif, "Factors Influencing Teachers' Attitudes Toward Mobile Technology Integration in K-12," *Technol. Knowl. Learn.*, vol. 23, no. 1, pp. 161–175, 2018, doi: 10.1007/s10758-017-9311-6.

[27] T. Fütterer, R. Steinhauser, S. Zitzmann, K. Scheiter, A. Lachner, and K. Stürmer, "Development and Validation of a Test to Assess Teachers' Knowledge About How to Operate Technology," *Comput. Educ. Open*, vol. 5, no. November, p. 100152, 2023, doi: 10.1016/j.caeo.2023.100152.

[28] S. Islam, F. Hossain, and M. Rahman, "Challenges of Materials Development for the Tertiary Level EFL Learners in Bangladesh : Materials Developers ' Perspectives," vol. 8, no. 12, pp. 6818–6830, 2020, doi: 10.13189/ujer.2020.081248.

[29] J. D. Creswell, J.W. and Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Los Angeles: Sage, 2018.

[30] L. Cohen, L. Manion, and K. Morrison, *Case studies*. 2018.

[31] O. Atabek, "Challenges in Integrating Technology Into Education," *Turkish Stud. - Inf. Technol. Appl. Sci.*, vol. 14, no. ITAS Volume 14 Issue 1, pp. 1–19, 2019, doi: 10.7827/turkishstudies.14810.

[32] S. Vatanartiran and S. Karadeniz, "[Part III – Plan Description] A Needs Analysis for Technology Integration Plan: Challenges and Needs of Teachers," *Contemp. Educ. Technol.*, vol. 6, no. 3, pp. 206–220, 2015.

[33] R. Butarbutar and S. M. R. Leba, "Teachers' perspectives on teaching EFL speaking virtually: A case study of COVID-19 pandemic survival," *Am. J. Soc. Sci. Humanit.*, vol. 8, no. 1, pp. 46–54, 2023, doi: 10.55284/ajssh.v8i1.852.

[34] U. Fauzan and L. H. Pimada, "ICT-Based Teaching of English at Madrasah Aliyah in Kalimantan," *TARBIYA J. Educ. Muslim Soc.*, vol. 5, no. 2, pp. 193–211, 2018, doi: 10.15408/tjems.v5i2.10414.

[35] N. L. S. Habeahan, S. M. R. Leba, W. Wahyuniar, D. B. Tarigan, S. I. Asaloei, and B. R. Werang, "Online teaching in an Indonesian higher education institution: Student's perspective," *Int. J. Eval. Res. Educ.*, vol. 11, no. 2, pp. 580–587, 2022, doi: 10.11591/ijere.v11i2.21824.

[36] Y. C. Gai Mali *et al.*, "Issues and Challenges of Technology Use in Indonesian Schools: Implications for Teaching and Learning," *IJIET (International J. Indones. Educ. Teaching)*, vol. 7, no. 2, pp. 221–233, 2023, doi: 10.24071/ijiet.v7i2.6310.

Integration of Technology and Religion Educational Values in the Development of English Language Teaching Materials

Nining Yus Mei[1*], Novi Hendri[2] and Melyann Melani[3]

[1] Pendidikan Agama Islam, STAI Yayasan Dakwah Islamiyah, Lubuk sikaping, Indonesia
[2] Tadris Bahasa Inggris, UIN Sjech M Djamil Djambek ,Bukittinggi, Indonesia
[3] Pemikiran Islam, UIN Sjech M Djamil Djambek ,Bukittinggi, Indonesia

[*]E-mail: niningyusmei@stai-ydi.ac.id

Abstract. Educational technology is defined as an application concept technology and resources power to increase and facilitate process learning in Education. Along with the exponential growth of English for academic purposes throughout the world over the last three decades, the integration of English language learning has become something that has helped a lot in the English language learning process. this research develops an English language teaching material for teaching reading that integrates intensive strategic reading instruction with extensive reading by using Islamic value. The 4 D model which stands for (*Define, Design, Develop*, and *Disseminate*) is more practical and easier to implement, but still fulfills the important elements in R&D. The core part of the teaching model that s reading strategy and provide as much opportunity as it is possible to use them in extensive and intensive reading promotes better reading habit to the students. the students are exposed to a lot of reading activities bu using islmic value and therefore it can somehow help them not only to become better reader.

1. Introduction

Along with the exponential growth of English for academic purposes throughout the world over the last three decades, the integration of English language learning has become something that has helped a lot in the English language learning process (Rintaningrum, 2023), (Chemir & Kitila, 2022) (Zakir et al., 2022) . In the learning process it needs to be easier adapting and being effective has fostered attention to cognitive processes and how successful learning occurs. one way is the integration of content in learning teaching materials (Do Coyle, 2014). There is very significant progress when integration is carried out in the English learning process (Yuliantari & Huda, 2023) (Roza, 2020) (Iswantir, 2019). Based on the results of previous research as conducted by researchers, integration in the world of education is very beneficial. This is also in accordance with the Indonesian government's goal of ensuring good integration in the implementation of learning in enhancing the resources of Indonesian society. (Presidential Regulation of the Republic of Indonesia No. 8 of 2012.

English language learning in higher education is becoming more intensively studied and English language proficiency (*English Proficiency*) is made a requirement for student acceptance and completion in higher education. Several Universities Undergraduate programs (S1) English a general subject that students must take during process academic. Religion Islamic Foundation Islamic Da'wah (STAI-YDI) Lubuk sikaping has includes learning English as a subject that must be taken by students, including students at the Tarbiyah Faculty majoring in Islamic Religious Education. The KKNI

curriculum and will be moving to the Merdeka curriculum which is being implemented at STAI-YDI Lubuk Sikaping implementing integrative learning in the vision and mission prepared. In this case, students not only gain benefits from one field of knowledge but also understand other fields of knowledge that are integrated (Melani, 2020).

AI (*Artificial* Intelligence) or artificial intelligence has been used in various fields of science to increase the efficiency and productivity that we want to achieve in the learning process. In the learning process such as develop material teach A.I Also has become Wrong One very supportive alternative. This is supported by research conducted by Supriadi And Tjahyanti (Putri Supriadi et al., 2022) , (Luh Putu Ary Sri Tjahyanti & et al., 2022) , AI technology has improved the learning and learning process.

2. Development of Electronic Teaching Materials

Educational technology is defined as an application concept technology and resources power to increase and facilitate process learning in Education (Mangal, 2019) On era globalization moment This development I n f o r m a t i o n Technology (IT) in the world of education has been used very widely (Pradana et al., 2022). The application of e-learning is beneficial for learning because of its flexible nature, allowing users to access information and learning resources without having to meet physically or otherwise (Muliyati et al., 2019). content of e-learning materials; -a tool that course developers can use to evaluate material that is already in the development stage (Al Khotaba, 2022).

Good teaching materials try to strengthen the values that apply in society. Descriptions that lead to the shaking of prevailing values should be avoided (Kosasih, 2021) .The Book Center in Kosasih explains the criteria or principles for writing good teaching materials. These principles include the principles of meaningfulness, authenticity, functionality, communicative performance, connectedness, and assessment principles.

2.1 Integrated English Language Learning in Islamic Education Values

To provide an understanding of integrated learning, researchers took the definition of integration between science and religion proposed by Bagir (Bagir) and Abdullah (2006) Bagir stated that integration is an effort to make contact between science and religion, but not get caught up in conflict. According to Bagir, integration has become a truly correct attitude , where science and religion should be combined. Integration can generally be understood as an effort to combine science and religion, while still understanding what valid integration is (Bagir Zainal Arifin, 2005).

Spider Web (Abdullah, 2006)

Spider Web is a paradigm and study of science that illustrates that the horizon of the spider web of Islamic science in the era of an ever-changing society. Spider Web was developed at UIN Sunan Kalijaga initiated by Amin Abdullah who is a philosopher. He is a lecturer at the Faculty of Ushuluddin and Islamic Thought. His background as a person who struggles in the world of philosophy and Islamic thought makes the Spider Web concept full of theoretical ideas and philosophical nuances (Riyanto et al., 2013).

There are three religious values that will be integrated into this research, namely

1. Aqidah, the meaning of Aqidah is certain faith in Allah by carrying out the obligations of monotheism to Him, believing in His Angels, His Messengers, the Last Day, and good and bad destiny.5 And also believing in all what has been shahih about the principles of religion (ushuluddin).

2. Sharia, sharia is defined as a system or rule that regulates the relationship between man and God, or man and man, as well as man and nature.

3. Behaviour. Morals are actions that arise from within the person who does them, without coercion or pressure from outside. Moral actions are actions that are carried out on the basis of the will, choice, and decision concerned. As with all Islamic teachings, the source of akhlaq is the Qur'an and Sunnah, not the mind or views of society as in the concepts of ethics and morals.

3. 4D Development Research Model

The 4 D model which stands for (*Define, Design, Develop* , and *Disseminate*) is more practical and easier to implement, but still fulfills the important elements in R&D. D. The 4 D model was developed by Thiagarajan, Semmel, and Semmel (1972). Although the 4 D model was originally intended for instructional development for special education teachers, it is stated that this model can also be used in other fields. This research uses the 4 D model for several considerations. First, the procedures used in the 4-D model resemble the basic procedures used in R & D. Second, needs analysis, as one of the important things to do before deciding to develop an educational product, is realized comprehensively at the define stage with a focus on defining needs instructional. This is done by analyzing problems related to teachers, students, tasks, as part of the needs analysis before determine objective learning. Final, d e s i g n stage , which includes the preparation of test criteria, media selection and instruction formats which are largely used in designing most educational products.

4. Result and discussion

The researcher concludes the study which was carried out by using Four-D model (defining, designing, developing and disseminating) based on the findings and the discussion in the previous chapter into four main parts that are actually in line with the research questions. First, based on what was discovered in the defining stage that both the lecturer and the students indicated that most students are still having difficulties reading and that there is a need to develop a model that can help students to read with better comprehension. The model that was intended to be developed is a model that can help students to read by teaching them reading strategy effectively and by providing opportunity to read not only in the classroom but also outside of the classroom. Thus, Integration of technology and religion educational values in the development of English language teaching materials intensive reading with the focus of teaching reading strategies explicitly is integrated with extensive reading as an effort to fulfil the need. The first thing that the researcher does in designing the Model Book is formulating the format of the book. The format of the book consists of important component that should be available in the Model Book. Therefore, the description of the format of the Model Book is described in the following table:

Table 1. Format of the Model Book

Component	Description
Chapter 1	Introduction
Chapter 2	Theoretical Bases of the Teaching Model
Chapter 3	Reading integration with Islamic value
Chapter 4	Strategic Reading Instruction
Chapter 5	Reading integration with Islamic value
Chapter 6	Integrated Model of Intensive Strategic reading Instruction with Extensive Reading : Islamic value
Chapter 7	Conclusion

Table 1 describes that the model Book consists of five different chapter. The book starts with an introductory chapter and followed with theoretical background of the integrated model.

Designing the format

The format of the book consists of components that are needed by teacher when designing reading lesson. The format of the book is described below:

Table 2. Format of Lecturer Book

Component	Description
Lesson Objective	Specification of the objective of the lesson

Lesson Sequence	Stages of Reading lesson, which consist of explanation on what should be done in each stage
	1. Intensive strategic Reading Instruction: Islamic value
	   a. Pre - reading
	   b. While - reading
	   c. After - reading
	2. Extensive Reading
	   a. Conducting
	   b. Discussing
	   c. Presenting

Extension	Follow up activity
Answer Key	Provide answer key for all activities.

Validity and practicality of the teaching model

In the development stage, several tests were conducted in order to improve the quality of the products. First, validity test which carried out as an attempt to measure the validity of the products. Before measuring the validity of the products, instrument used to validate the products were also validated as an attempt to make sure that the instruments were also valid. The result indicated that the instruments as well as the product were all valid.

Practicality test of the product were also carried out at this stage. It was done as an attempt to prove whether or not the products were practical to the users. Thus, the lecturer and the students were asked to participate in measuring the practicality of the products. The results also proven the products were practical. Finally, effectiveness of the products which was identified by conducting a quacy experiment. The result also indicated that the teaching model is effective in improving students' comprehension ability.

Finally, after reading stage was conducted as an effort to monitor students' comprehension which can be done by asking several questions related to the text. Besides, the after reading stage was also

designed to help develop students' critical thinking and as a means of providing activities for relating reading with other skills which is important since reading is used to also develop other skills of a language.

The core part of the teaching model that s reading strategy and provide as much opportunity as it is possible to use them in extensive and intensive reading promotes better reading habit to the students. the students are exposed to a lot of reading activities bu using islmic value and therefore it can somehow help them not only to become better reader, it is also expected to develop other language skills like speaking and writing and language component like grammar and vocabulary. Reading a lot can also enhance students' background knowledge on a wide variety of topics and increase their knowledge on different things as well.

References

[1] Bagir Zainal Arifin. (2005). *Integrasi Ilmu dan Agama: Interpretasi dan Aksi (Membangun Integrasi Ilmu dan Agama:Bagaimana Mengintegrasikan Ilmu dan agama)* (E. A. A. Zainal Abidin Bagir, Jarot Wahyudi (ed.); 1 ed). PT. Mizan Pustaka.

[2] Chemir, S., & Kitila, T. (2022). Learners' needs analysis for English for academic purposes in ethiopian higher education institutions: The case of Wachemo University freshman students. *Cogent Education*, *9*(1). https://doi.org/10.1080/2331186X.2022.2026190

[3] Do Coyle, P. H. and D. M. (2014). a Window Onto. *Cambridge University Press*, 6–8. https://assets.cambridge.org/97805211/30219/excerpt/9780521130219_excerpt.pdf

[4] Iswantir. (2019). *Pendidikan Islam Sejarah , Peran dan Kontribusi Dalam Sistem Pendidikan Nasional*. 127.

[5] Kosasih. (2021). *Pengembangan Bahan Ajar* (Bunga sari fatmawati (ed.); 1st ed.). Bumi aksara.

[6] Luh Putu Ary Sri Tjahyanti, & Dkk. (2022). Peran Artificial Intelligence (Ai) Untuk Mendukung Pembelajaran Di Masa Pandemi Covid-19. *Jurnal Komputerdan Teknologi Sains(KOMTEKS)*, *1*(1), 1–7.

[7] Melani, M. (2020). The Effect of Google Classroom Assisted Extensive Listening on Listening Comprehension Accross Learning Autonomy. *Lingua Cultura*, *14*(1), 129–142. https://doi.org/10.21512/lc.v14i1.6493

[8] Putri Supriadi, S. R. R., Haedi, S. U., & Chusni, M. M. (2022). Inovasi pembelajaran berbasis teknologi Artificial Intelligence dalam Pendidikan di era industry 4.0 dan society 5.0. *Jurnal Penelitian Sains Dan Pendidikan (JPSP)*, *2*(2), 192–198. https://doi.org/10.23971/jpsp.v2i2.4036

[9] Rintaningrum, R. (2023). Technology integration in English language teaching and learning: Benefits and challenges. *Cogent Education*, *10*(1). https://doi.org/10.1080/2331186X.2022.2164690

[10] Roza, V. (2020). *Combining Content and Language Study in Islamic Higher Education*. *411*(Icoelt 2019), 294–296. https://doi.org/10.2991/assehr.k.200306.049

[11] Yuliantari, S., & Huda, T. (2023). Integration of Culturally-Responsive Teaching in English Learning. *Pubmedia Jurnal Pendidikan Bahasa Inggris*, *1*(1), 1–8. https://doi.org/10.47134/jpbi.v1i1.17

[12] Zakir, S., Charles, S. D., & Annas, F. (2022). Absorbing The Religious Identity Values Through Woven Fabric Motif Digitization To Preserve Indonesian Identity And Culture. *Journal of Positive School …*, *6*(9), 2225–2237.

Exploring English Teachers' Psychological Problems in Integrating ICT: A Narrative Inquiry

Nissa Nur Velia¹, Fitriyani², Dyah Setyowati Ciptaningrum³

[1,2,3] Languages and Arts Faculty, Universitas Negeri Yogyakarta, Daerah Istimewa Yogyakarta, Indonesia
[1] nissanur.2021@student.uny.ac.id
[2] fitriyani.2023@student.uny.ac.id
[3] dyah_ciptaningrum@uny.ac.id

Abstract. The flourishing of ICT integration coupled with the teachers' psychology condition are assumed as the significant factors for the effectiveness of ICT-based learning in English language teaching (ELT). This study aimed to explore the influences of the English teachers' psychological problems, and the teachers' strategy to cope with the issues of psychological problems including motivation, anxiety, and confidence while teaching English using ICT. The study applied narrative qualitative research. There were two English teachers who participated in this study. The interview was used to collect the participants' stories and experiences through the assistance of a video conference application. Then, the data was analyzed through three steps including transcribing, coding, and interpretation. The shared stories were analyzed using Freytag's narrative structure. The result of this study revealed that teachers' psychological problems including anxiety, panic, and lack of confidence influence the teachers' mood, teaching performances, and classroom learning ambiences. Moreover, teachers were also involved in ICT seminars or workshops, and searching information regarding the innovation of learning using ICT from social media as the teachers' strategy to cope with the psychological problems. Likewise, the factors of technical support, teachers' teaching competencies, and stakeholder support are the essential sources for the effectiveness of ICT-based learning.
Keywords: ICT, psychological problems, English teachers

1. Introduction

The development of innovative information technology (ICT) has been popular in ELT as a part of teaching aids. According to Kuşcu, C. N., & ZAİMOĞLU, (2022), the current changes in life have made ICT the powerful and dynamic tool to support English language learning. Particularly, in this fourth Industrial Revolution (IR), the new students from the Z and Alpha generations as well as the technology-literate students' generation encourage the teachers to dominate ICT as they prefer to learn with the assistance of technology (Adzhari, & Din, 2021). Therefore, many studies revealed English teachers' perceptions of ICT tools that promote effective and attractive learning (Ibrahim, 2023; Triassanti, Penggaben, Susatyo, Wardhono, Rohmadtis, & Magribi, 2022; Khan, & Kuddus, 2020; KUŞCU, & ZAİMOĞLU, 2022; Nguyen, 2021). Hence, teachers' psychology plays a pivotal role in the context of the teachers' teaching performances in ICT-based learning as their personality influences the way they teach their students. It is important since the personal and professional characteristics of teachers impact on students' social, emotional, and academic skills (GÖRDESLİ1, & SÜNBÜL, 2021).

However, the practices of ICT-based learning are still having difficulties that are faced by the teachers. Teachers are mostly unable to integrate technologies in their teaching because of some influences (Abraham, Arficho, & Habtemariam, 2022). The integration of ICT tools in Indonesia is still not prevalent in every school due to the teachers' personal and contextual factors for example english teachers have limited time and tools, coupled with a poor Internet connection as well as a lack of knowledge and experience of ICT training by (Muslem, Yusuf, & Juliana, 2020; Zaadtyi, Petrus, & Vianty, 2021). Pertaining to the lack of facilities, it also generates psychological problems among the teachers. Jie, and Sunze, (2021), the problem of psychological anxiety arises when the technical failures coupled with the subjective factors such as teachers' insufficient competencies, and objective factors such as internet connectivity issues. Regarding the external problems, some teachers argued that they sometimes still have low confidence and less motivation in applying the ICT. Teachers' psychological problems become one of the crucial constraints. Souheyla, and Nassima, (2022) found the significant psychological obstacle that prevents the teacher's implementation of ICTs in Algerian EFL context, including the teachers' technology anxiety, resistance to changes, lack of ICT training, and no perceptions of benefits of ICT. It can be assumed that the external limitation influenced the teachers' psychological issues.

However, the implementation of ICT is still far away from the desired due to many factors that influence the effectiveness of ICT integration in the EFL classroom. Most of the previous studies concentrated on the challenges of ICT integration, and most of the previous studies revealed psychological issues on the productive skill of the students. Research exploring the specific issues on the impacts of teachers' psychological problems in implementing ICT is scarce in number. Teachers' attitudinal capacity being very crucial, and it has not been empirically evaluated to ascertain its influence (Bariu, & Chun, 2022).

Therefore, closing this gap this study contributes to exploring the influences of English teachers' psychological problems in the implementation of ICT in EFL context based on the teachers' experiences, and their strategies to overcome the problems. To achieve the goal of the research, the research questions stated below were identified:

1. How do teachers' psychological problems impact the implementation of ICT in ELT?

2. What are the English teachers' strategies to overcome psychological problems in the implementation of ICT in ELT?

2. Literature Review

The Psychological Problems

Psychology describes how people feel (affect), think (cognition), and act (behavior) while educational theories describe how people learn (O'Neil, Fisher, & Newbold, 2009) as cited in (Nordin, & Yunus, 2021). Psychological problems are defined as a teacher's internal obstacles since they derive from their intention and motivation. Internal obstacles integrating ICT comprise insufficient ICT competencies, resistance to change, technology anxiety, fear of technical breakdowns, and cognitive overloads produce the worst implementation of ICT (Souheyla, & Nassima, 2022). Triassanti, et al, (2022), teacher-level barriers include problems such as lack of confidence in using ICT, resistance to change, and negative attitudes towards ICT. Therefore, this study formulates three types of psychological issues namely, lack of confidence, anxiety, and lack of motivation.

These three psychological problems generate a negative feeling as the result of certain learning activities. Beta, (2004) asserted that there is a close relationship between levels of confidence and many other issues related to teaching and learning which can be considered as the hinders to integrating ICT. The lack of confidence while using technology in ELT can also come from the frustration of pedagogical

experiences (Jie, & Sunze, 2021). The unexpected, and mismatched with the classroom condition, and students' characteristics significantly decrease the level of teachers' confidence. Besides, Bai, et al, (2019) mentioned that anxiety as a negative predictor. Anxiety, fatigue, and depression are inferred as the majority psychological problems of the teachers' daily lives (Kumlu, 2022). Then, motivation is a main internal source manifest of conscious thought and reason to achieve the goals of learning. Motivation deals with the whys of behavior (Bentham, 2022). Lack of motivation is categorized as the mild challenges which impede the teachers in Afghanistan from using ICT in ELT (Alokozay, Shadab, & Dauodzai, 2022). The current reality shows that there are still teachers who look unprepared and unwilling to develop ICT-based learning in ELT (Perienen, 2019). The teachers use ICT just to substitute the teaching media into ICT tools. Consequently, the use of ICT in English language learning cannot be optimal as the teachers have limitations regarding their competences, and psychological issues.

The Impact of Teachers Psychological Problems
Teachers' psychological problems contribute to several aspects regarding the teachers' intention to use ICT, and teachers' teaching performances. The scale of negative perceptions also shows a significant negative association toward the practices of ICT utilization by the teachers (Lomos, Luyten, & Tieck, 2023). Moreover, a study by Poudel, (2021) revealed students' perspectives who mentioned that not all their teachers can handle their class while using ICT because the teachers did not have adequate pedagogical skills and technological skill to engage the students quite a lot in using ICTs for accessing information, collaborative learning, and English language skills learning. This situation is not easy therefore teachers' mental and readiness to prepare the teaching and learning stuff and several considerations for the students' learning.

Teachers' Strategies to Cope with Psychological Problems
Psychological well-being displayed a stronger prediction of work engagement than emotion regulation (Deng, Heydarnejad, Farhangi, & Khafaga, 2022). Teachers have consciousness in realizing the importance of good teachers, and personality. Hence, in order to reveal psychological problems, they are involved in ICT training, regulate their emotions, improve their digital competencies, and share with their fellow teacher. Training in ICT-assisted English language teaching significantly improves teachers' knowledge and skills of ICT tools for teaching English and their practice of using ICT tools in teaching English (Abraham, Arficho, & Habtemariam, 2022). If the psychological problems are high, it can easily contribute to some tendency of the teachers' emotions increasing. If the teachers can efficiently solve the technical problems of ICT, they would have positive their perceptions, subjective norms, and control their behavior (Rahimi, & Tafazoli, 2022). The most important factor is also the school environment, including management's support and teachers' interaction, which was thus identified as a strong motivational factor for teachers' eventual uptake of technology in their profession (Perienen, 2019).

3. Method

This study employed a qualitative research method which applied narrative inquiry to seek the essence from life-stories of the participants. Indeed, narrative study examines the stories from people talking about their lives or experiences (Ary, et al, 2010). The participants of the study were two English teachers who have been teaching English using ICT specifically in the rural and urban areas in the Yogyakarta province area. The researcher used open-ended questions as the instrument in conducting the interview to give a depth of data from the participants and it allowed the researcher to make follow-up questions. The data analysis technique used is thematic analysis. On the other hand, in conducting theme analysis, the researcher did several stages including transcribing, coding, and interpreting.

Additionally, In qualitative study, trustworthiness must be developed by the researchers through some strategies, so there are two ways the researchers do, namely member checking, and supervisory and peer-debriefing review.

4. Discussion

After analyzing the narrative data of two participants, there are two relevant themes regarding the teachers' psychological problems in teaching English using ICT. The first theme is oriented to the influences of teachers' psychological problems towards the process of ICT-based teaching and learning. The second theme is related to the teachers' strategies to overcome the teachers' psychological problems.

English Teachers' Psychological Problems
With regard to the technical problems, the teachers agreed that the issues of unexpected moments raise the teachers' psychological issues. This also confirms the previous study by Souheyla, and Nassima, (2022), that EFL teachers have psychological obstacles to integrating ICTs including the insufficient ICT skills, technology anxiety, fear of technical breakdowns, resistance to change, and cognitive overloads. The findings of the study confirm that teachers often faced the technical breakdown which induces teachers' psychological problems including anxiety, and feel uncomfortable. However, the first participant found the projector did not work.

> *.. but on that day, suddenly the projector cannot work and I do not know why. That is something that make me bad mood*

The findings also concern that the external problems have a significant impact on the teachers' anxiety upon the duration of learning. Findings match a result of a study by Souheyla, and Nassima (2022), revealed that the emotional anxiety towards technology is categorized as significant barriers. Hence, teachers' personal factors therein also contributed to the challenges over the contextual ones (Fahm, Azeez, Imam-Fulani, Mejabi, Faruk, Abdulrahaman, Olawoyin, Oloyede, & Surajudeen-Bakinde, 2019).

The first-time implementing ICT has been considered as the acquainted and familiarization phase. The findings found that the male teacher has ever felt unconfident and anxious in the first time of applying ICT tools especially application-based, due to the unexpected students' questions and technological failures. The second participant shared his experience when the first time he used the application, and he never applied it before for the students' learning. Then, he felt nervous.

> *...sometimes when I deliver it to my students, there is situation where I never expected before*

The findings, similar with the previous study by Alrashidi, (2022) revealed that lack of preparation trigger preservice English teachers' anxiety that make them confused about where to begin, not to consider expected questions, be unable to deliver a successful lesson, and be unconfident in their teaching. In particular, the female teacher has more issues towards the feeling of fear, and anxiety. In line with the study by Atabek, (2020) female teachers were especially more anxious while using educational technology. The teacher assumed that the psychological problems are the result of limited learning time, the uncertainty of Internet connection, and the technical failures.

Therefore, the current study does not validate the findings of the previous studies that ICT can save the teachers' time. Results were found in the study of Triassanti, et al, (2022), the occurrence of obstacles when operating ICT is time-consuming due to lack of presence of some tools coupled with the failed tools. The availability of tools often malfunctions either the application, and physical

appearance. Further, the limitation of learning time at school for English subjects was identified as hinders when the technical problems happened. The result may give additional information according to the limited time, which found that teachers mostly have limited time to prepare the materials using technology (Muslem, et al, 2020; Zadtyi, et al, 2021; Fitria, 2023; Hashim, 2021) and consider the suitable materials that meets the students' need and the objective of learning (Champa, Rochsantiningsih, & Kristiana, 2019). The teachers found that the limited learning time for English subjects at school sometimes is not enough to cover the whole of the expected learning materials.

Regarding the previous issue, the current study revealed that the teachers have a span of time of bad emotions as a negative response from the unexpected event that encourages the teachers to change the planned learning activities. Kumschick, Thiel, Goschin, and Froehlich, (2020) elaborated that emotions are stimulus-triggered by a certain situation, they are marked by strong energy, and tend to be relatively short-lived. As a result, the first participant depicts the classroom condition was chaos due to the shifted mood and vigor caused by the unpredictable moments within the technological and Internet problems. Her mind, and mood obviously led to the classroom atmosphere. She said the process of teaching and learning became unconducive while I got in a bad mood.

> *... because the teacher is also the person who creates the atmosphere of learning, so if teachers' mood is not good and less passionated, obviously the atmosphere of the class will be different*

Hence, the relationship among the facilitating conditions is interplay with teachers' psychological issues. Although, the number of challenges hampered the teaching and learning activities, and teachers' competences yet, Triassanti, et al, (2023) found that it does not stop their intention to be creative and innovate in ICT learning and strengthen their skills to provide interactive and fun learning for students in their class. It is like the current findings which demonstrated that teachers are still passionate in operating ICT tools, and even intend to improve their technological competencies due to the demands of this digital era.

Interestingly, the teachers also have high motivation to consistently integrate ICT even with external limitations. A study by Guillén-Gámez, Lugones, and Mayorga-Fernández, (2019) has predicted that future teachers have an adequate motivation to use ICT but there is still a lack of pedagogical consistency in their use. The findings showed several technical conditions in terms of insufficient infrastructure, lack of Internet, and the electricity problems that underlies the inconsistency of ICT usage by the teachers. Similarly, the teachers precisely encountered difficulties in integrating ICT due to the facility condition and Internet connection, but they still believed ICT promotes effectiveness in ELT (Aminullah, et al, 2019; Nguyen, 2021). Even the unexpected problems within the ICT facilities, teachers' motivation and pedagogical competencies are not affected. According to Pozas, and Letzel, (2021), revealed that the two strongest predictors of pre-service teachers towards ICT use are their attitudes, and perceived competency to implement technology in their teaching practices. Since, the teachers believed in the significance of ICT in the process of learning instruction, they have high motivation to improve their technological competencies. This correlation is proposed by Haryanto, (2021) if the teacher already has a positive attitude towards the use of technology, it can be concluded that the teachers are willing and motivated in innovating and creating the learning process through ICT.

The Influences of Teachers' Psychological Problems
Aforementioned, that the personal factors of teachers' psychological problems in integrating ICT in English language teaching and learning is the most crucial aspect rather than the contextual challenges. Based on the findings, external problems significantly influence their psychological well-being, and affect their teaching competences, and the classroom learning ambiences. First, the uncontrolled

psychological problems of the teachers related to the feeling and emotion coupled with the unexpected failures encourages the incidental teachers' decision making while in the learning process. Nguyen, (2021), confirmed that the experiences of ICT use in teaching also have affected the choice of pedagogical performances. Since the disrupted facilities are unlikely to keep going hence the teachers' decision competencies are very crucial. The current study depicts the process of teachers' decision making as the impact of unexpected moments out of planned activities. The teachers show their dedication in discovering the learning activities that are possible to do by considering the objectives of learning and students' knowledge.

The teachers perceived that their role is very crucial to the effectiveness of ICT-integration, the identified negative feeling and emotion while teaching influence the classroom ambience. It is because a lot of things will depend on how teachers behave in class (Harmer, 2015). Therefore, if the teachers start his or her teaching with a lost enthusiasm due to the undesirable problems, teachers easily transfer improper sentiment to their students. As students and teachers are the core of successful technology integration (Rahimi, & Tafazoli, 2022). Despite the planned pedagogical activities, they must decide the alternative learning activities for the students. The study found that improper decisions make the students less attractive and lose their attention to teachers' instruction. The current findings shows that teachers' decision making due to the technical failures create a negative impact on students' engagement. The unavailability of ICT and internet connectivity issues have been identified as the main hindrances faced by the teachers towards the students' engagement (Paudel, 2020; Ng, & Yunus, 2021). Similarly, A study by Bhattarai, (2021) found that teachers have difficulties while teaching English using ICT that is keeping the students on the right track.

Teachers' Strategies to Overcome Teachers' Psychological Problems

Teachers are the agent of innovation who have the important role as the facilitator as well as the guide for students' learning. Therefore, taking effective and progressive steps to convey an effective teaching and learning lesson should be prioritized when it comes to the profession (Ramadass, & Shah, 2022). Hence, teachers must find decisive, and effective learning activities, so the students will be far less likely to be disruptive in the learning process. Mandasari, and Aminatun, (2022), said that although there must be some obstacles and problems happening in the process of implementing ICT, teachers and students could manage it well, so the learning objectives can still be achieved. The study found that the teachers have good control in facing the unexpected technical failures, challenges, and the transformation of feeling and emotion that lead to their confidence.

The study reveals that teachers possess strong control over external challenges, and transform emotions into confidence. They also possess self-efficacy that enables the teachers to find alternative solutions and maintain effective learning. It is implied that the psychological and affective states as sources of teacher self-efficacy that can be maintained through emotion-regulation activity and it assist the development of teachers' conceptual development (Deng, et al, 2022). Teachers' strategies for utilizing technology effectively enhance their teaching competences and confidence in using ICT tools, thereby enhancing their creative and effective teaching. Further, the second participant's motivational reason underlies the integration of ICT in his teaching. He felt grateful because the technology was very helpful for his teaching.

> *As a matter of fact, personally there is something that encourages me to always improve my technological skills so I will not be left behind by my students.*

Enhancing their technological awareness enhances their understanding of technology's importance and positive psychology. Taopan, and Siregar, (2021) proposed that understanding the benefits of technological innovations allow for the development of teachers' confidence. Despite the external problems and psychological problems, the findings of the study revealed that the teachers have a high

awareness of their role as a teacher. The first participant even realized her feelings had changed when she overcame the external problems and unexpected moments outside her plan. Nevertheless, she said that it did not influence her teaching performance in delivering the learning materials.

> *.... because I realize my mood will influence the classroom atmosphere, so I have to bring back that positive vibe as a teacher.*

They are willing to solve the technical failure, and even if it is impossible, they attempt to make the learning process efficient and meaningful by searching for alternatives and even switching the learning activities. The study reveals that teachers are highly aware of their role and are willing to solve technical failures. They strive to make the learning process efficient and meaningful by searching for alternatives and switching activities.

Furthermore, the teachers understand the importance of self-efficacy in maintaining professionalism in teaching, and their efforts to enhance their technological knowledge and competencies through social media platforms like Youtube, Instagram, and TikTok. Moreover, she personally also struggles to improve her technological knowledge as it has benefited to boost her confidence while teaching English using ICT. She learned from the other teacher content creators in the social media.

> *Mostly I join in a public seminar that is interesting for me or I also learn from the teacher' content creator that is easy to access now*

The teachers independently learn the technological applications in order to create interesting lessons for the students (Nguyen, 2021) by searching online information, attending training at other institutions, and even sharing and interacting with other teachers (Ibrahim, 2023). Rintaningrum, (2023) suggested that teachers are necessarily to learn a new thing regarding the technology otherwise they will be behind; it is called a process of long-life learning.

 Besides that, the stakeholders are concerned about facilitating workshops or seminars to enhance teachers' teaching competence. Sharing sessions among workmates has increased teachers' confidence in using technology, especially during unpredictable moments. Support and empowerment for teachers to implement ICT in institutions are crucial. Therefore, teachers need to be supported and empowered to implement ICT in institutions (Bariu, & Chun, 2022). Training and professional development are essential for enhancing pedagogical and technological skills. The sharing session has significantly helped the teachers' confidence in teaching using technology especially facing the unpredictable moments that frequently hit the teachers' mood. Therefore, teachers need to be supported and empowered to implement ICT in institutions (Bariu, & Chun, 2022). Zadtyi, et al, (2021) suggested that ICT training in order to support the development of teachers' ability should always be conducted periodically since the teachers believed that ICT training would enhance their pedagogical knowledge and make the teacher more professional.

5. Conclusion

It has been acknowledged that psychological problems are essential to be discovered since the teachers' teaching competences are highly dependent on inside their feeling, and attitude. Based on the findings, it concluded that the teachers have several psychological problems including anxiety, and lack of confidence when integrating ICT in ELT. These psychological problems is a form of teachers' response of the unexpected moments within the technical failures or external problems such as the Internet connection, electricity, and the school facilities. Then, teachers' psychological problems clearly influenced the teachers' teaching competences, and impacted the classroom learning ambience, and students' engagement.

The present study has answered the main research questions. However, there are some potential limitations in this study, such as this research focuses on English teachers in Yogyakarta Province, Indonesia, with a small sample size. Which making the findings less generalizable due to the certain demographic and social conditions. In addition, the study uses interviews to explore teachers' experiences and psychological problems, but does not specifically test the type of psychological problems, resulting in insufficient statistical information about teachers' psychological problems. Moreover, the students' enthusiasm was not portrayed in this study. On the other hand, further research is expected to collaborate with the study to develop instruments with the questionnaire or test to provide statistical data that contributes more depth information about the current topic.

References

[1] Abraham, M., Arficho, Z., Habtemariam, T., & Demissie, A., (2022). Effect of information communication technology-assisted teaching training on English language teachers' pedagogical knowledge and English language proficiency. *Cogent Education*, *9*(1), 2028336, 1-18.

[2] Alokozay, W., Shadab, N., & Dauodzai, R. (2022). Utilizing ICT in English Language Teaching and Learning from the Perspective of Afghan EFL Teachers. *Randwick International of Education and Linguistics Science Journal*, *3*(2), 256–271. https://doi.org/10.47175/rielsj.v3i2.451

[3] Alrashidi, O. (2022). Sources of Foreign Language Teaching Anxiety Among Saudi Preservice English Teachers: A Qualitative Inquiry. *SAGE Open*, *12*(3), 215824402211194. https://doi.org/10.1177/21582440221119486

[4] Aminullah, A., Loeneto, B. A., & Vianty, M. (2019). Teachers Attitudes and Problems of Using ICT in Teaching EFL. *English Review: Journal of English Education*, *8*(1), 147. https://doi.org/10.25134/erjee.v8i1.2324

[5] Atabek, O. (2020). Association between emotional states, self-efficacy for and attitude towards using educational technology. International Journal of Progressive Education. 16(2). 175-194. DOI: 10.29329/ijpe.2020.241.12

[6] Bai, B., Wang, J., & Chai, C.S. (2021). Understanding Hong Kong primary school English teachers' continuance intention to teach with ICT. *Computer Assisted Language Learning*, *34*(4), 528–551. https://doi.org/10.1080/09588221.2019.1627459

[7] Bhattarai, P. (2021). Purposes and Challenges of Integrating ICT in English Language Teaching in Nepalese Context. *Utamax : Journal of Ultimate Research and Trends in Education*, *3*(3), 198–206. https://doi.org/10.31849/utamax.v3i3.7780

[8] Bentham, S. (2002). Psychology and Education. Routledge.

[9] Champa, R. A., Rochsantiningsih, D., & Kristiana, D. (2019). Teachers' Challenges to Integrate ICT in EFL Teaching and Learning Activities. *English Language and Literature International Conference (ELLiC) Proceedings – (ELLiC Proceedings). 3.*

[10] Deng J, Heydarnejad T, Farhangi F and Farid Khafaga A (2022) Delving into the relationship between teacher emotion regulation, self-efficacy, engagement, and anger: A focus on English as a foreign language teachers. *Frontiers in Psychology.* 13:1019984. 1-17. 10.3389/fpsyg.2022.1019984

[11] Fahm, A. O., Azeez, A. L., Imam-Fulani, Y. O., Faruk, N., Abdulrahaman, M. D., Olawoyin, L. A., Oloyede, A. A., & Surajudeen-Bakinde, N. T. (2022). ICT enabled Almajiri education in Nigeria: Challenges and prospects. *Education and Information Technologies*, *27*(3), 3135–3169. https://doi.org/10.1007/s10639-021-10490-7

[12] Fitria, T. N. (2023). Using Information and Communication Technology (ICT) in The Education Sector: Opportunities and Challenges in English Language Teaching. *Teaching English as Foreign Language, Literature and Linguistics*, *3*(1), 9–30. https://doi.org/10.33752/teflics.v3i1.4038

[13] GÖRDESLİ1, M, A., & SÜNBÜL, Z, A. (2021). Positive characteristics in primary school teachers: The interactive roles of psychological capital and mindfulness in teaching. *International Journal of Psychology and Educational Studies.* 8(4). 55-66.

[14] Harmer, Jeremy, (2014). The Practice of English Language Teaching. 5th ed. Pearson

[15] Haryanto, E. (2021). ICT in Indonesian Public Secondary Schools: EFL Teachers' Attitude and Problems. *Edukasi: Jurnal Pendidikan Dan Pengajaran*, 6–17. https://doi.org/10.19109/ejpp.v8i1.8170

[16] Ibrahim. (2023). Teachers' perceptions of information and communication technology (ICT): The case of English language teaching (ELT) in Indonesia. Journal of English Education. 8(1). 45-51. https://dx.doi.org/10.31327/jee.v8i1.1599

[17] Jie, Z., & Sunze, Y. (2023). Investigating pedagogical challenges of mobile technology to English teaching. *Interactive Learning Environments*, *31*(5), 2767–2779. https://doi.org/10.1080/10494820.2021.1903933

[18] Khan, Nafis Mahmud., & Kuddus, Khushboo. (2020). Integrating ICT in English Language Teaching in Bangladesh: Teachers' Perceptions and Challenges. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, *12*(5). https://doi.org/10.21659/rupkatha.v12n5.rioc1s23n1

[19] Kumlu, E. (2022). Psychological mindedness in ELT: Exploring contributions of comparative literature to pre-service English language teachers' psychological mindedness. *Educational Policy Analysis and Strategic Research. 17*(2). 31-49. DOI: 10.29329/epasr.2022.442.2

[20] Kumschick, I. R., Thiel, F., Goschin, C., & Froehlich, E. (2020). Decision-Making in Teaching Processes and the Role of Mood: A Study with Preservice Teachers in Germany. *International Journal of Emotional Education. 12*(2).

[21] Kuşcu, C. N., & ZAİMOĞLU (2022). The Perceptions of Turkish EFL Lecturers on Teaching through Information and Communication Technology. *Asian Journal of Distance Education.* 17(1).

[22] Mandasari, B., & Aminatun, D. (2022). Investigating Teachers' Belief and Practices towards Digital Media of English Learning during Covid-19 Pandemic. *English Review: Journal of English Education*, *10*(2), 475–484. https://doi.org/10.25134/erjee.v10i2.6248

[23] Muslem, A., Yusuf, Y. Q., Juliana, R., & Aceh, B. (2018). Perceptions and Barriers to ICT Use Among English Teachers in Indonesia. *Teaching English With Technology. 18(1), 3-23*

[24] Nguyen, L. T. H. (2021). Teachers' Perception of ICT Integration in English Language Teaching at Vietnamese Tertiary Level. (2021). *European Journal of Contemporary Education*, *10*(3). https://doi.org/10.13187/ejced.2021.3.697

[25] Paudel, P. (2020). Teachers' Skill and Motivation in Using Information and Communication Technology. *Prithvi Journal of Research and Innovation*, *2*, 20–35. https://doi.org/10.3126/pjri.v2i0.33431

[26] Paudel, P. (2021). Information and Communication Technology in Foreign Language Classes in English: Roles and Practices. *International Journal of Technology in Education and Science*, *5*(1), 37–55. https://doi.org/10.46328/ijtes.179

[27] Poudel, A. P. (2022). Information and Communication Technology in English Language Teaching: Some Opportunities and Challenges. *Journal of Comparative & International Higher Education*, *14*(4). https://doi.org/10.32674/jcihe.v14i4.3874

[28] Pozas, M., & Letzel, V. (2023). "Do You Think You Have What it Takes?" – Exploring Predictors of Pre-Service Teachers' Prospective ICT Use. *Technology, Knowledge and Learning*, *28*(2), 823–841. https://doi.org/10.1007/s10758-021-09551-0

[29] Rahimi, A., & Tafazoli, D. (2022). The role of university teachers' 21st-century digital competence in their attitudes toward ICT integration in higher education: Extending the theory of planned behavior. *The JALT CALL Journal*, *18*(2), 238–263. https://doi.org/10.29140/jaltcall.v18n2.632

[30] Ramadass, D. D., & Shah, P. M. (2022). Knowledge, Attitude and Use of Information Communication Technology (ICT) among English Language Teachers. *Creative Education*, *13*(02), 658–674. https://doi.org/10.4236/ce.2022.132041

[31] Souheyla, B., & Nassima, B. (2022). Taking the Wave of Digitalization: Reflection on the Psychological Readiness of Teachers in Using Information and Communication Technologies. *Arab World English Journal*, *8*, 121–135. https://doi.org/10.24093/awej/call8.8

[32] Taopan, L. L., & Siregar, R. A. (2021). Promoting pre-service English teachers' technological awareness in ELT: Narratives from a border area of Indonesia. *Journal on English as a Foreign Language*, *11*(2), 400–421. https://doi.org/10.23971/jefl.v11i2.2866

[33] Triassanti, R., Panggabean, C. I. T., Susatyo, B., Wardhono, A., Rohmadtis, Y., & Al Maghribi, S. (2022). Teachers and Students' Perceptions on The use of ICT in Learning English at a Junior High School in Tuban. *DIDAKTIKA: Jurnal Pemikiran Pendidikan*, *28*(2), 60.

[34] Zadtyi, H., Petrus, I., & Vianty, M. (2021). EFL Teachers' Capability and Barriers in Using Information and Communication Technology (ICT). *English Review: Journal of English Education*, *10*(1), 213–222. https://doi.org/10.25134/erjee.v10i1.5385

Juxtaposition of Technology in Education and Teacher Professional Development

Pelin Derinalp[1] and Gulay Agac[1*]

[1] Faculty of Education, Gaziantep University, Gaziantep, Turkey
[*]E-mail: agac@gantep.edu.tr

Abstract. This study aims to examine the documents addressing teacher professional development and technology jointly from a bibliometric perspective. The data obtained from the Web of Science database were analyzed using Biblioshiny and VosViewer Software. The findings indicate the dynamism of the field with an annual growth rate of 14.49% and an R² value of 0.84 in exponential regression analysis. The findings revealed the most productive authors and the most cited publications. The prominence of the USA, China, Australia and the UK in terms of the number of articles and total number of citations indicates that these countries are pioneers in academic research and development activities and contribute significantly to global knowledge production and innovation. The findings indicate that research activities in the field are increasing rapidly and steadily. This study will be an important resource to support teachers' technology-oriented professional development and to understand the state of research in this field.

1. Introduction

The role and importance of technology in education is gradually increasing. Technology offers numerous advantages such as facilitating access to information [1], diversifying learning processes to render them more effectively, and providing students with different learning experiences [2]. However, the role of technology in education is not only instrumental; it also supports a student-centred learning approach. Opportunities such as providing relevant content to students' interests and learning styles and creating interactive learning environments [3], further increase the importance of technology in education. In this context, teachers need to integrate technology effectively into their classrooms and learn how to use these technologies pedagogically.

Teachers' technological professional development is vital for them to effectively utilise the critical role of technology in education. This requires teachers to continuously develop their digital skills and endeavour to deliver the benefits of technology to students more effectively. Professional development enables teachers to adapt to changing needs and requires them to continuously update themselves throughout their careers. With this in mind, researchers have conducted a large body of research examining how teachers maintain their professional development in the age of technology. In this regard, while some of the studies focused on specific topics such as STEM education [4, 5], 21st-century skills [6], and teacher beliefs about technology [7, 8], others addressed broader themes such as digital technologies [9, 10], teacher professional development [11, 12], and educational technologies [13, 14]. Additionally, some studies have focused on current issues such as COVID-19 [15, 16], as well as recently emerging topics such as artificial intelligence [17, 18].

The literature on technology and teacher professional development is rapidly expanding. The complexity and scope of this field require a systematic approach to scientific review and evaluation. Bibliometric studies are an important tool for understanding the diversity, intensity, and trends of

research in this field. Bibliometric studies map the scientific literature by analysing various characteristics, publication trends, publishers, and their collaboration tendencies [19]. Such studies guide researchers by determining which topics are researched more, and which authors, institutions, and countries are pioneers in this field. In addition, bibliometric analyses help researchers identify gaps, trends, and suggested areas for future research, facilitating discoveries and planning future studies. In this context, it can be emphasized that bibliometric studies are critical for understanding the scope, depth, and impact of research in areas such as technology in education and teacher professional development. Therefore, this study set out to map the current state of the literature by adopting bibliometric analysis. With this aim, the research questions of this study were formulated as:

RQ1: What is the general view of scientific publications on teachers' professional development and technology?

RQ2. Who are the leading actors such as authors, organisations, and countries in the field of teacher professional development and technology?

2. Method

In this study, data collection and analysis methods were meticulously determined and applied. The data collection process included a review of academic studies in the field of technology in education and teacher professional development. The Web of Science (WoS) database was used as a primary source in this study as it is relatively the most comprehensive, reliable, and widespread database [20]. To have a comprehensive view of the field, no time limit was applied and the beginning year was marked with the first index documented in the WoS, which was 1992. For the query, "teacher" and "professional development" or "professional growth" or "professional learning" or "CPD" or "PD" keywords were searched on the topic while "technolog*" or "ICT" or "e-learning" or "online learning" or "TPACK " or "AI" or "artificial intelligence" were sought on the title. Data analysis involved a systematic evaluation of the characteristics and trends of these studies. Data analysis was conducted in the Biblioshiny and VosViewer Software.

3. Findings and Discussion

To map the studies on teacher professional development in the age of technology, various analyses were conducted. Those analyses include main data analyses, as well as analyses of the most relevant authors, institutions, and countries. The findings of these analyses are presented and discussed below.

The main data analysis reveals that a total of 1960 studies on teacher professional development (TPD) and technology were conducted between 1992 and 2024. The annual growth rate of this topic is 14.49% and the average citations per doc is 16.59. These results indicate that there has been a significant increase in studies in the field of teacher professional development and technology since its emergence and that there is an intense interest in this field.
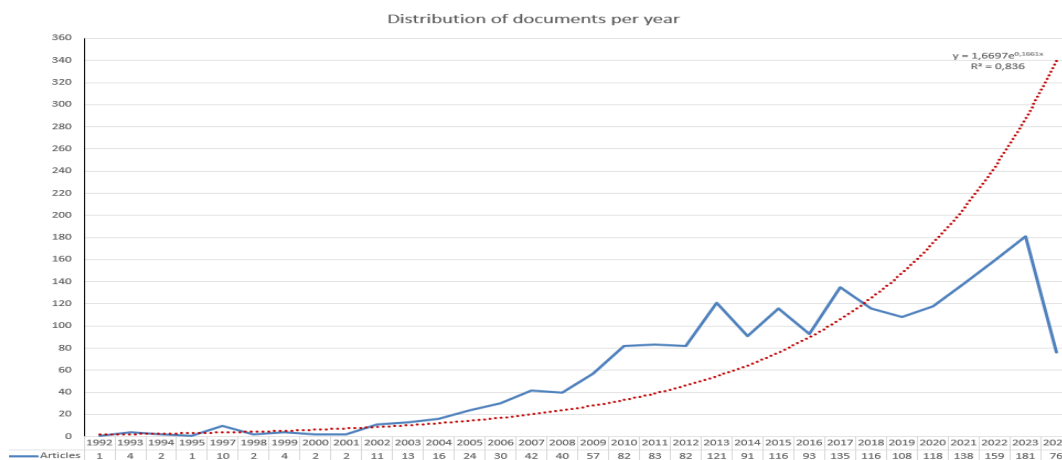
Figure 1. Distribution of documents per year: Exponential regression analysis

Figure 1 above illustrates the distribution of the documents annually. The R² value obtained in the exponential regression analysis on the number of articles produced annually in the field of TPD and technology is 0.84. This value shows that the model fits the data quite well. The model indicates that 84% of the annual change in the number of articles is explained by the time factor and that the field is attracting increasing interest. As the model is reliable, it can be expected that the number of studies in this field will increase in the future.

Table 1. Most cited document

Rank	Document	Citations
1	Mishra (2006)	3758
2	Ertmer (2005)	1014
3	Hew (2007)	859
4	Ertmer (2010)	850
5	Ertmer (2012)	774

Table 1 presents the most cited studies in the field. As seen from the table above, Mishra (2006) ranks first in the list with 3766 citations. This study is followed by Ertmer (2005), Hew (2007), Ertmer (2010) and Ertmer (2012). The number of 3766 citations to this single publication of Mishra indicates that Mishra is an important and influential figure who has been widely recognised in this field. Considering that in that study, Mishra (2006) developed a framework for teachers regarding the effective integration of technology into their classes, it can be claimed that Mishra's work may have filled an important research gap in the field or focused on a pioneering topic. Another striking finding is that Ertmer has three works in this list, indicating that this author is also an impactful scholar in the field and that the works of this author are remarkable. In addition, it can be concluded that although Ertmer has not been cited as much as Mishra, he conducts qualified and effective research and addresses important issues in the field. Hence, it can be inferred that Ertmer's works have shaped the debates in the field. For technology integration to be successful, teachers not only need to know the technology but also need to know how to use this technology for pedagogical purposes. In this context, Ertmer's (2005; 2010; 2021) studies focus on the critical role of teachers' beliefs in technology integration. Since teachers' professional development and technology adaptation processes emerged as an important theme in these studies, it is not surprising that these studies were widely cited.

Table 2. Top authors in the field

Rank	Author	NP	Author (NP)	TC	Author (NP)	ACN
1	Chai, C. S.	26	Mishra, Punya (5)	4338	Mishra, Punya (5)	868
2	Voogt, J	16	Koehler, Matthew (5)	4258	Hew, Khe Foon (1)	859
3	Koh, Joyce Hwee Ling	12	Ertmer, Peggy A. (7)	3467	Koehler, Matthew (5)	852
4	Polly, Drew	12	Ottenbreit-Leftwich, A.(11)	2609	Sadik, Olgun (1)	774
5	Ottenbreit-Leftwich, A.	11	Chai, C. S. (26)	994	Sendurur, Emine (1)	774
6	Tondeur, Jo	10	Brush, Thomas (3)	906	Sendurur, Polat (1)	774
7	Prestridge, Sarah	9	Hew, Khe Foon (1)	859	Ertmer, Peggy A. (7)	495
8	Tsai, Chin-Chung	8	Sadik, Olgun (1)	774	Lawless, Kimberly A. (1)	474
9	Ertmer, Peggy A.	7	Sendurur, Emine (1)	774	Pellegrino, James W. (1)	474
10	Longhurst, Max	7	Sendurur, Polat (1)	774	Demeester, Karen (1)	329

NP: Number of Publication   TC: Total Citations   ACN.: Average Citation Number

When Table 2 is analysed, it is seen that Chai is the author with the highest number of publications in this field with 26 studies, followed by Voogt, Koh, Polly, and Ottenbreit-Leftwich. In terms of the total number of citations, Mishra is the most cited author with 4338 citations, followed by Koehler, Ertmer, Ottenbreit-Leftwich, and Chai. In terms of the average number of citations, Mishra ranks first with 868 citations, followed by Hew, Koehler, Sadik, and Sendurur. It is also interesting to note that although they have produced only one study in this field, some authors are ranked in the top ten list in terms of total number of citations and average number of citations.

According to the number of publications' (NP) ranking, Chai is at the top of the list, indicating that this author has made a significant contribution to the research activities in the field. Similarly, Mishra's ranking in the first place in the total citation (TC) top ten list, although he is not in the NP top ten list, indicates that this researcher's work has had a significant impact on the field and is frequently cited by other researchers. It also shows that a high number of publications does not always result in a high number of citations. When analysed in terms of the average citation number, it is observed that Mishra is at the top of the list. This reveals that each of his studies has had a very high impact and that he is a respected author in this field. Similarly, in the list of the top ten in terms of ACN, seven researchers entered the list with a single publication, which indicates that some studies can have a major impact even alone and can be ground-breaking in their field. All these findings reveal that when evaluating the visibility or impact in a field, attention should be paid not only to the number of publications but also to the number of citations and the average of these citations. In-depth analysis of contributions in the academic field should be evaluated not only in terms of quantity but also in terms of quality and impact.

Table 3. Top organizations in the field

Rank	Organization	NP	Rank	Organization (NP)	TC
1	Nanyang Technol Univ	28	1	Michigan State Univ (8)	4366
2	Natl Taiwan Normal Univ	22	2	Purdue Univ (16)	3690
3	Open Univ	20	3	Indiana Univ (14)	3474
4	Univ Georgia	20	4	Nanyang Technol Univ (28)	1735
5	Chinese Univ Hong Kong	19	5	Univ Georgia (20)	1070

When Table 3 is analysed, it is seen that most studies in this field are conducted by researchers affiliated with Nanyang Technol Univ. followed by Natl Taiwan Normal Univ., Open Univ., Univ Georgia, and Chinese Univ Hong Kong, respectively. In terms of the total number of citations (TNC), it is seen that the most citations belong to researchers affiliated with Michigan State Univ, Purdue Univ, Indiana Univ, Nanyang Technol Univ and Univ Georgia, respectively. The fact that five of the top ten most cited institutions are located in the USA suggests that the USA is an important actor in this field.

The prominence of US universities such as Michigan State University, Purdue University, Indiana University, and University of Georgia, which are leading in terms of citation numbers, reflects the dominance of the USA in academic research. The high citation counts of these universities indicate the quality and global impact of USA academic research. These findings suggest that both the number of publications and the number of citations are important in assessing the contribution and impact of institutions in different countries in academic research. It can be asserted that academic impact is measured not only by producing publications but also by the extent to which these publications are cited by other researchers in the field.

Table 4. Top countries in the field

Rank	Country	NP	Rank	Country (NP)	TC
1	USA	565	1	USA (565)	18234
2	Peoples R China	166	4	England (126)	2411
3	Australia	137	3	Australia (137)	2048
4	England	126	2	Peoples R China (166)	2001
5	Spain	86	14	Singapore (36)	1834
6	South Africa	70	11	Netherlands (44)	1397
7	Canada	69	9	Turkey (57)	1344
8	Taiwan	69	8	Taiwan (69)	1311
9	Turkey	57	5	Spain (86)	1073
10	Germany	48	19	Belgium (24)	891

Table 4 presents that the USA has published the highest number of studies in the field with 565 NPs and ranks first in the TC list. Peoples R China, Australia, England, and Spain follow the USA in the list of countries with the highest number of publications. These countries are in the top ten in the list of the most cited countries, although the rankings vary. Similarly, seven countries in the top ten in the NP list are also in the top ten in the TC list. This shows that the research activities of these countries are strong in terms of both quantity and quality and have a profound impact on the global academic community. The prominence of certain countries in these research areas emphasises their strategic importance in that field. Thus, evaluating the countries with the highest number of research and citations in a particular field is important for understanding the global academic dynamics and the importance these countries attach to knowledge and technology. In conclusion, it can be inferred that these countries are leaders in academic research and development activities and contribute significantly to global knowledge production and innovation.

Conclusion

This study examined documents that address teacher professional development and technology jointly from a bibliometric perspective. The findings reveal an annual growth rate of 14.49% and an R² value of 0.84 in exponential regression analysis. It is noteworthy that Chai, Voogt and Koh top the list of authors with the most articles, while Mishra, Koehler and Ertmer have the highest total number of citations in the field. This shows that not only the number of publications but also the number of citations and the average number of citations are important when evaluating the impact of a field. As the number of articles and total number of citations of the USA, China, Australia, and the UK stand out, these countries are pioneers in academic research and development activities and contribute significantly to global knowledge production and innovation.

References

[1]   Pradeep, A. (2023). *Empowering special education through information technology.* In *2023 International Conference on Circuit Power and Computing Technologies (ICCPCT),* 31-34. https://doi.org/10.1109/ICCPCT58313.2023.10245240

[2]   Drew, J. (2015). Using technology to expand the classroom in time, space, and diversity. *Integrative and Comparative Biology, 55(5)*, 926-932 . https://doi.org/10.1093/icb/icv044

[3]   Sun, L. P., Siklander, P., & Ruokamo, H. (2018). How to trigger students' interest in digital learning environments: A systematic literature review. *Seminar.net, 14*(1), 62–84. https://doi.org/10.7577/seminar.2597

[4]   Meletiou-Mavrotheris, M., & Paparistodemou, E. (2024). Sustaining teacher professional learning in STEM: Lessons learned from an 18-year-long journey into TPACK-guided professional development. *Education Sciences, 14*(4), 402. https://doi.org/10.3390/educsci14040402

[5]   Shen, F., Roccosalvo, J., Zhang, J., Tian, Y., & Yi, Y. (2023). Online technological STEM education project management. *Education and Information Technologies, 28*(10), 12715-12735. https://doi.org/10.1007/s10639-022-11521-7

[6]   Koch, A. S., & Kush, J. C. (2014). The infusion of technology into teacher education programs. In *Advanced Research in Adult Learning and Professional Development: Tools, Trends, and Methodologies* (pp. 133-181). IGI Global.

[7]   Tondeur, J., Van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: a systematic review of qualitative evidence. *Educational Technology Research and Development*, 65, 555-575. https://orcid.org/10.1007/s11423-016-9481-2

[8]   Zhang, R. C., Wu, H. K., & Chien, S. P. (2024). Identifying secondary science teachers' adoption styles of technology-based assessments and examining the patterns of teachers' beliefs, attitudes, and intention: A latent class analysis approach. *Education and Information Technologies*, 1-31. https://doi.org/10.1007/s10639-024-12721-z

[9]   Dockendorff, M., & Zaccarelli, F. G. (2024). Successfully preparing future mathematics teachers for digital technology integration: a literature review. *International Journal of Mathematical Education in Science and Technology*, 1-32. https://doi.org/10.1080/0020739X.2024.2309273

[10]   Ofosu-Asare, Y. (2024). Developing classroom ICT teaching techniques, principles and practice for teachers in rural Ghana without access to computers or internet: A framework based on literature review. *The International Journal of Information and Learning Technology*. https://doi.org/10.1108/IJILT-04-2023-0045

[11]   Bon, S., & Inpin, B. (2024). Roles of two PD modes in technology integration for EFL classes: Training and professional learning communities. *Issues in Educational Research*, *34*(1), 1-18. https://orcid.org/0000-0002-8443-5145

[12]   Thurm, D., Li, S., Barzel, B., Fan, L., & Li, N. (2024). Professional development for teaching mathematics with technology: a comparative study of facilitators' beliefs and practices in China and Germany. *Educational Studies in Mathematics*, 1-23. https://doi.org/10.1007/s10649-023-10284-3

[13]   Nicholson, R., Bartindale, T., Kharrufa, A., Kirk, D., & Walker-Gleaves, C. (2022). Participatory design goes to school: Co-teaching as a form of co-design for educational technology. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (pp. 1-17). https://doi.org/10.1145/3491102.3517667

[14]   Rahimova, S. (2021). Preschool educational organizations educational technologies to improve the content of training of teachers. *Revista Geintec-Gestao Inovacao E Tecnologias*, *11*(2), 1597-1608. https://doi.org/10.47059/revistageintec.v11i2.1783

[15]   Huang, Y., Lazarides, R., & Richter, D. (2024). Teachers' adaptations to COVID-19: perceived preparedness for distance education, frequency of teacher-student contact, and resources in ICT. *European Journal of Teacher Education*, 1-26. https://doi.org/10.1080/02619768.2023.2288554

[16]   Pérez-Jorge, D., González-Herrera, A. I., Alonso-Rodríguez, I., & Rodríguez-Jiménez, M. D. C. (2024). Challenges and opportunities in inclusive education with ICT: Teachers' perspectives in the Canary Islands during the COVID-19 pandemic. *Education Sciences*, *14*(3), 283. https://doi.org/10.3390/educsci14030283

[17]   Jetzinger, F., Baumer, S., & Michaeli, T. (2024). Artificial intelligence in compulsory K-12 computer science classrooms: A scalable professional development offer for computer science teachers. In *Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 1* (pp. 590-596). https://doi.org/10.1145/3626252.3630782

[18]   Yue, M., Jong, M. S. Y., & Ng, D. T. K. (2024). Understanding K–12 teachers' technological pedagogical content knowledge readiness and attitudes toward artificial intelligence education. *Education and Information Technologies*, 1-32. https://doi.org/10.1007/s10639-024-12621-2

[19]   Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

[20]   Šubelj, L., Fiala, D., & Bajec, M. (2014). Network-based statistical comparison of citation topology of bibliographic databases. *Scientific Reports*, 4. https://doi.org/10.1038/srep06496

The Role of Digital Marketing in Influencing Service Quality on Customer Loyalty through Intervening Customer Satisfaction (Case Study at SPC FEB UNESA)

Prisilia Joyceline Atmojo[1*], Nadhifah[2], Farij Ibadil Maula[3], and Triesninda Pahlevi[4]

[1] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia
[2] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia
[3] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia
[4] Faculty of Economic and Business, Universitas Negeri Surabaya, Surabaya, Indonesia

[*]E-mail: prisiliajoyceline.22018@mhs.unesa.ac.id

Abstract. Marketing is essential in attracting buyers in business. The business place at SPC FEB applies digital marketing to promote and attract students as buyers who are open to technology (TAM). This study aims to look at customer loyalty through the influence of service quality that adopts digital marketing and customer satisfaction as an intermediary at SPC FEB UNESA. A quantitative approach using path analysis was used for this study. The participants of this study were FEB UNESA students with a total sample size of 98 respondents. The results showed that although service quality does not directly affect customer loyalty, service quality has a good influence on customer satisfaction. In turn, customer satisfaction significantly increases customer loyalty, and the mediating role of customer satisfaction between service quality and customer loyalty is quite large.

1. Introduction

The use of digital technology in delivering information with business partners that are integrated with systems or platforms to create new value is a form of digital marketing strategy [1]. This strategy aims to develop business capacity so that it can reach more consumers and be able to know their needs.

In our fast-paced world, people increasingly seek convenience and practicality when it comes to meeting their food needs. Consequently, the number of food vendors—both street stalls and restaurants—has surged. At Universitas Negeri Surabaya, the Studentpreneur Community within the Creative Economy Department offers culinary entrepreneurship opportunities for students. These student entrepreneurs operate stands between Buildings G1 and G2 at the Faculty of Economics and Business, selling diverse food and beverage items like Batagor, Rice Bowl, and Corn Ice.

While maintaining product quality is essential, the challenge lies in upholding service quality, especially when serving peers and close friends [3]. Striking a professional balance becomes crucial in this context [4]. The exploration of how service quality affects customer loyalty, with customer satisfaction as a mediating factor, remains a key area of interest for scholars. The study acknowledges ongoing challenges in securing customer loyalty at SPC FEB UNESA. Certain stalls within SPC FEB UNESA experience a dearth of patronage.

Enhancing service quality, which positively impacts customer satisfaction, is crucial. Satisfied customers are more inclined to revisit and make additional purchases at SPC FEB UNESA. Thus, this can increase customer loyalty, and this research can show that the activities of SPC FEB UNESA have successfully built a strong relationship with its consumers with the use of digital technology in its marketing. Therefore, this research will provide valuable insights about the role of digital marketing in

influencing service quality on customer loyalty through intervening custoemr satisfaction at SPC FEB UNESA. Thus, several problems are formulated in the research:
1. What is the influence of Service Quality on Customer Loyalty?
2. What is the influence of Service Quality on Customer Satisfaction?
3. What is the influence of Customer Satisfaction on Customer Loyalty?
4. How does Service Quality have a positive and significant indirect effect through Customer Satisfaction on Customer Loyalty?

2. Literature Review and Hypotheses Development

2.1 Service Quality
Service quality is defined as the fulfillment of consumer needs and the alignment with their expectations [5]. It represents a business's endeavor to align the delivered services with customer anticipations[6], [7], which is essential for a company's market endurance and the cultivation of consumer trust [8]. The facets of service quality, as outlined by [9], include tangible, reliability, responsiveness, assurance, and empathy.

2.2 Customer Loyalty
Customer Loyalty is defined as the buyer's attitude that shows loyalty to a product/brand, a commitment to repurchase the product, and an intention to continue long-term purchasing [10]. Business operators at SPC FEB UNESA have a majority of consumers among students because it is located within the UNESA FEB campus area. They need to adjust to the tastes of students who tend to be attracted to cheap prices with delicious and satisfying flavors. The dimensions of customer loyalty, as stated by [10], consist repurchase and recommendation.

2.3 Customer Satisfaction
There is a notable difference in the loyalty of customers who are merely satisfied and customers who are truly happy. Dissatisfied customers are at risk as they may defect to competitors or spread unfavorable opinions [11]. On the other hand, those who are satisfied will become brand advocates, sharing favorable endorsements that can serve as organic promotion and help reduce the costs associated with attracting new customers. SPC FEB UNESA has several advantages, such as its strategic location between student lecture buildings, so students do not need to walk far to buy food / drinks. In addition, SPC FEB also adopts social media as a place to promote products that can reach more students and the use of the QRIS digital payment system creates an efficient and practical purchase transaction. The dimensions of customer satisfaction consist of expectation fit, interest in returning, and willingness to recommend.
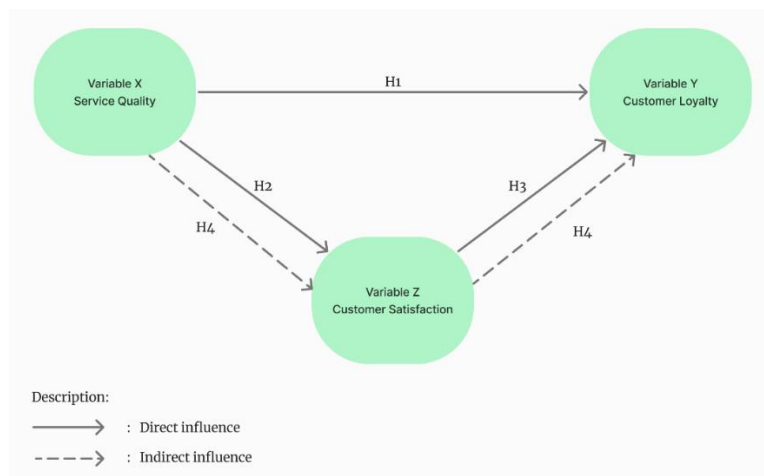
Figure 1. Methodology Conceptual Framework

Based on the Figure 1 above, the research hypotheses can be formulated as follows:

H1: Service Quality has a positive effect on Customer Loyalty

H2: Service Quality has a positive effect on Customer Satisfaction

H3: Customer Satisfaction has a positive effect on Customer Loyalty

H4: Service Quality has a positive and significant indirect effect through Customer Satisfaction on Customer Loyalty

3. Method

The study examining the effect of service quality on customer satisfaction and loyalty employs a descriptive quantitative approach [12]. The research methodically presents factual information and data, focusing on the analysis of how service quality impacts customer loyalty, with customer satisfaction acting as an intermediary factor. The focus group for this study encompasses the entirety of the student body within the FEB UNESA, and obtained a sample size of 98 respondents. The sample selection was given criteria that must be met, namely FEB students who have made purchases at the SPC FEB UNESA student stand located between G1 and G2 FEB.

The gathering of data was executed through the dissemination of surveys, which included a series of statements corresponding to each variable indicator. The responses for each statement were quantified using a Likert scale. The investigation utilizes the Partial Least Square (PLS) approach in conjunction with Structural Equation Modeling (SEM) for analyzing data.

4. Result and Discussion
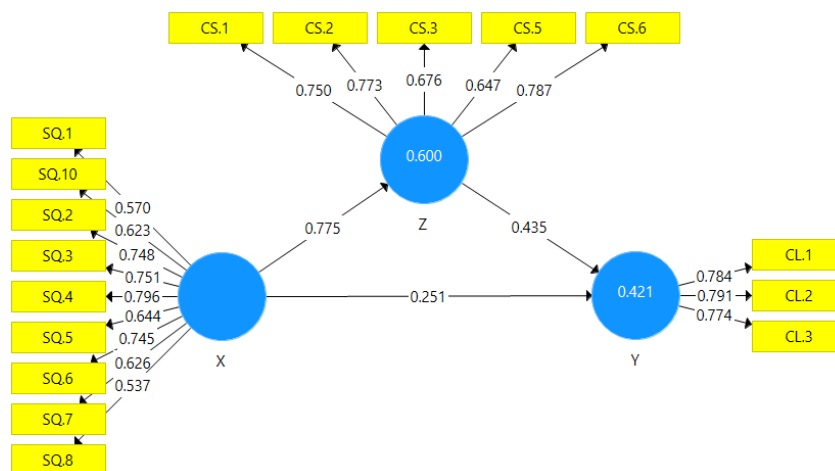
Figure 2. Methodology Conceptual Framework4.1 Convergent Validity

Table 1. Loading Factor

Variable	Indicator	Outer Loading	Description
Service Quality	X.1	0.569	Valid
	X.2	0.739	Valid
	X.3	0.748	Valid
	X.4	0.792	Valid
	X.5	0.636	Valid
	X.6	0.741	Valid
	X.7	0.634	Valid
	X.8	0.544	Valid
	X.9	0.297	Invalid
	X.10	0.615	Valid

Customer Satisfaction	Z.1	0.751	Valid
	Z.2	0.772	Valid
	Z.3	0.675	Valid
	Z.4	0.035	Invalid
	Z.5	0.647	Valid
	Z.6	0.786	Valid
Customer Loyalty	Y.1	0.783	Valid
	Y.2	0.789	Valid
	Y.3	0.775	Valid
	Y.4	-0.148	Invalid

ᵃ SmartPLS 3.0 (2024)

An indicator is considered high if the outer loading value is greater than 0.70. However, if an indicator has an outer loading value of 0.50 to 0.60, it is considered sufficient [13].

4.2 Discriminant Validity

Table 2. Discriminant Validity

	Average Variance Extracted (AVE)	Service Quality (X)	Customer Satisfaction (Z)	Customer Loyalty (Y)
Service Quality (X)	0.458	0.677	0.775	0.588
Customer Satisfaction (Z)	0.531		0.729	0.629
Customer Loyalty (Y)	0.613			0.783

ᵃ SmartPLS 3.0 (2024)

The constructs Customer Satisfaction (Z) and Customer Loyalty (Y) exhibit AVE values above 0.50, indicating that the indicators effectively represent their latent variables. Conversely, the construct Service Quality (X) displays an AVE value of 0.458, falling below the threshold, which suggests that the indicators may not adequately capture the latent variable. Consequently, the analysis in this study determines that the discriminant validity is not sufficient.

4.3 Composite Reliability

Table 3. Composite Reliability

	Cronbach's Alpha	Composite Reliability	Description
Service Quality (X)	0.848	0.882	Reliable
Customer Satisfaction (Z)	0.778	0.849	Reliable
Customer Loyalty (Y)	0.687	0.826	Reliable

ᵃ SmartPLS 3.0 (2024)

The reliability testing results that all constructs Service Quality (X) and Customer Satisfaction (Z) have values greater than 0.70, while the construct Customer Loyalty (Y) has a Cronbach's Alpha value of 0.687, which does not reach 0.70. However, the opinion [13] states that the reliability of research instruments can be considered reliable if they have a Cronbach's Alpha value > 0.60. Therefore, all measurement models used in this research have met good reliability.

4.4 R-Square

Table 4. R-Square

	R Square	R Square Adjusted
Customer Satisfaction (Z)	0.421	0.411
Customer Loyalty (Y)	0.600	0.597

[a] SmartPLS 3.0 (2024)

The R-Square for path model I, which is the relationship between Service Quality (X) and Customer Satisfaction (Z), is 0.421. This indicates that the ability of variable X to explain Z is 42.1% (weak). Then, for the R-Square of path model II, where the relationship of Service Quality (X) through Customer Satisfaction (Z) to Customer Loyalty (Y) is 0.600. This means that the ability of X through Z to explain Y is 60.0% (moderate).

4.5 Significance Test (Hypothesis)

Table 5. Direct Effects

	Original Sample (O)	T Statistics	P Values	Description
X → Y	0.251	1.558	0.122	H1 rejected
X → Z	0.775	17.328	0.000	H2 accepted
Z → Y	0.435	3.115	0.002	H3 accepted

[a] SmartPLS 3.0 (2024)

The relationship between Service Quality (X) and Customer Loyalty (Y) shows a significance value of 0.122, which is greater than the standard threshold of 0.05. Coupled with a positive path coefficient of 0.251 and t-statistics of 1.558, this suggests that Service Quality does not exert a significant influence on the Customer Loyalty among SPC FEB UNESA patrons, leading to the rejection of Hypothesis 1.

Conversely, the link between Service Quality (X) and Customer Satisfaction (Z) is marked by a significance value of 0.000, well below the 0.05 benchmark. With a robust positive path coefficient of 0.775 and t-statistics of 17.328, it's clear that Service Quality has a substantial impact on Customer Satisfaction for SPC FEB UNESA consumers, resulting in the acceptance of Hypothesis 2.

Lastly, the connection between Customer Satisfaction (Z) and Customer Loyalty (Y) is underscored by a significance value of 0.002, again below the 0.05 mark. The positive path coefficient of 0.435 and t-statistics of 3.115 indicate that Customer Satisfaction has a noteworthy positive effect on Customer Loyalty for customers at SPC FEB UNESA, confirming the acceptance of Hypothesis 3.

Table 6. Indirect Effects

	Original Sample (O)	T Statistics	P Values	Description
X → Z → Y	0.337	3.103	0.002	H4 accepted

[a] SmartPLS 3.0 (2024)

Customer Satisfaction in mediating the influence of Service Quality on Customer Loyalty of customers at SPC FEB has a significance value of 0.002 < 0.05. And it has a positive path coefficient value of 0.337 with t-statistics of 3.103. This can be explained that Customer Satisfaction significantly mediates the influence of Service Quality on Customer Loyalty of customers at SPC FEB or H4 is accepted.

4.6 Effect Size (F-Square) Test

Table 8. Effect Size (F-Square)

	Service Quality (X)	Customer Satisfaction (Z)	Customer Loyalty (Y)
Service Quality (X)		1.501	0.044
Customer Satisfaction (Z)			0.131
Customer Loyalty (Y)			

ª SmartPLS 3.0 (2024)

The influence of the Service Quality (X) variable on Customer Satisfaction (Z) is 1.501, indicating that Service Quality has a strong influence on Customer Satisfaction of customers at SPC FEB. Meanwhile, the Service Quality variable has a moderate influence on Customer Loyalty of SPC FEB UNESA customers with a value of 0.044. The influence of Customer Satisfaction also has a moderate effect on Customer Loyalty at SPC FEB with a value of 0.131.

4.7 Service Quality does not Significantly Affect Customer Loyalty
The hypothesis testing revealed a significance value of $0.122 > 0.05$ and a positive path coefficient of 0.251 with t-statistics of 1.558. These findings suggest a positive correlation between service quality and customer loyalty, yet the relationship lacks statistical significance. Therefore, it can be concluded that service quality does not have a significant effect on SPC FEB UNESA customer loyalty even though it is supported by technology, leading to the rejection of the alternative hypothesis (H1).

4.8 Service Quality Significantly Affects Customer Satisfaction
Based on the analysis, Service Quality (X) to Customer Satisfaction (Z) has a significance value of $0.000 < 0.05$ and a positive path coefficient value of 0.775 with t-statistics of 17.328. This shows that Service Quality assisted by technology can have a significant effect on Customer Satisfaction of SPC FEB UNESA customers, so hypothesis H2 is accepted.

4.9 Customer Satisfaction Significantly Affects Customer Loyalty
The results of the study, with a significance level of 0.002, which falls below the 0.05 threshold, coupled with a positive path coefficient of 0.775 and a t-statistic of 17.328, support the findings of [14]. Their research determined that customer satisfaction significantly affects customer loyalty. It underscores the critical role of customer satisfaction in fostering customer loyalty.

4.10 Service Quality Significantly Affects Customer Loyalty Through the Mediation of Customer Satisfaction
Based on the hypothesis testing results, a significance value of $0.002 < 0.05$ was found with a positive path coefficient value of 0.337 and t-statistics of 3.103. This research is supported by the study [15] which found that customer satisfaction can significantly mediate the influence of service quality on customer loyalty. This means that service quality significantly affects customer loyalty through customer satisfaction.

5. Conclusion

The research aimed to determine how service quality supported by technology at SPC FEB Unesa affects the loyalty of FEB students as consumers mediated by customer satisfaction. Based on the test results using the path analysis method, it was found that service quality does not significantly affect customer loyalty, but in contrast to customer satisfaction, which has a positive influence. Then customer satisfaction has a positive and significant effect on customer loyalty, and the mediating relationship by customer satisfaction to service quality and customer loyalty has a significant influence. This states that the use of technology has not been able to build the loyalty of FEB Unesa students through the services provided by the SPC FEB Unesa stand, which can be caused by various factors outside the research.

References

[1] C. W. Wu, D. Botella-Carrubi, and C. Blanco-González-Tejero, "The empirical study of digital marketing strategy and performance in small and medium-sized enterprises (SMEs)," *Technol. Forecast. Soc. Change*, vol. 200, no. January, 2024, doi: 10.1016/j.techfore.2023.123142.

[2] R. Joey Paywala, S. Sunaryanto, and S. H. Utomo, "Literasi Ekonomi, Rasionalitas Ekonomi, Dan Kelompok Teman Sebaya Terhadap Perilaku Konsumtif," *Jambura Econ. Educ. J.*, vol. 4, no. 1, pp. 16–22, 2022, doi: 10.37479/jeej.v4i1.11684.

[3] R. D. Putrimaulidita, "STRATEGI PEMASARAN MLIJO DALAM UPAYA MENARIK MINAT KONSUMEN (Studi Pada Mlijo di Dusun Sawur Desa Pucangsari Kecamatan Purwosari Kabupaten Pasuruan)," Universitas Islam Negeri Maulana Malik Ibrahim, 2022.

[4] A. S. Anwar, "Pengembangan Sikap Profesionalisme Guru Melalui Kinerja Guru Pada Satuan Pendidikan Mts Negeri 1 Serang," *Andragogi J. Pendidik. Islam dan Manaj. Pendidik. Islam*, vol. 2, no. 1, pp. 147–173, 2020, doi: 10.36671/andragogi.v2i1.79.

[5] A. T. Lestari and K. Iskandar, "Pengaruh Kualitas Pelayanan dan Kualitas Produk terhadap Kepuasan Konsumen Bank BTN Cabang Tegal," *JECMA (Journal Econ. Manag.*, vol. 03, no. 01, pp. 1–9, 2021, [Online]. Available: https://jurnal.umus.ac.id/index.php/jecma/article/view/513/313

[6] I. U. Huda and J. F. Sapar, "Analisis Kepuasan Anggota Koperasi terhadap Kualitas Pelayanan pada Koperasi Credit Union Sumber Sejahtera Kalimantan Selatan," *E-qien J. Ekon. Dan Bisnis*, vol. 11, no. 3, pp. 581–604, 2022, [Online]. Available: https://stiemuttaqien.ac.id/ojs/index.php/OJS/article/view/1096%0Ahttps://stiemuttaqien.ac.id/ojs/index.php/OJS/article/download/1096/783

[7] W. Widyanto and S. Sarkum, "Pengaruh Kualitas Pelayanan terhadap Kepuasan Pelanggan PT. XYZ di Kota Medan," *JAMAK J. Apl. Manaj. Akuntasi dan Kewirausahaan*, vol. 01, no. 02, pp. 73–79, 2024, [Online]. Available: https://ejournal.unsrat.ac.id/v3/index.php/productivity/article/view/36073%0Ahttps://ejournal.unsrat.ac.id/v3/index.php/productivity/article/view/36073/33591

[8] Sumarsid and A. B. Paryanti, "Pengaruh Kualitas Layanan dan Harga terhadap Kepuasan Pelanggan pada Grabfood (Studi Wilayah Kecamatan Setiabudi)," *J. Ilm. M-Progress*, vol. 12, no. 1, pp. 70–83, 2022, doi: 10.35968/m-pu.v12i1.867.

[9] S. W. Savira W, "View of KUALITAS PELAYANAN KESEHATAN DILIHAT DARI ASPEK TANGIBLE (BERWUJUD) DALAM RANGKA MENINGKATKAN PELAYANAN KESEHATAN PADA PUSKESMAS HIKUN KECAMATAN TANJUNG KABUPATEN TABALONG.pdf." 2023.

[10] Sugiharto, Sugiono, Raynaldo Alexander Wijaya, "Pengaruh Kualitas Layanan Terhadap Loyalitas Pelanggan Dengan Kepuasan Pelanggan Sebagai Variabel Mediasi Di Kafe One Eighteenth, Siwalankerto – Surabaya," *J. Strateg. Pemasar.*, vol. 7, no. 1, p. 11, 2020, [Online]. Available: https://publication.petra.ac.id/index.php/manajemen-pemasaran/article/view/10194

[11] P. G. Ing, N. Zheng Lin, M. Xu, and R. Thurasamy, "Customer loyalty in Sabah full service restaurant," *Asia Pacific J. Mark. Logist.*, vol. 32, no. 7, pp. 1407–1429, 2020, doi: 10.1108/APJML-07-2019-0437.

[12] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D (2nd ed)*. 2019.

[13] J. F. H. Jr., G. T. M. Hult, C. M. Ringle, M. Sarstedt, N. P. Danks, and S. Ray, *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*, vol. 30, no. 1. Springer, 2021. doi: 10.1080/10705511.2022.2108813.

[14] F. Anggraini and A. Budiarti, "Pengaruh Harga, Promosi, dan Kualitas Pelayanan Terhadap Loyalitas Pelanggan Dimediasi Kepuasan Pelanggan Pada Konsumen Gojek," *J. Pendidik. Ekon.*, vol. 8, no. 3, pp. 86–94, 2020, doi: 10.26740/jupe.v8n3.p86-94.

[15] I. G. B. Subawa and Eka Sulistyawati, "KUALITAS PELAYANAN BERPENGARUH TERHADAP LOYALITAS PELANGGAN DENGAN KEPUASAN PELANGGAN SEBAGAI VARIABEL MEDIASI," *E-Jurnal Manaj.*, vol. 9, no. 2, pp. 718–736, 2020, doi: https://doi.org/10.24843/EJMUNUD.2020.v09.i02.p16.

The Effectiveness of E-Learning *Ruang Guru* for the Digital Native Generation

Erika Kurniawati[1], Putri Beny Mawarsih[2], Ananda Wahyu Puspa Widuri[3], Hidayatun Nadzifah[4], Fahlulia Rahma Shofiana[5]

[1,2,3,4] Faculty of Language and Art, Universitas Negeri Surabaya, Surabaya, Indonesia
[5] Faculty of Education, Universitas Negeri Surabaya, Surabaya, Indonesia

[*]E-mail: erika.23009@mhs.unesa.ac.id

Abstract. Nowadays, the majority of students are the zillennial generation or what is usually called Gen-Z. Gen-Z has been accustomed to the digital world from an early age and is no stranger to technological advances. Gen-Z, who have been familiar with the digital world from an early age in the process of language acquisition, are known as digital natives. The process of learning Indonesian for digital natives is certainly different. This research aims to describe the effectiveness of using e-learning Ruang Guru in learning Bahasa Indonesia. Effectiveness here is viewed from two points of view, namely from students and also tutors. The research method used is a qualitative descriptive method with data sources from survey sheets with student resource persons and interviews with Bahasa Indonesian course instructors at LBB Ruang Guru as well as literature studies. The results of the research show that the application of e-learning media in the Ruang Guru which is digital and technology-based makes the Indonesian language learning process simpler and more interesting, and makes it easier for students to understand the material and makes it easier for teachers to deliver the material.

1. Introduction

In recent day, students from 2000 and above dominating in the world of education. It must be related to the different nature of students from previous generations. The majority of today's students are from the zillennial generation, also known as gen-Z, who are very familiar with the digital world from an early age. They are able to operate gadgets quite reliably, even when language acquisition has not yet reached the level of reading ability (Anam, Mulasi, Rohana, 2021). This generation is known as digital natives. In this modern era, everyone, especially digital natives, cannot live without the internet. This is in accordance with research conducted by the Association of Internet Providers (APJII). According to the results of a survey conducted in 2022-2023, the number of internet users reached 215.63 million people, an increase of 2.67% from the previous year. This number is equivalent to 78.19% of Indonesia's total population, which amounts to 275.77 million people, and East Java is one of the ten largest cities with 81.26 per cent of internet users (Benaziria, 2018).

The majority of students in Indonesia are digital natives. They usually use computers, laptops and smartphones to access the internet because they are driven by three things: as a medium of entertainment, communicating with friends, and finding information about school assignments, Aryana et al (2022). The large number of generations that use digital media, especially the internet, is natural because the progress of the times demands not to be left behind. In addition, they are the original digital generation born and developed together with technology (Carolina, 2023). Educational methods must be conventionalised to suit the learning styles and preferences of the new generation in the digital native era (Ghani et al., 2021). The use of technology in education can help fulfil individual needs and provide quick feedback to students. This is important because technology supports digital natives' natural

attraction to digital devices and ensures that educational materials are developed in a way that is interactive, engaging and content-worthy (Juliane et al., 2017).

Adaptations are necessary and must take into account the unique needs and preferences of digital natives, while ensuring that deep learning is not compromised in the process. In short, technological advances have led to the emergence of a generation of digital natives who process information differently and have unique learning needs (Machmud, 2018). To effectively serve these digital natives, educators must adapt their pedagogy and resources to align with the preferences of digital natives. These adaptations include integrating technology into the teaching and learning process, utilising online platforms, and providing interactive and multimedia-rich content. By doing so, educators can create dynamic and engaging learning environments that suit digital natives and support their academic success (Nurgiansah, 2022).

By utilising online learning platforms, digital natives can easily move their activities and interactions from traditional face-to-face environments to the digital world. These platforms offer various features and benefits that enhance the learning experience for digital natives. For example, the generation can access a wide variety of educational resources, including e-books, videos, and interactive simulations, which can cater to their diverse learning styles and preferences (Nur, 2019). Ruangguru is a brand name under the company PT Ruang Raya Indonesia. Ruangguru was introduced as a digital tutoring platform. Since its establishment, Ruangguru introduced its platform that can be used on various devices, such as laptops, mobile phones or tablets. The platform is a means of learning by utilising an online learning system, so that learners and tutors do not meet face-to-face. Learners can access the learning media with the available internet network. Ruangguru has a variety of products that can be used by its users, including study rooms, test rooms, classrooms, robo teachers and so on (Marini et al, 2021).

Ruangguru now not only offers online learning packages, but also hybrid access services under the brand name Brain Academy. Brain Academy is available in two options: online and offline. The offline Brain Academy utilises face-to-face learning while still utilising the Ruangguru app to support its materials and learning. Ruang Guru offers Indonesian language learning through fun and innovative learning. Students will tend to pay attention to subject matter delivered by interesting and innovative teachers. Based on this, the author conducted interviews with teachers and students in Indonesian language learning to find out how effective the use of e-learning in Indonesian language learning.

2. Methods

The research method used is descriptive qualitative method with a case study at LBB Ruang Guru in Jombang, East Java. The collection techniques in this study were observation, structured interviews, documentation and closed questionnaires. The research was conducted from January to March 2024. Secondary data is literature studies originating from books, articles, proceedings, theses, and other media that can support the availability of information related to related topics. The data that has been collected will be analysed according to the discussion of related topics using data reduction, presentation, and conclusion methods.

3. Result and Discussion

a. Implementation of *Ruang Guru* E-Learning in Learning

Indonesian language learning at Brain Academy offline uses a hybrid system. This system supports classroom learning by utilising the *Ruang Guru* application to work on questions and view learning materials. Learners still get lessons in general like classical learning

that uses a teacher-centred system. The teacher or what is commonly called the master teacher will explain and explain what material is being discussed on the learning topic that day. The master teacher explains and explains the material on the whiteboard directly for 20 minutes. then in the last 15 minutes, the master teacher asks students to open the *ruang guru* application to take the quiz that has been provided. After the quiz is done the master teacher will discuss the quiz in front of the class. The discussion in the student application will appear after the learning session ends so that students can focus on following the learning in the classroom. Students can also learn independently at home by opening the study room feature on the *ruang guru* application which contains recordings of learning materials and also practice questions accompanied by discussions. If students want additional learning, they can contact the student advisor to schedule a homework clinic.

b. **Indonesian Language Learning in the *Ruang Guru***

Indonesian language learning has the same standards as other subjects in the brain Academy Ruang Guru. The difference is only in the delivery of material and also practice questions. After getting the material then students work on the questions that have been provided in the Ruang Guru application. After finishing working on the master teacher will discuss the questions together with the students. The material obtained is in the form of concepts so that students can apply it in working on the questions that have been provided. The learning process is of course the same as other subjects. Students log in and apply existing features such as material summaries and also sample learning videos. Then the tutor explains or mediates when there is material in the application that is not understood. In this section a hybrid system occurs. When all the material is clear, students are directed to work on the questions in the application. In the application the questions contain high reasoning. When students answer, they will know the right and wrong, and there is a discussion of the answer to the question so that students more understand.

c. **Effectiveness of Using E-Learning in *Ruang Guru***

Based on the indicators of using the Brain Academy *Ruang Guru* application and the learning process has been carried out according to the learning steps in the digital native generation. The results of student learning by using the brain academy application in the *ruang guru* show maximum results. Based on interviews with students in the Brain Academy Rugu Room, this was obtained because the hybrid learning system used in the *ruang guru* allows students to study the material with focus and if there are things that are not understood, they can ask the master theacher. The learning features are also very easy to access and everything is presented in full so that it is easy to understand.

After the learning process, a satisfaction survey was conducted with the use of the application during the Indonesian language learning process. This survey was conducted by filling out a questionnaire to a number of respondents. the total respondents who filled in were 27 respondents. of the 27 respondents showed that all indicators showed positive things. With details, namely from the aspect of enthusiasm for learning, 63% of students feel very enthusiastic and the remaining 37% of students are enthusiastic about learning with the *ruang guru* brain academy. In terms of student enthusiasm in the learning process, 63% of students felt very enthusiastic and 37% felt enthusiastic. Then regarding the indicator of student focus, the results showed that

51.9% of students were very focused and 48.1% of students felt focused. And in the last indicator, namely the ease of access in learning, 70.4 students felt that the brain academy application in the *ruang guru* was very easy to access and the remaining 29.6% answered easily. There were no students who answered less or not in all indicators. It can be concluded that the use of the brain academy *ruang guru* gets a positive response from students who are mostly digital natives.

4. Conclusion

The implementation of e-learning through Ruang Guru application in Indonesian language learning at Brain Academy uses a hybrid system approach that combines the role of a master teacher in the classroom with application features. The system has yielded positive results with high levels of excitement, enthusiasm, focus and ease of access to learning from students, most of whom are digital natives. Features such as complete materials, questions with appropriate difficulty levels, homework clinics for personalised guidance, as well as integration of all students in Indonesia, make it easy for students to understand the material and achieve maximum grades. Students' positive response to the app shows that the use of Ruang Guru e-learning effectively enhances the learning experience for students at Brain Academy.

The hybrid system approach with master teacher involvement in the classroom and integration of app features provides a more interactive, flexible and enjoyable learning experience for students. Students' positive responses to the app indicate that this learning model is effective in facilitating understanding of the material, motivating students to learn, as well as increasing their engagement in the learning process. This success is also reflected in the achievement of maximum scores by the majority of students, indicators of learning enthusiasm, focus, and ease of access in learning. Thus, the implementation of Ruang Guru e-learning can be considered as an effective step in meeting the needs of students adapting to technological development as well as bringing positive impacts to their learning experience.

References

[1] Anam, K., Mulasi, S., & Rohana, S. (2021). Efektifitas Penggunaan Media Digital dalam Proses Belajar Mengajar. Genderang Asa: Journal of Primary Education, 2(2), 76-87.

[2] Aryana, S., Zulaeha, I., Pristiwati, R., & Haryadi, H. (2022, October). Digital Literacy of Indonesian Teachers on AKM Class and Asesmenpedia. *International Conference on Science, Education, and Technology* (Vol. 8, pp. 890-900).

[3] Benaziria, B. (2018). Pengembangkan Literasi Digital pada Warga Negara Muda dalam Pembelajaran PPKn melalui Model VCT. Jupiis: Jurnal Pendidikan Ilmu-Ilmu Sosial, 10(1), 11. https://doi.org/10.24114/jupiis.v10i1.8331

[4] Carolina, Y. D. (2023). Augmented Reality sebagai Media Pembelajaran Interaktif 3D untuk Meningkatkan Motivasi Belajar Siswa Digital Native. *Ideguru: Jurnal Karya Ilmiah Guru*, 8(1), 10-16.

[5] Ghani, N. A., Hamid, S., Hashem, I. A. T., & Ahmed, E. (2019). Social media big data analytics: A survey. *Computers in Human behavior*, 101, 417-428.

[6] Hasil Survei Penetrasi dan Perilaku Pengguna Internet Indonesia. (6 Desember 2023). Asosiasi Penyelenggara Jasa Internet Indonesia (APJII). Diakses dari: https://www.apjii.or.id/survei

[7] Juliane, C., Arman, A. A., Sastramihardja, H. S., & Supriana, I. (2017). Digital teaching learning for digital native; Tantangan dan Peluang. Jurnal Ilmiah Rekayasa dan Manajemen Sistem Informasi, 3(2), 29-35.

[8] Machmud, K. (2018). The smartphone use in Indonesian schools: the high school students' perspectives. *Journal of Arts and Humanities*, 7(3), 33-40.

[9] Marini, Y., Marina, N., Nasution, M. M., & Lubis, M. A. (2021). APLIKASI RUANG GURU UNTUK PEMBELAJARAN DI ERA COVID-19. *DIRASATUL IBTIDAIYAH*, 1(2), 198-214.

[10] Nur, M. (2019). Literasi Digital Keagamaan Aktivis Organisasi Keagamaan di Madrasah Aliyah Negeri (MAN) di Kota Bandung. Jurnal SMART (Studi Masyarakat, Religi, dan Tradisi), 5(1), 1-14.

[11] Nurgiansah, T. H. . (2022). Meningkatkan Minat Belajar Siswa dengan Media Pembelajaran Konvensional dalam Pembelajaran Pendidikan Kewarganegaraan. Jurnal Pendidikan Dan Konseling (JPDK), 4(3), 1529– 1534. https://doi.org/10.31004/jpdk.v4i3.490

The Integration of Technology in Learning : Problem Based Learning Liveworksheet to Improve Students' Critical Thinking Skill

Restu Wahyu Utami[1], Nisrina Imtinan[2], and Mundilarto[3]

[1,2,3] Department of Physic Education Master's Degree, Faculty of Mathematics and Natural Sciences, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: restuwahyu.2022@student.uny.ac.id

Abstract. This research aims to analyze the effect of technology integration in learning using problem based learning (PBL) liveworksheet to improve students' critical thinking skills. This research used a pre-experimental design of one group pretest-posttest design. Data collection techniques in this research used a written test technique in the form of pretest and posttest with the instrument that was consist of five item critical thinking skills test questions on global warming topic. The population in this study was students of Science Studies XE in MAN 2 Yogyakarta. Data analysis using a one sample t-test for hypothesis testing. H0 was rejected, it means there is a significant effect of the implementation of PBL Liveworksheet to improve students' critical thinking skills in global warming topic at high school. Based on the results of the Gain test, students' critical thinking was 0.54 in the less effective category. Based on the results, learning by integrating technology using Liveworksheet with PBL was improving the quality of achievement and significance effect of learning outcomes.
Keywords : Liveworksheet, PBL, critical thinking skills

1. Introduction

The 21st century requires every individual to have skills that include hard skills and soft skills, so they can compete in global competition. Important skills that need to be possessed are known as learning and innovation skills, include aspects of critical thinking, communication, collaboration, and creativity [16]. Critical thinking as an important aspect to be equipped in facing the global competition can be mastered through education. The education quality has an impact on individual quality [9]. Based on the study conducted by Agnafia [1], indicators of critical thinking skills and problem solving have a high percentage to be develop in 21st century learning. Therefore, 21st century learning really requires critical thinking skills.

One of the subjects that requires relatively high critical thinking skills is science. In the science learning process, critical thinking is carried out by students using principles and concepts based on several aspects [24]. These aspects include interpretation, analysis, evaluation, inference, and explanation [10]. Students who have critical thinking are able to ask questions or convey problems and formulate them clearly. Then, students can bring up new ideas so it is hoped that students will be able to solve the problems [12]. Critical thinking skills in science learning consist of the skills to communicate information, manage, store, create, analyze, and utilize access to technology [15].. Students need critical thinking skills to calculate, manipulate, and observe in science learning [10].

However, in learning science, the level of students' critical thinking is still relatively low. According to Samadun et al. [23]., low critical thinking skills can be seen in several ways, including: 1) students have difficulty to identify similarities in solving a problem, 2) students have difficulty to connect the calculation results with daily phenomena, and 3) students experience difficulties to solve existing problems. Factors that result in students' low critical thinking skills, namely the knowledge possessed by students is still fragmented so it is difficult to relate one to another concept [22]. In addition, most students are more comfortable of hearing teacher explanations than asking the material deepen [2].

The low critical thinking skills has an unfavorable impact on the further learning process [18]. Therefore, it is important to train students to think critically because it allows students to analyze their thoughts in making decisions and drawing conclusions intelligently. Handayani [13], states that if the teacher gives students the opportunity to use their higher-level thinking, they will get used to distinguishing between facts and opinions.

The problem was also found in MA Negeri 2 Yogyakarta. Even though the teacher has implemented student-centered activities in learning, teacher is still the center of information for students. This causes learning to tend to be conventional, not using technology for innovation. Students tend to be passive compared to the teacher. Students also do not have the opportunity to be able to use their thinking at a higher level so they have not been trained to develop critical thinking skills.

Critical thinking skills can be empowered through attractive problem-based learning. It can increase students' motivation and interest in learning [3]. Problem-based learning is a learning model that changes the learning paradigm from teacher-centered to student-centered [6]. Students are given the opportunity to identify initial problems so that students not only learn concepts but also use the scientific method to solve these problems. Problem-based learning is recommended for use in learning the Independent Curriculum because it can present fully student-centered learning situations [21].

Problem-based learning provides opportunities for students to be able to learn through problems by linking to previous knowledge and knowledge to be learned. Learning is carried out by giving problems to students and these problems are solved by students so that an active learning climate can be created [8]. The teacher acts as a facilitator who has prepared the learning steps. These steps are in accordance with the problem-based learning syntax, including: 1) student orientation to problems, 2) student organizations for learning, 3) guiding investigations, 4) developing and presenting results, and 5) analyzing and evaluating the solving process problem [26].

Problem-based learning is not only carried out in the process of implementing learning, but can also be in the form of student worksheets (LKPD) as a guide for teachers and students to carry out a series of learning activities [4]. LKPD which is arranged based on problem-based learning syntax is expected to be able to improve students' critical thinking skills. The use of LKPD in accordance with current developments can be developed online, one of which is using Liveworksheets. Liveworksheets is a web platform that utilizes the latest technology by displaying sound, image and video features in LKPD [17]. Learning using Liveworksheet is expected to improve the quality of achievement of learning outcomes so that the quality of learning is more efficient and effective.

Based on the description and problems above, the focus of this research is integrating technology and problem-based learning innovation using Liveworksheets to improve students' critical thinking skills. The subject used in Liveworksheets is global warming. This subject consists of several sub-sections, including the greenhouse effect, causes, impacts, and efforts to tackle global warming. Liveworksheets are used to develop students' high-level thinking skills so that they can practice critical thinking skills. The series of activities on the Liveworksheets are arranged according to the problem-based learning syntax with interesting and not monotonous questions.

2. Method

This study used a pre-experimental design of one group pretest-posttest design. The treatment in this study was the implementation of problem-based learning liveworksheets on global warming material. This research process was carried out in four hours lessons of learning through the implementations of PBL Liveworksheet. The Liveworksheet was implied five syntax of PBL.

The population of this study was students of MAN 2 Yogyakarta and the sample is students of class XE consist of 24 students. Data collection techniques in this study used a written test technique in the form of pretest and posttest with the instrument that was used multiple-choice consist of five item critical thinking skills test questions. The critical thinking skills test was developed by adopt Facione [11] indicators as shown in Table 1. The instruments has gone through validity test from the physic teacher and colleagues. From the validity test, the instrument is valid based on content validity.

Table 1. . Indicator and Question Test of Critical Thinking Skills

Aspect	Indicator	Question	Item
Interpretation	State or understand the intent of data, events, or procedures.	A graph of carbon dioxide (CO2) levels was presented. Students can formulate appropriate hypotheses related to the impact of increasing levels of carbon dioxide (CO2) appropriately.	1
Analysis	Identify the right conclusion between statements and explanations based on existing information or opinions.	An illustration of the greenhouse effect was presented. Students can describe one of the processes of the greenhouse effect precisely.	2
Evaluation	Assess the accuracy of statements or other representations by assessing experiences or situations using the power of logic.	Students can determine daily behavior that can reduce greenhouse gas emissions appropriately.	4
Inference	Identify the factors required to make a statement by paying attention to the relevant information.	A statement of the impact of global warming was presented. Students can infer the causes of the impact of global warming appropriately.	3
Explanation	State opinions or reasons based on evidence and reasonable considerations.	Illustrations and statements related to the impact of global warming was presented. Students can correctly infer the causes and effects of global warming.	5

.

The critical thinking skills then obtained from the calculation then categorized according to the following Table 2.

Table 2. Interpretation Critical Thinking Category

Interval	Interpretation
X ≤ 25	Very low
25 < X ≤ 42	Low
42 < X ≤ 58	Enough
58 < X ≤ 75	High
75 < X	Very high

This study used descriptive analysis to measure the effect of implementations of PBL Liveworksheet to improve critical thinking skill of class XE. The statistical technique used as a prerequisite test is normality test. The significance of critical thinking skills improvement measured using paired t-test. The effectiveness of the treatment was measured using N-gain.

$$g = \frac{s\ posttest - s\ pretest}{s\ maximum - s\ pretest}$$

In Hake (1998), the normalised gain score is divided into several modified criteria. The criteria can be seen in Table 3.

Table 3. N-Gain Criteria

Interval	Criteria
N-Gain> 0,7	Effective
0,55 ≤ N-Gain ≤ 0,7	Enough effective
0,4 ≤ N-Gain ≤ 0,54	Less effective
N-Gain< 0,4	Not effective

3. Results & Discussion

Before learning activities begin, students are given a pretest. Furthermore, problem-based learning activities are carried out based on five learning syntaxes that consist of orienting students to problems, organizing students to learn, guiding investigations, developing and presenting results, and analyzing and evaluating problems. The evaluation stage is carried out by giving a posttest. There was an improve in the results of the pretest and posttest seen from the frequency of students who answered correctly on each indicator as shown in Figure 1.
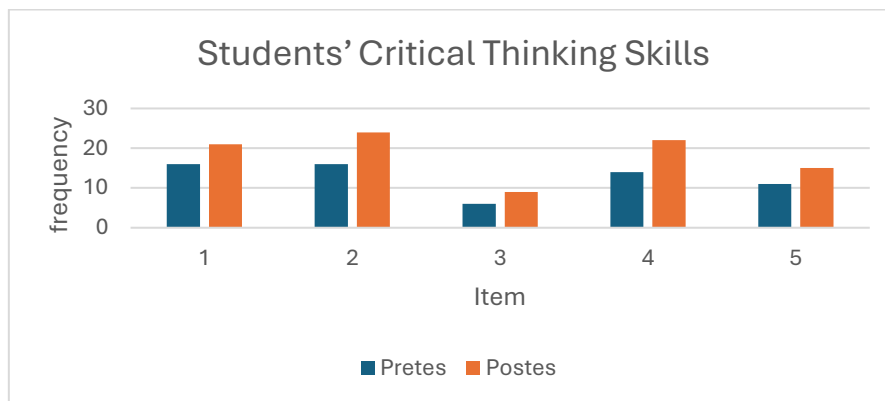
Figure 1. Students' critical thinking skills

The results showed an improve in the frequency of students answering correctly on all of the question indicators.

Students' critical thinking skills can be seen from five indicators, that are state or understand the meaning of data, events, or procedures; identify appropriate conclusions between statements and explanations based on existing information or opinions; identify the factors required to make a statement by paying attention to the relevant information; assess the accuracy of statements or other presentations by assessing experiences or situations using the power of logic; express opinions or reasons based on evidence and reasonable considerations. Based on these indicators, the results of achieving critical thinking as shown in Table 4.

Table 4. Students' Critical Thinking Achievement

Number	Indicator	Achievement	Category
1	State or understand the intent of data, events, or procedures.	87.50	Very high
2	Identify the right conclusion between statements and explanations based on existing information or opinions.	100.00	Very high
3	Assess the accuracy of statements or other representations by assessing experiences or situations using the power of logic.	37.50	Low
4	Identify the factors required to make a statement by paying attention to the relevant information.	91.67	Very high
5	State opinions or reasons based on evidence and reasonable considerations.	62.50	High

.

Students' critical thinking skills indicator of the state or understand the meaning of data, events, or procedures obtaining an average score of 87.50 in the very high category; identify the right conclusion between statements and explanations based on existing information or opinions obtaining an average score of 100.00, very high category; identify the factors required to make a statement by paying attention the relevant information obtaining an average score of 37.50 in the low category; assess the accuracy of statements or other representations by assessing experiences or situations using the power

of logic obtaining an average score of 91.67 in the very high category; and on the indicators of state opinions or reasons based on evidence and reasonable considerations obtaining an average score of 62.50 in the high category. Overall, the average critical thinking ability of the students is 75.83 in the high category.

The descriptive analysis to see the changes in student test results that carried out on pretest and postest shown in Table 5.

Table 5. The Result of Descriptive Analysis

	Pre-test	Post-test
Mean	60.00	80.00
Std. Dev	29.06	17.64
Min	00.00	60.00
Max	100.00	100.00

Based the Table 5, the average pretest score is 60,00 while the post-test is 80.00. based on that results, there is an improve in critical thinking skills. So, it can be concluded that there is an improvement in the critical thinking skill achieved before and after the implementation of PBL Liveworksheet. Then, for the normality test used Shapiro-Wilk test are shown in Table 6.

Table 6. The Result of Normality Test

	Sig.	Probability (α)	Interpretation
Pre-test	0.830	0.05	Normal
Post-test	0.835	0.05	Normal

Based on the result of normality test, the data is normally distributed so that analysis can be continued using t-test. The t-test used for compare paired sample values. In this study, we want to know the average value of students' critical thinking skills is significantly different or not. The hypothesis of this research is as follows. H0: There is no significant effect of the implementation of PBL Liveworksheet to improve students' critical thinking skills in global warming topic at high school. H1: There is a significant effect of the implementation of PBL Liveworksheet to improve students' critical thinking skills in global warming topic at high school. The result of T-test shown in Table 7.

Table 7. The Result of T-Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre - Post	-20.83333	36.10572	7.37005	-36.07944	-5.58722	-2.827	23	.010

Based on the Table 7, the Sig (2-tailed) < α is 0.010 < 0.05. it means H0 is rejected. The final conclusion is that there is a significant effect of the implementation of PBL Liveworksheet to improve students' critical thinking skills in global warming topic at high school. The used of PBL Liveworksheet is an interactive learning media to support the learning process.

Using N-Gain test, the effectiveness of PBL Liveworksheet to improve students' critical thingking skills was shown in Table 8.

Table 8. The Result of N-Gain Test

	Score			Std. dev	$\langle g \rangle$	Category
	Min	Max	Average			
Pre-test	0.00	100.00	60.00	29.06	0.54	Less effective
Post-test	60.00	100.00	80.00	17.64		

Based on the results of the Gain test, students' critical thinking was 0.54 in the less effective category. From the results of the analysis, it can be concluded that media assisted by Liveworksheet based on problem-based learning is improving the student's critical thinking skill but still on less effective category in the global warming learning topic.

The characteristic of PBL model is the existance of problem case studies which become topic for discussion in learning process. PBL directs students to gets conclusions after the discussion that required critical thinking skills. It supported by the research, that student discussion activity is one aspect of critical thinking skills [14]. The strength of PBL is that problem solving is a great technique to help students develop higher order thinking skills such as creative thinking, problem solving and communication skills [20]. Problem-based learning plays a role during the learning process because the activities are carried out using a real context so that it can help students to understand and analyze the properties. Students who have critical thinking are able to ask questions or convey problems and formulate them clearly. Then, students can bring up new ideas so it is hoped that students will be able to solve the problems [12]. Students need critical thinking skills to calculate, manipulate, and observe in science learning [10]. Its important for students in the future.

PBL activities are carried out by integrating technology innovative liveworksheet learning media. Liveworksheets are a supporting interactive media for learning the topic of global warming with case studies in a video that is displayed. Then students can discuss the problem with colleagues. It supported the research that Liveworksheets is a web platform that utilizes the latest technology by displaying sound, image and video features in LKPD [17]. By giving the Liveworksheet E-LKPD with stages of a scientific method that will help students to improve their critical thinking skills, the Liveworksheet E-LKPD itself will make it easier for students to absorb the information supplemented by engaging feature's [7]. Learning using Liveworksheet is expected to improve the quality of achievement of learning outcomes so that the quality of learning is more efficient and effective.

From the results of research and discussion, the combination of Liveworksheet and PBL is the right strategy to improve student's critical thinking skill. Based on the results learning using the integration of technology using Liveworksheet with PBL was improving the quality of achievement and significance effect of learning outcomes. But the results are still in the less category. That requires many modifications on that learning media cause at the implementation have some technical problems. Beside that, the test result in item 3 has less category achievement, also needs some improvement for that item.

4. Conclusion

Based on the findings and results analysis, the application of problem-based learning Liveworksheets has significant effect to improve student's critical thinking skill. The result is on less effective category, it can be concluded that media assisted by Liveworksheet based on problem-based learning is less effective in the learning process. The results can be used as an input for teacher or user to improving the media, and make sure the time learning process effective, if using problem-based learning Liveworksheets in the future. Future research is expected to be able to develop effective PBL-Liveworksheet on other topic that support critical thinking or more specific research.

References

[1] Agnafia, D. N. (2018). Analisis Kemampuan Berpikir Kritis Siswa dalam Pembelajaran Biologi (Vol. 5, Issue 1).

[2] Al-Fikry, I., Yusrizal, Y., & Syukri, M. (2018). Pengaruh Model Problem Based Learning Terhadap Kemampuan Berpikir Kritis Peserta Didik Pada Materi Kalor. Jurnal Pendidikan Sains Indonesia, 6(1), 17–23. https://doi.org/10.24815/jpsi.v6i1.10776

[3] Arfianto, A., Sutama, S., & Fathoni, A. (2022). Kelayakan Buku Lembar Kerja Peserta Didik Berbasis Problem Based Learning (PBL) pada Pembelajaran Tatap Muka Terbatas di Sekolah Dasar. Jurnal Basicedu, 6(1), 656–663. https://doi.org/10.31004/basicedu.v6i1.1985

[4] Ariawan, R., Kinanti, D., & Putri, J. (2020). Pengembangan Perangkat Pembelajaran Matematika dengan Model Pembelajaran Problem Based Learning disertai Pendekatan Visual Thinking pada Pokok Bahasan Kubus dan Balok Kelas VIII. In Journal for Research in Mathematics Learning) p (Vol. 3, Issue 3).

[5] Azmi Handayani, F. (n.d.). Validitas dan Praktikalitas Modul Pendidikan Agama Islam Berbasis Scientific Approach untuk Siswa Kelas VII SMP.

[6] Bojonegoro Jawa Timur Indura Asmawati, K., Saleh, S., Yusna Otomatisasi dan Tata Kelola Perkantoran SMK Nasional Baureno Kabupaten Bojonegoro Jawa Timur, S., Ilmu Sosial dan Hukum Universitas Negeri Makassar Sulawesi Selatan, F., dan Tata Kelola Perkantoran SMK Negeri, O., & Sulawesi Selatan, S. (2022). ©JP-3 Jurnal Pemikiran dan Pengembangan Pembelajaran Peningkatan Keaktifan dan Hasil Belajar Korespondensi melalui Penerapan Model Pembelajaran Problem Based Learning SMK Nasional Baureno. In ©Indura Asmawati (Vol. 4, Issue 1).

[7] Chaniago, O. A. A. B., Maulina, D., Wiono, W. J., & Hernawati, D. (2022). Junior High School Students' Critical Thinking Ability in Biology Learning through Liveworksheet E-LKPD Based on Scientific Approach. Biosfer: Jurnal Tadris Biologi, 13(2), 173-182.

[8] Darsani Negeri, L. S. (2019). Penerapan Model Pembelajaran Berbasis Masalah untuk Meningkatkan Hasil Belajar IPA. JP2, 2(3).

[9] Devi, P. S., & Bayu, G. W. (2020). Berpikir Kritis dan Hasil Belajar IPA Melalui Pembelajaran Problem Based Learning Berbantuan Media Visual. Mimbar PGSD Undiksha, 8(2), 238-252.

[10] Dewi, A. C., Hapidin, H., & Akbar, Z. (2019). Pengaruh Model Pembelajaran dan Kemampuan Berpikir Kritis terhadap Pemahaman Sains Fisik. Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini, 3(1), 18. https://doi.org/10.31004/obsesi.v3i1.136

[11] Facione, P. A. (2015). Permission to Reprint for Non-Commercial Uses Critical Thinking: What It Is and Why It Counts. Peter A. Facione, Measured Reasons LLC.

[12] Gunawan, A. S., Marianti, A., & Kamari, P. (2022). Analisis Kemampuan Berpikir Kritis Siswa Smp Dalam Menyelesaikan Soal Terkait Materi Hereditas. BIO-EDU: Jurnal Pendidikan Biologi, 7(2), 125–133. https://doi.org/10.32938/jbe.v7i2.2006

[13] Handayani, L. (2020). Peningkatan motivasi belajar IPA melalui model pembelajaran project based learning pada masa pandemi covid-19 bagi siswa SMP Negeri 4 Gunungsari. Jurnal Paedagogy, 7(3), 168-174.

[14] Harianja, R., Tampubolon, T., & Manalu, L. (2023). Analysis of problem-based learning model on mathematical critical thinking skills of elementary school students. Formatif: Jurnal Ilmiah Pendidikan MIPA, 13 (1): 101-108. http://dx.doi.org/10.30998/formatif.v13i1.17251

[15] Hidayah, Y., Dwi Kurniawan, I., & Nawang Ginusti, G. (2023). JPK: Jurnal Pancasila dan Kewarganegaraan (Print) Penggunaan Literasi Informasi untuk Pengembangan Watak Kewarganegaraan: Interaksi antara Pendidikan Kewarganegaraan, Teknologi dan Bahasa. JPK: Jurnal Pancasila Dan Kewarganegaraan, 8(1), 65–75. https://doi.org/10.24269/jpk.v8.n1.2023.pp65-75

[16] Letasado, M. R., & Muhsam, J. (2020). Pengaruh Implementasi Pembelajaran Saintifik Berbasis Keterampilan Belajar dan Berinovasi 4C terhadap Percaya Diri dan Kemampuan Membaca Pemahaman. Musamus Journal of Primary Education, 76–84. https://doi.org/10.35724/musjpe.v2i2.2559

[17] Nadifatinisa, N., & Mutia Sari, P. (2021). Pengembangan Lembar Kerja Peserta Didik (LKPD) Berbasis Higher Order Thingking Skill (HOTS) Pada Pembelajaran IPA Materi Ekosistem Kelas V. Jurnal Pedagogi Dan Pembelajaran, 4(2), 344–351. https://ejournal.undiksha.ac.id/index.php/JP2/index

[18] Nuryanti, L., Zubaidah, S., & Diantoro, M. (n.d.). Analisis Kemampuan Berpikir Kritis Siswa SMP. http://journal.um.ac.id/index.php/jptpp/

[19] Nyoman Wirata SMK Negeri, I. (2018). Penerapan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Prestasi Belajar Ipa Siswa (Vol. 8, Issue 1). http://ejournal-pasca.undiksha.ac.id/index.php/jurnal_ipa/index

[20] Palinussa, A.L., Lakusa, J.S., & Moma, L. (2023). Comparison of problem-based learning and discovery learning to improve students' mathematical critical thinking skills. Formatif: Jurnal Ilmiah Pendidikan MIPA, 13 (1): 109-122. http://dx.doi.org/10.30998/formatif.v13i1.15205

[21] Pertiwi. (2023). Al-Khazini: Jurnal Pendidikan Fisika Pengaruh Model Pembelajaran Problem Based Learning Berbantuan LKPD Live Worksheet Terhadap Motivasi Belajar Peserta Didik. 3(1). https://doi.org/10.24252/al-khazini.v3i1.36228

[22] Putri, R. M., Setiadi, D., Mahrus, M., & Jamaluddin, J. (2022). Analisis Pembelajaran Daring dan Kemampuan Literasi Sains Biologi serta Berpikir Kritis Siswa di SMA Negeri 1 Woha pada Masa Pandemi Covid-19. Jurnal Ilmiah Profesi Pendidikan, 7(2c), 747–754. https://doi.org/10.29303/jipp.v7i2c.619

[23] Samadun, S., Setiani, R., Koranto, D., & Marsini, M. (2023). Effectiveness of Inquiry Learning Models to Improve Students' Critical Thinking Ability. IJORER : International Journal of Recent Educational Research, 4, 203–212. https://doi.org/10.46245/ijorer.v4i2.277

[24] Sevtia, A. F., Taufik, M., & Doyan, A. (2022). Pengembangan Media Pembelajaran Fisika Berbasis Google Sites untuk Meningkatkan Kemampuan Penguasaan Konsep dan Berpikir Kritis Peserta Didik SMA. Jurnal Ilmiah Profesi Pendidikan, 7(3), 1167–1173. https://doi.org/10.29303/jipp.v7i3.743

[25] Sintya Devi, P., & Wira Bayu, G. (2020). id 2 Berpikir Kritis dan Hasil Belajar IPA Melalui Pembelajaran Problem Based Learning Berbantuan Media Visual. 8(2), 238–252.

[26] Wirata, I Nyoman. (2019) penerapan model pembelajaran problem based learning untuk meningkatkan prestasi belajar IPA siswa Jurnal Pendidikan dan Pembelajaan IPA Indonesia, Volume 9 Nomor 3 Tahun 2019. https://ejournalpasca.undiksha.ac.id/index.php/jurnal_ipa/article/view/2934/1571

ICT-Based Collaborative Learning Approach to Improve Students' Participation in the Classroom

Ricky Sriyanda[1], Muhammad Farhan[2], and Patri Juliyati[3]

[1,2,3] Department of English Language Education, Faculty of Languages, Arts, and Culture
Universitas Negeri Yogyakarta, Indonesia

rickysriyanda.2022@student.uny.ac.id
muhammadfarhan.2022@student.uny.ac.id
patrijuliyati.2022@student.uny.ac.id

Abstract. The level of engagement in English language classrooms in modern times is highly related to using Information and Communication Technology (ICT) for teacher and student interaction. This study examines how incorporating Information and Communication Technology (ICT) in collaborative learning strategies can enhance student engagement in English language classrooms. The research involved 36 Grade XII students from Senior High School 6 Yogyakarta, Indonesia. This study was conducted in Classroom Action Research (CAR) with two cycles. The data was collected mainly by class observation and execution of a t-test. This research suggests that the Collaborative Learning strategy could improve students' participation actively, proven by the increasing number of confident students from Cycle 1 (33.3%) and Cycle 2 (66.6%). Moreover, the Paired Sample t-test findings showed a statistically lower mean score for pretests, 66.81 compared to post-tests, with 76.67 scores. Therefore, using ICT in collaborative learning can enhance student engagement and motivation in the learning process.

Keywords: Collaboration Learning (CL), English Language Teaching (ELT), ICT tools, students' engagement.

1. Introduction

Considering the continuous changes occurring in the educational landscape due to technological development (Raja et al. 2018), traditional teaching methods must change to keep up with emerging trends and engage and motivate students properly. One noticeable tendency is the shift from a teacher-centered to a student-centered approach in the classroom (Serin, H. 2018); here, the teacher goes from being the single authority figure in the classroom to having the role of a learning facilitator. This change signifies a distancing from the traditional power structure, where the teacher held absolute control over the classroom, towards a more collaborative and inclusive environment. The use of learning Collaboratively in teaching empowering teaching methods. According to Ibrahim et al. (2015), and Nguyen et al., 2021), the Collaborative Learning approach increases student dependence on one another for information acquisition. It adds significance and enthusiasm to the learning process. By fostering a collaborative method, one can tap into each learner's diverse perspectives and unique talents, enabling them to thrive and reach their full potential. (Nur, S., & Butarbutar, R. (2022); Bošković Marković, V. (2020). According to Patesan et al. (2016), implementing Collaborative Learning for EFL students has four benefits: (1) Students who collaborate tend to understand and like one another more. (2) They have a fantastic opportunity to develop critical thinking abilities and demonstrate significant

development in those skills. (3) They enhance their ability to communicate effectively, and (4) Individuals' respect and self-esteem increase when peers appreciate their work.

On the other hand, the role of Information and Communication Technology (ICT) has become increasingly prominent in modern teaching practices. With the rapid advancement of technology, educators now have access to a vast array of digital resources, tools, and platforms that enhance the learning experience. ICT empowers teachers to create interactive lessons (Avidov-Ungar, O. 2018), provide personalized feedback, and facilitate collaborative learning opportunities beyond the confines of the traditional classroom. ICTs can help students acquire learning resources, interact and collaborate, increase their comprehension of language, and strengthen their learning autonomy (Falck et al., 2018; Poudel, 2022). However, the use of ICT has its challenges because students getting distracted during classes by using ICT. Kacetl, J., & Klímová, B. (2019) also mentioned that due to the multiple uses of ICT, students can choose what utilization they will give to the ICT tools. Therefore, by embracing these new trends and incorporating ICT into teaching, educators can transform the learning experience into a dynamic and engaging process (Hoesni et al., 2020). Moreover, the main focus of the present study is the teaching methods and students' lack of participation in the teaching and learning process. As such, this study discussed engaging students to participate actively in the classroom while using ICT as an aid to assist in the teaching method through Collaborative Learning (CL).

3. Research Methodology

3.1 Research Design

This study is designed as Classroom Action Research (CAR). This research was intended to give actions to improve the teaching and learning process for students who participated, especially in speaking skills, by using Collaborative techniques. This classroom action research was conducted using Kurt Lewin's action research model, which goes as follows, planning, action, observation, and reflection (Djajadi, 2019). In this classroom action research, the research was conducted in two cycles.

3.2 Participants

The present study consists of 36 students of 12th grade from science specialty at National Yogyakarta Senior High School 6 (SMA 6 Negeri Yogyakarta) from the 2022/2023 academic year. The sample was taken by purposive sampling technique The attitude of the students towards the English language classes was considered as main factor to determine whether the students fit to be the sample of the study or not. The task assigned to participants involved encouraging student engagement in oral communication classes through the utilization of collaborative methods.

3.3 Instruments

The researchers collected the data by using the following techniques:

1. Observation checklist: the researchers visited SMA 6 Negeri Yogyakarta to observe a regular class conducted by the teacher of the institution, among the checklist factors it can be found, management of time and discipline, sensitivity to students' cultural and personal differences, academic and personal assistance to student by the teacher, attitude of the teacher during the classes, and physical aspects of the classroom and its overall conditions.
2. Pre-test and post-test: researcher assessed students' English language skills during observation and after an action plan, using mean and standard deviation at 0.00 and tested a hypothesis using an independent t-test at 0.05 alpha level.

3.4 Indicator of Success

The success of using ICT for collaborative learning to engage student's participation in Grade XII IPA 6 of SMAN 6 Yogyakarta can be measured with two aspects, namely:

1. As per the observation checklist, the researcher recorded that more than 60% (>20 students) of the 36 students actively participated in the classroom from the first to the last meeting.
2. Secondly, the pretest and post-test scores increased after using Collaborative Learning through ICT tools.

3.5 Hypothesis

H0: There is no difference between ICT-Based Collaborative learning approach to improve students' participation in the classrrom.

H1: There is difference between ICT-Based Collaborative learning approach to improve students' participation in the classrrom.

4. Findings

4.1 The Description of the Action Research

This study was conducted based on observations and interviews with teacher at SMA N 6 Yogyakarta during the first semester of the English subject. Researchers discovered several issues during the research process, particularly in Class XII IPA 4. The researcher discovered an interesting problem: Students needed more participation and were busy with their smartphones in class. The researcher discovered that only a few students (8 out of 36) participated in speaking in English class. The researcher implemented a CL strategy with ICT tools to address this issue to increase student participation.

4.2 Description of Cycle 1

Cycle 1 uses collaborative learning and ICT tools as teaching strategies. The cycle was completed in three meetings. English teachers and researchers identified the need for students to participate more in the teaching and learning process before implementing Collaborative Learning teaching strategies. This cycle includes four stages: planning, action, observation, and reflection. English teachers collaborate with researchers to observe the teaching and learning process. In addition, the researcher asked an assistant to document and photograph the learning process. The teacher's RPP prepares the material, which continues with the first-semester plan.

A. *Plan*

Three meetings were conducted to discuss the classroom teaching schedule, develop a collaborative learning framework using ICT tools, create student observation checklists, and prepare necessary teaching materials, including projectors, laptops, recorders, and cameras.

B. *Action*

The action involved three meetings, including an introduction, an ice-breaking activity on Quizizz, a presentation of teaching methodology, a video of news, and a 15-minute discussion with partners to identify the text's structure and language features, followed by presenting their works.

C. *Observation*

The collaborator observed the implementation of Collaborative Learning (CL) using ICT tools in Cycle 1, observing student participation and observing low improvement in participation. The table shows students' confidence in speaking English, indicating a need for further improvement.

Table 1. Result of Cycle 1

Students' Participation Categories	The Number of Students	Percentage (%)
Participation	12	33.3%
Not Participation	24	66.6%

Table 1. shows 33.3% of 36 students participated in classroom activities during Cycle 1, with gadgets like smartphones, tablets, and laptops playing a significant role in class, assisting in practice and information search, but also distracting during explaining.

D. *Reflection*

The number of students actively participating in Collaborative Learning with ICT tools increased in comparison to the pre-cycle observation, as shown by the following:

Table 2. Comparison of Pre-Cycle and Cycle 1

Students' Participation Categories	Pre-Cycle		Cycle 1	
	The Number of Students	Percentage (%)	The Number of Students	Percentage (%)
Participation	8	22.2%	12	33.3%
Not Participation	28	77.7%	24	66.6%

The study found a (22.2%) to 12 (33.3%) increase in English speaking students in cycle 1, but still needs to meet the goal of 60% participation. Researchers should investigate why the learning process is ineffective due to disruptions from gadgets such as smartphones, tablets, and laptops. Many students were focused on something other than learning but engaged in the discussion.

4.3 Description of Cycle 2
Cycle 2 continued the improvement of Cycle 1, focusing on planning, action, observation, and reflection. Despite improvements, Collaborative Learning through ICT tools did not increase student participation by 60% of 36 students.

A. *Plan*
The task involved creating a Collaborative Learning material using ICT tools, creating an observation checklist for students, and conducting post-tests for each group.

B. *Action*
The action was implemented over three meetings. In the final meeting, the researcher incorporated the CL strategy. The class began with the presentation of group projects on review texts to the entire class. The other students, acting as spectators, paid close attention to their classmates' presentations. Some spectators responded to the presenters, showing interest and engagement in the activity.

C. *Observation*
The collaborator observed that the implementation of the CL teaching strategy in Cycle 2 significantly improved students' classroom participation using ICT tools in. The results can be seen in the table below:

Table 3. Result of Cycle 2

Students' Participation Categories	The Number of Students	Percentage (%)
Participation	24	66.6%
Not Participation	12	33.3%

According to the above table, 24 out of 36 students, or 66.6%, participated in the classroom during cycle 2, while 12 out of 36 students, or 33.3%, did not participate and still needed to participate. Therefore, the implementing a CL teaching strategy with ICT tools in Cycle 2 to improve student participation in Grade XII IPA 4 at SMAN 6 Yogyakarta.

D. *Reflection*
Students in cycle 2 with category participation increased in the implementation as compared to cycle 1. See the table below:

Table 4. Comparison of Cycle 1 and Cycle 2

Students' Participation Categories	Cycle 1	Cycle 2
Participation	33.3%	66.6%
Not Participation	66.6%	33.3%

The study found a significant improvement in active participation among students in cycle 2, with a 60% classroom participation rate. Students showed increased confidence during practicing sessions and were motivated by immediate rewards and praise, resulting in a higher participation rate.

4.2 Pretest and Post-test Scores

Through measuring student participation, this study used a t-test to see the result of the T-test compared two different scores between the pre-test and post-test.

T-Test

[DataSet0]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	hasilpretest	66.81	36	9.026	1.504
	hasilpostest	76.67	36	9.798	1.633

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	hasilpretest & hasilpostest	36	.750	.000

Figure 1. T-Test sample statistic

According to the table above overall, it can be said the subjects of this study were 36 students. The percentage of mean in the pre-test result is 66.81 with a standard deviation of 9.026 while the percentage of mean in the result of post-test is 76.67 with a standard deviation of 1.633. However, the table on paired samples correlations showed that there is a correlation between pre-test and post-test. The hypothesis of this research will be answered below.

Paired Samples Test

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	hasilpretest - hasilpostest	-9.861	6.698	1.116	-12.127	-7.595	-8.833	35	.000

Figure 2. Paired Sample Test

Based on the table output "Paired Sample Test" above, it is known that the sig value. (2-tailed) is 0.000 < 0.05, then H0 is rejected, and H1 is accepted. The average difference between the pre-test and post-test results indicates that the collaborative technique on ICT has a positive influence on students' English learning activity at SMAN 6 Yogyakarta. According to the table output paired samples test above, the mean paired differences value is -9.861. The pre-test and post-test differences are represented by this figure, which ranges from -12.127 to -7.595 (95% confidence interval of the difference lower and upper) based on the average pre- and post-test findings of 66.81 - 76.67 = -9.861. Therefore, the test was successful as it identified students who participated in the classroom. The results are shown in **Figure 1**. There was a difference between their pre and post-test. Moreover, since each student was required to perform their task, the expected total was 36 students. Based on the result, a few students completed their final project and presented it successfully.

5. Discussions

The study found that 33.3% of 36 students participated actively in the first cycle, while 66.6% attended the first meeting. After completing cycle 2, 66.6% of students participated, indicating that the Collaborative Learning strategy using ICT tools can improve classroom participation, despite some

students not following the researcher's instructions. This finding was consistent with research conducted by Johnson et al. (2014). *Collaborative Learning* is a process in which students learn something collaboratively. It makes teachers collaborate with other teams and share responsibilities. The teacher also provides feedback and builds trust with each other. It will give teachers good self-confidence in using their skills and competencies. Interaction is significant for teachers to upgrade and create professional relationships with each other. Collaborative Learning occurs when students work collaboratively toward a common objective, with teachers directing the process of acquiring knowledge, developing skills, and creating a sound and inclusive learning environment (Hei et al., 2020; Nguyen et al., 2021).

The findings from the observation addressing several issues raised that the students were not engaged in classroom participation because of anxiety and technology distraction. Using the collaborative method can be seen in the result that at the end of the findings, students engaged in the task, students enjoyed and learned through collaboration when they found it valuable, even when working in diverse groups (Lee & Yang, 2020). It is consistent with the findings (Ha et al., 2022; and Law et al., 2017), who also found that collaborative Learning is a potential method for learners to help them identify their nervous selves and gain in utilizing the target language. Similar pre- and post-test changes implied that CL improved students' participation and reduced anxiety.

6. Conclusion

The study found that using ICT in a Collaborative Learning strategy can enhance student engagement in the classroom. In cycle 1, students were active and engaged, while in cycle 2, they showed increased enthusiasm, active participation, and collaboration. This flexible approach promotes motivation, interaction, and critical thinking, indicating the success of using ICT in collaborative learning.

References

[1] Avidov-Ungar, O. (2018). Empowerment among teachers in leadership positions involving ICT implementation in schools. Leadership and Policy in Schools, 17(1), 138-163. https://doi.org/10.1080/15700763.2016.1270331

[2] Bošković Marković, V. (2020). Teachers' Perception of the Use of ICT in Foreign Language Teaching at a Higher Education Institution. In Sinteza 2020-International Scientific Conference on Information Technology and Data Related Research (pp. 93-98). Singidunum University. https://doi.org/10.15308/Sinteza-2020-93-98

[3] Djajadi, M. (2019). Penelitian tindakan kelas (Classroom Action Research). Yogyakarta: Arti Bumi Intaran.

[4] Falck, O., Mang, C., & Woessmann, L. (2018). Virtually no effect? Different uses of classroom computers and their effect on student achievement. Oxford Bulletin of Economics and Statistics, 80(1), 1-38.

[5] Ha, T. Y. N., Nguyen, T. B. N., Nguyen, N. L. D., & Tran, T. N. (2022). Effects of Collaborative Learning on young ESL learners' L2 anxiety and speaking performance. International Journal of Asian Education, 3(2), 109–121. https://doi.org/10.46966/ijae.v3i2.286

[6] Hei de, M., Tabacaru, C., Sjoer, E., Rippe, R., & Walenkamp, J. (2020). Developing intercultural competence through Collaborative Learning in international higher education. Journal of Studies in International Education, 24(2), 190–211. https://doi.org/10.1177/1028315319826226

[7] Hoesni, W. E. W., Hassan, F. N. A., Ajmain, M. T., & Rosli, N. A. M. (2020). The Effects of ICT Towards Students' Attitude. Khazanah Pendidikan Islam, 2(2), 90-99. https://doi.org/10.15575/kp.v2i2. 9270.

[8] Johnson, D.W., Johnson, R.T., and Smith, K.A. (2014). Cooperative learning: Improving university instruction by basing practice on validated theory. Journal on Excellence in College Teaching, 25, 85-118.

[9] Kacetl, J., & Klímová, B. (2019). Use of smartphone application in English language learning—A challenge for foreign language education. Education Sciences, 9(3), 179. doi:10.3390/educsci9030179

[10] Law, P. S. Q., Chung, W. Y. J., & Leung, C. C. L. (2017). Perceptions of Collaborative Learning in Enhancing Undergraduate Education Students' Engagement in Teaching and Learning English. US-China Education Review A, 7(2). https://doi.org/10.17265/2161-623x/2017.02.002

[11] Lee, W. W. S., & Yang, M. (2020). Effective Collaborative Learning from Chinese Students' Perspective: A Qualitative Study in a Teacher Training Course. Teaching in Higher Education, 1–17. https://doi.org/10.1080/13562517.2020.1790517

[12] Nguyen, C., Trinh, T., Le, D., & Nguyen, T. (2021). Cooperative Learning in English language classrooms: Teachers' perceptions and actions. Anatolian Journal of Education, 6(2), 89–108. https://doi.org/10.29333/aje.2021.628a

[13] Nur, S., & Butarbutar, R. (2022). Insights of Collaborative Learning Approach from Social-Psychology Perspective: A Systematic Review. Journal of English Education and Teaching, 6(3), 379-397. https://doi.org/10.33369/jeet.6.3.379-397

[14] Pateşan, M., Balagiu, A., & Zechia, D. (2016). The benefits of cooperative learning. In International conference knowledge-based organization (Vol. 22, No. 2, pp. 478-483).

[15] Poudel, A. P. (2022). Information and communication technology in English language teaching: Some Opportunities and Challenges. Journal of Comparative & International Higher Education, 14(4), 103–116. https://doi.org/10.32674/jcihe.v14i4.3874

[16] Serin, H. (2018). A comparison of teacher-centered and student-centered approaches in educational settings. International Journal of Social Sciences & Educational Studies, 5(1), 164-167. https://doi.org/10.23918/ijsses.v5i1p164

Enhancing Students' Story Writing Skills through Book Creator: A Mixed-Method Study

Rukadah

English Department, Universitas Negeri Yogyakarta, Sleman, Indonesia
E-mail: rukadah.2023@student.uny.ac.id

Abstract. Integrating digital media into the teaching and learning process is important to enhance writing skills. This study aimed to describe the implementation of the Book Creator application to promote writing skills and gain students' perceptions about the application. The research used purposive sampling, that consisted of 16 students from the ninth grade of junior high school. This research using Mixed methods with sequential explanatory design. First, the quantitative method is a one-group Pretest-posttest design to obtain data of the effectiveness of Book Creator in enhancing students' skill. The second, qualitative method to deepen the information about students' perception in using the Book Creator application for story writing. The validity of the questionnaire and test were analysed using the validity of content which was consulted with the experts. The results showed that an increased students' skills in story writing with the normalised gain results g= 0.69. Second, the qualitative method was used to gain students' perception in implementing Book creator. The results were presented thematically with positive perception in terms of experience reflection, technology learning, creativity process, and challenges and solutions.

Keywords: Enhancing students writing skills, Book creator, mixed-method study

1. Introduction

The adoption of digital learning in English classroom settings has become more widespread in recent years and plays an important role in the teaching and learning process (Azad, 2023). Digital media becomes very important to provide digital skills to students to accommodate diverse learning styles (Erstad et al, 2021). Digital storytelling (DST) could be especially beneficial for facilitating vocabulary learning, writing and speaking skills in EFL education (Kevser, 2019; Yang & Hung, 2020). Tanrikulu (2020) showed that DST had a positive perception and could improve students' writing skills. It is reflected in the student views that collaborative DST positively affects the internal and external structure of the text.

Writing skills are important to be intensively developed by the students (Rao & Durga, 2018). Among the four English skills, the most problematic talent is writing. Even though it is known that Indonesian students have been studying English for a long time, they still do not possess a strong writing foundation (Epçaçan, 2019). Narrative text or story is one of the materials that is taught in an English classroom to junior high students, aligning with one of the learning outcomes of phase D in the Independent Curriculum, writing skills. According to Chen Hsieh & Lee, 2021; Kevser, 2019, storytelling has a strong positive influence on the students' learning. Story writing could be so versatile, so it is an appropriate genre to teach in the classroom. Through story writing, students learn how to

organize the idea, about the linguistic, pragmatic, and sociolinguistic competencies. A story writer described the writing experience as enjoyable, the narrative as creative with a moral lesson, and the interpretation as profound, comprehensive, and pertinent to the lives of others (Lang, et al 2024)

Appropriate digital media can be implemented in the classroom to achieve the goals and objectives of learning (Erstad et al, 2021; Hidayat & Susanto, 2020) and the strategic media must align with their pedagogical goals and objectives (Azad, 2023). Digital media such as Book Creator is one of the applications that can be implemented in writing class. Digital Storytelling (DST) where the primary objective is to effectively narrate stories to the audience.

BooAccording to Tanrikulu (2020), the story-writing phase is the crucial part of the Digital Storytelling creator application is one of the digital platforms that can be applied in the classroom as a medium of writing. Book Creator is an internet-based application, simple to use and enables students to produce text by combining images, drawings and sounds. It allows students to design layouts and forms based on their creativity (Maharani & Santosa, 2021). Due to its simplicity and ease of use, it is highly beneficial for educators to employ this application during the learning process as a teaching medium to create digital books. The Book Creator application also answers the challenge of the conventional learning system. Information technology (IT) that uses internet standards can solve many problems.

Although the integration of technology such as the Book Creator application is a simple tool used to create digital books, not many teachers use this application. Digital Storytelling (DST) offers a way of negotiating and making sense of identities, experiences, and knowledge through the multimodal and open-ended opportunities they offer for self-expression (Kalantari et al, 2023). However, many educators still face challenges in consistently integrating technology into their teaching routines. As seen in the previous research just a few articles were found. Besides, teachers prefer using manual handwriting to implementing digital books application for some reasons such as lack of time, heavy teaching loads, and the limitation of facilities to access the internet. This research aims to investigate the implementation of the Book Creator application in writing class. The discussion is limited to the following questions: (1) How does the use of the Book Creator application affect students' story writing skills performance? (2) What are the students' perceptions about the implementation of the Book Creator application in story writing activities?

2. Research and Method

2. 1. Research Design

To answer the research questions, a mixed methods approach with a sequential explanatory design was implemented by combining quantitative and qualitative research methods in step-by-step ways. The application of the sequential explanatory design begins with the collection and analysis of quantitative data, followed by the collection and analysis of qualitative data, which is developed based on the initial quantitative data results (Creswell, 2018). The data collection of the first phase was quantitative to answer the research question (RQ) no 1 by applying pre-experimental design, namely a group pretest-posttest design. The follow-up of the first data collection was a qualitative method to answer the research question (RQ) no 2. In the second phase of the research, a survey using a questionnaire as the instrument consisting of open-ended questions was presented through Google form application to gain deeper understanding about the research questions.

2. 2. Participants

The data source sample was selected through purposive sampling where the subjects of the study were determined before the research was conducted, namely students in class 9 of Budi Mulia Dua Junior High School, with a total 16 students. All of the participants' pretest and posttest were used to know the

result of the progress in pre-experimental design. Meanwhile, in the second phase of the research, to get qualitative data, the researcher spread to the participants through a google form application to get deeper information due to the use of the Book Creator application in story writing. (Creswell, 2018) states that the participants in a mixed methods approach with a sequential explanatory design should be the same individuals as the quantitative participants because the design intends to follow up the quantitative results and explore the results in more depth.

2.3 Method of Data Collection and Analysis
2.3.1 Data Collection
This study utilized both quantitative and qualitative data collection to evaluate the effectiveness of Book Creator in enhancing story writing skills. The research employed a pre-experimental design with pre-tests and post-tests analyzed using SPSS to examine distribution patterns and calculate N-Gain for each student's progress. Both tests comprised 20 validated questions reviewed by an expert. For qualitative data, a convenient-purposive sampling method was used with open-ended questionnaires via Google Forms to capture students' perceptions of Book Creator. This mixed-methods approach, following Creswell's (2018) sequential explanatory design, involved the same participants in both phases to ensure qualitative data complemented the quantitative findings. Eight participants responded to the survey, providing deeper insights into the application's impact on their writing skills.

2.3.2 Data Analysis
The study's quantitative data analysis involved comparing pre-test and post-test scores to measure the impact of Book Creator on students' performance. Using SPSS, the analysis examined test distributions to identify trends and calculated N-Gain for individual student improvement. Each test contained 20 expert-validated questions, providing a thorough understanding of the intervention's effectiveness in enhancing learning outcomes. The qualitative data analysis, derived from open-ended survey questions, involved transcribing and organizing responses, then categorizing them into themes and patterns. This process offered detailed insights into participants' experiences, opinions, and attitudes. Together, these analyses provided rich, contextualized insights, complementing each other to offer a comprehensive understanding of the research topic and the reasons behind participants' perspectives.

3. Result and Discussion

3.1 How does the use of the Book Creator application affect students' story writing skills performance?
The pre-test and post-test results before and after the implementation of Book Creator in story writing can be presented in the graphs, as follows.
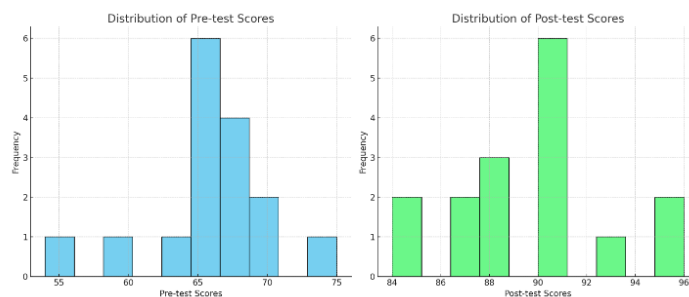
Figure 1. The distribution of pre-test and post-test

Based on the histograms above, it can be represented that the pre-test scores show a result of scores around 65. It indicates that the majority of students initially had a moderate level of understanding.

Related to the materials of story writing text, some students had a foundational knowledge of the subject, but there was still significant room for improvement. In contrast, the post-test scores exhibit a significant shift towards higher scores, with most students achieving between 88 and 90. The trend shifting into higher scores indicates that the implementation of Book Creator in story writing was effective. The increase in post-test scores signifies that the educational strategies implemented were effective in elevating the students' comprehension and performance levels. The reduction in the number of students with lower scores post-intervention shows the positive impact of the teaching methods applied. Overall, the comparison of the two histograms vividly demonstrates the significant improvement in student performance. To confirm the improvement of the pre-test and post-test scores, N-Gain must be presented too.
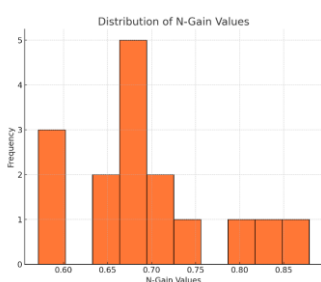
Table 1 Criteria for gain score (Arifatun et al., 2015).

Interval	Criteria
G ≥ 0.7	High
0.3 ≤ g < 0.7	Medium
G < 0.3	Low

Figure 2. The distribution of N-Gain values

The N-Gain of pre-test and post-test can be presented in the histogram above. The N-Gain metric is a measure of the relative improvement of a student's performance, with values ranging from 0.57 to 0.87 in this dataset. The histogram shows that the majority of students have N-Gain values clustered around the 0.65 to 0.70 range. It means that there is a relatively better improvement in the students' performance. The distribution highlights the overall success of the educational strategy, with relatively few students exhibiting lower N-Gain values below 0.60. It indicates that the integration of the technology gives positive results and enhances students' performance.

3.2. What are the students' perceptions about the implementation of the Book Creator application in story writing activities?

The survey results related to the students' perception of the implementation of Book Creator in story writing were thematically analyzed. The five key themes were Experience Reflection, Challenges and Solutions, Creative Process, Technology and Learning, and Preference for Writing Medium.

3.2.1. Experience Reflection

In the experience reflection, participants were asked to tell their initial experiences in using the Book Creator application. The first time, students were confused about implementing the application during the story writing process. However, they quickly adapted due to the user-friendly interface and icons. As a student said, "*Initially I was a bit confused, but I could learn how to use it.*" (S4). This theme shows the initial learning but with the overall ease of adaptation. Another student noted that by implementing Book Creator in the writing process, it allows students to explore the writing techniques in story writing. *"Using Book Creator helped me make the story more interesting because it wasn't just text, and I could use different fonts and layouts." (S3).* In short, students have different reflections due to the initial use of Book Creator.

3.2.2. Challenges and Solutions

The integration of Book Creator during the story writing process was commonly well-received. However, the obstacles during the process were found by some of the students. The arisen challenges lead them to find the solution. The most common issues included a lack of engaging images and the

need to use gadgets, which sometimes required access to computer labs. *"The challenge was that we had to use gadgets, so if we were at school, we had to go to the computer lab first."* (S5). Moreover, it also felt difficult to find the right topics or utilise certain features like voice notes effectively. These challenges highlight areas where Book Creator could potentially improve to better support student needs.

3.2.3. Creative Process

Based on the survey results, the Book Creator application strongly gives a positive improvement in students' creativity. The creativity in inserting pictures, modifying various fonts and editing the work digitally made the process so engaging. One student said *"Yes, it helped me be more creative because I could add images as I liked."* (S5). Another said, *"With the editing features, I could explore different ways of writing stories."* (S3, S4). The theme shows that digital media not only gave them creativity in learning but also it illustrates that the digital platform not only facilitated creativity but also encouraged students to think out of the box.

3.2.4. Technology and Learning

In terms of technology integration, students responded positively to their learning process. Some students said that using Book Creator means refreshing traditional methods and making them more enjoyable and interactive. It is the proof, *"It is very much recommended because it makes learning more fun and cool."* (S4). To support this statement, others said that implementing the application enhanced their digital literacy. *"This is a different experience; usually, I only write on worksheets, but this time I'm using Book Creator on a gadget."(S5).* In short, when the technology was effectively integrated, it made students enjoy writing because the teaching media used was interactive.

3.2.5. Preference for Writing Medium

The last theme of the survey was about the preference for learning media used whether comfortable using Book Creator or manual handwriting. The responses were mixed but leaned towards the digital medium. Students appreciated the convenience and additional features that Book Creator provided, such as autocorrect and the ability to decorate pages. One student expressed, *"Using Book Creator is more appealing because you can decorate and colour without needing additional stationery."* (S2). However, some students still preferred writing on paper for its tactile nature. *"Both are equally liked, but I prefer Book Creator because it has many elements and doesn't tire my hand from writing.* (S6) This indicates a divide based on personal comfort with digital versus manual writing methods, suggesting that a hybrid approach might cater best to diverse student preferences.

4. Conclusion

The quantitative and qualitative data have different roles but strengthen each other. The results and discussion demonstrate the effectiveness of using Book Creator in improving students' story-writing skills. As can be seen in the pre-test, the students achieved scores around 65 that indicates moderate results. However, the post-test showed a significant change after the integration of Book Creator. This improvement is further quantified by the N-Gain values illustrating substantial relative gains in students' performance. Furthermore, qualitative descriptive results strengthen the quantitative data. The thematic analysis of student surveys represents the positive response towards Book Creator, highlighting its role in boosting creativity and effectively integrating into existing educational frameworks. The study recommends the future use of such a technology in the learning process.

References

[1] Azad, T. (2023). Exploring the Use of Technology in the Classroom: A Qualitative Study of Students' and Teachers' Experience. Qualitative Research in Educational Psychology, 1(01), 23–32. Retrieved from https://journal.nubaninstitute.org/index.php/qrep/article/view/5

[2] Creswell, J. W. & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Fifth Edition. Los Angeles, CA: SAGE Publications.

[3]   Chen Hsieh, J., & Lee, J. S. (2021). Digital storytelling outcomes, emotions, grit, and perceptions among EFL middle school learners: robot-assisted versus PowerPoint-assisted presentations. *Computer Assisted Language Learning*, *36*(5–6), 1088–1115. https://doi.org/10.1080/09588221.2021.1969410

[4]   Epçaçan, C. (2019). A review on the relationship between critical thinking skills and learning domains of Turkish Language. Educational Research and Reviews, 14(3), 67–77. https://doi.org/10.5897/err2018.3658.

[5]   Erstad, O. A., Kjällander, S., & Jarvela, S. (2021). Facing the challenges of 'digital competence'. A Nordic agenda for curriculum development for the 21st century. Nordic Journal of Digital Literacy, 16(2), 77–87. 10.18261/issn.1891-943x-2021-02-04

[6]   Hidayat, R., & Susanto, F. (2020). Developing Multi-Literacy Skills by Creating Graphic Story in Literature Class: A Project-Based Learning Approach. *International Journal of Language Teaching and Education*, *4*(2). https://doi.org/10.22437/ijolte.v4i2.12049

[7]   Kalantari, S. et al (2023). "When I'm writing a story, I am really good" Exploring the use of digital storytelling technology at home. International Journal of Child-Computer Interaction. Volume 38, December 2023, 100613. https://doi.org/10.1016/j.ijcci.2023.100613

[8]   Kevser, Hava (2019): Exploring the role of digital storytelling in student motivation and satisfaction in EFL education, Computer Assisted Language Learning,   https://doi.org/10.1080/09588221.2019.1650071

[9]   Lang, J., Et al (2024). Story Writing and the "Play of Imagination". Psychology of Aesthetics, Creativity, and the Arts. Advance online publication. DOI:10.1037/aca0000664

[10] Maharani, A.G.P. & Santosa, M.H. (2021). The implementation of process approach combined with screencast-o-matic and book creator to improve students' argumentative writing. LLT Journal: A Journal on Language and Language Teaching. http://e-journal.usd.ac.id/index.php/LLT.   https://doi.org/10.24071/llt.v24i1.2516

[11] Rao, C., & Durga, S. (2018). Developing Students' Writing Skills in English-A Process Approach. Journal for Research Scholars and Professionals of English Language Teaching, 6(6), 1–5. https://www.researchgate.net/publication/325489625

[12] Suryanto, & Sari, Z. E. (2021). Difficulties and Strategies in Learning English: An Analysis of Students From English and Non-English Education Department in Indonesia. 518(ICoSIHESS 2020), 313–331. https://doi.org/10.2991/assehr.k.210120.140.

[13] Tanrıkulu, F. (2020). Students' perceptions about the effects of collaborative digital storytelling on writing skills. *Computer Assisted Language Learning*, *35*(5–6), 1090–1105. https://doi.org/10.1080/09588221.2020.1774611

[14] Yang, Y. T. C., Chen, Y. C., & Hung, H. T. (2020). Digital storytelling as an interdisciplinary project to improve students' English speaking and creative thinking. *Computer Assisted Language Learning*, *35*(4), 840–862. https://doi.org/10.1080/09588221.2020.1750431

Development of an Astronomy Bulletin Based on Ethnoastronomy Assisted by Stellarium Integrated with NASE to Enhance the Physics Identity of Astronomy Olympiad Participants

Salsabila Husna[1*], Duwi Susanto[1], Bayu Setiaji[1], and Kuncoro Asih Nugroho[1]

[1] Physics Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
*E-mail: salsabilahusna.2020@student.uny.ac.id

Abstract. This research focuses on the development of learning media for astronomy olympiad participants. The developed media is an astronomy bulletin integrated with the Network Astronomy for School Education (NASE). The material contained within it includes star photometry material that utilizes ethnoastronomy and practical application using the Stellarium app. The development of the bulletin emphasizes the NASE program to attract interest and enhance the physics identity of students. The bulletin development method in this research is Research and Development (R&D) with the 4D model. The 4D model consists of the stages: define, design, develop, and disseminate. The selection of research samples used purposive sampling, with the subjects being astronomy olympiad participants from SMAN 1 Jetis and MAN 3 Sleman. After the data was obtained, descriptive analysis was conducted using SBI and inferential analysis using the Wilcoxon test and Mann-Whitney test. The results showed that the implementation of the ethnoastronomy-based astronomy bulletin assisted by Stellarium integrated with NASE was capable and effective in enhancing the physics identity of astronomy olympiad participants, with moderate to high improvement categories.

Keywords: bulletin, ethnoastronomy, NASE, physics identity, Stellarium

1. Introduction

Astronomy education is an effort to realize the desire to pass on astronomical knowledge and traditions to future generations. One of the efforts made by the Indonesian government in 2003 was to participate in the International Astronomy Olympiad (IAO). In preparing its participants, in 2004, astronomy was made one of the branches competed in the National Science Olympiad (OSN) (Elzulfiah et al., 2015). Since then, astronomy has become one of the branches of OSN, with its popularity increasing every year. However, currently, education in Indonesia is still inadequate to channel the interests and talents of Indonesian students in astronomy (Julianti et al., 2022). This is clearly seen when examining the astronomy content in the school curriculum.

The school curriculum does not include astronomy as a specific subject, which is an obstacle for students who want to improve their knowledge in this field. Moreover, the lack of facilities and astronomy mentors in schools hampers the equal distribution of knowledge and skills in astronomy (Elzulfiah et al., 2015). The limited number of higher education institutions offering astronomy courses in Indonesia also makes it difficult to evenly distribute astronomy education, including astronomy

education for physics teachers (Julianti et al., 2022). Given these issues, special attention is needed regarding astronomy education in schools, especially for astronomy olympiad participants.

Astronomy education in schools falls under the physics subject. This results in astronomy being inseparable from physics concepts. Pujani & Rapi (2012) mention that astronomy concepts involve physics concepts, and students' success in astronomy education is influenced by their ability to apply physics concepts. One positive factor that affects the ability to apply physics concepts in astronomy education is physics identity (Hazari et al., 2022). Similar research by Close et al. (2016); Lock et al. (2019); Wulf et al. (2011) states that star observation activities support the development of physics identity. Research by Hazari et al. (2022) also mentions that students' informal science knowledge and experiences, such as participating in traditional star observation activities, positively affect physics identity. However, with the advancement of time and rapid development, the culture of star observation is starting to be abandoned, even though astronomy itself cannot be separated from the traditional cultural life.

According to berita.itb (2021), Dr. Hakim stated that local wisdom related to astronomy has good potential to be developed in the modern science era, one of which is through education in schools. Dr. Hakim and his team developed a program based on the IAU-Network for Astronomy School Education (NASE) guidelines, such as workshops, classroom learning, and astronomy-related excursions. One of the learning materials from the NASE program is about stars (Malasan et al., 2020). Additionally, NASE also promotes active learning of astronomy through the observation of objects or phenomena and emphasizes learning through culture (Malasan et al., 2020). This makes NASE's learning more interesting.

The NASE program, which involves classroom learning, can be conducted with engaging learning media and also supports independent learning. A bulletin is one of the engaging learning media that can be used in both classroom and independent learning (Wahyuni, 2019). Previous relevant research on bulletin learning media has been conducted by Mikraj et al. (2019). Their research on the influence of bulletin learning media found that there is a significant effect on improving student learning outcomes when using bulletin learning media. Thus, a bulletin can be an alternative for astronomy learning that can be developed for NASE-integrated cultural-based learning on star photometry material.

The NASE program, which involves observing astronomical objects or phenomena, can be conducted virtually using virtual observation applications. However, this is still rarely applied in school-level education. Stellarium is one of the virtual observation applications that is very effective as a medium for explaining astronomical phenomena at all levels of education, including elementary, secondary, and higher education (Pilendia, 2020). Research by Habibi et al. (2014) found that using Stellarium by students showed positive results, with students' cognitive abilities increasing from pre-test to post-test after using Stellarium. Therefore, researchers are interested in using the Stellarium virtual observation application in learning about star photometry.

Research conducted by Putri (2015) and Asyhari & Silvia (2016) proved that bulletin learning media can enhance one of the indicators of students' physics identity, which is enthusiasm (interest). This is because the bulletin itself has a simple and attractive appearance. Another study by Mikraj et al. (2019) stated that the physics bulletin learning media in the form of a pocketbook could improve students' learning outcomes (cognitive). Therefore, the authors are interested in conducting research on the development of a NASE-integrated astronomy bulletin that includes cultural learning (ethnoastronomy) and the use of the Stellarium application. Compared to previous studies, this research examines physics identity more comprehensively, including cognitive aspects consisting of competence and performance indicators, as well as affective aspects consisting of interest and recognition indicators.

2. Methods

2.1 Sampling Method

The sampling technique used in this study is purposive sampling (judgment sampling). The subjects of this research are astronomy olympiad participants from SMAN 1 Jetis, representing the population of Bantul Regency. The reason for selecting this sample is that SMAN 1 Jetis was ranked the 4th best high school in Bantul Regency in 2023, making it considered representative of the population of Bantul Regency. The second sample consists of astronomy olympiad participants from MAN 3 Sleman, representing the population of Sleman Regency. This selection is based on the fact that in 2023, the astronomy olympiad participants from MAN 3 Sleman were ranked 3rd in Sleman Regency, thus assumed to represent the population of Sleman Regency. Each participant from both schools was selected by their respective schools, so the sample is assumed to be non-random.

2.2 Data Analysis Method

1) Analysis of Physics Identity Improvement

The analysis of physics identity improvement is conducted to determine the degree of improvement in physics identity before and after the application of the media. This analysis uses the values from the instruments obtained during the field test, namely the pretest and posttest scores. The magnitude of the physics identity improvement is calculated using the normalized gain, which is represented by the following equation:

$$g = \frac{X_{posttest} - X_{pretest}}{X_{max} - X_{pretest}}$$

Explanation:

$X_{posttest}$: Score after the learning session
$X_{pretest}$: Score before the learning session
X_{max} : Maximum score

The results from this equation can then be compared with the classification table to interpret the obtained values. The N-Gain classification can be seen in the Table 1.

Table 1. N-Gain Classification Table (Hake, 1999).

N-Gain	Category
g ≥0,7	High
0,7≥ g ≥0,3	Medium
g <0,3	Low

2) Inferential Statistical Analysis

Inferential statistical analysis aims to make decisions from sample data processing that can be applied to the population. Inferential data analysis of the field test is performed using the JASP program. The data tested are the improvement scores or N-Gain scores. The inferential statistical analysis in this research uses non-parametric tests because the sample used is non-random. The sampling technique employed is purposive sampling (judgment sampling). In this study, the

samples used are astronomy olympiad participants who were preselected by their schools. The inferential statistical analysis used in this research is Wilcoxon Test.

Data processing using the Wilcoxon test is conducted to determine whether there is a difference in physics identity before and after using the bulletin. The aspects of physics identity analyzed in this study are the cognitive aspect with indicators of performance and competence and the affective aspect with indicators of interest and recognition. The analysis is conducted through comparative tests on the astronomy olympiad participants at SMAN 1 Jetis and MAN 3 Sleman before and after using the bulletin. The test results are then compared with the significance level (0.05). The decision-making is done by testing the following hypotheses:

a. Improvement in physics identity in the cognitive aspect with indicators of performance and competence
   H0: There is no significant difference in physics identity between before and after the treatment in the cognitive aspect with indicators of performance and competence among the astronomy olympiad participants at SMAN 1 Jetis and MAN 3 Sleman.
   Ha: There is a significant difference in physics identity between before and after the treatment in the cognitive aspect with indicators of performance and competence among the astronomy olympiad participants at SMAN 1 Jetis and MAN 3 Sleman.

b. Improvement in physics identity in the affective aspect with indicators of interest and recognition
   H0: There is no significant difference in physics identity between before and after the treatment in the affective aspect with indicators of interest and recognition among the astronomy olympiad participants at SMAN 1 Jetis and MAN 3 Sleman.
   Ha: There is a significant difference in physics identity between before and after the treatment in the affective aspect with indicators of interest and recognition among the astronomy olympiad participants at SMAN 1 Jetis and MAN 3 Sleman.

3. Results and Discussion

3.1 Analysis of Physics Identity Improvement
a. Analysis of Physics Identity in the Cognitive Aspect

The cognitive aspect of physics identity consists of indicators of performance and competence, which are measured using pretest and posttest questions as data collection instruments. The data obtained were analyzed using Normalized Gain or N-Gain. The results of the analysis of the average pretest and posttest scores along with the N-Gain values are presented in Table 2.

Based on the analysis in Table 2., it is known that the highest N-Gain is at SMAN 1 Jetis with an N-Gain of 0.9125, which falls into the high improvement category. Meanwhile, the N-Gain at MAN 3 Sleman is 0.7, also in the high improvement category. This aligns with the research conducted by Mikraj et al. (2019), which found a significant impact on the improvement of student learning outcomes when using bulletin learning media.

Table 2. Analysis Results of N-Gain Values of Physics Identity in the Cognitive Aspect.

School	Aspect	Average score		N-Gain	N-Gainave
		Pre-test	Post-test		
SMAN 1 Jetis	Competence	2.9	4.4	0.825	0.9125

School	Aspect	Average score		N-Gain	N-Gainave
		Pre-test	Post-test		
	Performance	1	2	1	
MAN 3 Sleman	Competence	2.7	3.7	0.4	0.7
	Performance	1	2	1	

b. Analysis of Physics Identity in the Affective Aspect

The affective aspect of physics identity consists of indicators of interest and recognition, which are measured using pretest and posttest questions as data collection instruments. The data obtained were then analyzed using N-Gain. The results of the analysis of the average pretest and posttest scores along with the N-Gain values are presented in Table 3.

Table 3. Analysis Results of N-Gain Values of Physics Identity in the Cognitive Aspect.

School	Aspect	Average score		N-Gain	N-Gainave
		Pre-test	Post-test		
SMAN 1 Jetis	Competence	2.833	4.5	0.785	0.9125
	Performance	2.813	4.813	0.927	
MAN 3 Sleman	Competence	2.767	4.133	0.547	0.7
	Performance	2.7	4.25	0.617	

Based on the analysis in Table 3., it is found that the highest N-Gain is at SMAN 1 Jetis with an N-Gain of 0.8559, which falls into the high improvement category, while the N-Gain at MAN 3 Sleman is 0.5819, which falls into the medium improvement category. From these results, it can be concluded that learning using the developed bulletin can improve the affective aspect of physics identity with indicators of interest and recognition among astronomy students at SMAN 1 Jetis and MAN 3 Sleman. This is in line with the research conducted by Wahyuni (2019), which stated that educators' responses to the physics bulletin were very positive, with 87.5% of students interested and motivated in learning physics.

3.1 Inferential Statistical Analysis

Data processing in this study uses a significance level (0.05) as a reference for decision-making. Data processing using the Wilcoxon test is conducted to determine whether there is a difference in physics identity before and after using the bulletin. This test is performed by comparing the scores before and after the treatment. The results of the Wilcoxon test are presented as follows:

a. Physics Identity in the Cognitive Aspect with Indicators of Performance and Competence

Based on the Wilcoxon test, a p-value of 0.009 was obtained (see Table 4). This value is smaller than the significance level (0.05), thus it can be concluded that H0 is rejected and Ha is accepted. From these results, the researcher can conclude that there is a significant difference in physics identity

between before and after the treatment, particularly in the cognitive aspect with indicators of performance and competence.

Table 4. Wilcoxon Test Output for Physics Identity in the Cognitive Aspect

Paired Samples T-Test

Measure 1	Measure 2	W	z	df	p
Pretest	Posttest	0.000	-2.666		0.009

ᵃ Wilcoxon signed-rank test.

b. Physics Identity in the Affective Aspect with Indicators of Interest and Recognition

Based on the Wilcoxon test, a p-value of 0.009 was obtained (see Table 5). This value is smaller than the significance level of 0.05, therefore it can be concluded that H0 is rejected and Ha is accepted. From these results, the researcher can conclude that there is a significant difference in physics identity between before and after the treatment, particularly in the affective aspect with indicators of interest and recognition.

Table 5. Wilcoxon Test Output for Physics Identity in the Affective Aspect

Paired Samples T-Test

Measure 1	Measure 2	W	z	df	p
Pretest	Posttest	0.000	-2.666		0.009

ᵃ Wilcoxon signed-rank test.

The improvement in physics identity in this study has an impact on the ability to apply physics concepts in astronomy learning for olympiad participants. This is consistent with the research by Hazari et al. (2022), which stated that one of the positive factors influencing the ability to apply physics concepts in astronomy learning is physics identity. The implications of this study can be considered by school principals in selecting astronomy olympiad participants by measuring the physics identity of the prospective participants.

4. Conclusion

Based on the conducted research, it is concluded that the ethnoastronomy-based astronomy bulletin assisted by Stellarium integrated with NASE is effective in enhancing the physics identity of astronomy olympiad participants. This can be observed from the N-Gain values in the cognitive aspect of students from SMAN 1 Jetis and MAN 3 Sleman, which are 0.9125 and 0.7 respectively (high improvement category). Meanwhile, in the affective aspect, each school has N-Gain scores of 0.8559 (high improvement category) and 0.5819 (moderate improvement category) respectively.

References

[1] Asyhari, A., & Silvia, H. (2016). Pengembangan media pembelajaran berupa buletin dalam bentuk buku saku untuk pembelajran IPA terpadu. *Jurnal ilmiah pendidikan fisika Al-Biruni*, 5(1), 1-13. https://doi.org/10.24042/jipfalbiruni.v5i1.100

[2]   Close, E. W., Conn, J., & Close, H. G. (2016). Becoming physics people: Development of integrated physics identity through the Learning Assistant experience. *Physical Review Physics Education Research*, 12(1), 010109. https://doi.org/10.1103/PhysRevPhysEducRes.12.010109

[3]   Elzulfiah, R., Mahanti, D. E., Ramadhan, F., & Nasbey, H. (2015). Kajian perkembangan pendidikan astronomi untuk SMA di Indonesia. *Prosiding Seminar Nasional Fisika, Universitas Negeri Jakarta*, IV, 37-42.

[4]   Hazari, Z., Dou, R., Sonnert, G., & Sadler, P. M. (2022). Examining the relationship between informal science experiences and physics identity: Unrealized possibilities. *Physical Review Physics Education Research*, 18(1), 010107. https://doi.org/10.1103/PhysRevPhysEducRes.18.010107

[5]   Julianti, V., Permana, A. H., & Fahdiran, R. (2022). Pengembangan E-Module astrofisika sebagai modul pendamping persiapan KSN astronomi. *Prosiding Seminar Nasional Fisika (E-Journal),* Universitas Negeri Jakarta, X, 45-50.

[6]   Lock, R. M., Hazari, Z., & Potvin, G. (2019). Impact of out-of-class science and engineering activities on physics identity and career intentions. *Physical Review Physics Education Research*, 15(2), 020137. https://doi.org/10.1103/PhysRevPhysEducRes.15.020137

[7]   Malasan, H. L., Ros, R. M., Kunjaya, C., Soegiartini, E., Aprilia, & Romadhonia, R. W. (2020). Empowering science teachers in Indonesia through NASE workshops. *Proceedings of the International Astronomical Union*, 15(S367), 30-33.

[8]   Mikraj, A., Utami, L. S., & Zulkarnain, Z. (2019). Pengaruh buletin fisika berbentuk buku saku untuk meningkatkan hasil belajar siswa di MAN 2 Bima kelas X materi hukum Newton tahun pelajaran 2018/2019. *ORBITA: Jurnal Kajian, Inovasi dan Aplikasi Pendidikan Fisika*, 5(1), 5-14.

[9]   Pilendia, D. (2022). Stellarium sebagai media pembelajaran fenomena astronomi: Kajian Literatur. *Jurnal Ilmiah Wahana Pendidikan*, 8(1), 525-532.

[10]   Pujani, N. M., & Rapi, N. K. (2013). Pelatihan praktikum IPBA bagi guru SMP/SMA di Kota Singaraja menuju Olimpiade Astronomi. *Widya Laksana*, 1(2), 99-109. https://doi.org/10.23887/jwl.v2i1.9126

[11]   Putri, N. R. (2015). Pengembangan buletin pembelajaran fisika pokok bahasan gerak melingkar pada siswa kelas X IPA SMA Negeri 3 Purworejo tahun pelajaran 2014/2015. *Jurnal Radiasi*, 6(1).

[12]   Wahyuningsih, A. N. (2022). Pengembangan Media Komik Bergambar Materi Sistem Saraf untuk Pembelajaran yang Menggunakan Strategi PQ4R. *JISE*, 1(1).

[13]   Wulf, P., Hazari, Z., Petersen, S., & Neumann, K. (2011). Engaging young women in physics: An intervention to support young women's physics identity development. *Physical Review Physics Education Research*, 14(2), 020113. https://doi.org/10.1103/PhysRevPhysEducRes.14.020113

Designing Physics Mobile Learning to Enhance Critical Thinking and Creative-Problem Solving Skills: a Storyboard

Sri Zakiyah[1]*, Irma Rahma Suwarma[1] and Dadi Rusdiana[1]

[1] Physics Education Department, Universitas Pendidikan Indonesia, Bandung, Indonesia

*E-mail: srizakiyah02@gmail.com

Abstract. The paper describes our ongoing research into developing mobile learning instructional resources to enhance critical thinking and creative problem-solving abilities. This study aimed to create a Mobile Learning (M-Learning)-based learning design for high school students in the lesson on soundwaves. The ADDIE process for making this learning media design is divided into five stages: analysing, designing, developing, implementing, and evaluating. However, only two research steps were carried out: analysis and design. The analysis stage comprises a preliminary investigation of the mobile learning teaching materials requirement. In addition, the design stage covers the overall design selection for delivering mobile learning that will be created. During this step of the study, a mobile learning storyboard was created. Three of the five developed subchapters have the potential to integrate CPS features.

1. Introduction

Rapid technology advancements in the twenty-first century create unforeseen scenarios, emphasising the need for humans with critical thinking abilities and innovative problem solutions [1]. Critical thinking is required to swiftly select legitimate and accurate information, as is creative problem-solving when dealing with shaky and unpredictable challenges [1]–[4]. As a result, learning activities that help pupils improve their critical thinking and creative problem-solving abilities are crucial.

Curriculum development in Indonesia also recognizes the need to develop students' critical thinking and problem-solving skills. High-level thinking skills-oriented learning, which incorporates reasoning, analytical abilities, problem-solving, and critical and creative thinking skills, manifests this in the Kurikulum 2013 [5]. Aside from that, the Kurikulum Merdeka Belajar, which will be implemented in stages beginning in 2023, includes the phrase Pancasila student profile, which refers to the student's character that is supposed to evolve when learning is completed. Faith, devotion to God Almighty, worldwide variety, cooperation, independence, critical reasoning, and creativity are all traits of this character. Aside from that, according to the accompanying document on learning outcomes in high school physics learning, students in both phases must be able to use physics concepts to solve issues [6].

However, the quality of reasoning abilities among students remains a concern in Indonesian secondary schools. According to the Indonesian education report card issued by the Indonesian Minister of Education, Nadiem Makarim, via the Indonesian Ministry of Education and Culture's YouTube account [7], the portrait of Indonesian students' thinking skills is still not ideal, according to the findings of the national assessment, which show that two out of every three pupils and one out of every two students did not meet the required competency in reading and numeracy, respectively. Furthermore, some earlier studies performed questionnaires to assess students' problem-solving ability. [8] surveyed 65 high school pupils in class. [9] did a similar study on 100 grade 11 science programme students, with

the results showing that students' problem-solving abilities remained in the poor group, with a score range of 0-50. Then, [10] investigation of 154 grade 11 high school students revealed that students' abilities to solve physics problems remained inadequate, and misconceptions arose due to this problem. [11] delivered questionnaires to 87 class members. Aside from that, respondents indicated that the characteristics of physics studies are highly confusing and challenging to comprehend.

Several factors can contribute to low creative problem-solving ability. [12] demonstrate that the teacher's design of competency achievement indicators in the learning implementation plan (RPP) does not yet include higher-order thinking and problem-solving characteristics. As a result, students solve physics problems using plugs and chugs from equations they recall [13]. Furthermore, the findings of open interviews with numerous physics teachers in South Sumatra suggested that physics learning activities were solely used to convey knowledge in class. Aside from that, numerous teachers used printed physics textbooks provided by the government for pupils to use during the learning process. The hands-on exercises are only used to introduce concepts and are restricted to specific materials, such as static fluids and pressure.

The use of technology in a learning environment is considered to improve students' learning capacities [14]. The technology-based learning method will supply learning content through multiple media, positively influencing student learning achievement[15]. Learning with multimedia improves student learning results [16]. One example of IT deployment in the learning industry is the development of mobile learning instructional materials.

Making m-learning teaching materials is essential, mainly when applied to learning, because it will improve learning outcomes and student engagement [17]. One technological development that is currently of interest to many people is Android-based smartphones. Because smartphones are easier to use, they have an open operating system allowing smartphone users to add various applications.[18]. Previous research shows that the use of mobile learning in physics learning shows improvements in vector representation abilities, high-level thinking abilities, learning performance and attitudes [19]–[23].

Thus, we need efforts to develop the android-based teaching material. This paper reports the preliminary stage of how to manufacture android-based mobile learning on soundwaves to increase students' critical thinking and creative problem-solving skills. The remainder of this paper is structured as follows. The following main section presents the theoretical background. Section 3 then presents design and storyboard. Section 4 closes with a conclusion.

2. Theoretical Background

2.1 Critical Thinking

Critical thinking is reflective thinking that makes sense and focuses on deciding what to believe or do. It can be applied to other ideas, such as higher-order thinking, problem-solving, and metacognition (Ennis, 1989). Facione (2015) states critical thinking is a handy investigative tool. According to the OECD (2019), to innovate, students must have critical thinking and creativity to use diverse techniques or viewpoints to uncover and solve problems. Thus, critical thinking capacity can be defined as a person's ability to objectively analyse and evaluate an issue, information, or experience to create an assessment.

2.2 Creative Problem-Solving Skills

The ability to solve problems creatively can be used to measure an individual's ability to respond to changing situations and the individual's potential as a constructive and reflective citizen (OECD, 2014). In this research, creative problem-solving abilities will be assessed based on a framework referring to the Osborn-Parnes CPS process (Parnes, 1988; Evans, 1997; van Hooijdonk, 2020; Isaksen, 2023), which consists of five four aspects of CPS, namely fact finding, problem finding, idea finding, and

solution finding. The acceptance finding stage was not the focus of the research because it considered the complexity of the CPS itself. The acceptance-finding stage is difficult and time-consuming because students need to choose which solution does not cause other problems and need efforts to convince other people that the idea used as a solution is worthy of being accepted and implemented.

2.3 Mobile Learning

Mobile learning occurs when students are not in a fixed, predetermined location or take advantage of learning opportunities offered by mobile technology (O'Malley et al., 2003). Kukulska-Hulme and Traxler (2005) define *mobile learning* as a form of attention to student mobility in the sense that students must be able to engage in educational activities without being tied to a strictly restricted physical location. Thus, mobile learning allows students involved in educational activities to use technology as a learning medium through mobile devices that can access data and communicate with other people via wireless technology (Wu et al., 2012). The wireless devices are cell phones, personal digital assistants (PDAs), or laptop computers (O'Malley et al., 2003).

2.4 Enhance Critical Thinking and Creative Problem-Solving Skills Through M-Learning

According to constructivist learning theory, students construct new knowledge based on past experiences (Bruner, 1960). Thus, individuals create or build their new understanding or knowledge through interactions between their beliefs and ideas, events, and activities related to students (Ultanir, 2012). Meanwhile, according to Piaget (2003), learning is triggered by situations provoked by psychological experimenters, a teacher, or external situations. Piaget also emphasized that teachers must provide opportunities to classify and group information to facilitate the assimilation of new information with previous knowledge (Lefa, 2014). The constructivist theory also emphasizes that the focus of learning must be student-centred (Bada & Olusegun, 2015).

These theories underlie the character of mobile learning, such as cognitive learning theory, which also underlies how cognitive processes occur in mobile learning and how the brain works (Kumar et al., 2018), as well as constructivist learning theory, where students build knowledge by interpreting new knowledge based on previous knowledge. For example, collaborative learning in mobile learning allows for social interaction between students in actively constructing information. This situation is possible because mobile learning is personal and student-centred, whereas according to constructivist theory, learning must be student-centred (Ozdamli, 2012; Yakar et al., 2020).

Then there is another theory that underlies the character of mobile learning, namely the dual coding theory by Allan Palvio (1986), which explains that there are two cognitive sub-systems that work in humans; the first is non-verbal events or processing objects such as images while the second is processing verbal language and audio. These two aspects significantly impact memory, memory and cognition, and together, they can have additional effects on learning. By this, optimizing learning effectiveness is possible through mobile learning designs that place images, spoken language, and printed words in the right combination (Wang & Shen, 2012; Curum & Khedo, 2021).

Further research by Etkina et al. (2007) shows that students who study physics in a multi-representation-based learning environment will influence the students' problem-solving performance. Apart from that, using various types of representation can also help students master concepts. This representation is in pictures, tables, graphs, free diagrams, bar charts, and the rest (Etkina et al., 2015). Ainsworth (200) also emphasized that using multiple representations can help understand complex scientific concepts. Ainsworth (1999, 2006) describes three main functions of using multiple representations, including 1) complementary function. 2) interpretation constraints; 3) construction of deeper understanding.

Teaching materials that integrate multi-mode representation are in the form of Android-based mobile learning. Teaching materials created in Android-based mobile learning are teaching materials

that integrate variants of visual and audio representation such as text, images, tables, graphs, animations, videos and simulations. Using teaching materials in Android-based mobile learning will provide students with meaningful experiences in obtaining information. Apart from that, using Android-based mobile learning teaching materials will make it easier for students to understand learning concepts, which improves learning quality.

The role of multiple representations in teaching materials is an essential aspect of representation systems and meaningful information transformation (McKendree, 2002). Apart from that, variations in representation will influence students' reasoning, so it should be used in the learning process to build a more profound understanding. Those representations also encourage students' thinking abilities, including developing critical thinking skills (Bronkhorst, 2020). Khotimah et al. (2017) show a linear relationship between the level of response given to the use of multi-representation-based physics teaching materials on student learning outcomes and critical thinking abilities. Mobile learning can also be designed to support creative problem-solving activities (Bae & Lee, 2017) through programs that focus on increasing brain activity or experimental activities using graphic processes. Sukmafani et al. (2021) developed teaching materials that support creative problem-solving activities by presenting components of the latest news articles, explanations of material presented in animated videos, phenomenon videos, images, worksheets, and goal-based learning activities.

3. Design and Storyboard

3.1 CT skills and CPS Abilities

Our objective in building this application is to provide a learning application for class XI students focusing on soundwaves. We include CT (critical thinking) skills and CPS (creative problem-solving) abilities aspects in the mobile learning design created. The CT framework refers to Facione (2015), and the CPS refers to the Osborn-Parness (Parnes, 1988; Evans, 1997; van Hooijdonk, 2020; Isaksen, 2023) framework. Table 1 summarizes the material description.

Soundwave material comprises five subchapters. On the subtopic "Apa itu bunyi?" It covers basic ideas such as the definition of sound and how people can hear it. On this issue, the critical thinking component of interpretation can be trained on various occurrences, like the vibration of cricket wings when they generate a cricket sound. At the end of the phenomenon, students must provide an interpretation of cricket behaviour and sound. CPS cannot be used in this sub-chapter since the discussion involves basic principles, and the issues discussed are more closely related to the advanced topics in the following sub-discussion.

Table 1. Skills component matrix

Sub topic	CT	CPS
Apa itu bunyi?	✓	✗
Sifat gelombang bunyi	✓	✓
Besaran gelombang bunyi	✓	✓
Bunyi dalam kehidupan sehari-hari	✓	✓
Polusi suara	✓	✗

The sub-topic "sifat gelombang bunyi" discusses interference, echoes and reverberations, refraction and diffraction. We implement critical thinking skills, specifically inference, in echo and reverberation in sound reflection. We include a virtual simulation of sound reflection so that students can obtain data to make conclusions. After discussing sound diffraction, we inserted the CPS component, where we previously discussed sound interference, reflection and refraction. We took an incident where residents in hilly areas could not clearly hear the announcement through the mosque's speakers. From this incident, we direct students to analyze the problems and the causes to generate possible solutions.

Next, the third sub-discussion is entitled "besaran gelombang bunyi". This discussion contains the concepts of amplitude, sound intensity, sound intensity levels, frequency, Doppler effect and their applications in technology. One aspect of critical thinking included in this sub-discussion is analysing which events include a single frequency and a series of frequencies of two different events. Then, for the CPS aspect, we included the peddler phenomenon at the end of the discussion of the Doppler effect.

Then, on the fourth subtopic, "bunyi dalam kehidupan sehari-hari", we discuss the relationship between notes and musical instruments. At the beginning of the discussion, we discussed basic tones, the factors that influence them, and resonance. After this discussion, we will include CT skills (evaluate) in evaluating a resonance event. Next, we use the problem of resonance impacts in apartments to practice CPS skills.

In the last sub-topic, polusi suara, we provide information regarding how developed countries overcome the problem of noise pollution and how sound can disturb the lives of humans and animals. The CT aspect in this sub-discussion is "explanation", where the phenomenon of two events with different frequency levels is given. It explains why one set of frequencies sounds less comfortable than the other set of frequencies. Meanwhile, for the CPS skills, we found issues related to sound pollution are already covered in previous subchapters.

3.2 Storyboard
Figure 1 depicts a storyboard design as a blueprint for building an Android-based mobile learning application prototype.

The initial display will display a login portal where students enter their names. Next, after successfully login, the user will be directed to the dashboard page, which contains three tabs: how to use it, competency achievements, and materials. A droplist feature in the form of four vertical black line assets on the dashboard page helps users track learning progress. This feature also includes a logout button, where if students log out, the work gets erased from the system completely.

In addition, students will be forwarded to the material tab, which contains five subtopics. On this page, users must open subchapters systematically and sequentially; in other words, advanced subchapters cannot be opened if the previous subchapters have not been completed. This feature is essential so that users fully understand the basic concepts of the material before learning advanced concepts.
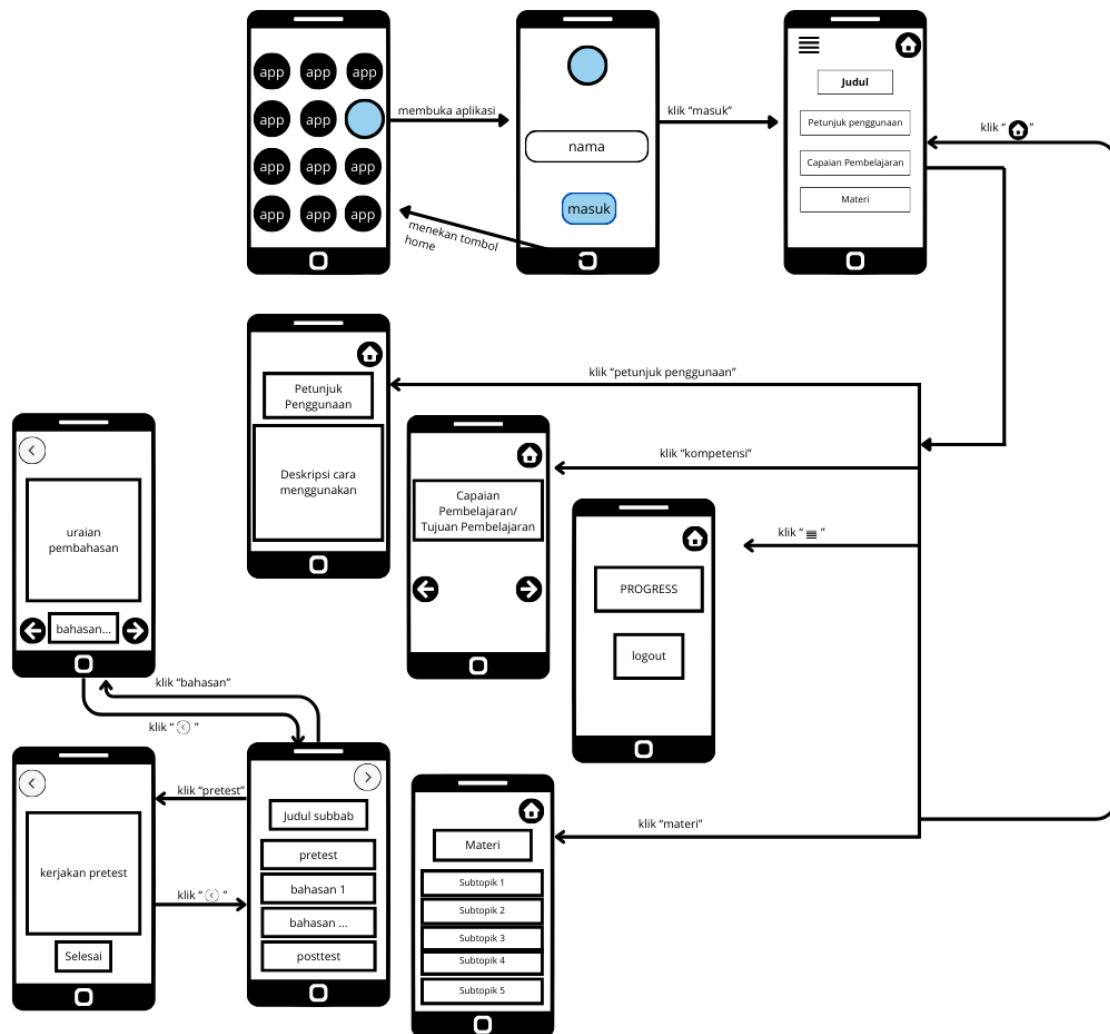
Figure 1. Android-based M-learning storyboard for enhancing critical thinking skills and creative problem-solving abilities

At each subchapter's beginning and end, a pretest and posttest are provided, respectively. We utilize Google Forms for the evaluation, as the questions provided are open-answer questions.

4. Conclusion

This study outlines the design and theoretical foundation of physics mobile learning, which fosters critical thinking and problem-solving skills. This system embeds students in activities that emphasize contextual issues and phenomena, drawing on constructivist learning theory, multiple representation theories, and cognitive-related theory. Related to content analysis, which can be linked to aspects of CT and CPS skills training, the results obtained were that CPS could not be applied to all sub-chapters due to the complexity of the material and its relationship to problems around students.

References

[1] OECD, "PISA 2012 Results: Creative Problem Solving (Volume V)," *Program. Int. Student Assess.*, 2014.

[2] OECD, "PISA 2015 Results in Focus," pp. 1–31, 2018, doi: 10.1596/28293.

[3] S. Kasidin, *Berpikir Kritis: Kecakapan Hidup di Era Digital - Kasdin Sihotang - Google Books*. 2019.

[4] R. Reiter-Palmon and J. J. Illies, "Leadership and creativity: Understanding leadership from a creative problem-solving perspective," *Leadersh. Q.*, vol. 15, no. 1, 2004, doi: 10.1016/j.leaqua.2003.12.005.

[5] Kemendiknas, "Implementasi Kurikulum 2013 Konsep dan Penerapan," *Kementrian Pendidik. dan Kebud.*, pp. 1–162, 2014.

[6] Peraturan Menteri Pendidikan dan Kebudayaan, *Permendikbud Nomor 22 Tahun 2016*. 2016.

[7] Kemdikbud, "Profil Pelajar Pancasila," 2022. [Online]. Available: https://ditpsd.kemdikbud.go.id/hal/profil-pelajar-pancasila

[8] A. M. R. Tumanggor, J. Jumadi, I. Wilujeng, and E. S. Ringo, "The Profile of Students' Physics Problem Solving Ability in Optical Instruments," *J. Penelit. Pengemb. Pendidik. Fis.*, vol. 5, no. 1, 2019, doi: 10.21009/1.05104.

[9] O. Q. Rachmawati, K. B. Prahani, and M. Husni, "Profile of Students' Physics Problem-solving Skills and Implementation of Quizizz-based Team Games Tournament (QTGT) Method in Physics Learning," *JIPF (Jurnal Ilmu Pendidik. Fis.*, vol. 7, no. 1, 2022.

[10] B. K. Prahani, B. Jatmiko, T. Amelia, K. A. Arzak, N. A. Qotrunnada, and S. B. A. Neswary, "Research Profile of Inquiry on Physics Learning During the COVID-19 Pandemic," *J. Penelit. Pendidik. IPA*, vol. 9, no. 1, pp. 20–30, 2023, doi: 10.29303/jppipa.v9i1.1889.

[11] M. R. R. Zamil, E. Hariyono, and B. K. Prahani, "Profile of Implementation Direct Instruction and Physics Problem Solving Skills of Senior High School Students," *J. Ilm. Pendidik. Fis.*, vol. 5, no. 3, 2021, doi: 10.20527/jipf.v5i3.3895.

[12] I. Amin, Y. Sukestiyarno, S. B. Waluya, and S. Mariani, "Kualitas Rencana Pelaksanaan Pembelajaran (RPP) dan Implementasinya dalam Pembelajaran Matematika SMA," *JNPM (Jurnal Nas. Pendidik. Mat.*, vol. 4, no. 1, 2020, doi: 10.33603/jnpm.v4i1.2914.

[13] Nurhayati, L. Yuliati, and N. Mufti, "POLA PENALARAN ILMIAH DAN KEMAMPUANPENYELESAIAN MASALAH SINTESIS FISIKA," *J. Pendidik. Teor. Penelitian, dan Pengemb.*, vol. 1, no. 8, 2016.

[14] C. Slamet, A. Rahman, M. A. Ramdhani, and W. Dharmalaksana, "Clustering the verses of the holy qur'an using K-means algorithm," *Asian J. Inf. Technol.*, vol. 15, no. 24, 2016.

[15] M. A. Ramdhani and E. R. Wulan, "The Analysis of Determinant Factors in Software Design for Computer Assisted Instruction," *Int. J. Sci. Technol. Res.*, vol. 1, no. 8, 2012.

[16] M. A. Ramdhani and H. Muhammadiyah, "The Criteria of Learning Media Selection for Character Education in Higher Education," in *International Conference of Islamic Education in Southeast Asia*, 2015.

[17] D. Eseryel, V. Law, D. Ifenthaler, X. Ge, and R. Miller, "An investigation of the interrelationships between motivation, engagement, and complex problem solving in game-based learning," *Educ. Technol. Soc.*, vol. 17, no. 1, 2013.

[18] Y. D. Prasetyo, J. Ikhsan, and R. L. P. Sari, "THE DEVELOPMENT OF ANDROID-BASED MOBILE LEARNING MEDIA AS CHEMISTRY LEARNING FOR SENIOR HIGH SCHOOL ON ACID BASE, BUFFER SOLUTION, AND SALT HYDROLYSIS," *J. Educ. Math. Sci.*, vol. 15, no. 1, 2014.

[19] M. Husna and H. Kuswanto, "Development of physics mobile learning based on local wisdom to improve vector and diagram representation abilities," *Int. J. Interact. Mob. Technol.*, vol. 12, no. 6, 2018, doi: 10.3991/ijim.v12i6.8746.

[20] I. Darimi, "TEKNOLOGI INFORMASI DAN KOMUNIKASI SEBAGAI MEDIA," vol. 1, pp. 111–121, 2017.

[21] C. Wongwatkit, P. Panjaburee, and N. Srisawasdi, "A proposal to develop a guided-inquiry mobile learning with a mastery learning mechanism for improving students' learning performance and attitudes in Physics," *Int. J. Mob. Learn. Organ.*, vol. 11, no. 1, pp. 63 – 86, 2017, doi: 10.1504/IJMLO.2017.080898.

[22] M. R. D. Saputra and H. Kuswanto, "The effectiveness of Physics Mobile Learning (PML) with HomboBatu theme to improve the ability of diagram representation and critical thinking of senior high school students," *Int. J. Instr.*, vol. 12, no. 2, 2019, doi: 10.29333/iji.2019.12230a.

[23] B. E. Dasilva *et al.*, "Development of Android-based Interactive Physics Mobile Learning Media (IPMLM) with scaffolding learning approach to improve HOTS of high school students," *J. Educ. Gift. Young Sci.*, vol. 7, no. 3, 2019, doi: 10.17478/jegys.610377.

Artificial Intelligence in Vocational Education: A Bibliometric Approach

Suhanto[1*], Moch Rifai[1], Julfansyah Margolang[1], Bambang Driyono[1], Fachrurrazi Burhanuddin[2]

[1]Politeknik Penerbangan Makassar, Makassar, Indonesia
[2] Aerospace Engineering Department, University of Bristol, Bristol, United Kingdom

[*]E-mail: suhanto@poltekbangmakassar.ac.id

Abstract. Artificial intelligence (AI) is being integrated into vocational education to overcome various challenges and improve learning experiences and challenges of modern life. This research uses bibliometric methods to provide insight into course structure, research trends, and issues addressing AI in vocational education. A Scopus database search was carried out on June 1, 2024, using the term artificial intelligence in the title. The second search field is in the title, abstract, and keywords of vocational education; the search is limited to journal articles or proceedings in English. This analysis found that 160 articles in journals and proceedings were indexed by Scopus from 2014 to 2024. This research provides insight into the use of AI in vocational education and the importance of integrating AI principles in vocational education programs to improve student learning outcomes.

1. Introduction

Vocational education plays an important role in the technological era by equipping individuals with the skills necessary to meet the demands of growing industry and the digital workforce [1], [2]. The integration of Information and Communication Technologies (ICT) in Technical and Vocational Education and Training (TVET) is essential for preparing a skilled workforce, improving pedagogical strategies, and facilitating students' vocational competence [3], [4]. Additionally, the COVID-19 pandemic has accelerated the adoption of online courses in vocational education, highlighting the importance of sustainable online learning models and the need to understand students' perceptions and attitudes towards digital learning tools [5].

Technology plays an important role in vocational education learning, offering a variety of innovative approaches to improve student engagement and learning outcomes. Studies highlight the use of digital technology access for teaching purposes in Indonesian vocational schools, emphasizing the importance of factors such as motivation and skills access [6]. Artificial intelligence (AI) is increasingly being integrated into education to overcome various challenges and improve learning experiences and modern challenges [7], [8]. Artificial intelligence (AI) is increasingly integrated into vocational education and training (VET) to improve learning experiences. Research shows that AI can be used to provide additional qualifications in AI knowledge and competencies in the VET system, meeting the demand for skilled workers in Germany [9]. AI applications in education extend to personalized learning environments, adaptive learning tools, and online intelligent systems that assist with administrative tasks and content customization to meet individual student needs [10], [11].

Based on relevant articles, this research intends to comprehensively analyze the use of AI in vocational education using a bibliometric approach to provide insight into the subject, research trends,

and themes. This research aims to review the literature to identify countries, authors, contexts, and important sources for using AI in vocational education. This review uses a conceptual framework based on the use of AI in vocational education, this framework is used to categorize and analyze publications, authors, and research themes identified by bibliometric analysis. This framework enables literature analysis based on these key concepts, provides a comprehensive overview of the use of AI in vocational education, and identifies research gaps, research streams, and topics by searching the Scopus database for publications from 2014 to 2024.

2. Method

Bibliometric analysis is a quantitative method that uses mathematical and statistical tools to evaluate the interrelationships and impact of publications, authors, institutions, countries, and research fields [12]. It involves analyzing bibliographic material to highlight core theoretical and empirical research in a particular field, classifying previous studies, and tracking publication trends over time [13].
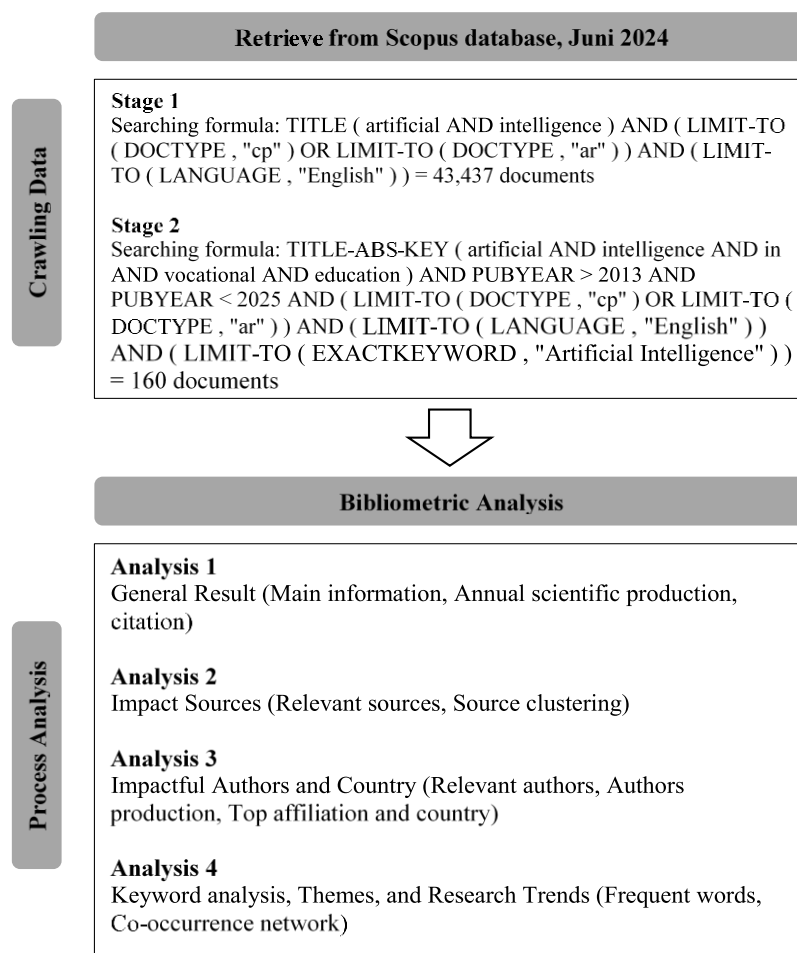
Figure 1. AI bibliometric procedures in vocational education

This research uses the Scopus database, which provides complete research results and information; the search was carried out on June 1, 2024 with the search terms TITLE-ABS-KEY (artificial AND intelligence AND in AND vocational AND education) AND PUBYEAR > 2013 AND PUBYEAR <

2025 AND (LIMIT -TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (EXACTKEYWORD , "Artificial Intelligence")). The first search term is artificial intelligence in the title column, and the term vocational education in the second search column is title, abstract, and keywords. As a result of the search, all publications related to the use of AI in vocational education were found, as shown in Figure 1. This research was limited to journal articles or proceedings in English to keep the results relevant. VOSviewer software maps a collection of articles, and VOS functions display data and visualize written material into image maps.

3. Results, Analysis and Discussion

3.1 General Results

In this initial section, we discuss the annual publications of AI journals in vocational education from 2014 to 2024. The search found 160 publications in journals and proceedings indexed by the Scopus database. Seventy-six percent were conference papers, and twenty-four percent were journal articles. Figure 2 shows the number of annual publications from 2014 to 2024.
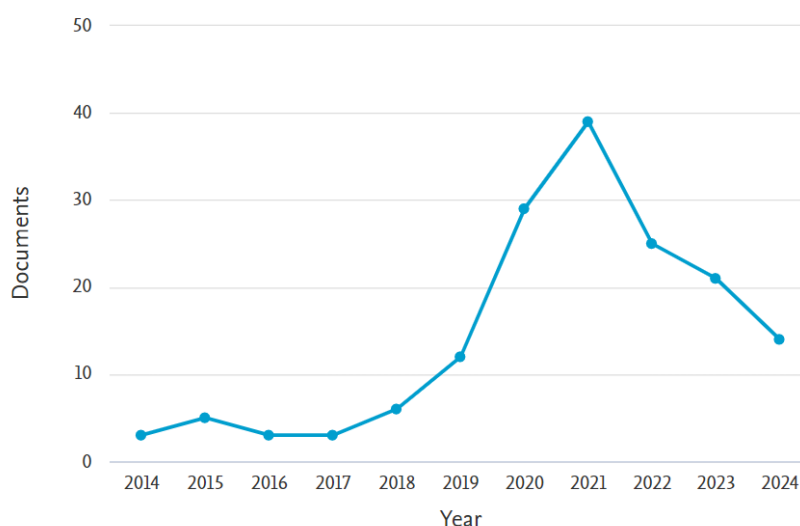
Figure 2. Articles published from 2014-2024

Article from Krause, A. et al. published in 2014 and presented at ITHET 2014 - 13th International Conference on Information Technology Based Higher Education and Training, 7155679. This paper discusses the concept of modular and active learning in automation engineering courses for vocational training and education. The concepts applied in the course consist of modular learning that addresses various aspects of the automation engineering process [14]. The following article Brunner, M. et al. presented in the 2014 Lecture Notes in Computer Science (Lecture Notes in Artificial Intelligence and Bioinformatics) discusses student-oriented teaching methods and procedures to increase students' intrinsic motivation and creativity in general. It is clear that the INIT competency areas provide very demanding learning outcomes, and their implementation has proven challenging at various levels [15].
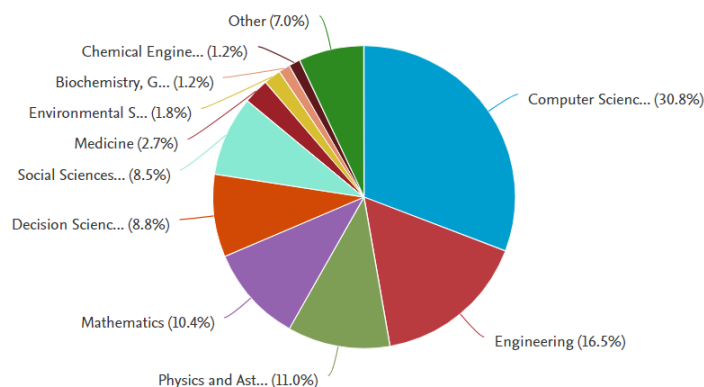
Figure 3. Articles by field of study (Scopus)

The Scopus database classifies the subjects in Figure 2 as the top scientific disciplines are computer science 101 documents (30.8%), engineering 54 documents (16.5%), physics and astronomy 36 documents (11.0%), and mathematics 34 documents (10.4%).

3.2 Sources of Impact

Intellectual structure of knowledge topics by analyzing articles and determining the amount and authority of referenced literature. Table 1 displays the five most cited articles using the Scopus database citation data.

Table 1. The top five most cited documents on AI in vocational education

Reference	DOI	Source	Citation
Kahn K et al. (2018)	10.1007/978-3-319-98572-5	CEUR Workshop Proceedings	17
Kumar et al. (2023)	10.3390/app13021180	Applied Sciences (Switzerland), MDPI	16
Peker M et al. (2017)	10.17559/TV-20151105201325	Technical gazette, Portal of Croatian scientific and professional journals - HRČAK	12
Wu X dkk. (2021)	10.1088/1742-6596/1881/3/032074	Journal of Physics: Conference Series	9
Ocana F et al. (2020)	10.9756/INT-JECSE/V12I1.201016	International Journal of Early Childhood Special Education	8

Kahn K et al.'s (2018) article received 17 citations in Scopus as the most cited article. The research by Kahn K et al. (2018) studied students' understanding of AI concepts and enjoyment of the learning process among high school and vocational students [16]. Kumar et al. (2023) received 16 citations with a study showing that practical teaching in agriculture in vocational higher education assisted by AI can improve learning with an accuracy of 83.2% [17].

Most of the articles in this research are in the form of conference proceedings; conference papers account for seventy-six percent of all AI research in vocational education. Based on data since 2017, the Journal of Physics Conference Series has been the most productive, initially with 1 document in 2017, increasing significantly in 2020 to 10 documents, and peaking in 2021 with 14 documents. An impactful article is Xi Wu's (2021); the primary purpose of this research is to urge modern vocational

education colleges to pay attention to artificial intelligence technology and stimulate interest in vocational education graduates in artificial intelligence. Artificial intelligence technology can be implemented fully and efficiently, so more and more qualified professionals and technical personnel can be trained for society [18].
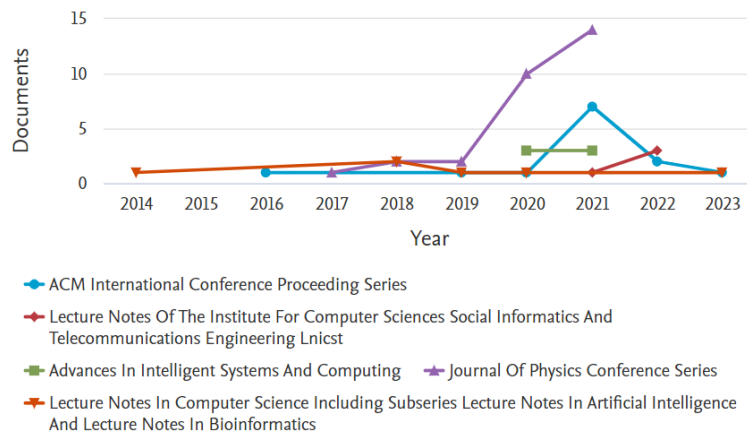
Figure 4. The top five sources for AI research in vocational education

3.3 Influential Authors and Countries

The integration of industry and education has an important role in developing effective artificial intelligence-based professional capabilities, the importance of algorithm and design skills as the main criteria for evaluating artificial intelligence [19].
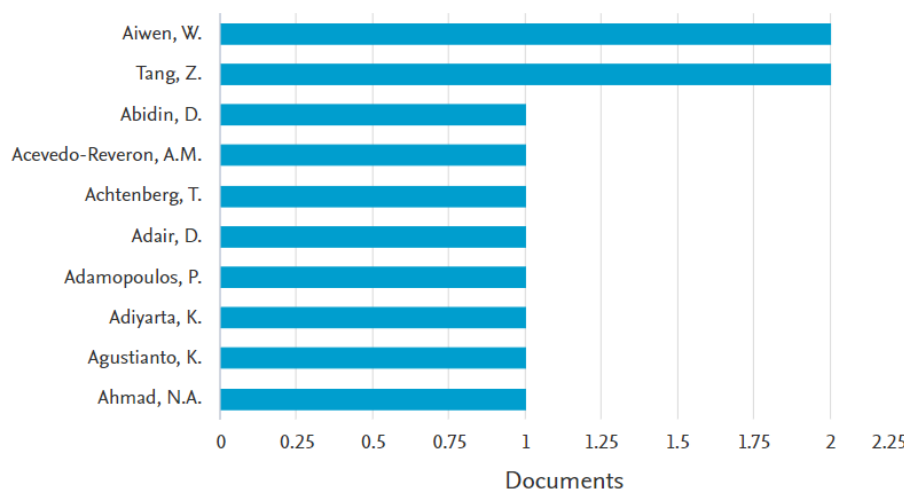
Figure 5. The ten most productive authors in dealing with AI in vocational education

The ten most productive authors in dealing with AI in vocational education are shown in Figure 4 above. Writers Wang Aiwen and Ziwei Tang were the authors who wrote the most on this topic, with 2 articles each. According to [20] the tough challenges faced in this era then navigate the specific path for professional growth of vocational college counselors with a background in artificial intelligence. Meanwhile, according to [21] it effectively utilizes the strong resource integration capabilities of

artificial intelligence, empowers the improvement of the university-industry integration system, and reconstructs the multi-dimensional integration capabilities between industry-vocational education.
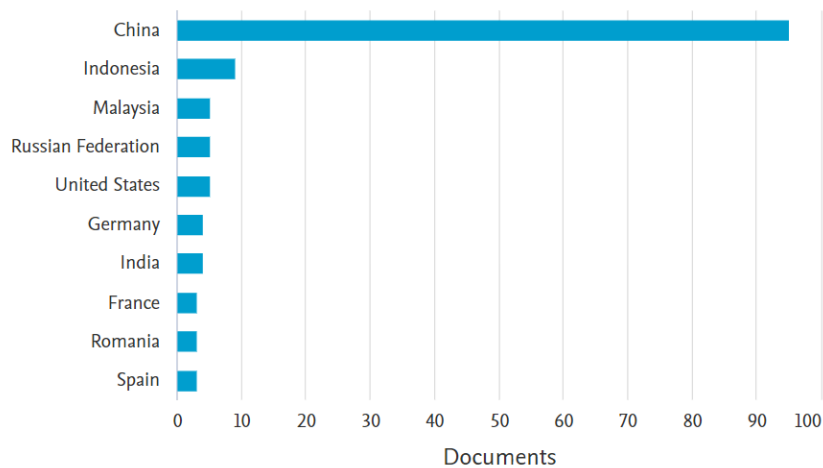
Figure 6. Top ten countries in AI research in vocational education

Figure 5 above shows that Indonesia also makes an important contribution to research related to AI in vocational education, with 9 documents in second place, while China is in first place with 95 documents out of a total of 160 papers identified in the Scopus database related to this research.

3.4 Analysis of Keywords, Themes, and Research Trends

Researchers use strategies to find trends and patterns in research by analyzing keywords used in publications. This step is done by counting how often certain keywords appear in publications and comparing them with other keywords to see which are frequently used. This data is used to guide future research and identify research gaps. Researchers analyzed keywords from 160 papers and found common terms and topic trends. VOSviewer is used to visualize the keywords used.
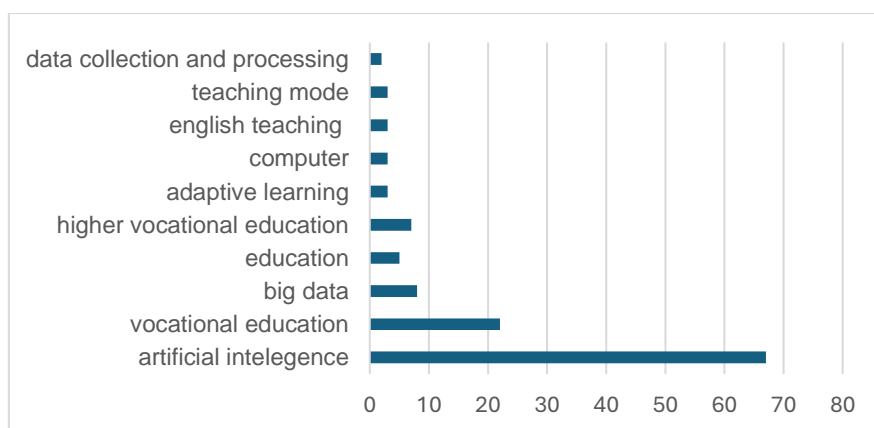
Figure 7. Top ten words in vocational education AI research

Figure 6 shows the keywords used the most: artificial intelligence the most 67 times, vocational education second 22 times, big data 8 times, education 5 times, and higher vocational education 7 times.

It can be seen that the use of AI in vocational education utilizes big data and computers to support the success of classroom learning.
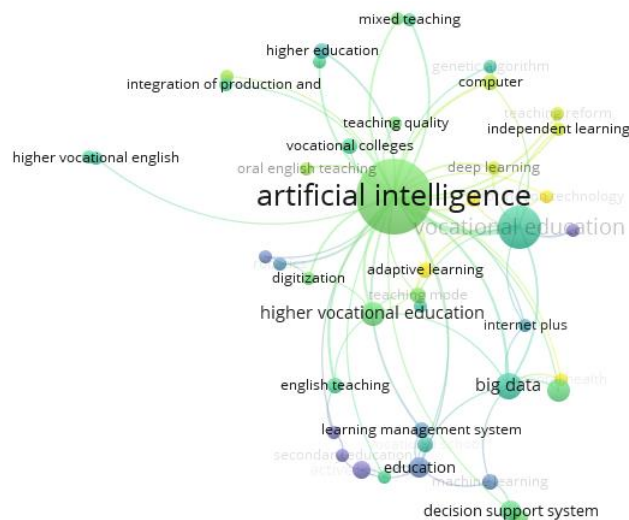
Figure 8. Co-occurrence networks in vocational education AI research

Figure 7 shows a shared network of 47 nodes based on 160 reviewed publications on the subject; each entity is represented as a node in the network. The description of the connections between modes shows the interactions between entities. There are four clusters that are quite significantly related. Evaluating these relationships can help find patterns and trends in the data and gain research insights.

The results of AI co-occurrence network analysis in vocational education show a different approach; the AI approach is simulation-based learning, combining virtual agents, affective computing, and assessment tools to improve learning outcomes and experiences [22]. In vocational education, approaches to AI learning integrate AI principles into training programs to improve learning outcomes. This can be achieved by leveraging AI in various forms, such as web-based intelligent education systems, robots, and chatbots to help instructors meet student needs.

4. Conclusion

This research adds to previous reviews related to AI by using a bibliometric approach to analyze the use of AI in vocational education. The bibliometric approach provides an overview of subjects, research trends, and themes by searching the Scopus database from 2014 to 2024. This analysis found 160 articles from journals and proceedings indexed by Scopus, with 76% of the articles being conference papers and 24% being journal articles.

The article by Krause A. et al., published in 2014, discusses the concept of modular and active learning in automation engineering courses for vocational training and education. Research from 2014 to 2018 numbered under 10 documents and increased fourfold in 2021. Kahn K et al. (2018) received 17 citations in Scopus as the most cited article. The research examines students' understanding of AI concepts and enjoyment of the learning process among high school and vocational students. The most useful media is the Journal of Physics Conference Series, which is the most productive, initially with 1 document in 2017, 2020 with 10 documents, and 2021 with 14 documents.

Based on the co-occurrence network analysis of the use of AI in vocational education, the resulting keywords show that AI and vocational education have different approaches. This study

provides insight into the use of AI in vocational education and the importance of integrating AI principles in vocational education and training programs to improve learning outcomes.

References

[1] R. H. Hassan, M. T. Hassan, S. Naseer, Z. Khan, and M. Jeon, "ICT Enabled TVET Education: A Systematic Literature Review," *IEEE Access*, vol. 9, no. 07, pp. 81624–81650, 2021, doi: 10.1109/ACCESS.2021.3085910.

[2] S. Carlsson and S. Willermark, "Teaching Here and Now but for the Future: Vocational Teachers' Perspective on Teaching in Flux," *Vocat. Learn.*, vol. 16, no. 3, pp. 443–457, 2023, doi: 10.1007/s12186-023-09324-z.

[3] J. H. Ye, Y. S. Lee, C. L. Wang, W. Nong, J. N. Ye, and Y. Sun, "The Continuous Use Intention for the Online Learning of Chinese Vocational Students in the Post-Epidemic Era: The Extended Technology Acceptance Model and Expectation Confirmation Theory," *Sustain.*, vol. 15, no. 3, 2023, doi: 10.3390/su15031819.

[4] W. C. Riddell and X. Song, "The Role of Education in Technology Use and Adoption: Evidence from the Canadian Workplace and Employee Survey," *ILR Rev.*, vol. 70, no. 5, pp. 1219–1253, 2017, doi: 10.1177/0019793916687719.

[5] I. Placklé, K. D. Könings, K. Struyven, A. Libotton, J. J. G. van Merriënboer, and N. Engels, "Powerful learning environments in secondary vocational education: towards a shared understanding," *Eur. J. Teach. Educ.*, vol. 43, no. 2, pp. 224–242, 2020, doi: 10.1080/02619768.2019.1681965.

[6] A. Habibi, S. Sofyan, and A. Mukminin, "Factors affecting digital technology access in vocational education," *Sci. Rep.*, vol. 13, no. 1, pp. 1–12, 2023, doi: 10.1038/s41598-023-32755-6.

[7] S. F. Ahmad *et al.*, "Impact of artificial intelligence on human loss in decision making, laziness and safety in education," *Humanit. Soc. Sci. Commun.*, vol. 10, no. 1, pp. 1–14, 2023, doi: 10.1057/s41599-023-01787-8.

[8] R. F. Kizilcec, "To Advance AI Use in Education, Focus on Understanding Educators," *Int. J. Artif. Intell. Educ.*, vol. 34, no. 1, pp. 12–19, 2024, doi: 10.1007/s40593-023-00351-4.

[9] O. Hamal, N. E. El Faddouli, M. H. Alaoui Harouni, and J. Lu, "Artificial Intelligent in Education," *Sustain.*, vol. 14, no. 5, pp. 1–11, 2022, doi: 10.3390/su14052862.

[10] L. Chen, P. Chen, and Z. Lin, "Artificial Intelligence in Education: A Review," *IEEE Access*, vol. 8, pp. 75264–75278, 2020, doi: 10.1109/ACCESS.2020.2988510.

[11] K. J. Rott, L. Lao, E. Petridou, and B. Schmidt-Hertha, "Needs and requirements for an additional AI qualification during dual vocational training: Results from studies of apprentices and teachers," *Comput. Educ. Artif. Intell.*, vol. 3, no. October, p. 100102, 2022, doi: 10.1016/j.caeai.2022.100102.

[12] Y. Fu, Y. Mao, S. Jiang, S. Luo, X. Chen, and W. Xiao, "A bibliometric analysis of systematic reviews and meta-analyses in ophthalmology," *Front. Med.*, vol. 10, no. March, pp. 1–9, 2023, doi: 10.3389/fmed.2023.1135592.

[13] N. O. D. Ellili, "Bibliometric analysis of sustainability papers: Evidence from Environment, Development and sustainability," *Environ. Dev. Sustain.*, vol. 26, no. 4, pp. 8183–8209, 2024, doi: 10.1007/s10668-023-03067-6.

[14] A. Krause and L. Urbas, "Modular and active learning to support asynchronous learning in automation engineering," 2014, doi: 10.1109/ITHET.2014.7155679.

[15] M. Brunner and M. Di Angelo, "Competence orientation in vocational schools – the case of industrial information technology in Austria," *Lect. Notes Comput. Sci. (including Subser. Lect. Notes Artif. Intell. Lect. Notes Bioinformatics)*, vol. 8730, pp. 88 – 99, 2014, doi: 10.1007/978-3-319-09958-3_9.

[16] K. Kahn, R. Megasari, E. Piantari, and E. Junaeti, "AI programming by children using snap! Block programming in a developing country," in *CEUR Workshop Proceedings*, 2018, vol. 2193, [Online]. Available: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85053707384&partnerID=40&md5=f572adf493a473f9dbe766b2fa5945d9.

[17] M. G. V. Kumar, N. Veena, L. Čepová, M. A. M. Raja, A. Balaram, and M. Elangovan, "Evaluation of the Quality of Practical Teaching of Agricultural Higher Vocational Courses Based on BP Neural Network," *Appl. Sci.*, vol. 13, no. 2, 2023, doi: 10.3390/app13021180.

[18] X. Wu, "Application of Artificial Intelligence in Higher Vocational English Teaching Mode," in *Journal of Physics: Conference Series*, 2021, vol. 1852, no. 2, doi: 10.1088/1742-6596/1852/2/022089.

[19] Y. Bian, Y. Lu, and J. Li, "Research on an Artificial Intelligence-Based Professional Ability Evaluation System from the Perspective of Industry-Education Integration," *Sci. Program.*, vol. 2022, 2022, doi: 10.1155/2022/4478115.

[20] Z. Tang and Y. Liu, "Analysis of the Development Path of Counselors in Higher Vocational Colleges in the Era of Artificial Intelligence," in *Proceedings - 2023 13th International Conference on Information Technology in Medicine and Education, ITME 2023*, 2023, pp. 600 – 603, doi: 10.1109/ITME60234.2023.00125.

[21] W. Aiwen, "Research on University-Industry Cooperation of Vocational Colleges under the Background of Artificial Intelligence," in *Proceedings - 2022 2nd International Conference on Big Data Engineering and Education, BDEE 2022*, 2022, pp. 228 – 232, doi: 10.1109/BDEE55929.2022.00046.

[22] C. P. Dai and F. Ke, "Educational applications of artificial intelligence in simulation-based learning: A systematic mapping review," *Comput. Educ. Artif. Intell.*, vol. 3, no. June, p. 100087, 2022, doi: 10.1016/j.caeai.2022.100087.

Analysing Needs for Effective Video-Based Strategies to Enhance Students' Speaking Skills

Syabitha Asrilawaly[1*] and Dyah Setyowati Ciptaningrum[,2]

[1,2] Faculty of Languages, Arts, and Culture, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

[*]E-mail: syabithaasrilawaly.2022@student.uny.ac.id

Abstract. The objective of this research is to examine the particular needs and educational prerequisites of eleventh-grade beginner students in order to provide video-based resources that improve their oral communication abilities. In order to assess the learning needs of the students, questionnaires were distributed, resulting in comprehensive insights into their preferences and requirements. The study utilized a research and development approach, notably using the Jolly and Bolitho framework, to systematically create and improve these video-based materials. The results underscore the significance of customizing video material to fulfil these standards, guaranteeing congruence with the students' requirements and augmenting the educational encounter. This tailored method is expected to greatly enhance the effectiveness of English language training by creating a more engaging and efficient learning experience.

1. Introduction

The widespread availability of English language learning videos emphasizes how heavily technology is integrated into the teaching of the language. When teachers use videos successfully, they may create more dynamic and interesting learning sessions. Through the provision of diverse and enhanced learning opportunities, this technology integration enhances the effectiveness and interest of the educational process for students. The increasing emphasis on communicative techniques and the integration of video as an audio-visual tool in foreign language training have attracted considerable interest in academic environments. Yükselir & Kömür (2017) noted that the utilization of video is clearly a beneficial and essential resources for foreign language educators, significantly improving the instruction and acquisition of the target language.

The use of both visual and verbal information improves the clarity and retention of second language input. The simultaneous activation of both verbal and non-vernal systems enhances learning outcomes by facilitating the easier recall of information from memory (Hsieh, 2020). The integration of video creation into speaking sessions has shown significant benefits for students. Students indicated that participating in video production activities improved their language and literary abilities, offering a realistic setting for language application and enhancing their expertise (Riyanto, 2020).

Saed et al. (2021) argued utilizing video as an instructional tool for teaching a foreign language provides numerous advantages, it is very efficient tool for enhancing language proficiency, including the expansion of vocabulary and facilitating discussions and debates, covering all forms of English utilized in the EFL educational setting. Language instructors perceive video content as both captivating and inspiring, as it fosters a genuine, contextualized, and genuine teaching-learning atmosphere. Video materials offer genuine and unaltered feedback since they are specifically created for native speakers. Integrating video materials in English language courses improves students' ability to gain important cultural knowledge and emotionally connect with the subject matter.

However, according to Hadijah (2016) one significant obstacle in using video in EFL classes is the teachers' capacity to choose suitable content that efficiently enhances students' communicative capability. While there are many English videos available online, it is important for teachers to make sure that these videos are in keeping with their teaching goals, curriculum, and the English skills levels of their students. In Indonesia, English is commonly acquired in educational environments but rarely utilized in daily spoken exchanges. This presents a dilemma for educators, since they must actively look for chances to give assignment that incorporate practical uses of the English language. An important problem emerges when teachers choose videos that do not accurately represent real-life circumstances, so impeding the practical use of the language (Tyas & Fitriani, 2021). This underscores the necessity of meticulously selecting audiovisual resources that are pertinent to the situation in order to optimize language acquisition.

In addition, although textbooks do not completely cater to the specific contextual requirements of learners, numerous English language teachers and programs nevertheless rely on them for course direction and instruction. Teachers frequently depend on existing resources because of multiple limitations, such as time limits, inadequate expertise, or a lack of linguistic confidence, which hinder their ability to create their own materials. In the meantime, there may be institutional mandates that necessitate the usage of particular textbooks. And underlying cause of this issues is the lack of professional teacher training programs, which would otherwise provide instructor with the essential skills to develop more efficient and contextually suitable learning materials (Albino, 2017) .

Moreover, since the textbook is supplied by the government, it nevertheless has several deficiencies. Significantly, it is deficient in listening and speaking materials, as it does not come with audio resources and only offers a restricted number of speaking task. The main goal for those learning common English is to improve their abilities in hearing and speaking in order to effectively communicate in everyday situations. As a result, teachers are obligated to search for extra resources and create supplementary materials in order to teach these essential abilities efficiently.

Considering these obstacles, it is vital to furnish students with current tools to augment their oral communication abilities. The objective of this project is to create assignments and activities utilizing video content in order to enhance students' oral communication skills. The project aims to create effective speaking exercises by carefully selecting videos and utilizing the benefits of video as a teaching media. This strategy seeks to attain the intended results of English language education and learning procedures, specifically in speaking course, as specified in the curriculum.

2. Method of Research

Minto (2024) provide material development is continous endeavour aimed at creating efficient educational resources that promote significant learning experiences for students. It encompasses the process of developing modifying and improving educational resources to cater to the varying requirements of students and various educational settings. This process encompasses several stages, including needs analysis, design, production, and evaluation, all with the purpose of guaranteeing the quality and pertinence of the educational resources.

Tomlinson (2012) suggested material development refers to the comprehensive set of activities carried out by educators to create and utilize materials for language acquisition. It is desirale for these processes to be interconnected and taken into account together when creating language-learning resources that are successful.

This study employes a Research and Development (R&D) methodology with a specific emphasis on generating novel goods and techniques. This study employed Jolly and Bolitho's (1998) framework for material development, with appropriate modifications made to cater to the specific requirements of the research. This methodology highlights the significance of subjecting instructional resources to

rigorous trials and evaluations, irrespective of their origin, be it commercial or teacher-generated. By include peers or experts in the creation and evaluation of materials, the framework guarantees the effectiveness and applicability of these educational resources, hence improving their overall quality and appropriateness for the intended educational setting. The research was carried out at a private secondary school in Yogyakarta, specifically chosen for its unique curriculum that combines the National Academic Curriculum (NAC) with the Cambridge curriculum. The participants consisted of eleventh-grade students who were selected through purposive sampling. The data collection process consisted of administering questionnaires specifically tailored to determine the learning needs and preferences of students in relation to their speaking skills.
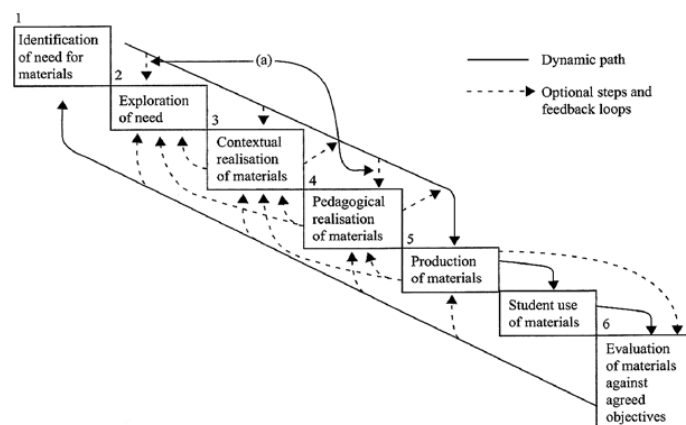
Figure 1. Jolly and Bolitho Framework

When developing materials, it is essential for both teachers and learners to recognize the dominant phenomena in the teaching and learning environment. This requirement necessitates the development of innovative instructional materials. Researchers in material development must subsequently analyse the particular domain associated with language forms and functions. Subsequently, it is imperative to provide context to the materials by integrating relevant local content into the speaking resources. The subsequent stage involves the application of pedagogy, which employs suitable instructional techniques, exercises, and activities. The last phase entails the tangible fabrication of materials, with a specific emphasis on the arrangement and visual components.

3. Findings and Discussion

The data collected for the development process was derived from an examination of the students' target needs and learning needs. The evaluation of target needs involved evaluating the students' requirements. The evaluation of target needs involved evaluating the students' necessities, lacks, and wants. The findings are presented in Table 1. Meanwhile, the examination of learning needs encompassed factors such as input, process, context, learners' roles, and teachers' roles. The results are displayed in Table 2.

Table 1 Target Needs of Grade XI Students in Speaking Class

Aspects	Point to Consider in Materials Development
Necessities	Materials a. Asking and giving suggestions & offering related culture event. b. Identifying the expression of stating opinions, agreeing, and disagreeing related to technology. c. Stating opinions agreeing, and disagreeing related to entertainment.

Aspects	Point to Consider in Materials Development
	d. Identifying the structure cause and effect (Hortatory text) related to health real-world situation.
	e. Presenting (Hortatory exposition text) related to teenager.
	f. Presenting (Explanation text) related to education.
	Speaking Elements
	a. Vocabulary.
	b. Fluency.
	c. Pronunciation.
	d. Grammar.
Lacks	Speaking Elements
	a. Vocabulary.
	b. Pronunciation.
	c. Fluency.
	d. Intonation.
Wants	a. Achieve a high level of competency in using English language verbal communication.
	b. Fluency in spoken English.
	c. Enhance their pronunciation and grammar.

Table 2. Learning Needs of Grade XI Students in Video Materials for Practice Speaking

Aspects	Point Consider in Materials Development
Goal	a. Improve their proficiency in spoken English.
	b. Improve their pronunciation.
	c. Improve their vocabulary.
Procedure	Activities to improve speaking skill
	a. Tasks that require the expressing words or phrases in English related to the themes or subjects being studied.
	b. Participating in interactive discussions with their peers, specifically focusing on topics that are pertinent to the educational themes or subjects.
	c. Engage in exercises that entail performing monologues that depict ordinary events in life.
Input	Media for learning process
	a. Video-Based resources
	b. PowerPoint
	c. Games
	Category of video
	a. Video with visual is essential for facilitating comprehension, with the inclusion of high-resolution images and clear audio.
	b. Videos should have animated movements.
	c. Video should reflect the learning objective.
	d. Video should incorporate legible text size that are easy to read.
	The Length of Video
	a. 4-5 minutes
Setting	a. Blended learning.
	b. Small Group activities.
	c. In-class activities.
Teacher's Role	a. Motivating and encouraging.
	b. Provide supportive atmosphere.

Aspects	Point Consider in Materials Development
	c. Encourage and direct students employ creative thinking.
Student's Role	a. Participate in classroom discussion.
	b. Participate in collaborative conversation.
	c. Proficiently acquire and effectively utilize acquired vocabulary.

All highlighted needs were met while also adjusting the technique to align with the current emphasis on learner-centeredness in language education. Students are increasingly taking on more independence and accountability in their learning processes, a pattern that includes individuals establishing personal learning objectives that are frequently aligned with external educational targets. This movement represents a move away from conventional teacher-focused methods towards more student-focused strategies in education.

Lee & Hannafin (2016) stated the core of this strategy lies in students utilizing their diverse backgrounds and personal experiences to actively participate in the exploration, selection, and use of different educational tools and resources. By engaging in this practice, individuals are not only improving their comprehension but also tailoring their educational journeys to align with their distinct requirements and preferences. Essentially, this change in perspective towards learner autonomy emphasizes the significance of tailored learning experiences and instructional practices that are led by students. The approach fosters a dynamic and adaptable learning setting, empowering students to actively contribute to their own educational growth, so enhancing their level of involvement and achieving more significant learning results.

The obtained data was structured into a course grid consisting of objectives, materials, input, learning resources, and activity sequences. According to Richards (2015) for creating speaking courses, the first step is to establish the course objectives. The objectives were determined based on a thorough analysis of the learning outcomes specified in the Merdeka curriculum, with a particular emphasis on Phase F, which highlights the integration of listening and speaking skills. Students are required to have the necessary skills in English subjects to confidently and spontaneously engage in conversations with native English speakers. They should demonstrate proficiency in narrative, expository, and discussion situations.

These materials should focus on essential aspects like vocabulary, fluency, pronunciation, and grammar. The presence of vocabulary, pronunciation, fluency, and intonation shortcomings suggests the necessity for specific activities. Students reported a strong aspiration to attain a high level of proficiency in verbal communication, better their fluency in spoken English, and refine their pronunciation and grammar. These findings indicate that speaking materials should be thorough, encompassing both the fundamental aspects of language and the particular situations in which students are expected to utilize English.

The main objectives were to enhance pupils' fluency in spoken English, enunciation, and lexicon. The effective activities encompassed exercises that necessitated students to articulate terms or phrases associated with the subjects under examination, actively engage in interactive discussions, and perform monologues portraying routine daily occurrences. The major medium for learning was determined to be video-based materials, which were supplemented by PowerPoint presentations and educational games. Effective videos comprise high-quality visuals, crisp sound, dynamic animations, and easily readable text. An optimal instructional strategy was suggested, which involves integrating both small group activities and in-class exercises to enhance student participation and foster connection. Teachers were required to inspire and empower students, foster a nurturing environment, and guide students in utilizing innovative thinking, while students were expected to actively engage in classroom discussions, participate in collaborative conversations, and effectively acquire and use new vocabulary.

The results suggest that the use of video materials can greatly improve the learning process by offering high-quality, captivating information that effectively caters to the specific educational requirements and interests of students. In order to create impactful video resources for teaching speaking skills, it is essential to include a diverse range of speaking exercises. This will enable students to practice the required language functions in many situations and settings. Integrating interactive discussions and real-life scenarios into video materials can facilitate students in connecting their learning to practical applications. Videos should be superior quality, featuring distinct audio, visual aids, and animations to enhance understanding and memory retention. By integrating video resources into the educational process while taking these factors into account, educators can establish a comprehensive structure for instructing speaking abilities that not only addresses the current requirements of students but also equips them for practical communication in real-life situations.

Video is widely acknowledged as a potent and easily understandable medium for second and foreign language learners. The dynamic nature and capacity to portray genuine relationships make it an important tool for acquiring language. Videos offer a wealth of contextualized material that surpasses other forms of media, making them especially helpful for showcasing genuine language usage and cultural subtleties. This is in line with Bajrami & Ismaili (2016) recommended by incorporating video materials into curriculum, instructors can be establish a more captivating and efficient learning environment. This approach facilitates the acquisition of effective communication skills, enabling students to engage in natural and effortless interactions with those who speak the language as their first language.

Integrating video-assisted speaking activities into language instruction is essential for improving speaking abilities and minimizing fear. Teachers should encourage active participation of students in authentic conversations with native speakers to enhance their self-assurance and mastery of the English language. Moreover, extended therapies may be necessary to adequately tackle ingrained concerns such as test anxiety and fear of poor appraisal (Lu et al., 2019).

4. Conclusion

Language training must include video-aided speaking exercises to improve students' speaking abilities and reduce fear. Videos enhance learning by presenting dynamic and entertaining content. This research emphasizes the necessity of choosing video material that matches educational objectives and student performance. Video materials should have clear audio, high-quality graphics, and interactive aspects to aid understanding and memory. Video footage with real-life settings and engaging conversations may also help students apply their lessons. Teachers inspire and guide pupils, encouraging active engagement and innovative thinking. Finally, audiovisual resources in English language classes may improve students' oral communication abilities and prepare them for real-world conversation. This study has significant drawbacks. The research did not examine how personality and linguistic experience affect video-aided speaking activities. To further understand the impact of video materials in language training, future research should acknowledge these constraints and perform longitudinal studies with varied participant groups.

References

[1] Albino, G. (2017). Improving Speaking Fluency in a Task-Based Language Teaching Approach: The Case of EFL Learners at PUNIV-Cazenga. *SAGE Open*, *7*(2). https://doi.org/10.1177/2158244017691077

[2] Bajrami, L., & Ismaili, M. (2016). The Role of Video Materials in EFL Classrooms. *Procedia - Social and Behavioral Sciences*, *232*(April), 502–506. https://doi.org/10.1016/j.sbspro.2016.10.068

[3] Hadijah, S. (2016). Teaching by using video: Ways to make it more meaningful in EFL classrooms. *In Proceedings of ISELT FBS Universitas Negeri Padang*, *4*(2), 307–315. https://www.researchgate.net/publication/320146544

[4] Hsieh, Y. (2020). Effects of video captioning on EFL vocabulary learning and listening comprehension. *Computer Assisted Language Learning*, *33*(5–6), 567–589. https://doi.org/10.1080/09588221.2019.1577898

[5] Lee, E., & Hannafin, M. J. (2016). in student-centered learning : own it , learn it , and share it. *Educational Technology Research and Development*. https://doi.org/10.1007/s11423-015-9422-5

[6] Lu, H. W., Lee, J. Y., & Lin, M. H. (2019). Effects of Authentic English-Language Videos on EFL Students' Speaking Anxiety. *International Journal of Information and Education Technology*, *9*(6), 423–428. https://doi.org/10.18178/ijiet.2019.9.6.1239

[7] Minto, T. L. (2024). Material Development in ELT : Principles and Procedures. *Research Journal of English Language and Literature (RJELAL)*, *12*(1). https://doi.org/10.33329/rjelal.12.1.316

[8] Riyanto, E. D. (2020). *The Benefits of Integrating Video Making in a Speaking Class*. *3*(1), 64–73.

[9] Saed, H. A., Haider, A. S., Al-salman, S., & Hussein, R. F. (2021). The use of YouTube in developing the speaking skills of Jordanian EFL university students. *Heliyon*, *7*(February), e07543. https://doi.org/10.1016/j.heliyon.2021.e07543

[10] Tomlinson, B. (2012). Materials development for language learning and teaching. *Language Teaching*, *45*(2), 143–179. https://doi.org/10.1017/S0261444811000528

[11] Tyas, N. K., & Fitriani, N. (2021). Enhancing Students Speaking Skills by Making Video Youtube TUTORIAL AS PROJECT BASED LEARNING. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, *9*(2), 233–244. https://doi.org/10.24256/ideas.v9i2.2262

[12] Yükselir, C., & Kömür, S. (2017). Using Online Videos to Improve Speaking Abilities of EFL Learners. *Online Submission*, *May 2016*, 12–14. https://doi.org/10.5281/zenodo.495750

Interactive Multimedia Time Ruler "TiRu": Does It Affect the Mathematics Concept Understanding of Primary School Students?

Wahyu Purwaningsih[1*], Sugiman[2] and Haryanto[1]

[1] Department of Education and Psychology, UNY, Yogyakarta, Indonesia
[2] Department of Mathematics and Science, UNY, Yogyakarta, Indonesia
[*]E-mail: wahyupurwaningsih.2022@student.uny.ac.id

Abstract. This study aims to examine the effect of time ruler interactive multimedia in mathematics learning on the understanding of primary school students' concepts; to determine the effectiveness of time bar interactive learning multimedia on concept understanding in grade III students at Primary schools. The research used the of quasi-experiment Third graders conducted the study in the Bantul primary school. The research population is a third graders in Bantul Primary school students, with 120 students. A sample of research taken by stratified random sampling comprises 60 students as an experimental class using multimedia interactive learning "TiRu" and 60 students as a control class without using interactive multimedia learning "TiRu". The data collection techniques were an interview guide, observation, and an understanding concept essay test. This research data analysis uses the normalized gain (n gain) to know increases in the pretest and post-test, independent samples t-test, and paired samples t-test. The results show that: to examine the effect of "TiRu" interactive multimedia in mathematics learning on the understanding of primary school student's concepts; The reliability test is calculated with the formula Cronbach's alpha obtained 0.613 in the pretest and 0.714 in post-test results for understanding students' concepts; the results from Independent Samples t-Test, Paired-Samples t-Test obtains a significant value < 0.05; The results of the experiment's with N-gain pretest and posttest class report: 0.45, which means it's effective, the "TiRu" interactive learning multimedia is significantly influential on the interest of students' learning.

Keywords: Interactive Multimedia "TiRu", understanding mathematical concepts

1. Introduction

In the development of the 21st century, students must master 4c skills. These skills include communication, critical thinking and problem-solving, collaboration, and creating and innovating. On this 21st, it's a 4.0 industrial revolution. Industrial development 4.0 also requires improving our ability to create and innovate. These creative and innovative skills require us to create and innovate with technology. With technological developments, humans must be able to filter technology's positive and negative effects. Technological advances also have an impact on education. Technological developments, which can make it easier for students to obtain information. Electronic technologies, such as multimedia use through computers in learning, motivate students and increase their

understanding of concepts [1,2]. Industrial Revolution 4.0 also refers to intelligent machines and industrial processes with the help of information technology and communication [3–5]

Technological use, such as multimedia use in learning, makes students more motivated to learn and improve their cognitive aspects [6,7]. Teachers must have expertise in using technology and informed learning media to help students connect experiences and knowledge to actual conditions so that learning becomes centered on students and influences learning success [8,9] Learning can be done where, when, and by anyone using the medium of learning can increase the attainment of learning technology [10,11] The primary school has not utilized the optimal use of mathematical learning and computer laboratorium it makes as an alternate tool for learning infrastructure [12–14]. In contrast, multimedia learning for teachers and students is essential because it develops cognitive, therapeutic, and student motivation and proficiency in mathematics [15–18]. Learning using multimedia makes the learning process simple, straightforward, and concrete. It's important to note that Industry 4.0 is not only about technology. It also sees the impact and role of society and its workers or human resources. Therefore, began to develop human resources at an early age for primary school children.

National Council of Teachers of Mathematics [19–21] states that using technology for teachers and students is essential because it develops student understanding and proficiency in mathematics. Therefore, the technology of mathematical learning is essential. Math is a branch of science that can help develop technology [22,23]. Learning mathematics can develop creative, logical, rational, critical, and systematic thinking because math study it's a study of several interrelated concepts. Math can get students to think creatively, logically, rationally, critically, systematically, and analytically, and occupational and math to be associated with problems occurring in daily life. Then, math learning is essential to learn as early as possible [24,25].

In Indonesia, the math score is still under the index. This corresponds with the [26] of PISA, which shows that more than in 2018, Indonesia's reading, mathematics, and science students remain significantly lacking in the Organization for Economic Cooperation and Development (OECD). The OECD (2020) noted that the Programme for International Student Assessment (PISA) rating for the Indonesians Survey 2018 is in the bottom order, let alone for the value of mathematical competence ranks 72 out of 78 countries (OECD, 2019). It can be seen from time to time that mathematics is learning students lack interest and fear because it is difficult to understand.

Math education is challenging, abstract, and tedious; students with learning difficulties are influenced by a lack of conceptual understanding of the material being taught [20,28,29]. Math learning requires effort to increase concepts to make students competent, earn learning, learn more effectively, gain confidence, and understand their mistakes [30] [31] [21] [32].

Facts on the ground say that understanding concepts in mathematical learning is lacking. Math study is one of the most vulnerable learning loads to drop students' concepts other than science [29]. Math study will be more interesting because of the internal stimulus that can affect student concepts and attention [19]. From this, it will affect increased understanding of students' concepts. Mathematics has become the instrument of all other sciences, making students think that it is creative, logical, rational, critical, systematic, and analytical [23,25,30,31]. While understanding math concepts is essential for primary school students [32–34]. However, in the field, understanding of students' concepts has not been developed optimally, especially in math learning [35].

That would account for some problems in grades 3 In Bantul Primary schools. The problem is that the average student scores in charge of math studies more than most others: 46-75. The results of the interview by the class 3 teacher have noted that during the first semester, there is time measuring material, particularly counting the length of time of activity. Still, students' accomplishments in studying and learning on a material time measurement are lacking. As well as understanding students' concepts in class 3, time measurement materials are low because time measurement is difficult to

understand. During the second semester of class 3, there is time-measuring material, particularly the length of time activity. At the time of the study, students still cannot work on math problems that require high-level thinking ability.

Teachers use only available sources of study in schools, such as package books, whereas most schools in the Bantul Primary Schools help have computer laboratories and LCD projectors, but the computer has not been put to good use. Furthermore, inadequate amounts of media also impede learning effectiveness, especially in lower-class students who must be able to feel and observe what is seen. This corresponds with the opinion of [8,36,37] say that the use of computers in computer laboratories is less optimal because there is limited access to information-based media and communications. The great hope for a teacher is to create effective learning according to the student's development by revealing abstract concepts.

Multimedia interactive learning can make learning effective and efficient. Multimedia interactive learning to convey information to children is very effective for use, as this interactive multimedia combine several media rather than simply communicating information using words [6,15,38–40]. Multimedia means a combination of various media [41][42][43]. Multimedia learning could link images, texts, animation, lines, videos, and audio in one learning application [16]He, 2021)[44][45]. Students become more active interactive using various media and, making learning more accessible and improving students' understanding [43][46][47][48][38][49]. Primary age is also attracted to brightly coloured, animated, and game media to make learning memorable [50–52]

Therefore, students and teachers in the primary school in the help district need multimedia interactive in math study to know its impact on understanding mathematical concepts. One example of the multimedia interactive learning curve is time. It was a gauge used to measure the length or width of an object. A ruler or a piece of paper would be as precise as 0.5 cm (0.5 in.). A correct length measurement would be the scale of 0 on a weighted ruler with the end of an object to be measured in length. Time is part of the universe's basic structure, a dimension where events occur in sequence. Time is a dimension in which events can be experienced from the past through the present into the future and the duration of events and intervals. So, the multimedia of interactive learning "TiRu" is used as a measuring instrument for events or activities.

Multimedia use "TiRu" includes cover, multimedia names "copied, use clues, concepts of materials, class 3 measuring materials, a quiz of time, a game, and there are questions of valuation, and material summarizes in these multimedia include a variety of media as text, picture lines, animation, bright colours, sounds, music, videos, and a button to use are expected to make students more interested in taking math lessons. The learning of time and concepts must be correct with the help of multimedia interactive learning. Media use, such as phones and computers, can benefit by providing high access to learning flexibility so students have a learning concept and interest [53]. Thus, in the learning and education process, mobile phones and computers are essential tools today, including that mathematics [13,40,54]. In so doing, the student feels good and excited to follow the learning that his or her interest in learning mathematics is growing. Multimedia based on learning technologies can enhance the quality of learning.

2. Methods

The study was intended to learn the effect of multimedia "TiRu" learning on understanding students' concepts at primary math school. The study uses quantitative research with quasi-experiment types. The study is conducted in Bantul Primary Schools. The study population is third graders, helped by 120 students. Research samples taken by stratified random sampling are made up of 60 students as an experimental class using multimedia interactive learning "TiRu" and 60 students as a control class without using multimedia interactive learning "TiRu" data collection techniques using observation,

interviews and essay testing pretest and post-test understanding mathematical concepts. Data from the pretest and post-test results can then be analyzed using the intended gain standards to calculate the increased understanding of concepts. This research data analysis uses the normalized gain (n gain) to know increases in the pretest and post-test, independent samples t-test, and paired samples t-test.

[55] revealed that a formula is used to calculate the n-gain score.

$$g = \frac{postest\ score - pretest\ score}{maximal\ score - pretest\ score} \qquad (1)$$

Table 1. Value interpretation n gain

Interval	Category Effectiveness
≥ 0,7	Very Effective
0,7 > (g) ≥ 0,3	Effective
< 0,3	Less Effective

3. Results

Validity tests of the instrument are made to obtain valid and valid data. The validity of the bowl-test instrument using the formula of moment product correlation with the help of SPSS 27. The validity of the value is a 5% measure. The instrument is said to be valid when $r_{xy} > r_{table}$. On the other hand, religious testing is conducted to determine the level of reliability of an institution. The level of religious capability on a description test is done with the tests of **Cronbach's** alpha with the help of SPSS 27.

Table 2. Pretest Reliability review of concepts.

Reliability Statistics	
Cronbach's Alpha	N of Items
.613	6

Table 3. Post-test Reliability review of concepts

Reliability Statistics	
Cronbach's Alpha	N of Items
.714	6

The "TiRu" multimedia use of interactive learning helps students understand the ability to understand concepts of materials measuring the load of mathematical learning. An indicator of that concept is the ability to relate concepts presented to other concepts, the ability to interpret concepts presented, the ability to explain concepts mathematically, and the ability to explain concepts from picture to picture. The material used to develop the multimedia product of interactive "TiRu" multimedia product is a matter of time of calculating the length of time an event/activity.

Figure 1. Multimedia interactive learning "TiRu".

The learning activities in the control class are performed like normal learning activities using textbooks and LKS. For the learning activities in the experiment class, using the "TiRu" interactive learning multimedia as a basis for doing the learning activities on a load of mathematical learning.

Concept understanding tests aim to know the effectiveness of the "TiRu multimedia in understanding students' concepts. The concept understanding test was conducted twice for each class on an experimental and control class. Concept understanding tests are conducted through pretests and posttests for experimental and control classes. To know students' initial ability to understand concepts before teaching activities begin pretests. The post-test is done to know the ability to understand concepts after the learning activities are done in the control and experiment classes. Pretest and posttest results came from the students working on the concepts understanding test. The materials used in the matter measuring time determine the length of time an event or activity takes place. This concept comprehension test is in the form of an essay on six problems. Here is the result of the value of understanding concepts.

Table 4. Data results from the control class concept understanding test.

	Pretest	Post-test
Total Score	2031	2440
Average	61.5455	73.9394
n gain	0.32 (effective)	

The average pretest of the control group concept understanding is 61.54 then, after the pretest, home-teaching activities are carried out like any everyday learning with a textbook, both a package book and a student worksheet provided by the school. During the four sessions, posttests and students obtained an average of 73.93 from the subject, indicating that other students in the control class have increased their sense of concept and gained ability by 0.32 to effective criteria.

Table 5. Data results from the experiment class concept understanding test.

	Pretest	Post-test
Total Score	2459	3012
Average	66.4594595	81.4054
n gain	0.45 (effective)	

Pretest results on a class group experiment were obtained on average 66.45. After the students in the experiment class were treated using the "TiRu" multimedia product, Students use the "TiRu"

multimedia product "TiRu" for two hours of lessons, as many as two meetings or 2x35 minutes as many as four times the meeting. Then, the students completed the posttest and scored an average of 81.4. This indicates that students in an experiment class increased their ability to understand concepts of matter, measuring a load of mathematical learning by effectively checking the value gain of 0.45 included in the criteria. So, it can be known that the gain value in the experiment class groups is more significant than with the control class.

Table 6. Result of Normality Mathematics Understanding Concepts

No	Class	Data	Sig.	Condition	Description
1	Control	Pretest	0,200	> 0,05	Normal
		Posttest	0,200	> 0,05	Normal
2	Experiment	Pretest	0,200	> 0,05	Normal
		Posttest	0,115	> 0,05	Normal

Based on Table 6, it may be known that pretest value data and posttests of concept understanding tests in control class and experiment classes have significance > 0.05, then the data on understanding concepts is said to be distributed or worded normality.

Table 7. Result of Homogeneity Mathematics Understanding Concepts

No	Data	Sig.	Condition	Description
1	Pretest Experiment and Control	0,945	> 0,05	Homogen
2	Post-test Experiment and Control	0,985	> 0,05	Homogen

Based on Table 7, the homogeneity test data may be known that the pretest value and the posttest ability of conceptual understanding in the control and experiment classes has a significance > 0.05. The value data of conceptual understanding is said to be homogeneous.

Table 8. Independent Samples T-test of Mathematics Understanding Concepts

No	Data	Class	Sig.	Description
1	Pretest	Experiment and Control	0,055	Ha Received
2	Post-test	Experiment and Control	0,000	Ho Rejected

Based on Table 8 test results, the significance value < 0.05 could cause Ho to be rejected and Ha to be received. Therefore, there can be concluded that there is a difference in concept understanding ability between students using multimedia "TiRu and students who do not use "TiRu" multimedia in math learning activities.

Table 9. Paired Samples T-test of Mathematics Understanding Concepts

No	Data	Sig.	Condition	Description
1	Pretest and Post-test Mathematics Understanding Concepts	0,000	<0,05	Ho Rejected

Based on Table 9, the results in the paired samples t-test show that the significance value < 0.05, so Ho was rejected, and Ha was received. Thus, it may be concluded that there is a difference in concept

understanding in the student experiment class groups between students using the "TiRu" multimedia with students who do not use the "TiRu" multimedia in math learning activities.

4. Discussion

4.1 The "TiRu" multimedia impact on mathematics concept understanding.

The "TiRu" multimedia use of interactive learning in one control class and one experimental class aims to be able to determine the effectiveness of the "TiRu" multimedia products to the ability of mathematical concepts ([43,45,56–58]. The "TiRu" interactive multimedia study effectively improves the understanding of mathematical concepts [1]. It is derived from data results of concept understanding tests, which can be seen from average value and gain. The average score of the results of the pretest and post-test of the experimental class is higher than the results in the control class. In the class, the average posttest value experiment was higher than the pretest value of 81.40 for the post-test and 65.45 for the pretest average of 14.95 increases and had a 0.45 value-added n gain. Then, the results of the control class get a higher average posttest value of the pretest value of 73.93 for the posttest and 61.54 for the pretest class with a 12-39 increase and gain value of 0.32 classified. Gaining n gains control class value is smaller than this experiment class means that the "time scroll" interactive multimedia learning can influence concept understanding [11,45,47,59].

Furthermore, based on data from hypotheses using independent samples t-test and paired samples t-test against student concepts have found a degree of $0,000 < 0.05$. From the results, the "time slide" interactive learning multimedia can influence the understanding of third-grade students' concepts in charge of math learning. It conforms to the opinion [38,47,59] that the multimedia of interactive learning used in charge of mathematical learning can enhance the ability to understand students' concepts mathematically. [60] suggest that using interactive multimedia learning in software applications can increase students' understanding of math lessons. The process of learning students can increase by using multimedia interactive learning. Multimedia learning is essential to student understanding [39,61,62]. Students are capable of logical thinking and can solve problems that occur in daily life when students can understand good concepts [3,4,63,64].

References

[1] Tziritis EP, Datta PS, Barzegar R. Characterization and Assessment of Groundwater Resources in a Complex Hydrological Basin of Central Greece (Kopaida basin) with the Joint Use of Hydrogeochemical Analysis, Multivariate Statistics and Stable Isotopes. Aquat Geochem 2017;23:271–98. https://doi.org/10.1007/s10498-017-9322-x.

[2] Fahadi M, Khan MdSH. Technology- enhanced Teaching in Engineering Education : Teachers ' Knowledge Construction Using TPACK Framework. International Journal of Instruction 2022;15:519–42.

[3] Rohaeti EE, Bernard M, Bias Primandhika R, Siliwangi I, Jendral JT, Cimahi S. Developing interactive learning media for school level mathematics through open-ended approach aided by visual basic application for excel. Journal on Mathematics Education 2019;10:59–68.

[4] Andini S, Fitriana L. Developing flipbook multimedia: the achievement of informal deductive thinking level. Journal on Mathematics Education 2018;9:227–38.

[5] Nursyifa A, Rahmadi IF, Hayati E. TPACK Capability Preservice Teachers Civic Education in the Era of Industrial Revolution 4.0. JPI (Jurnal Pendidikan Indonesia) 2020;9:15–29. https://doi.org/10.23887/JPI-UNDIKSHA.V9I1.17982.

[6] Sutiarso S, Coesamin M. The effect of various media scaffolding on increasing understanding of students' geometry concepts. Journal on Mathematics Education 2018;9:95–102.

[7] Ekawati R, Wachidul Kohar A, Matul Imah E, Maghfirotun Amin S, Fiangga S. Students' cognitive processes in solving problem related to the concept of area conservation. Journal on Mathematics Education 2019;10:21–36.

[8] Prasetyo H, Kristiyanto A, Doewes M. The Development of Android-Based Mobile Learning Media in Healthy Lifestyle Teaching Materials for Senior High School Students. International Journal of Multicultural and Multireligious Understanding 2019;6:188–94. https://doi.org/10.18415/IJMMU.V6I2.656.

[9] Putra A, Syamsyui E, Radzuan NFM. Development of Multimedia Interactive Module for Learning Adobe Photoshop CS4. Scientific Journal of Ppi-Ukm 2015;2:38–42.

[10] Vaughan T. Multimedia: making It Work. vol. 63. 8th ed. America: Multimedia: making It Work; 2011. https://doi.org/10.2298/VSP0602169S.

[11] Shah I, Khan M. Impact of Multimedia-aided Teaching on Students" Academic Achievement and Attitude at Elementary Level. International Journal of Emerging Technologies in Learning 2015;5:349–60. https://doi.org/https://doi.org/10.17265/2161- 623X/2015.05.006.

[12] Schwier, R., & Misanchuk ER. Interactive multimedia instruction. 1993.

[13] Cairncross S, Mannion M. Interactive Multimedia and Interactive Multimedia andLearning : Realizing the Bene ts. Innovations in Education and Teaching International 2010;38:156–64. https://doi.org/10.1080/14703290110035428.

[14] Vasudeva, Manjunath. Multimedia and animation. Mukthagangotri: Karnataka State Open University; 2014.

[15] Shilpa S, Sunita M. A Study About Role of Multimedia in Early Childhood Education A Study About Role of Multimedia in Early Childhood Education. International Journal of Humanities and Social Science Invention 2018;2:80-85A.

[16] Smaldino SharonE, Lowther DeborahL, Mims C. Instructional technology and media for learning. vol. 15. 12th ed. United States of America: Pearson; 2019.

[17] Ardani RA, Setyaningrum W, Salsabila NH. The Perceptions of Students and Teachers About The Use of Edutainment Instructional Media in Mathematics Learning.), Volume 160 University 2018;160. https://doi.org/10.2991/incomed-17.2018.49.

[18] Mayer RE. Multimedia Learning Second Edition. 2nd ed. New York: Cambrige UniversityPress; 2010.

[19] Bintaro TY. Developing Interactive Multimedia on the Thematic-Integrative Learning for Grade IV Students under the Sub-Theme my Food is Health and Nutritious. Jurnal Prima Edukasia 2017;5:193–202. https://doi.org/https://doi.org/10.21831/jpe.v5i2.7223.

[20] Madanhire I, Mbohwa C. Application of Statistical Process Control (SPC) in Manufacturing Industry in a Developing Country. Procedia CIRP 2016;40:580–3. https://doi.org/10.1016/j.procir.2016.01.137.

[21] NCTM. Strategic Use of Technology in Teaching and Learning Mathematics. Livestock Research for Rural Development 2015;24:6.

[22] Kusmaryono. THE IMPORTANCE OF MATHEMATICAL POWER IN MATHEMATICS LEARNING I . Kusmaryono Department of Mathematics Education Sultan Agung Islamic University Semarang Indonesia. International Conference on Mathematics, Science, and Education 2014;2014.

[23] Suneetha, E., Rao, R. S., & Rao DB. Methods of learning mathematics. London: SAGE Publications; 2011.

[24] Sholihah DA, Mahmudi A. Keefektifan Experiential Learning Pembelajaran Matematika MTS Materi Bangun Ruang Sisi Datar. Jurnal Riset Pendidikan Matematika 2015;2:175–85. https://doi.org/https://doi.org/10.21831/jrpm.v2i2.7332.

[25] Skemp RR. The Psychology of Learning Mathematics. Baltimore: Richard Clay (The Causer Press) Ltd.; 1971.

[26] OECD. PISA 2018 results volume IV. vol. I. OECD Publishing; 2020.

[27] OECD. PISA 2018: Assessment and Analytical Framework 2019:11–20.

[28] Booth JL. Why Can ' t Students Get the Concept of Math ? 2014:31–5.

[29] Mwakapenda W. Understanding student understanding in mathematics. Pythagoras 2004:28–35.

[30] Anintia R, Sadhu S, Annisa D. Identify Students' Concept Understanding Using Three-Tier Multiple Choice Questions (TTMCs) on Stoichiometry. International Journal of Science and Applied Science: Conference Series 2017;2:308. https://doi.org/10.20961/ijsascs.v2i1.16734.

[31] Eriana, Kartono, Sugianto. Understanding Ability of Mathematical Concepts and Students " Self -reliance towards Learning by Implementing Manipulative Props (APM) on Jigsaw Technique. Journal of Primary Education 2019;8:176–83. https://doi.org/https://doi.org/https://doi.org/10.15294/jpe.v8i2.25984.

[32] Yuliani K, Suragih S. The Development Of Learning Devices Based Guided Discovery Model To Improve Understanding Concept And Critical Thinking Mathematically Ability Of Students At Islamic Junior High School Of Medan. Journal of Education and Practice 2015;6:116–28.

[33] HØgheim S. Making Math Interesting: an Experimental Study of Interventions to Encourage Interest in Mathematics. University of Bergen.; 2017.

[34] Godino JD. Mathematical Concepts, Their Meanings, and Understanding. Psychology of Mathematics Education-PME20 2015;2:1–7.

[35] Geller EH, Son JY, Stigler JW. Conceptual explanations and understanding fraction comparisons. Learn Instr 2017;52:122–9. https://doi.org/10.1016/j.learninstruc.2017.05.006.

[36] Bogdanović I, Obadović DŽ, Cvjetićanin S, Segedinac M, Budić S. Students' Metacognitive Awareness and Physics Learning Efficiency and Correlation between Them. European Journal Of Physics Education 2015;6. https://doi.org/10.20308/ejpe.96231.

[37] Hoffman B, Spatariu A. The influence of self-efficacy and metacognitive prompting on math problem-solving efficiency. Contemp Educ Psychol 2008;33:875–93. https://doi.org/10.1016/j.cedpsych.2007.07.002.

[38] Wibowo A, Yus A, Setiawan D, Gading Tabir Selatan SI, Negeri Medan Corresponding Author U, Wibowo agung A. Analysis of the Effectiveness of Learning Multimedia Based on Contextual Learning in Elementary Schools. Indonesian Journal of Advanced Research (IJAR) 2022;1:21–32. https://doi.org/10.55927/ijar.v1i1.2936.

[39] Yilmaz Ç, Altun SA, Olkun S. Factors affecting students' attitude towards Math: ABC theory and its reflection on practice. Procedia Soc Behav Sci 2010;2:4502–6. https://doi.org/10.1016/j.sbspro.2010.03.720.

[40] Lutfi S, Ismatullah K, Nur Kholiso Y. Developing Interactive Learning Multimedia for Mathematics Subject in Junior High School Grade VIII Student East Lombok. Indonesian Journal of Innovation and Applied Sciences (IJIAS) 2021;1:105–12. https://doi.org/10.47540/ijias.v1i2.237.

[41] Akbarini NR, Murtini W, Rahmanto AN. Design of Interactive Learning Multimedia Development in General Administration Subject. International Journal of Multicultural and Multireligious Understanding 2018;5:138. https://doi.org/10.18415/ijmmu.v5i4.218.

[42] Graves T, Blankenbeckler P, Bankus T. Learning to Learn : An Interactive Multimedia Instruction Validation. US Army Research Institute for the Behavioral and Social Sciences 2019.

[43] Prihatiningtyas S, Hidayatul Mar'ah F, Wardani DK, Lu'lu'ul Husna A, Hasbullah KAW. Learning Media Using Qr Code-Based Professional Pdf Flips as an Effort to Improve Students' Concept Understanding in PAI Lessons 2022;2:184–9.

[44] Drigas AS, Pappas MA. A review of mobile learning applications for mathematics. International Journal of Interactive Mobile Technologies 2015;9:18–23. https://doi.org/10.3991/ijim.v9i3.4420.

[45] Sudarman, Riyadi R, Astuti RF. Development of Interactive Learning Multimedia to Increase Understanding of Basic Skills Teaching Procedures 2020;432:132–6. https://doi.org/10.2991/assehr.k.200417.030.

[46] Li J, Luo C, Zhang Q, Shadiev R. Can emotional design really evoke emotion in multimedia learning? International Journal of Educational Technology in Higher Education 2020;17. https://doi.org/10.1186/s41239-020-00198-y.

[47] He W. The effects of applying multimedia in primary English language teaching in China. Parahikma Journal of Education and Integrated Sciences Published 2021;1:9–15.

[48] Ulfa M, Purnamaningsih IR. Innovation of Learning Media Through Information and Communication Technology in the Revolution Era 4.0. PROJECT : Professional Journal of English Education 2022;5:885–90.

[49] Chiou CC, Tien LC, Lee LT. Effects on learning of multimedia animation combined with multidimensional concept maps. Comput Educ 2015;80:211–23. https://doi.org/10.1016/j.compedu.2014.09.002.

[50] Suh H. Collaborative Learning Models and Support Technologies in the Future Classroom. International Journal for Educational Media and Technology 2011;5:50–61.

[51] Lempas JF, Soenarto S, Barahama AD. Need Analysis of Interactive Multimedia Development for Virtual Learning in Pandemic. J Phys Conf Ser 2021;2111. https://doi.org/10.1088/1742-6596/2111/1/012032.

[52] Saputra HN, Salim S. Analysis of the Multimedia Use of Primary Schools. AL-ISHLAH: Jurnal Pendidikan 2021;13:2535–44. https://doi.org/10.35445/alishlah.v13i3.673.

[53] Purwaningsih W, Wangid MN. Improving students' critical thinking skills using time bar media in mathmathics learning in the third grade primary school. Jurnal Prima Edukasia 2021;9. https://doi.org/https://doi.org/10.21831/jpe.v9i2.39429.

[54] Grey S, Grey D, Gordon N, Purdy J. Using formal game design methods to embed learning outcomes into game mechanics and avoid emergent behaviour. International Journal of Game-Based Learning 2017;7:63–73. https://doi.org/10.4018/IJGBL.2017070106.

[55] Miller, M. D., Linn, R. L., & Gronlund NE. Measurement and assessment in teaching. New Jersey: Perason Education International; 2009.

[56] Annetta LA, Lamb R, Stone M. Assessing Serious Educational Games. 2011. https://doi.org/10.1007/978-94-6091-329-7_5.

[57] Arista FS, Kuswanto H. Virtual physics laboratory application based on the android smartphone to improve learning independence and conceptual understanding. International Journal of Instruction 2018;11:1–16. https://doi.org/10.12973/iji.2018.1111a.

[58] She HC, Chen YZ. The impact of multimedia effect on science learning: Evidence from eye movements. Comput Educ 2009;53:1297–307. https://doi.org/https://doi.org/10.1016/j.compedu.2009.06.012.

[59] Hake RR. Interactive-engagement versus traditional methods: A six-185 thousand-student survey of mechanics test data for introductory physics courses. Am J Phys 1998;66:64–74. https://doi.org/https://doi.org/10.1119/1.18809.

[60] Lusiana B, Maryanti R. The Effectiveness of Learning Media Used During Online Learning. Media Pendidikan, Gizi, Dan Kuliner 2020;9. https://doi.org/10.17509/BOGA.V9I2.38379.

[61] Wallace ED. Developing critical thinking skill: assessing the effectiveness of workbook exercise. J Coll Teach Learn 2015;12.

[62] Wilhelmi MR, Godino JD, Lacasta E. Didactic Effectiveness of Mathematical Definitions: The Case of the Absolute Value. International Electronic Journal of Mathematics Education 2021;2:72–90. https://doi.org/10.29333/iejme/176.

[63] Oliinyk V, Chuieva O, Arefiev V, Prystavka V, Knyzhnykova S, Lytvynenko N. Multimedia Technologies in Modern Visual Communications and Design Education. Journal of Curriculum and Teaching 2022;11:72. https://doi.org/10.5430/JCT.V11N9P72.

[64] Al Musawi A, Kazem, A. M.Al Hashmi A, Al Busaidi F. The effectiveness of instructional software in reading comprehension skills and reading aloud of Omani fourth basic schools' students. Technology, Innovation and Education 2016;2. https://doi.org/https://doi.org/10.1186/s40660-016-0018-0.

[65] Samat MS bin A, Aziz AA. The effectiveness of multimedia learning in enhancing reading comprehension among indigenous pupils. Arab World English Journal 2020;11:290–302. https://doi.org/), 290–302. https://doi.org/10.24093/awej/vol11no2.20.

[66] Irlidiya, Tolla A, Noni N, Anshari. The development of interactive multimedia for first-grade beginning readers of elementary school: An innovative learning approach. Journal of Language Teaching and Research 2015;6:553–9. https://doi.org/10.17507/jltr.0603.10.

[67] Denizli ZA, Erdoğan A. Development of a three dimensional geometric thinking test for early graders. Journal on Mathematics Education 2018;9:213–26.

[68] Nizar H, Ilma Indra Putri R. Developing pisa-like mathematics problem using the 2018 asian games football and table tennis context. Journal on Mathematics Education 2018;9:183–94.

The Utilization of Canva in Project Based Learning (PjBL) to Enhance the Students' Writing Skills

Widuri Indah Dwi Jayanti[1*] and Maya Ulyani[2]

[1] SMK Negeri 6 Yogyakarta
[2] Institut Teknologi Sosial Kesehatan Muhammadiyah Selong

*E-mail: widurijayanti92@guru.smk.belajar.id

Abstract. This research was intended to find out the utizilation of Canva for education to enhance the students' writing skills in a Project-Based learning among the students in Culinary Program Vocational High School. In this research, a PJBL was conducted to close the gap and enhance the students' writing skills in writing an exposition text using Canva for education. A Descriptive qualitative method was proposed to investigate the problem of the research. The data was collected using observation and questionnaire, and the researcher used purposive sampling to select the data. Thirty-six students in grade 11 are in the Culinary Program of SMKN 6 Yogyakarta as the research data. The results show project-based learning by integrating the Canva app successfully and using the Canva application in the PjBL model to enhance the student's writing skills, especially in Exposition text. It is also supported by the questionnaire of students' perception of using the Canva application. Most of the students agree that using Canva in writing Project of Exposition text can ease their understanding of the learning material, explore their idea and creativity and enable them to focus more on the writing project.
Keyword: Canva, Writing skills, Exposition Text, Project-based learning.

1. Introduction

In the twenty-first century, learning media has been integrated with technology. Technology has become a significant focus across various fields, including education because it is a medium for knowledge transfer in many countries. Consequently, schools and other educational institutions preparing students for life in the "*knowledge community*" must consider incorporating ICT into their curricula (Ghavifekr & Rosdy, 2015). Technology in EFL (English as a Foreign Language) classes facilitates access to communication tools and information, fostering more significant interaction between students and teachers. Additionally, using information technology-based media makes student assignments and projects more engaging and helps to nurture their creativity (Akhsani et al., 2021). Technological media aids EFL students in mastering English more swiftly (Apriani et al., 2022). Research by Anggitasari et al. (2020) indicates that web-based English teaching motivates students to enhance their literacy skills, making writing instruction more effective.

Furthermore, the Ministry of Education and Culture recommends project-based learning (PjBL) to achieve the learning objectives outlined in the 2016 Minister of Education and Culture Regulation No. 22. However, many teachers are still unclear on how to implement PjBL. Addressing this issue involves improving teaching materials and adopting suitable learning approaches or models tailored to the class's needs. Jusmaya & Putra (2017) also note that the scientific approach is widely used across schools, with

project-based learning being one method that encourages productivity, creativity, and innovation among students. Project-Based Learning (PjBL) is innovative and enhances students' creativity by applying their knowledge and skills to real-world problems (Wiratomo, 2018). It is a highly effective approach to 21st-century language learning. The use of technological media in language teaching, particularly ICT-based media like the Canva application, has become increasingly popular, offering more interactive and practical learning experiences.

Project-based learning can be implemented through collaborative efforts in both traditional classrooms and community settings (Hasni et al., 2016). As stated by Pinto et al., (2021), this approach is utilized in vocational schools to help students enhance their thinking abilities, problem-solving skills, and the capacity to tackle complex questions within the classroom environment. Canva is one of the applications the teachers use to help them learn to use media in writing. The Canva app is a tool for teachers, especially when teaching writing. As an educational resource, Canva can inspire students to write by offering a variety of stimuli, such as photos, graphics, images, photo filters, free icons, shapes, and numerous fonts. It significantly boosts students' motivation (Nurhidayati et al., 2019).

Most students reported that using Canva to do a writing task was beneficial, as it provided images, colourful visuals, photos, fonts, and graphics. The students felt that Canva enhanced their creativity in learning. Canva also made the writing process more manageable, facilitating accessible communication of ideas that readers could quickly grasp. Additionally, students found that Canva increased writing motivation and reduced anxiety (Nurhidayati et al., 2019). Overall, students regard Canva as a valuable and practical tool for improving their writing skills. The Canva platform stands out among the others for having a striking and easy-to-use interface since it does not require specialized knowledge for its use, which favours the acquisition of skills and abilities through the development of individual or group creativity.

Canva is an interactive tool that allows the introduction of content on various topics, such as the preparation of comics, posts, advertisements, posters, logos, collages, cards, brochures, and different infographics that adapt to the creativity and needs of the user (Grossi et al., 2018). It has been observed that students' abilities, especially in writing skills, are still lacking. An innovative learning model known as Project-Based Learning (PjBL) should be implemented to address this issue. PjBL is a teaching strategy that enables students to acquire new knowledge and understanding through hands-on experiences and various presentations. Teachers are encouraged to leverage technology to support student creativity in writing English texts. One of the technologies is the Canva application, which educators can use to enhance students' writing abilities. The project-based learning approach is well-suited for 21st-century language education.

Nowadays, the use of technological media in language teaching is widely favoured among students. Technology-based learning media represents an evolution from traditional methods, with ICT-based media facilitating more interactive and practical learning experiences. Several previous studies have addressed the issue of analyzing the Canva application. Andriyanti et al. (2023)found that using the Canva application effectively improves students' writing skills, as evidenced by qualitative data. The learning process became more engaging, and students actively enjoyed writing. Permatasari & Arsyad (2023)observed that project-based learning with media support, including Canva, resulted in positive student perceptions when teaching writing invitation cards. Students were more interested and motivated to collaborate on the invitation card writing project. Siti et al., (2024)reported that their analysis, which included total student scores, average scores, and an analysis of the lowest, middle, and highest scores, demonstrated the effectiveness of using the discovery learning model with Canva for writing expository texts, achieving an excellent average score of 78.5.

All the previous studies, as mentioned above, were significantly different from this study; the previous study primarily focused on the effectiveness of Canva at the junior high school level, and this

research emphasizes the technology-based Project-Based Learning (PjBL) model, specifically its application and students' perceptions while learning to write expository texts. Previous studies have not explored the application of PjBL with Canva media for English writing, particularly for expository texts. To address these gaps, this research aims to find out the utilization of Canva within a Project-Based Learning model to enhance the writing skills of grade XI students in Vocational High Schools and the student's perception of using Canva to write Exposition text of grade XI students in Vocational High Schools.

2. Method of Research

The present investigation is basic, theoretical phenomenology oriented to prove a theory. In addition, the scientific knowledge developed does not require practical application, so descriptive qualitative research was adopted in this study. According to Creswell et al., (2007) a descriptive design is research that describes more about the phenomenology of the study. While to deeply analyse of's utilization of Canva within a Project-Based Learning model to enhance the writing skills of grade XI students in Vocational High Schools and the student's perception in using Canva to write Exposition text of grade XI students in Vocational High Schools. The researcher used the qualitative approach to comprehend people's ideas, experiences, attitudes, behaviour and interactions in the study. The study used purposive sampling by selecting the research sample, thus, thirty-six students in grade 11 in the Culinary Program at Vocational High School 6 Yogyakarta. The data collecting techniques in this research were observation and questionnaire. The instrument of the research was modified from Permatasari & Arsyad (2023) there are 10 statements of the questionnaire was distributed to thirty-six students. This questionnaire uses five categories of alternative answer Choices, namely Strongly Agree (SA) is given a score of 5; Agree (A) is given a score of 4; Neutral (N) score (3); Disagree (DS) is given a score of 2, Strongly Disagree (SD) is given a score of After the data were collected, the researcher sorted in the sense of directing, discarding what was necessary and organizing them. In this research the data obtained from classroom observation and questionnaire. The analytical method used in this research was interactive analysis as stated by Miles & Huberman (1984). According to Miles & Huberman (1984), there are three steps in data analysis: Data condesation, Data Display, and Conclusion.

3. Main Discussion

3.1 The Utilization of Canva in Project-Based Learning to Enhance the students' writing skills.

To answer the problem of writing on how to use Canva in the Project Based Learning Model, the researcher, as the English teacher, implemented the PjBL learning phases that are: (1) start with the essential question, (2) design a plan for the Project, (3) create a schedule, (4) monitor the students and the progress of the Project, (5) assess the outcome, and (6) evaluate the experience (Ariyana, Yoki, 2018) (Chamisijatin & Zaenab, 2024). Those phases were prepared in a lesson plan in which the teacher arranged the material and divided the meeting into four. The description of each student's activities in writing Exposition Text using Canva is as follows:

    a. Phase 1 starts with the essential question;

        In this phase, the teacher provides questions that are essential or basic. After reviewing the previous material and giving an overview of the new material, the teacher asked the students to watch a short video. The students are asked to write a statement sentence related to the video. Then, they are asked to change those statement sentences into interrogative sentences using question words, including who, when, where, why, and how. After that, the teacher gives several students opportunities to deliver the question and the other answer the

questions orally. The last question was addressed to all the students as the essential question to be answered in a group project.

b. Phase 2: design a plan for the Project

Students were formed into discussion groups, each consisting of 7 – 8. In this phase, the teacher explained the material of Exposition Text related to its social function, generic structure and language features. The teachers had already provided a sample of the Exposition text to be analyzed in a group. The students are introduced to Canva worksheets to explore the Exposition text topic and the assignment. The teacher used spin wheel games on the chosen subject to divide the group's topic.

c. Phase 3 creates a schedule.

In this phase, the students in groups prepare for the stages of working on the Canva project. The steps are;

1. Students in groups study by analyzing an Exposition Text in the canvas worksheet;
2. Each group creates question words using what, who, when, where, why and how. Then, arrange sentences according to questions related to the provided topic in the Exposition text. The five topics are related to the current issues in teenagers' lives, such as bullying must be stopped at school, using smartphones during school time is needed by students, using tumblers to replace plastic bottles for drinking is good at school, Tiktok is good for students to learn something new, and students should wear uniform;
3. The students in a group have the responsibility to write complete sentences for each questions so that they can arrange it into a good paragraphs of Exposition text.

d. Phase 4 monitors the students and the progres of the Project

In this phase, the teacher monitored the progress of her students' work. If something is not quite right, the teacher immediately facilitate how the Project can be carried out appropriately according to the learning objectives

e. Phase 5 assesses the outcome

In this phase the teacher asses the student's project writing on Exposition Text. The teacher applied writing rubric to do assesment. After completing the Project, the teacher ask the groups to present the result of their writing assignment. When a group delivered a presentation in front of the class, the other students were listening to it and giving respond to the results of their friend's presentation. There are several input and criticism from other groups. The group that did presentation took a note to be used as reference material to improve their writing project. After all group presentation, the teacher and the students draw conclusions and strengthen the result of their Project. The teacher provided a formative assesment by giving a post test sheet

f. Phase 6 evaluates the experience.

In this phase, the teacher provided a reflection sheet on their Canva's writing project. It was included about students' impression of the learning experience of using Canva for writing Exposition text.

From the above result of Project-Based learning implementation, the teacher had succesfully used the Canva application in PjBL model to enhance the student's writing skills. The PjBl model is greatly assisted using technology, especially for EFL students. It eases the teacher for conducting the lesson in the class and make a progress for the learning activities (Wuntu et al., 2022)

3.2 The perceptions of Vocational High School students about the utilization of the Canva application

The researcher distributed questionnaires after students of Grade XI of the Culinary program studied completed writing Exposition text. This questionnaire aims to determine students' perceptions of using Canva in Project Based Learning to enhance the students writing skills. In presenting the data, the researcher classified three aspects of affection, cognition, and conation, which are tabulated in Table 1.

Table 1

No	Statements	SA	A	N	D	SD	Grade XI Students
	Vocational Highschool Grade XI Student's Perception of the Utilization of Canva Application						
	Affection related to emotions, feelings, and assessment						
1	I like writing with the Canva app	9 (25%)	20 (55.6%)	7 (19.4%)	0	0	36 (100%)
2	I find it comfortable and easy to write Canva apps instead of writing on paper or a book	6 (16.7%)	14 (38,9%)	15 (41,7%)	1 (2.8%)	0	36 (100%)
3	I find it helpful and fast in completing the assignment of writing an Exposition Text Project	8 (22.2%)	21 (58.3%)	7 (19.4%)	0	0	36 (100%)
4	I was challenged to complete a writing Exposition Text Project using the Canva Application	7 (19.4%)	17 (47.2%)	11 (30.6%)	1 (2.8%)	0	36 (100%)
Total		30 (20.8%)	72 (50%)	40 (27.8%)	2 (1.4%)	0	144 (100%)
	Conation related to motivation, behaviour, and action						
5	I prefer to work on writing projects using the Canva application as the medium to another application	7 (19.4%)	17 (47.2%)	12 (33.3%)	0	0	36 (100%)
6	I like the teamwork projects to write Exposition Text using Canva	8 (22.2%)	18 (50%)	10 (27.8%)	0	0	36 (100%)
7	My team can work together as a group to write an Exposition Text	6 (16.7%)	22 (61.1%)	8 (22.2%)	0	0	36 (100%)
Total		21 (19.4%)	57 (52.8%)	30 (27.8%)	0	0	108 (100%)
	Cognition related to knowledge						
8	I find it easier to understand information written on Canva than without any technologies in learning.	3 (8.3%)	16 (44.4%)	15 (41.7%)	2 (5.6%)	0	36 (100%)
9	I can explore my ideas and creativity using the Canva application as a medium for writing Exposition Text	8 (22.2%)	20 (55.6%)	8 (22.2%)	0	0	36 (100%)
10	I can focus more on writing the language features and the structure of the text of an Exposition Text because the supporting image designs are available in Canva	9 (25%)	19 (52.8%)	8 (22.2%)	0	0	36 (100%)
Total		20 (18.5%)	55 (50.9%)	31 (28.7%)	2 (1.9%)	0	108 (100%)

According to Table 1, students' perception was categorized into three aspects: affective, conation and cognition (Schiffman and Kanuk (2004) in Permatasari, 2023). First, in the affective aspects, the total score showed a positive perception and value regarding using the Canva application writing Exposition text by 72 (50%). Most of the students agree that students feel challenged and comfortable and prefer to utilize the Canva application for writing projects. Second, for the conation aspects, the total score result showed that at more than half of the students answered 57 (52.8%) voted agree. Students agreed that using Canva applications enables and eases the students to work together in a writing project. The last cognition aspects result from the total score of 55 (50.9%) students agree. It implied that most of the students agree that the utilization of Canva in the writing project of Exposition text can ease their understanding of the learning material, explore their idea and creativity and enable them to focus more on the writing project. In line with Noor & Karani (2023), implementing the Project Based learnng model can enhance student writing skills. The utilization of Canva in the PjBL model is appropriate for the teachers for teaching writing skills, especially for Exposition text material

4. Conclusion

Project-based learning to the utilization of Canva in Project Based Learning to Enhance the student's writing skills is carried out through six steps such as (1) start with the essential question, (2) design a plan for the Project, (3) create a schedule, (4) monitor the students and the progress of the Project, (5) assess the outcome, and (6) evaluate the experience. The result of Project-based learning by integrating the canva app successfully used the Canva application in the PjBL model to enhance the student's writing skills, especially in Exposition text. It is also supported by the result from the questionnaire of students' perception of using the Canva application. It shows that most of the students agree that the utilization of Canva in writing Project of Exposition text can ease their understanding of the learning material, explore their idea and creativity and also enable them to focus more on the writing project.

References

[1] Akhsani, L., Ahmad, & Eko Subekti, F. (2021). Development of project and ICT-based learning media subject modules. *Journal of Physics: Conference Series*, *1778*(1), 012025. https://doi.org/10.1088/1742-6596/1778/1/012025

[2] Andriyanti, F., Pratiwi, D., Yunda, D., Bahasa dan Seni Budaya, F., Negeri Yogyakarta Jl Colombo Yogyakarta No, U., Malang, K., Depok, K., & Sleman, K. (2023). Improving Students Writing Skills Through Canva Application At Smp Muhammadiyah Imogiri Yogyakarta. *International Journal of Contemporary Studies in Education*, *02*, 119–126. https://doi.org/10.30880/ijcse.v2i2.416

[3] Anggitasari, M., Tarwana, W., Febriani, R. B., & Syafryadin, S. (2020). Using Wattpad to Promote the Students' Responses to Literary Works: EFL College Students' Perspectives and Experiences of Enjoying Short Stories. *Jadila: Journal of Development and Innovation in Language and Literature Education*, *1*(2), 182–192. https://doi.org/10.52690/jadila.v1i2.59

[4] Apriani, E., Arsyad, S., Syafryadin, S., Supardan, D., Gusmuliana, P., & Santiana, S. (2022). ICT platforms for Indonesian EFL students viewed from gender during the COVID-19 pandemic. *Studies in English Language and Education*, *9*(1), 187–202. https://doi.org/10.24815/siele.v9i1.21089

[5] Ariyana, Yoki, et al. (2018). *Buku Pegangan Pembelajaran Berorientasi pada Ketrampilan Berpikir Tingkat Tinggi*. *53*(9), 1689–1699.

[6] Chamisijatin, L., & Zaenab, S. (2024). Student competencies in intracurricular learning through project-based learning in Muhammadiyah junior high school. *Research and Development in Education (RaDEn)*, *4*(1), 285–303. https://doi.org/10.22219/raden.v4i1.32558

[7] Creswell, J. W., Hanson, W. E., Clark Plano, V. L., & Morales, A. (2007). Qualitative Research Designs. *The Counseling Psychologist*, *35*(2), 236–264. https://doi.org/10.1177/0011000006287390

[8] Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, *1*(2), 175–191. https://doi.org/10.21890/ijres.23596

[9] Grossi, M. G. R., Elias, M. C. A. de S., Chamon, C. M., & Leal, D. C. C. C. (2018). The Educational Potentialities of the Virtual Learning Environments Moodle and Canvas: A Comparative Study. *International Journal of Information and Education Technology*, *8*(7), 514–519. https://doi.org/10.18178/ijiet.2018.8.7.1091

[10] Hasni, A., Bousadra, F., Belletête, V., Benabdallah, A., Nicole, M.-C., & Dumais, N. (2016). Trends in research on project-based science and technology teaching and learning at K–12 levels: a systematic review. *Studies in Science Education*, *52*(2), 199–231. https://doi.org/10.1080/03057267.2016.1226573

[11] Jusmaya, A., & Putra, E. E. (2017). THE DEVELOPMENT OF ENGLISH TEACHING MATERIALS ORIENTED PROJECT BASED LEARNING BASED ON ICT. *Komposisi: Jurnal Pendidikan Bahasa, Sastra, Dan Seni*, *18*(1), 179. https://doi.org/10.24036/komposisi.v18i2.8427

[12] MILES, M. B., & HUBERMAN, A. M. (1984). Drawing Valid Meaning from Qualitative Data: Toward a Shared Craft. *Educational Researcher*, *13*(5), 20–30. https://doi.org/10.3102/0013189X013005020

[13] Noor, M., & Karani, E. (2023). The Effectiveness of Canva Application as a Media in Writing Greeting Card at the Eight Grade of SMP Negeri 12 Banjarmasin. *Journal on Education*, *5*(3), 9540–9548. https://doi.org/10.31004/joe.v5i3.1826

[14] Nurhidayati, Asrori, I., Ahsanuddin, M., & Dariyadi, M. W. (2019). 10508-28881-1-Pb. *Pembuatan Media Pembelajaran Berbasis Powerpoint Dan Pemanfaatan Aplikasi Android Untuk Guru Bahasa Arab*, *2*(3), 1–4.

[15] Permatasari, C. Y., & Arsyad, S. (2023). Coherence Analysis of Reading Texts in English Textbooks for Class X SMA "Work in Progress" Published by Ministry of Education and Culture of the Republic of Indonesia. *Journal of English for Specific Purposes in Indonesia*, *2*(1), 59–66.

[16] Pinto, T., Dias, A. G., & Vasconcelos, C. (2021). Geology and Environment: A Problem-Based Learning Study in Higher Education. *Geosciences*, *11*(4), 173. https://doi.org/10.3390/geosciences11040173

[17] Siti, I., Azzahra, S., & Azhari, Y. Z. (2024). *Description of Writing Exposition Text Using the*. *7*(1), 9–16.

[18] Wiratomo, Y. (2018). Analisis Kebutuhan pada Model pembelajaran Project Base Learning. *Titian Ilmu: Jurnal Ilmiah Multi Sciences*, *10*(2), 74–83. https://doi.org/10.30599/jti.v10i2.163

[19] Wuntu, C. N., Singal, Y., & Rorintulus, O. A. (2022). The Implementation of Project Based Learning (PBL) in Improving Students' Speaking Skill at SMA Yadika Kopandakan II. *International Journal of English and Applied Linguistics (IJEAL)*, *2*(3), 387–398. https://doi.org/10.47709/ijeal.v2i3.1882

Development of Computer-Based Media for Learning Number Patterns Using Kodu Game to Improve Student Learning Outcomes

Wirayoga Abdillah Kurnianto[1*], Haryanto[1], Arif Sapta Mandala[2],Yudi Kurniawan[1],Maria Susanti Menge Sawu[1],Nadhira Fasya Salsabila[1], Mughnil Muhtaj[1], Siti Mualiyah[1]

[1]Faculty of Education and Psychology, Universitas Negeri Yogyakarta, DI Yogyakarta, Indonesia
[2]Doctoral School of Mathematics Education, Universitas Negeri Malang, Malang, Indonesia

[*]E-mail: wirayogaabdillah.2023@student.uny.ac.id

Abstract. This research aimed to develop a computer-based educational game to enhance learning outcomes for number patterns in 8th grade mathematics. The research was conducted in three stages: product development using 4D model, validation tests by learning experts, and trials involving 26 students from State Junior High School in Jember. The results showed that a game application about number patterns was developed, designed attractively using Kodu Game Lab, and uploaded online on Google Classroom. The game was highly valid with an average score of 98% by validator experts. It was also found to be very practical with 89.8% of from the student feedback survey. The data analysis carried out using a one-sample t-test obtained a value of $t = 3.028$, which was higher than the t-table value of 1.708. Thus, it can be concluded that the computer-based media developed using Kodu Game Lab in this research effectively promoted student learning outcomes.

1. Introduction

In today's rapidly advancing digital age, incorporating technology into the educational process has become essential. Interactive computer-based media, such as those created using Kodu Game Lab, offer a dynamic and engaging learning experience that can significantly enhance students' interest and motivation [1]. As educational systems worldwide strive to adapt to technological advancements, traditional methods reliant on lectures and textbooks are being replaced by more interactive and participatory approaches. This shift is particularly noticeable in the teaching of mathematics, where interactive media, like educational games, have been proven effective in improving students' understanding of complex concepts [2].

Learning number patterns often presents challenges for students due to the abstract nature of the concepts, which are difficult to grasp through traditional explanations and exercises [3]. Many educators continue to rely on conventional methods for teaching number patterns, which often lack engagement and fail to fully utilize the potential of current technology. With the advancement of technology, interactive and computer-based learning approaches offer a promising solution [4]. However, effective learning media for teaching number patterns that meet students' needs are still limited. Smith et al. [5] introduced the concept of "digital natives," emphasizing the necessity of integrating technology into education for students who have grown up with digital devices. Yu et al. [6] further explored the potential of video games as effective learning tools, demonstrating that educational games can increase student engagement and aid in understanding complex concepts.

Although technology has developed rapidly, the utilization of technology in learning number patterns is still not optimal [7], and there is significant potential for further research to explore the use of computer-based game media within a game-based learning framework in this context. Most previous research has focused broadly on educational games without delving into specific [8], easily implementable platforms for teachers [9]. This study aims to address this gap by developing interactive computer-based learning media using Kodu Game Lab, specifically designed for teaching number patterns. The proposed media will be tested in classroom settings, and its impact on student learning outcomes will be evaluated. The primary objective of this research is to develop effective interactive learning media based on Kodu Game Lab to enhance students' learning outcomes in number patterns. By leveraging the potential of Kodu Game Lab, this research aims to make a significant contribution to the field of education, particularly in using technology to improve the quality of mathematics education in schools.

2. Methodology

The research and development (R&D) method with the 4D model by Thiagarajan was used in the study. This model consists of four stages: Define, Design, Develop, and Disseminate [10]. The Define stage will involve the identification of students' learning needs and objectives. The Design stage will concern the creation of learning media content and structure. The Develop stage will include the actual creation and subsequent testing of the learning media based on experts judgments. Finally, the Disseminate stage will cover the implementation and evaluation of the learning media within a mathematics classroom context. The interactive computer-based learning media will be developed using Kodu Game Lab to support grade VIII junior high school students in learning number patterns.

The subjects in this research included two education specialists who assessed the validity of the media and junior high school students from SMPN 1 Jember consist of 26 grade VIII H students who participated in the practicality and effectiveness tests of the computer-based mathematics learning media implementation.

The data collection techniques used in this research were questionnaires and test. The collected data were then subjected to analysis using both percentage calculations and the one-sample t-test method. The data obtained from the questionnaires were used to determine the validity and practicality of the computer-based media being developed. The percentage calculations were conducted using the following formula [11]:

$$Percentage\ Value\ = \frac{Score\ obtained}{Maximum\ score} \times 100\%$$

Specifically, the validity was ascertained through the approval ratings obtained from expert appraisals and practicality was assessed through the analysis of student feedback surveys, which indicated positive outcomes. The quality report of the computer-based media developed adjusted to specific criteria for the validity and practicality value as outlined in Table 1 [12].

Table 1. The criteria of validity and practicality result.

Percentage (%)	Criteria of Validity	Criteria of Practicality
$85 - 100$	Very Valid	Very Practical
$70 - 85$	Valid	Practical
$50 - 70$	Less Valid	Less Practical
$00 - 50$	Invalid	Impractical

Meanwhile, the data obtained from test was used to the effectiveness was measured using a mathematical achievement test instrument about number patterns. In addition, the computer-based

media is considered effective if the average score of students' mathematical learning outcomes exceeds the Minimum Completeness Criteria, which is set at 75. Data analysis was performed using a one-sample t-test after ensuring data normality, and the analysis was conducted with SPSS Version 27 software [13].

3. Results and Discussion

3.1 Results of Product Development

This section provides information about the product development process using the 4-D Model. The define stage in this development involves several important steps [14]. At this stage, an initial analysis is conducted that includes lesson concepts, learning targets, and tasks to be completed [15]. This analysis aims to explore the necessary information related to the initial design of learning media in the form of PC (Personal Computer) games, including features that support academic achievement and student motivation in learning number pattern material. In addition, task analysis is conducted to develop a series of student activities based on core competencies and basic competencies that cover the substance of the subject matter related to number patterns integrated into the features of this game [16].

The design phase involves several steps, including: 1) Test development: Creating tests that align with the material presented in the educational media, such as questions about number patterns; 2) Media selection: Choosing the appropriate media format for the educational game; 3) Format selection: Determining the specific format of the educational game; and 4) Preliminary media design: Creating an initial outline for the educational media [17]. The development of the math educational game was carried out independently using Kodu Game Lab software. The game concept was designed with logical algorithms to create 10 levels of gameplay and practice, as well as an online exam in Google Classroom using Google Forms. The preliminary media design included determining the concept and design elements, such as the background, player characters, and button icons. Next, number patterns were created using rows of coins or apples at each level. It was made easier for students to form number patterns by collecting coins or apples. The coins or apples were placed sequentially on a path so that students could collect them in order. With the help of Kodu Game Lab software, students were directed to a house at the end of the path leading to a question related to the previous level. This question aimed to assess whether students understood the number patterns they had formed in the previous level [18]. If students were successful, they could proceed to the next level. The design of computer-based media using Kodu Game Lab is provided in Figure 1.

Figure 1. Game display on PC.

3.2 Product Validation Testing

The development phase of the educational game involved creating a draft PC game in Kodu format for validation by experts or validators. The validators in this study were two mathematics lecturers at Universitas Jember. The validity of the product content measured in this study encompasses several criteria, including: content feasibility, appropriateness of language use, and suitability of game components [19]. The validation results can be seen in Table 2.

Table 2. Product content validity analysis from the validators.

Criteria	Average	Percentage	Criteria of Validity
Content Feasibility	4.75	95%	Very Valid
Appropriateness of Language Use	5	100%	Very Valid
Suitability of Game Components	4.9	98%	Very Valid
Average Score	4.883	98%	Very Valid

According to Table 2, the expert assessments indicate a high level of validity for the product, with a score of 98%. This suggests that the product developed in this research is feasible to be implemented by students and teachers.

3.3 Product Testing

The practicality analysis of the developed product was conducted using a student response survey. The practicality of the product testing measured in this study encompasses several criteria, including: ease of use, availability and accessibility, relevance of content, interactivity and engagement, also appropriateness of language use [20]. Based on the student response survey, a percentage value of 89.8% was obtained, which falls into the category of very practical. The results of the user response survey can be seen in Table 3.

Table 3. Product content practicality analysis from student response survey.

Criteria	Average	Percentage	Criteria of Practicality
Ease of Use	3.5	87.50%	Very Practical
Availability and Accessibility	3.73	93.25%	Very Practical
Relevance of Content	3.46	86.5%	Very Practical
Interactivity and Engagement	3.62	90.50%	Very Practical
Appropriateness of Language Use	3.65	91.25%	Very Practical
Average Score	3.592	89.80%	Very Practical

The effectiveness test was carried out to find out how effective the product developed was through an online test using google classroom of student learning outcomes on number patterns material which consisted of 5 questions. The achievement of student learning outcomes is indicated by the results of the student learning tests that have been conducted, which show a completion percentage of 84.6% among 26 students who meet the minimum completion criteria (75). In addition, the average student learning outcome is 86,923. Furthermore, the test results from the normality test and one sample t-test can be seen in Table 3.

Table 3. Results of normality and one-sample tests.

Variabel	Statistics		Tests of Normality (Kolmogorov-Smirnov)			One-Sample Test			
	Mean	SD	Statistic	N	Sig.	t	df	Sig. (2-tailed)	t-table
Learning Outcomes	86.923	16.916	0.298	26	0.200	3.028	25	.006	1.708

As seen in Table 3, the normality test using Kolmogorov-Smirnov indicates that the student scores are normally distributed. Normality testing is a prerequisite for a one-sample test. The SPSS calculation yields a significance value (Sig) of 0.200. This value was greater than the significance level ($\alpha = 0.05$), indicating that the data is normally distributed. The one-sample test yields a computed t-value of 3.028, which is higher than the critical t-value of 1.708. Therefore, there is a significant difference between the minimum achievement criteria and the average mathematical learning ability of the students [21], [22]. In other words, the developed learning media is effective in improving students' learning outcomes about number patterns.

3.3 Final Product Review

The development of an interactive computer-based media for learning number patterns using Kodu Game Lab has shown promising results in improving student learning outcomes. The product developed has received positive feedback from both students and experts. Student feedback surveys indicate a strong positive response towards the game, with high ratings in various aspects such as material display, ease of implementation, problem presentation, and overall engagement in learning number patterns. Experts have validated the game, confirming its content, utility, and appearance. The product developed encourages student engagement, fosters enthusiasm, and integrates online learning through Google Classroom, making it an innovative and engaging learning tool. Moreover, interactive computer-based media offers several advantages in enhancing student learning outcomes [23]. It provides a dynamic and engaging learning environment that stimulates students' interest and motivation. Through interactive games and activities, students can actively participate in the learning process, promoting deeper understanding and retention of concepts [24]. Furthermore, the hands-on nature of the media encourages critical thinking, problem-solving, and decision-making skills [25]. Students are motivated to explore different strategies and approaches within the game, promoting a deeper understanding of the underlying mathematical concepts. In addition, the use of Kodu Game Lab allows for personalized and adaptive learning experiences [26], [27]. Students can create their own games and problem-solving scenarios, tailoring the learning process to their individual needs and preferences [28]. This flexibility promotes student autonomy and ownership of their learning, leading to improved learning outcomes [27]. Overall, the game application using Kudo Game Lab was validated to meet high-quality media standards in terms of validity, practicality, and effectiveness in improving student learning outcomes in the area of number patterns. Additionally, the dissemination of this product involves transferring game extracts and Kodu Game Lab software via a flash disk. Furthermore, this game will be widely disseminated with the assistance of mathematics teachers from SMPN 1 Jember through the Mathematics Teachers' Working Group (MGMP) in Jember. Moreover, this product has been published on the Dunia Matematika website.

4. Conclusion

Based on the results and discussion, an interactive game application about number patterns using Kodu Game Lab was developed and uploaded online on Google Classroom. This game was designed to facilitate students' learning of number patterns and assist them in constructing the concepts being studied. Additionally, the game application developed in this research is considered very valid and practical to operate. Our findings showed that the data analysis using a one-sample t-test obtained a value of t = 3.028, which was higher than the t-table value of 1.708. Thus, it can be concluded that the computer-based media developed using Kodu Game Lab in this research effectively promoted student learning outcomes. Finally, we recommend that educators implement the game application more widely in the future.

Conflict of Interest

The authors declare no conflict of interest regarding the publication of this manuscript.

References

[1] C. Lalos and I. Skarpa, "Educational Digital Games as Learning Tools: Microsoft Kodu's Case," *International Journal of Education (IJE)*, vol. 8, no. 3, 2020, doi: 10.5121/ije.2020.8301.

[2] N. Dayo, M. M. Asad, and U. Alvi, "Effects of Digital Game-Based Learning and Traditional Teaching Approaches on Students' Mathematics Problem-Solving Attitude," in *Innovative Education Technologies for 21st Century Teaching and Learning*, 2021. doi: 10.1201/9781003143796-7.

[3] S. W. Chan, C. K. Looi, W. K. Ho, W. Huang, P. Seow, and L. Wu, "Learning number patterns through computational thinking activities: A Rasch model analysis," *Heliyon*, vol. 7, no. 9, 2021, doi: 10.1016/j.heliyon.2021.e07922.

[4] M. H. Hussein, S. H. Ow, M. M. Elaish, and E. O. Jensen, "Digital game-based learning in K-12 mathematics education: a systematic literature review," *Educ Inf Technol (Dordr)*, vol. 27, no. 2, 2022, doi: 10.1007/s10639-021-10721-x.

[5] E. E. Smith, R. Kahlke, and T. Judd, "Not just digital natives: Integrating technologies in professional education contexts," *Australasian Journal of Educational Technology*, 2020, doi: 10.14742/ajet.5689.

[6] Z. Yu, M. Gao, and L. Wang, "The Effect of Educational Games on Learning Outcomes, Student Motivation, Engagement and Satisfaction," *Journal of Educational Computing Research*, vol. 59, no. 3, 2021, doi: 10.1177/0735633120969214.

[7] I. Hartaji, I. Nursit, A. H. Fathani, and Y. Milshteyn, "Identification of Students' Mathematical Creative Thinking Ability in Number Pattern Problems Solving," *Numerical: Jurnal Matematika dan Pendidikan Matematika*, vol. 7, no. 1, 2023, doi: 10.25217/numerical.v7i1.3698.

[8] R. Huang *et al.*, "The impact of gamification in educational settings on student learning outcomes: a meta-analysis," *Educational Technology Research and Development*, vol. 68, no. 4, 2020, doi: 10.1007/s11423-020-09807-z.

[9] R. W. Mee Mee *et al.*, "Role of gamification in classroom teaching: Pre-service teachers' view," *International Journal of Evaluation and Research in Education*, vol. 9, no. 3, 2020, doi: 10.11591/ijere.v9i3.20622.

[10] N. Nurhasanah, S. Masitoh, F. Arianto, and N. Ayubi, "Development of Android Application-Based Early Childhood Learning Devices (PAUDPEDIA) During the COVID-19 Pandemic," *International Journal of Interactive Mobile Technologies*, vol. 16, no. 9, 2022, doi: 10.3991/ijim.v16i09.31703.

[11] L. O. A. Jazuli, A. Arvyaty, H. Hasnawaty, and M. F. Ibrahim, "Pengembangan media pembelajaran Articulate Storyline untuk pemahaman konsep materi turunan," *Jurnal Riset Pendidikan Matematika*, vol. 10, no. 2, 2024, doi: 10.21831/jrpm.v10i2.71066.

[12] A. S. Mandala and W. Setyaningrum, "Development of mobile augmented reality application for geometry in mathematics learning," 2024, p. 090007. doi: 10.1063/5.0133554.

[13] K. H. Inde, M. B. U. Kaleka, and I. Ilyas, "The Effect of Discovery Learning Model on Learning Outcome of Grade-VII Students of SMPN 5 Nangapanda," *Journal of Science Education Research*, vol. 4, no. 1, 2020, doi: 10.21831/jser.v4i1.34233.

[14] T. T. Wijaya, L. Li, N. Hermita, Z. H. Putra, and J. A. Alim, "Helping Junior High School Student to Learn Fibonacci Sequence with Video-Based Learning," *International Journal of Interactive Mobile Technologies*, vol. 15, no. 11, 2021, doi: 10.3991/ijim.v15i11.23097.

[15] N. L. P. J. Dewi and I. W. Sujana, "Learning Multimedia Based on RPG Maker MV Material for Circumference and Area of Flat Shapes for Elementary School Students," *Journal of Education Technology*, vol. 5, no. 3, 2021, doi: 10.23887/jet.v5i2.34462.

[16] D. J. Brahier, *Teaching secondary and middle school mathematics*. 2020. doi: 10.4324/9780429052934.

[17] S. Dugdale, "The Design of Computer-Based Mathematics Instruction," in *Computer-Assisted Instruction and Intelligent Tutoring Systems*, 2021. doi: 10.4324/9781315044361-2.

[18] J. T. Sowder, "Making Sense of Numbers in School Mathematics," in *Analysis of Arithmetic for Mathematics Teaching*, 2020. doi: 10.4324/9781315044606-1.

[19] H. S. Lukman, N. Agustiani, and A. Setiani, "Gamification of Mathematics Teaching Materials: Its Validity, Practicality and Effectiveness," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 18, no. 20, pp. 4–22, Oct. 2023, doi: 10.3991/ijet.v18i20.36189.

[20] A. Putri *et al.*, "EUCLIDA: 3D Augmented Reality Card for Learning Numeracy about Geometry," *TEM Journal*, vol. 12, no. 2, 2023, doi: 10.18421/TEM122-63.

[21] A. M. Arifin, et al., "Pengembangan media pembelajaran STEM dengan augmented reality untuk meningkatkan kemampuan spasial matematis siswa," *Jurnal Riset Pendidikan Matematika*, vol. 7, no. 1, pp. 59–73, 2020, doi: 10.21831/jrpm.v7i1.32135.

[22] H. R. F. Rahmah, N. Wahyuningtyas, N. Ratnawati, R. Marsida, M. K. A. W. Mufid, and M. H. Ibrahim, "Development of 'ARCIL' Media in Prehistoric Culture Materials for Junior High School Students," *International Journal of Interactive Mobile Technologies*, vol. 16, no. 22, 2022, doi: 10.3991/ijim.v16i22.36155.

[23] R. Richardo *et al.*, "Ethnomathematics Augmented Reality: Android-Based Learning Multimedia to Improve Creative Thinking Skills on Geometry," *International Journal of Information and Education Technology*, vol. 13, no. 4, 2023, doi: 10.18178/ijiet.2023.13.4.1860.

[24] R. Wijayanti, B. Hasan, and R. K. Loganathan, "Media comic math berbasis whiteboard annimation dalam pelajaran matematika," *Jurnal Riset Pendidikan Matematika*, vol. 5, no. 1, 2018, doi: 10.21831/jrpm.v5i1.19207.

[25] L. Hu, G. Chen, P. Li, and J. Huang, "Multimedia Effect in Problem Solving: A Meta-Analysis," *Educ Psychol Rev*, vol. 33, no. 4, 2021, doi: 10.1007/s10648-021-09610-z.

[26] A. Fowler, T. Fristce, and M. MacLauren, "Kodu Game Lab: a programming environment," *The Computer Games Journal*, vol. 1, no. 1, 2012, doi: 10.1007/bf03392325.

[27] A. Kaplan, D. Pavlov, and M. Myradov, "Features of Using Kodu Game Lab in Teaching Programming in Elementary School," *MATHEMATICS AND INFORMATICS*, vol. 63, no. 1, 2020.

[28] G. Uluay and A. Dogan, "Pre-Service Science Teachers' Learning and Teaching Experiences with Digital Games: KODU Game Lab," *J Educ Environ Sci Health*, vol. 6, no. 2, 2020, doi: 10.21891/jeseh.668961.

The Effectiveness of E-Learning *Ruang Guru* for the Digital Native Generation

Erika Kurniawati[1], Putri Beny Mawarsih[2], Ananda Wahyu Puspa Widuri[3], Hidayatun Nadzifah[4], Fahlulia Rahma Shofiana[5]

[1,2,3,4] Faculty of Language and Art, Universitas Negeri Surabaya, Surabaya, Indonesia
[5] Faculty of Education, Universitas Negeri Surabaya, Surabaya, Indonesia

[*]E-mail: erika.23009@mhs.unesa.ac.id

Abstract. Nowadays, the majority of students are the zillennial generation or what is usually called Gen-Z. Gen-Z has been accustomed to the digital world from an early age and is no stranger to technological advances. Gen-Z, who have been familiar with the digital world from an early age in the process of language acquisition, are known as digital natives. The process of learning Indonesian for digital natives is certainly different. This research aims to describe the effectiveness of using e-learning Ruang Guru in learning Bahasa Indonesia. Effectiveness here is viewed from two points of view, namely from students and also tutors. The research method used is a qualitative descriptive method with data sources from survey sheets with student resource persons and interviews with Bahasa Indonesian course instructors at LBB Ruang Guru as well as literature studies. The results of the research show that the application of e-learning media in the Ruang Guru which is digital and technology-based makes the Indonesian language learning process simpler and more interesting, and makes it easier for students to understand the material and makes it easier for teachers to deliver the material.

1. Introduction

In recent day, students from 2000 and above dominating in the world of education. It must be related to the different nature of students from previous generations. The majority of today's students are from the zillennial generation, also known as gen-Z, who are very familiar with the digital world from an early age. They are able to operate gadgets quite reliably, even when language acquisition has not yet reached the level of reading ability (Anam, Mulasi, Rohana, 2021). This generation is known as digital natives. In this modern era, everyone, especially digital natives, cannot live without the internet. This is in accordance with research conducted by the Association of Internet Providers (APJII). According to the results of a survey conducted in 2022-2023, the number of internet users reached 215.63 million people, an increase of 2.67% from the previous year. This number is equivalent to 78.19% of Indonesia's total population, which amounts to 275.77 million people, and East Java is one of the ten largest cities with 81.26 per cent of internet users (Benaziria, 2018).

The majority of students in Indonesia are digital natives. They usually use computers, laptops and smartphones to access the internet because they are driven by three things: as a medium of entertainment, communicating with friends, and finding information about school assignments, Aryana et al (2022). The large number of generations that use digital media, especially the internet, is natural because the progress of the times demands not to be left behind. In addition, they are the original digital generation born and developed together with technology (Carolina, 2023). Educational methods must be conventionalised to suit the learning styles and preferences of the new generation in the digital native

era (Ghani et al., 2021). The use of technology in education can help fulfil individual needs and provide quick feedback to students. This is important because technology supports digital natives' natural attraction to digital devices and ensures that educational materials are developed in a way that is interactive, engaging and content-worthy (Juliane et al., 2017).

Adaptations are necessary and must take into account the unique needs and preferences of digital natives, while ensuring that deep learning is not compromised in the process. In short, technological advances have led to the emergence of a generation of digital natives who process information differently and have unique learning needs (Machmud, 2018). To effectively serve these digital natives, educators must adapt their pedagogy and resources to align with the preferences of digital natives. These adaptations include integrating technology into the teaching and learning process, utilising online platforms, and providing interactive and multimedia-rich content. By doing so, educators can create dynamic and engaging learning environments that suit digital natives and support their academic success (Nurgiansah, 2022).

By utilising online learning platforms, digital natives can easily move their activities and interactions from traditional face-to-face environments to the digital world. These platforms offer various features and benefits that enhance the learning experience for digital natives. For example, the generation can access a wide variety of educational resources, including e-books, videos, and interactive simulations, which can cater to their diverse learning styles and preferences (Nur, 2019). Ruangguru is a brand name under the company PT Ruang Raya Indonesia. Ruangguru was introduced as a digital tutoring platform. Since its establishment, Ruangguru introduced its platform that can be used on various devices, such as laptops, mobile phones or tablets. The platform is a means of learning by utilising an online learning system, so that learners and tutors do not meet face-to-face. Learners can access the learning media with the available internet network. Ruangguru has a variety of products that can be used by its users, including study rooms, test rooms, classrooms, robo teachers and so on (Marini et al, 2021).

Ruangguru now not only offers online learning packages, but also hybrid access services under the brand name Brain Academy. Brain Academy is available in two options: online and offline. The offline Brain Academy utilises face-to-face learning while still utilising the Ruangguru app to support its materials and learning. Ruang Guru offers Indonesian language learning through fun and innovative learning. Students will tend to pay attention to subject matter delivered by interesting and innovative teachers. Based on this, the author conducted interviews with teachers and students in Indonesian language learning to find out how effective the use of e-learning in Indonesian language learning.

2. Methods

The research method used is descriptive qualitative method with a case study at LBB Ruang Guru in Jombang, East Java. The collection techniques in this study were observation, structured interviews, documentation and closed questionnaires. The research was conducted from January to March 2024. Secondary data is literature studies originating from books, articles, proceedings, theses, and other media that can support the availability of information related to related topics. The data that has been collected will be analysed according to the discussion of related topics using data reduction, presentation, and conclusion methods.

3. Result and Discussion

a. Implementation of *Ruang Guru* E-Learning in Learning

Indonesian language learning at Brain Academy offline uses a hybrid system. This system supports classroom learning by utilising the *Ruang Guru* application to work on questions and view learning materials. Learners still get lessons in general like classical learning that uses a teacher-centred system. The teacher or what is commonly called the master teacher will explain and explain what material is being discussed on the learning topic that day. The master teacher explains and explains the material on the whiteboard directly for 20 minutes. then in the last 15 minutes, the master teacher asks students to open the *ruang guru* application to take the quiz that has been provided. After the quiz is done the master teacher will discuss the quiz in front of the class. The discussion in the student application will appear after the learning session ends so that students can focus on following the learning in the classroom. Students can also learn independently at home by opening the study room feature on the *ruang guru* application which contains recordings of learning materials and also practice questions accompanied by discussions. If students want additional learning, they can contact the student advisor to schedule a homework clinic.

b. Indonesian Language Learning in the *Ruang Guru*

Indonesian language learning has the same standards as other subjects in the brain Academy Ruang Guru. The difference is only in the delivery of material and also practice questions. After getting the material then students work on the questions that have been provided in the Ruang Guru application. After finishing working on the master teacher will discuss the questions together with the students. The material obtained is in the form of concepts so that students can apply it in working on the questions that have been provided. The learning process is of course the same as other subjects. Students log in and apply existing features such as material summaries and also sample learning videos. Then the tutor explains or mediates when there is material in the application that is not understood. In this section a hybrid system occurs. When all the material is clear, students are directed to work on the questions in the application. In the application the questions contain high reasoning. When students answer, they will know the right and wrong, and there is a discussion of the answer to the question so that students more understand.

c. Effectiveness of Using E-Learning in *Ruang Guru*

Based on the indicators of using the Brain Academy *Ruang Guru* application and the learning process has been carried out according to the learning steps in the digital native generation. The results of student learning by using the brain academy application in the *ruang guru* show maximum results. Based on interviews with students in the Brain Academy Rugu Room, this was obtained because the hybrid learning system used in the *ruang guru* allows students to study the material with focus and if there are things that are not understood, they can ask the master theacher. The learning features are also very easy to access and everything is presented in full so that it is easy to understand.

After the learning process, a satisfaction survey was conducted with the use of the application during the Indonesian language learning process. This survey was conducted by filling out a questionnaire to a number of respondents. the total respondents who filled in were 27 respondents. of the 27 respondents showed that all indicators showed positive things. With details, namely from the aspect of enthusiasm for learning, 63% of students feel very enthusiastic and the remaining 37% of students are enthusiastic about learning with the *ruang guru* brain academy. In terms of student enthusiasm in the learning process, 63% of students felt very enthusiastic and 37% felt enthusiastic.

Then regarding the indicator of student focus, the results showed that 51.9% of students were very focused and 48.1% of students felt focused. And in the last indicator, namely the ease of access in learning, 70.4 students felt that the brain academy application in the *ruang guru* was very easy to access and the remaining 29.6% answered easily. There were no students who answered less or not in all indicators. It can be concluded that the use of the brain academy *ruang guru* gets a positive response from students who are mostly digital natives.

4. Conclusion

The implementation of e-learning through Ruang Guru application in Indonesian language learning at Brain Academy uses a hybrid system approach that combines the role of a master teacher in the classroom with application features. The system has yielded positive results with high levels of excitement, enthusiasm, focus and ease of access to learning from students, most of whom are digital natives. Features such as complete materials, questions with appropriate difficulty levels, homework clinics for personalised guidance, as well as integration of all students in Indonesia, make it easy for students to understand the material and achieve maximum grades. Students' positive response to the app shows that the use of Ruang Guru e-learning effectively enhances the learning experience for students at Brain Academy.

The hybrid system approach with master teacher involvement in the classroom and integration of app features provides a more interactive, flexible and enjoyable learning experience for students. Students' positive responses to the app indicate that this learning model is effective in facilitating understanding of the material, motivating students to learn, as well as increasing their engagement in the learning process. This success is also reflected in the achievement of maximum scores by the majority of students, indicators of learning enthusiasm, focus, and ease of access in learning. Thus, the implementation of Ruang Guru e-learning can be considered as an effective step in meeting the needs of students adapting to technological development as well as bringing positive impacts to their learning experience.

References

[1] Anam, K., Mulasi, S., & Rohana, S. (2021). Efektifitas Penggunaan Media Digital dalam Proses Belajar Mengajar. Genderang Asa: Journal of Primary Education, 2(2), 76-87.

[2] Aryana, S., Zulaeha, I., Pristiwati, R., & Haryadi, H. (2022, October). Digital Literacy of Indonesian Teachers on AKM Class and Asesmenpedia. *International Conference on Science, Education, and Technology* (Vol. 8, pp. 890-900).

[3] Benaziria, B. (2018). Pengembangkan Literasi Digital pada Warga Negara Muda dalam Pembelajaran PPKn melalui Model VCT. Jupiis: Jurnal Pendidikan Ilmu-Ilmu Sosial, 10(1),11. https://doi.org/10.24114/jupiis.v10i1.8331

[4] Carolina, Y. D. (2023). Augmented Reality sebagai Media Pembelajaran Interaktif 3D untuk Meningkatkan Motivasi Belajar Siswa Digital Native. *Ideguru: Jurnal Karya Ilmiah Guru*, *8*(1), 10-16.

[5] Ghani, N. A., Hamid, S., Hashem, I. A. T., & Ahmed, E. (2019). Social media big data analytics: A survey. *Computers in Human behavior*, *101*, 417-428.

[6] Hasil Survei Penetrasi dan Perilaku Pengguna Internet Indonesia. (6 Desember 2023). Asosiasi Penyelenggara Jasa Internet Indonesia (APJII). Diakses dari:https://www.apjii.or.id/survei

[7] Juliane, C., Arman, A. A., Sastramihardja, H. S., & Supriana, I. (2017). Digital teaching learning for digital native; Tantangan dan Peluang. Jurnal Ilmiah Rekayasa dan Manajemen Sistem Informasi, 3(2), 29-35.

[8] Machmud, K. (2018). The smartphone use in Indonesian schools: the high school students' perspectives. *Journal of Arts and Humanities*, *7*(3), 33-40.

[9] Marini, Y., Marina, N., Nasution, M. M., & Lubis, M. A. (2021). APLIKASI RUANG GURU UNTUK PEMBELAJARAN DI ERA COVID-19. *DIRASATUL IBTIDAIYAH*, *1*(2), 198-214.

[10] Nur, M. (2019). Literasi Digital Keagamaan Aktivis Organisasi Keagamaan di Madrasah Aliyah Negeri (MAN) di Kota Bandung. Jurnal SMART (Studi Masyarakat, Religi, dan Tradisi), 5 (1), 1-14.

[11] Nurgiansah, T. H. . (2022). Meningkatkan Minat Belajar Siswa dengan Media Pembelajaran Konvensional dalam Pembelajaran Pendidikan Kewarganegaraan. Jurnal Pendidikan Dan Konseling (JPDK), 4(3), 1529– 1534. https://doi.org/10.31004/jpdk.v4i3.490

Prototype Precision Approach Path Indicator Light Based on Virtual Reality on Visual Landing Aids Practicum at Makassar Aviation Polytechnic

Bayu Purbo Wartoyo[1*], Muhammad Yahya[2], and Muhammad Agung[2]

[1]Politeknik Penerbangan Makassar, Makassar, Indonesia
[2] Universitas Negeri Makassar, Makassar, Indonesia

*E-mail: bayu.purbo@poltekbangmakassar.ac.id

Abstract. The Airport Technology study program at Makassar Aviation Polytechnic has a Visual Landing Aid course with Precision Approach Path Indicator (PAPI) material. Makassar Aviation Polytechnic plans to make a Virtual Reality-based PAPI Light Prototype in the Visual Landing Aid practicum to support practicum activities and hone student motor competence. In this study, the method used is Research and Development with the ADDIE development model. The first stage to be done is to conduct a needs analysis. The second stage is to design the PAPI Light lamp, the environment around the lamp, and the workshop. After the design process, the next stage is to develop using virtual reality applications. Next is the implementation and evaluation stage of testing the system to determine whether it runs as it should. From this research, the author could design a Virtual Reality-based PAPI Light Prototype. In addition, with this research, the knowledge and abilities of the Makassar Aviation Polytechnic Airport Technology study program students in the Visual Landing Aids course. In terms of increased confidence in practicum, reasonable control of practicum tools, and precision and precise movement instruments, students can overcome technical challenges in practicum.

1. Introduction

Education in Airport Technology is crucial in preparing reliable professionals to support smooth flight operations [1],[2]. One of the most essential activities in learning is practicum[3]-[5]. Practicum is crucial in aviation education, especially in understanding and operating visual landing aids such as the Precision Approach Path Indicator (PAPI) Ligh. PAPI Light is an important system that assists pilots in maintaining a safe and precise landing path.

At Makassar Aviation Polytechnic, the availability of practicum equipment such as PAPI Light is a significant obstacle. Currently, students can only practice at Sultan Hasanuddin Airport, but the PAPI Light equipment at the airport is active equipment that cannot be carelessly used for practicum purposes. This limitation creates difficulties for students in gaining adequate and equitable practical experience[6]. As a result, students' technical and motor competencies in operating and maintaining PAPI Light cannot be optimally developed. From the questionnaire distributed to 24 respondents who are students of the Airport Technology Study Program, in terms of practical skills, as many as 16.64% said strongly disagree, 62.5% said disagree, and 20.86% answered undecided.

To overcome this problem, developing a Virtual Reality (VR) based prototype application that can simulate the runway and workshop environment for PAPI Light[7]. This VR application is expected to provide a realistic simulation of the runway environment with a fully functional PAPI Light and an interactive workshop that allows students to disassemble PAPI Light components virtually[8],[9]. Thus, students can practice and improve their competence without relying on active equipment at the airport. This approach not only addresses equipment availability issues but also provides flexibility in practicum schedules and enhances the quality of learning through innovative simulation technology[10]-[12].

2. Method

This research uses the Research and Development method with the 4D development model, namely Define, Design, Develop, and Disseminate, with the following stages of implementation[13]-[15]:

a. Define

Research objectives: Determine the main objectives of the research, namely developing Virtual Reality PAPI Light to support the learning of Visual Landing Aids courses at Makassar Aviation Polytechnic.

Needs Analysis: Conduct surveys and interviews with stakeholders, including course lecturers, students, and administrative parties, to understand the needs and expectations related to visual landing aids[16],[17].

b. Design

Concept Development: Conceptualize a virtual reality-based visual landing aid, including its physical design and functionality[18].

Technology Selection: Select appropriate virtual reality technology, including VR platforms, sensors, and related hardware[19].

Implementation Plan: Develop an implementation plan that includes steps, resources, and timelines[20].

c. Develop

Prototype Creation: Make an initial prototype of a virtual reality-based visual landing aid using the concept design that has been designed[21].

Initial Testing: Conduct initial prototype testing to ensure functionality and detect potential flaws or issues[22].

Improvement and Enhancement: Refine and update the prototype based on the results of the initial trial[23].

d. Disseminate

Evaluation: Conduct further evaluation of the visual landing aids developed through trials with the participants involved, both lecturers and students.

Analysis of Results: Analyze results from the evaluation, including participant feedback and performance data[24].

Dissemination and Implementation: Integrating virtual reality-based visual landing aids in learning the Visual Landing Aids course.

Here is a figure of the stages of the 4D development model:
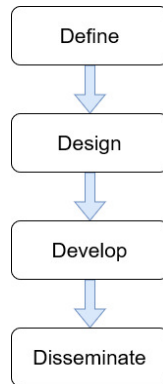
Figure 1. 4D Development Model

Here is the design of the PAPI Light Virtual Reality program:
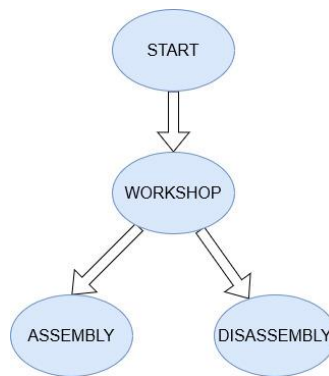
Figure 2. PAPI Light Virtual Reality Program Design.

The following is the Activity Diagram of Virtual Reality PAPI Light:
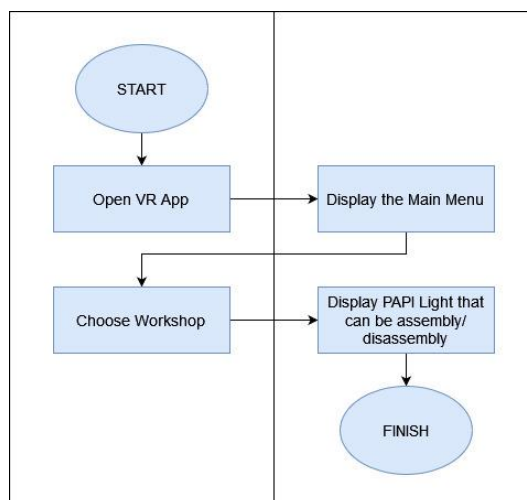
Figure 3. Activity Diagram Virtual Reality PAPI Light

3. Results and Discussion

a. PAPI Light Virtual Reality Prototype App Development
The results of the development of Virtual Reality PAPI Light using 3D modeling and Unity 3D. Blender software is used to create 3D Models, which allows the creation of models with high detail and realism. Then, the 3D models from Blender are incorporated into Unity 3D, a popular VR development platform, which allows users to interact with the 3D models they have created.

b. Implementation Results of the PAPI Light Virtual Reality Prototype Application.
1) Home App Display
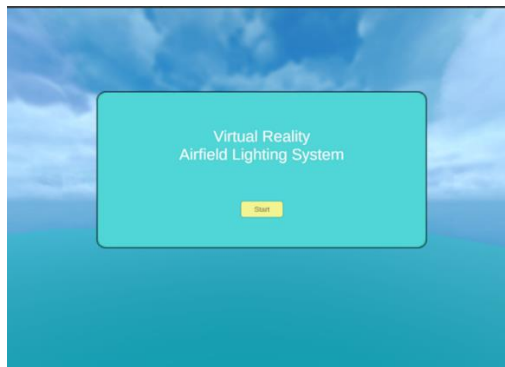
Figure 4. Home App Display

The home screen of this application will appear when this PAPI Light Virtual Reality Prototype application is started.

2) Main Menu Display
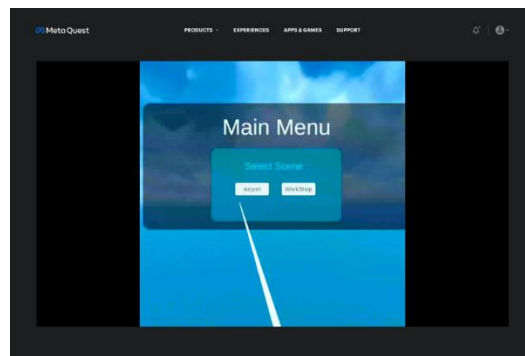
Figure 5. Main Menu Display

This main menu display has two options: the "Airport" menu to simulate Airport conditions and the "Workshop" menu to display simulated PAPI Light workshop rooms.

3) PAPI Light Workshop Display
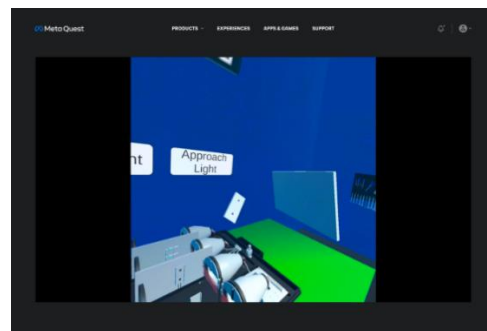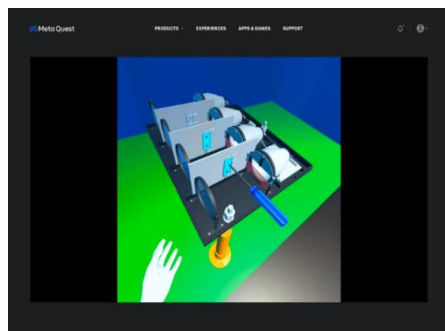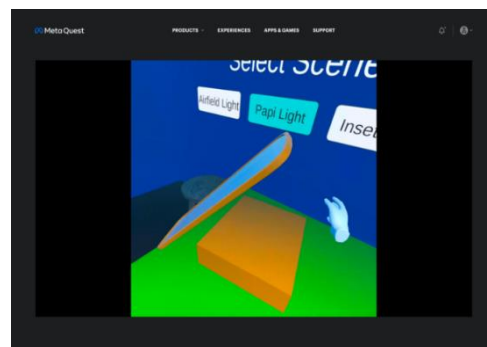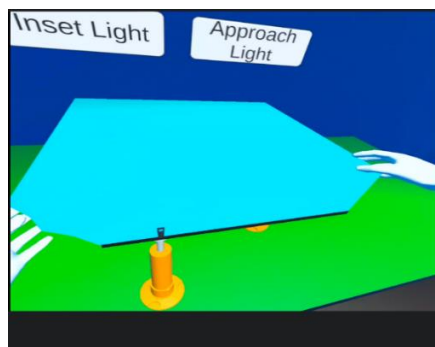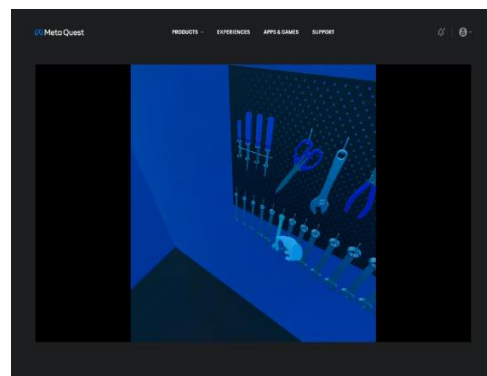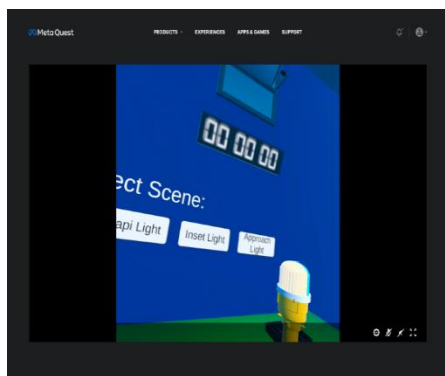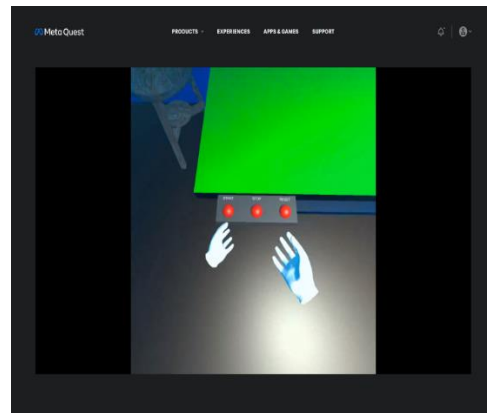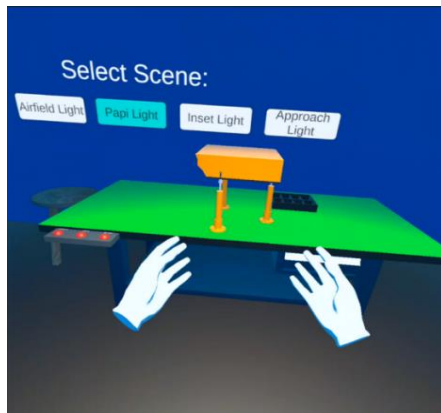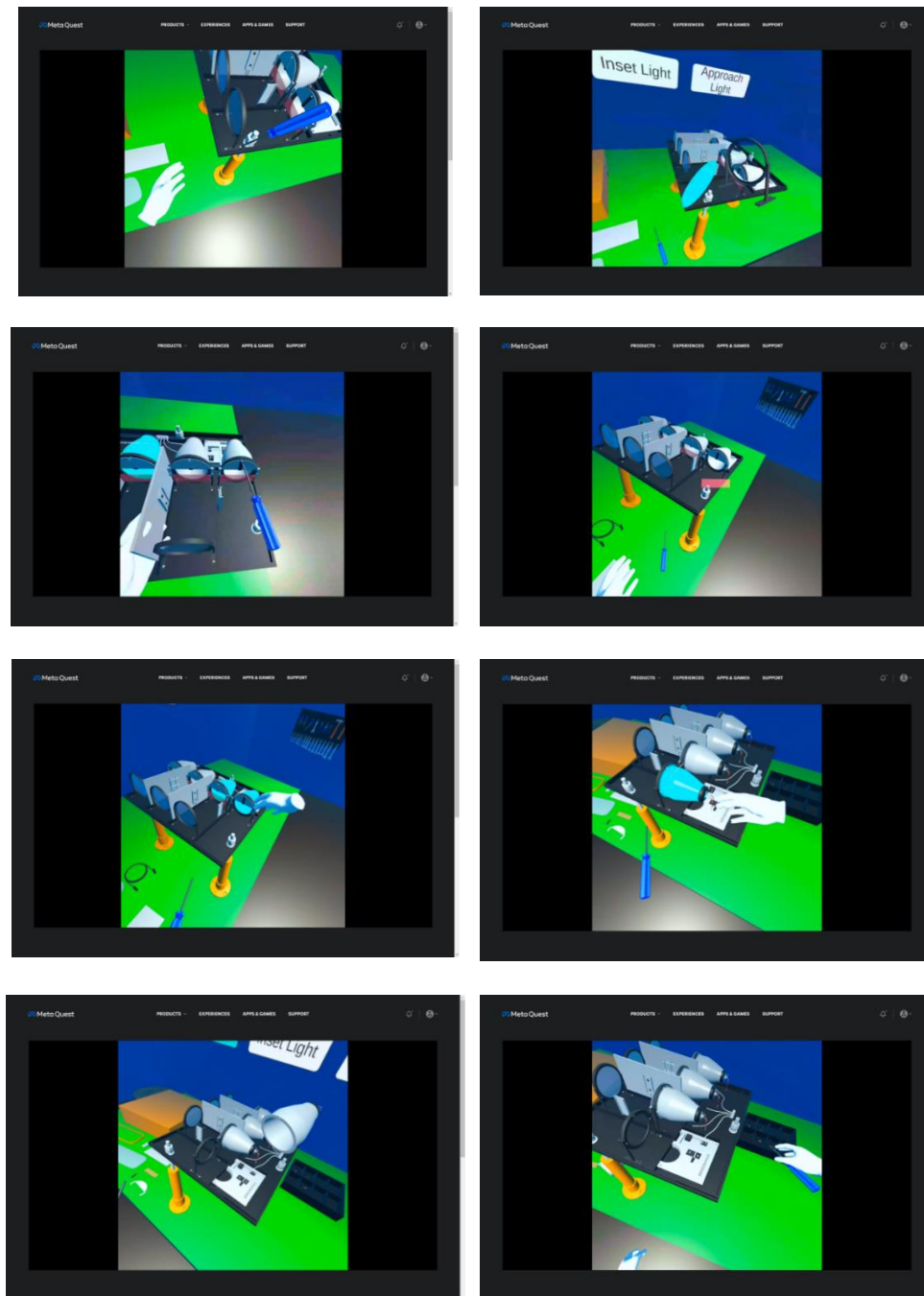
Figure 6. PAPI Light Workshop Job Display.

Figure 6 shows the job of the PAPI Light workshop, including:
a)   Removing the PAPI light cover
b)   Removing rubber and glass PAPI light
c)   Removing the bolt with a screwdriver
d)   Removing plate and screen
e)   Removing the lens mount
f)   Removing the red/white filt

    g)   Remove the filter support

    h)   Removing the lamp

    i)   Removing the reflector section

    j)   Removing the reflector mount

    k)   Removing the master switch

c.   Black Box Testing

Black Box testing performed on the PAPI Light Virtual Reality Prototype Application aims to test the application's functionality.

Table 1. Black Box Testing Result

No	Testing Activities	Expected Results	Test Results	Conclusion
1	Powering on and running the Oculus device	Oculus device can run properly	Oculus device can run properly	Test Succesful
2	Running the PAPI Light app on an Oculus device	The application runs well on Oculus devices	The application runs well on Oculus devices	Test Succesful
3	After pressing the "start" button, the main menu display will appear.	The main menu will appear with "Airport" and "Workshop" options.	The main menu will appear with "Airport" and "Workshop" options.	Test Succesful
4	Select the "Workshop" menu in the main menu screen	The workshop simulation display will appear	The workshop simulation display will appear	Test Succesful
5	Set the work timer	When pressing the "Start" button, the time will run, the "stop" button will stop, and the "reset" button will return to the beginning.	When pressing the "Start" button, the time will run, the "stop" button will stop, and the "reset" button will return to the beginning.	Test Succesful
6	Picking up tools	The selected tool will be picked up when picking up a tool in the holder.	The selected tool will be picked up when picking up a tool in the holder.	Test Succesful
7	Removing the PAPI light cover	The PAPI light cover will come off	The PAPI light cover will come off	Test Succesful
8	Removing the rubber and glass PAPI light	The rubber and glass PAPI light will come off	The rubber and glass PAPI light will come off	Test Succesful
9	Removing the bolt with a screwdriver	Bolts can be removed using a screwdriver.	Bolts can be removed using a screwdriver.	Test Succesful
10	Removing plate and screen	Plate and screen can be removed.	Plate and screen can be removed.	Test Succesful
11	Removing the lens mount	The lens mount may come off.	The lens mount may come off.	Test Succesful
12	Removing the red/white filt	The red/white filt can be removed.	The red/white filt can be removed.	Test Succesful
13	Removing the filter support	The filter support can be removed	The filter support can be removed	Test Succesful
14	Removing the lamp	The lamp can be removed	The lamp can be removed	Test Succesful
15	Removing the reflector section	The reflector section can be removed	The reflector section can be removed	Test Succesful
16	Removing the reflector mount	The reflector mount can be removed	The reflector mount can be removed	Test Succesful
17	Removing the master switch	The master switch can be removed	The master switch can be removed	Test Succesful

d. Questioner

Testing the PAPI light virtual reality questionnaire as a practicum media aims to evaluate the effectiveness of using virtual reality (VR) technology as a practicum tool to improve student motor skills in practical activities. The questionnaire instrument was distributed and responded to by 24 students of the Airport Technology Study Program; the instrument results are as follows:

1) Self-Confidence
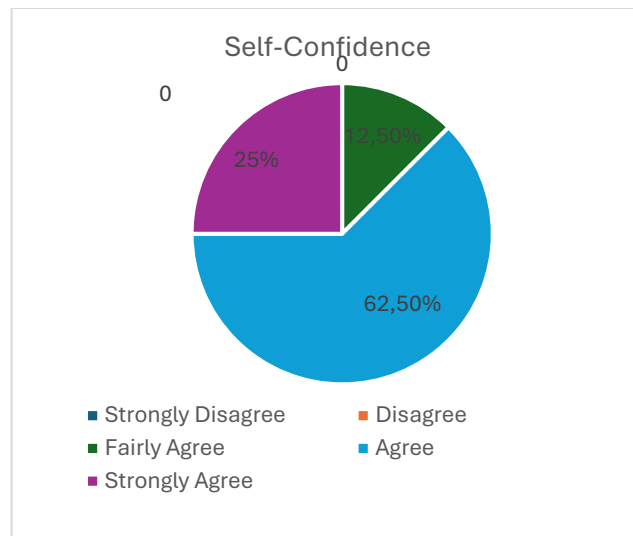
Figure 7. Self-Confidence Instrument

Based on the questionnaire results, students assessed confidence in practicum; 25% strongly agreed, 62.5% agreed, and 12.5% fairly agreed.

2) Control of Practic Tools.
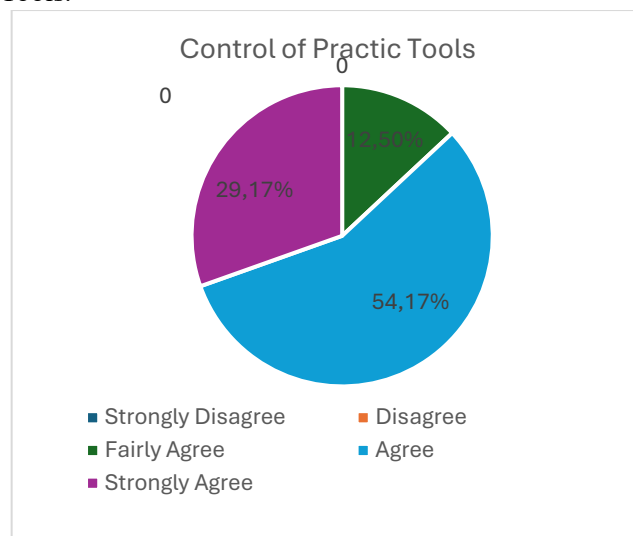
Figure 8. Control of Practic Tools Instrument

Based on the questionnaire results, students considered that they had reasonable control over practicum tools; as many as 29.17% strongly agreed, 54.17% agreed, and 16.66% fairly agreed.

3) Precise movement
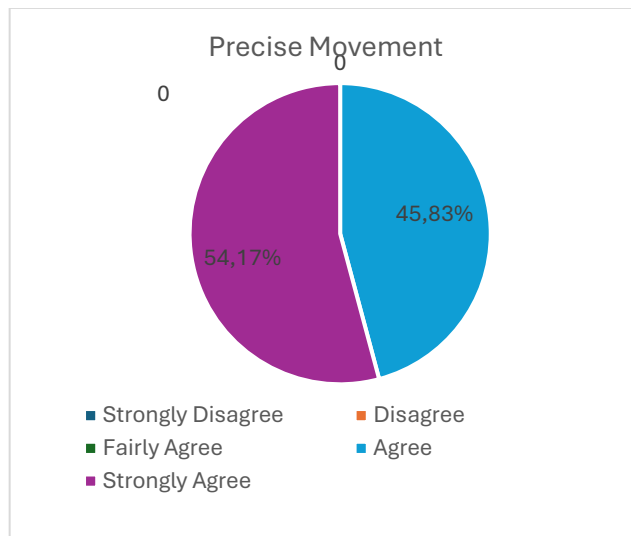
Figure 9. Precise Movement Instrument

Based on the questionnaire results, students considered that they had precise movements in practicum; 54.17% strongly agreed, and 45.83% agreed.

4) Overcoming Technical Challenges
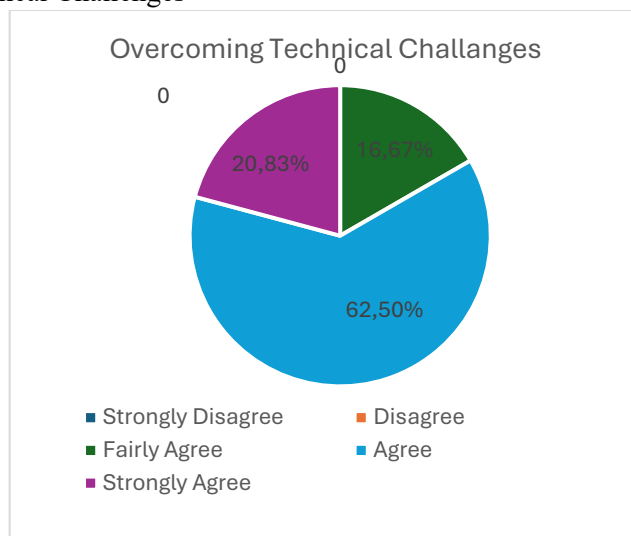
Figure 10. Overcoming Technical Challenges Instrument

Based on the results of the questionnaire above, students considered that they could overcome technical challenges in practicum; as many as 20.83% strongly agreed, 62.5% agreed, and 16.67% fairly agreed.

4. Conclusion
a. Conclusion

From the results of discussions and tests that have been carried out on Virtual Reality PAPI Lighting research, it is concluded that:

1) This research aims to improve education and training methods at Poltekbang Makassar by applying Virtual Reality PAPI Light technology. Thus, this technology is expected to provide a more interactive and realistic learning experience and allow students and lecturers to better understand and master PAPI light material, especially student motor skills. In addition, the implementation of Virtual Reality PAPI Light is expected to significantly improve the efficiency and effectiveness of the education and training process at Makassar Polytechnic[25].

2) This study aims to assess the effectiveness and usability of Virtual Reality PAPI Light in the context of education and training at Poltekbang Makassar. Judging from the pre-test questionnaire given, where related to practical skills 16.64% said strongly disagree, 62.5% said disagree, and 20.86% answered undecided. After this Virtual Reality PAPI Light technology, 25% strongly agreed, 62.5% agreed, and 12.5% fairly agreed in terms of self-confidence. 29.17% strongly agreed, 54.17% agreed, and 16.66 fairly agreed regarding reasonable control in practicum. 54.17% strongly agreed and 45.83% agreed in precise and precise movements during practicum. 20.83% strongly agreed, 62.5% agreed, and 16.67% fairly agreed in overcoming technical challenges.

b. Suggestion

From testing Virtual Reality PAPI Lighting in this study, it cannot be separated from weaknesses and shortcomings. So that the authors provide suggestions as a reference as follows:

1) Improve the interactivity between the user and the virtual environment to provide a more immersive experience.

2) Conduct continuous evaluation of the effectiveness of Virtual Reality PAPI Lighting.

References

[1] Abdullah, R. (2017). Pembelajaran Dalam Perspektif Kreativitas Guru Dalam Pemanfaatan Media Pembelajaran. *Lantanida Journal*, *4*(1), 35. https://doi.org/10.22373/lj.v4i1.1866

[2] Arif, F. (2021). Application of virtual reality for infrastructure management education in civil engineering. *Education and Information Technologies*, *26*(4), 3607–3627. https://doi.org/10.1007/s10639-021-10429-y

[3] Artun, H., Durukan, A., & Temur, A. (2020). Effects of virtual reality enriched science laboratory activities on pre-service science teachers' science process skills. *Education and Information Technologies*, *25*(6), 5477–5498. https://doi.org/10.1007/s10639-020-10220-5

[4] Bermejo-Berros, J., & Gil Martínez, M. A. (2021). The relationships between the exploration of virtual space, its presence and entertainment in virtual reality, 360º and 2D. *Virtual Reality*, *25*(4), 1043–1059. https://doi.org/10.1007/s10055-021-00510-9

[5] Binti Fauzi, J., Iqbal Malik, S., Tawafak, R. M., Mathew, R., Jabbar, J., Al Farsi, G., Bin Mohd Yusof, A., Jumani Binti Fauzi, W., & Ezanee Bin Rusli, M. (2021). *The Practicality of Virtual Reality Applications in Education: Limitations and Recommendations*. *48*(7).

[6] Cáceres Miranda, A., & Florez niño, Y. (2020). View metadata, citation and similar papers at core.ac.uk. *PENGARUH PENGGUNAAN PASTA LABU KUNING (Cucurbita Moschata) UNTUK SUBSTITUSI TEPUNG TERIGU DENGAN PENAMBAHAN TEPUNG ANGKAK DALAM PEMBUATAN MIE KERING*, *2*, 274–282.

[7] Carretero, M. del P., García, S., Moreno, A., Alcain, N., & Elorza, I. (2021). Methodology to create virtual reality assisted training courses within the Industry 4.0 vision. *Multimedia Tools and Applications*, *80*(19), 29699–29717. https://doi.org/10.1007/s11042-021-11195-2

[8] Doub, J. P. (2012). UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 12 TAHUN 2012 TENTANG PENDIDIKAN TINGGI. *UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 12 TAHUN 2012 TENTANG PENDIDIKAN TINGGI*, 262.

[9] Durukan, A., Artun, H., & Temur, A. (2020). Virtual Reality in Science Education: a Descriptive Review. *Journal of Science Learning*, *3*(3), 132–142. https://doi.org/10.17509/jsl.v3i3.21906

[10] Dwijayani, N. M. (2019). Development of circle learning media to improve student learning outcomes. *Journal of Physics: Conference Series*, *1321*(2), 171–187. https://doi.org/10.1088/1742-6596/1321/2/022099

[11] Dzardanova, E., Kasapakis, V., Gavalas, D., & Sylaiou, S. (2022). Virtual reality as a communication medium: a comparative study of forced compliance in virtual reality versus physical world. *Virtual Reality*, *26*(2), 737–757. https://doi.org/10.1007/s10055-021-00564-9

[12] Elfian, E., Ariwibowo, P., & Johan, R. S. (2018). Peran Pendidikan Tinggi dalam Meningkatkan Minat Masyarakat untuk Produktivitas Pendidikan. *Sosio E-Kons*, *9*(3), 200. https://doi.org/10.30998/sosioekons.v9i3.1870

[13] Elmqaddem, N. (2019). Augmented Reality and Virtual Reality in education. Myth or reality? *International Journal of Emerging Technologies in Learning*, *14*(3), 234–242. https://doi.org/10.3991/ijet.v14i03.9289

[14] Fadya, M., & Sari, I. P. (2018). Modelling 3D dan Animating Karakter pada Game Edukasi "World War D" Berbasis Android. *Multinetics*, *4*(2), 43–48. https://doi.org/10.32722/multinetics.vol4.no.2.2018.pp.43-48

[15] Fitriana, M. P. K. & E. W. (2016). PERANCANGAN DAN PEMBUATAN 3D MODELLING DENGAN TEKNIK CEL SHADING. *JURNAL ILMIAH Data Manajemen Dan Teknologi Informasi*, *17*(september), 1–6.

[16] Globalisasi, B. M. (n.d.). *syarieff,+Journal+manager,+9.+Kuntang-jurnal+vokasi+72-78 (1)*. *5*(1), 72–78.

[17] Hidayati, A., Kom, S., Retno, A., & Hayati, T. (2009). Analisa Pengembangan Model Kualitas Berstruktur Hirarki Dengan Kustomisasi Iso 9126 Untuk Evaluasi Aplikasi Perangkat Lunak B2B. *Seminar Nasional Electrical, Informatic and It's Education*, 1–8. http://elektro.um.ac.id/ceie/2009/files/B1. IT

[18] ISO/IEC9126. (2001). International Standard ISO / IEC 9126 Software Engineering — Product quality ISO 9126 - Content. *International Standard ISO/IEC 9126, Software Engineering-Product Quality*, 1–8.

[19] Kang, S., & Kang, S. (2019). The study on the application of virtual reality in adapted physical education. *Cluster Computing*, *22*, 2351–2355. https://doi.org/10.1007/s10586-018-2254-4

[20] Kogler, W., Wood, G., & Kober, S. E. (2021). Effects of electrical brain stimulation on brain indices and presence experience in immersive, interactive virtual reality. *Virtual Reality*. https://doi.org/10.1007/s10055-021-00612-4

[21] Lau, K. W., & Lee, P. Y. (2019). Shopping in virtual reality: a study on consumers' shopping experience in a stereoscopic virtual reality. *Virtual Reality*, *23*(3), 255–268. https://doi.org/10.1007/s10055-018-0362-3

[22] Lavoie, R., Main, K., King, C., & King, D. (2021). Virtual experience, real consequences: the potential negative emotional consequences of virtual reality gameplay. *Virtual Reality*, *25*(1), 69–81. https://doi.org/10.1007/s10055-020-00440-y

[23] Lembaran, T., Dan, T., Kementerian, F., Serta, N., Eselon, F., & Negara, I. K. (2020). Menteriperhubungan Republik Indonesia. *STATUTA POLITEKNIK PENERBANGAN MAKASSAR*, *2011*, 1–17.

[24] Miftah, M. (2013). Fungsi, Dan Peran Media Pembelajaran Sebagai Upaya Peningkatan Kemampuan Belajar Siswa. *Jurnal Kwangsan*, *1*(2), 95. https://doi.org/10.31800/jurnalkwangsan.v1i2.7

[25] Muhammad Sholeh1, Uning Lestari 2, A. A. (2005). PERANCANGAN DAN PEMBUATAN PLUG IN OBJECT 3DS MAX DENGAN MENGGUNAKAN PEMROGRAMAN MAXSCRIPT. *JURNAL TEKNOLOGI ACADEMIA ISTA*, *10*(September), 1–7.

Transforming Early Childhood Education with Augmented Reality: Research Trends and Implementation Insights

Joharatil Maknun

Universitas Negeri Yogyakarta, Indonesia

joharatilmaknun.2023@student.uny.ac.id

Abstract. Augmented Reality (AR) has emerged as a transformative technology in various fields, with significant potential impacts on early childhood education. This study presents a comprehensive bibliometric analysis to explore the evolution and current trends of AR applications in early childhood educational settings. Utilizing data extracted from major academic databases Scopus from 2000 to 2024, this paper identifies key patterns, themes, and collaborations within this research area. The analysis reveals a marked increase in publications related to AR in early childhood education, especially noticeable from 2020 onwards, indicating a growing academic and practical interest. The study categorizes the literature into two predominant clusters: technological integration and pedagogical outcomes.

Furthermore, this review identifies significant global collaborations influencing AR research trajectories, with notable contributions from the United States, China, and the European Union. Through these collaborations, diverse educational models integrating AR have been tested and implemented, showcasing a range of effectiveness across different cultural and educational contexts. The study concludes that AR presents a promising avenue for enriching early childhood education but also emphasizes the need for ongoing research to address challenges such as accessibility, teacher training, and the integration of AR with traditional teaching methods. Future research directions are proposed, focusing on longitudinal studies to assess long-term educational outcomes and the development of standardized frameworks for implementing AR in diverse educational settings.

Keywords: Augmented Reality, Early Childhood Education, Pedagogical Outcomes, Technological Integration

1. Introduction

Indonesia is an archipelagic country, stretching from Sabang to Merauke. It is no surprise that Indonesia ranks as the fourth most populous country in the world, with a population exceeding 275 million people (Detik.com, 2023). The continually increasing population each year must be accompanied by enhancements in human resources quality to compete and achieve the aspirations of Indonesia's vision for 2045. The first step towards this goal is improving the quality of education. Education forms the foundation for the development and enhancement of human resources. According to UNESCO, education should be constructed on four pillars: learning to know, learning to do, learning to be, and learning to live together (Priscilla & Yudhyarta, 2021). These foundations must be implemented from the early stages of education, notably in early childhood education. Early childhood education (PAUD) is defined as a developmental effort aimed at children from birth up to six years old, conducted through

educational stimulation to support their physical and spiritual growth and development, thus preparing them for further education. In a narrow sense, education is synonymous with schooling where education is conducted in the form of formally planned and programmed learning activities with specific goals (Hasyim, 2018).

The primary goal of Early Childhood Education (PAUD) is to lay the foundation for the development of attitudes, behaviors, recognition, skills, and creativity necessary for a child's growth and subsequent development. According to Islamic principles, the purpose of PAUD is to shape children who are faithful, ethically upright, practice good deeds, are knowledgeable and technologically adept, skilled, and experienced, so that they become independent individuals who are beneficial to themselves, their religion, their parents, their nation, and their country. Early childhood education is crucial for an individual's future success; how one responds to various challenges faced in each step of life is greatly determined by the experiences and education received during early childhood (Hasyim, 2018).

Early childhood represents the most sensitive period in the acquisition of information and adaptation of attitudes. This is reinforced by Hurlock (1991: 27), who stated that the early years of a child's life form a foundation that tends to endure and influence the child's attitudes and behaviors throughout their life. A child's activeness in exploration, identification, imitation, and sensitivity to their environment presents potentials that must be optimally stimulated. This period is also referred to as the 'golden age,' which occurs only once in a lifetime. During this phase, a child's brain develops up to 50% by the age of 4 and 80% by the age of 8 (Bloom et al., 1956). This research indicates that the development occurring in the first four years is as significant as that which occurs over the following fourteen years.

At this age, appropriate stimulation becomes crucial in delivering educational material. In the digital era 5.0, innovation in learning methods is necessary to enhance engagement. One such innovation is the use of augmented reality (AR). Augmented reality is an application that presents objects in a more realistic three-dimensional display (Kato, 2012). It is particularly suitable for educational purposes as it aids students in achieving learning objectives (Billinghurst & Dünser, 2012). More comprehensively, augmented reality is a technology that integrates two-dimensional or three-dimensional virtual objects into a real three-dimensional environment and projects these virtual objects in real-time directly through media such as markers directed at a camera. Unlike virtual reality, which completely replaces reality, augmented reality only adds to or complements it (Muntahanah et al., 2017).

Currently, the use of augmented reality has been implemented across various fields, including education. Numerous studies on the use of augmented reality in education, particularly concerning student learning in 2023, have been conducted. As of June 19, 2024, a search on Google Scholar with the keyword "Augmented Reality in Education" yields 169,000,000 results in just 0.08 seconds, illustrating the immense popularity of AR in education today. Augmented reality holds potential to make learning more engaging and clearer. Nowadays, nearly all students and teachers have access to Android devices, thus eliminating significant barriers to using AR for educational purposes. AR-based learning is becoming increasingly popular, with many studies highlighting its benefits. According to Ali Khan, the valuable use of AR starts from early childhood; however, the focus of this article is on machine learning education, not specifically on learning media in schools for young children (Ali Khan et al., 2024). Therefore, this study discusses the trends in the use of augmented reality in education, particularly in early childhood education, to observe annual growth, the most frequently discussed topics annually, authors, leading journals, and countries that extensively discuss augmented reality. This article will also explore the innovations in the use of augmented reality in early childhood. The data collected is expected to provide valuable insights into the research landscape, assisting in guiding future research and policy-making.

2. Methode

This research design employs a bibliometric analysis, a quantitative method for exploring topics and categories (Jin et al., 2022) to track annual search trends from 2000 to 2024 and provide quantitative information on the distribution of authors, countries, journals, and the most discussed topics(Leefmann et al., 2016). Data were retrieved using the Scopus database the largest database of citations and abstracts that includes peer-reviewed research and a larger selection of journals (Falagas et al., 2008), with searches accessed on June 15, 2024. The data were downloaded in CSV format for further analysis using VosViews to examine clusters of journals that publish most frequently and have the highest citation counts. The h-index is utilized to identify the most relevant articles in the subject area, selecting articles that have h or more citations as the most relevant (Vega-Muñoz et al., 2022). The most frequently used keywords by authors were analyzed using the bibliometric analysis software VOSviewer, with the keywords used being "Early Childhood Education" OR "Preschool Education" OR "Kindergarten" AND "Augmented Reality" OR "AR". This software processes and visualizes the dataset, highlighting interactions between prominent co-authors, identifying, and displaying interactions between the countries/regions involved in the topic discussed, and presenting interactions between the most frequently used keywords. This setup is used for data calculation and processing. Furthermore, to explore innovations in this research use literature review analysis is conducted.

3. Result

Based on data analysis from a total of 222 documents published between 2000 and 2024, there has been a significant increase in publications concerning the use of Augmented Reality (AR) in early childhood education, particularly during the period from 2020 to 2023. This rise reflects a growing trend in the exploration and implementation of AR within the early education sector. This increase is closely linked to technological advancements in the era of Industry 5.0, where continuous innovation is enhancing educational methods and interactions. This development not only indicates a rising academic interest in the potential of AR to support early childhood learning but also highlights technological progress that allows for more efficient and effective integration of AR. These factors together lead to broader use of AR in educational settings, promising a paradigm shift in the way children learn and interact with educational content. This opportunity paves the way for further research that can explore the tangible benefits of AR in education, potentially transforming teaching and learning landscapes profoundly.
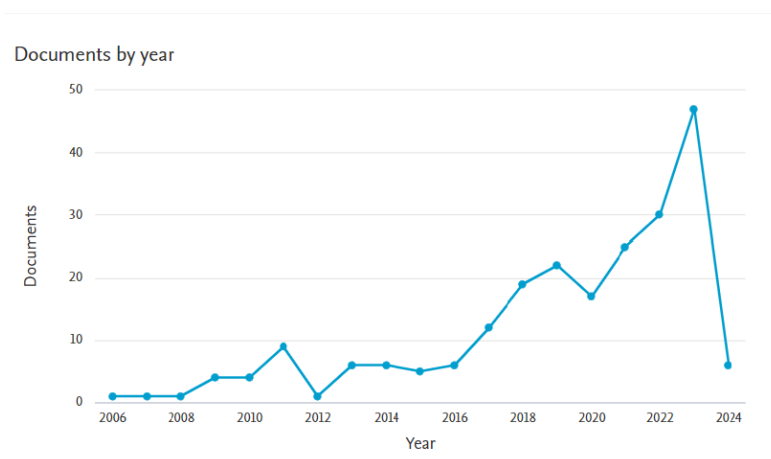
Figure 1. Document Publications Per Year

The author's performance in Figure 2 illustrates the relationships between authors involved in research concerning the use of Augmented Reality (AR) in early childhood education. In this diagram, the size of each node represents the number of citations received by each author, while the color of the node reflects the publication year, with yellow indicating more recent publications. From this diagram, it is evident that the most prominent and interconnected authors are Mantri, Archana, and Tuli, Neha. These authors demonstrate a close involvement with the topic, marked by nodes that are connected to each other. Other researchers such as Wei, Xiaodong, and Sundell, Jan, despite contributing to this research area, do not show a direct linkage in the publications on the same topic. The connection between Mantri, Archana, and Tuli, Neha, as indicated by the connected nodes, signifies significant collaboration in their research on the use of AR in early childhood education. This connection offers further insights into the direction of the research currently and previously conducted by these authors and the potential for future collaborations. Overall, this analysis provides a comprehensive overview of author interactions in the field of AR in early childhood education, revealing ongoing collaborations and emerging research trends. These findings can help guide future research and enhance understanding of how AR can be effectively implemented in early educational contexts.
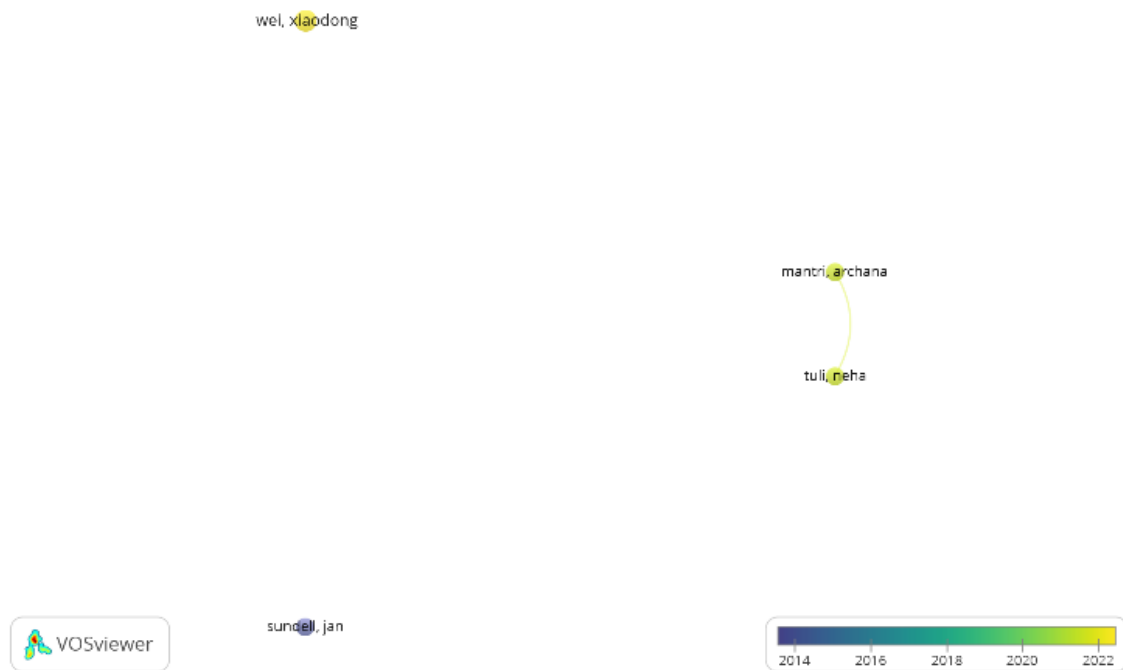
Figure 2. The relationship between authors

The international collaboration network between countries in research, depicted in Figure 3 using data visualization from VOSviewer, shows each node representing a country with the node size indicating the intensity of research activities. Lines between nodes signify international collaboration, with the thickness and color of the lines reflecting the frequency and intensity of these collaborations. Countries like Spain, China, and the United States stand out as major hubs of collaboration, with numerous lines connecting them to other countries, highlighting their roles as key players in international research. Meanwhile, green lines indicate more regular and intensive collaboration, whereas red lines represent newer or less intense relationships, and thicker lines suggest a higher frequency of collaboration. This visualization not only aids in identifying global collaboration patterns

but is also instrumental in guiding research and development policies by research institutions and policymakers.
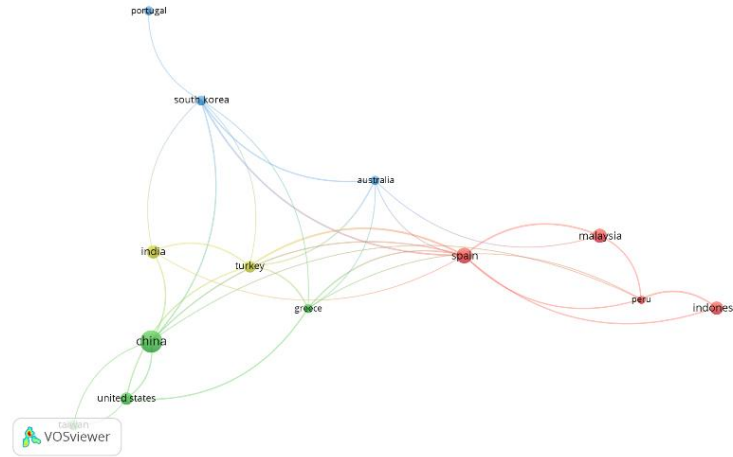
Figure 3. Co-authorship networks by countries/regions

The collaborative network among three academic institutions engaged in research on the use of Augmented Reality (AR) in early childhood education, as visualized by VOSviewer in Figure 4. The institutions involved are the Faculty of Education at Comenius, the School of Science and Technology, and the University of the Aegean in Greece. The lines connecting these institutions signify active research collaboration. The color of the lines between the institutions indicates the novelty of the collaboration, with green lines leading to the University of the Aegean suggesting a relatively recent partnership, possibly focusing on the latest aspects of AR technology. This joint research may include the development of new methodologies, practical applications in the classroom, or the assessment of AR technology's effectiveness in enhancing learning outcomes for young children. This visualization offers a clear depiction of how higher education institutions are collaborating to advance in the field of technology-based and innovative education.
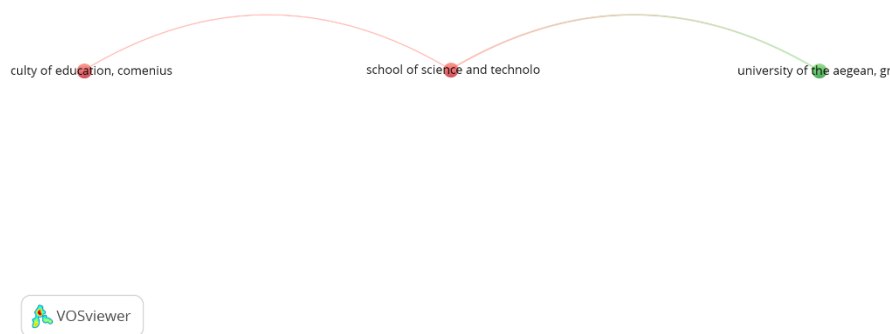
Figure 4. Organizations networks

Displays a visual analysis of keyword co-occurrence in the literature related to Augmented Reality (AR) within the contexts of education and health, utilizing VOSviewer in Figure 5. The primary focus of this analysis is on the development and application of AR technology, as indicated by the dominant cluster of frequently discussed topics such as augmented reality and kindergarten. This cluster, characterized by a color gradient shifting from yellow to purple, signifies a transition from basic technology and its applications (older, yellow) to a more profound integration into modern education

methods and learning techniques (newer, purple). This shift illustrates a growing trend in research that not only examines AR as a technology but also explores its application in enhancing early childhood learning experiences and the potential for customized educational adaptations utilizing AR's visual and interactive elements. Additionally, there is a cluster related to health studies and human demographics, indicating that AR research also spans multiple disciplines, linking technology with health aspects and the prevalence of specific medical conditions within populations.
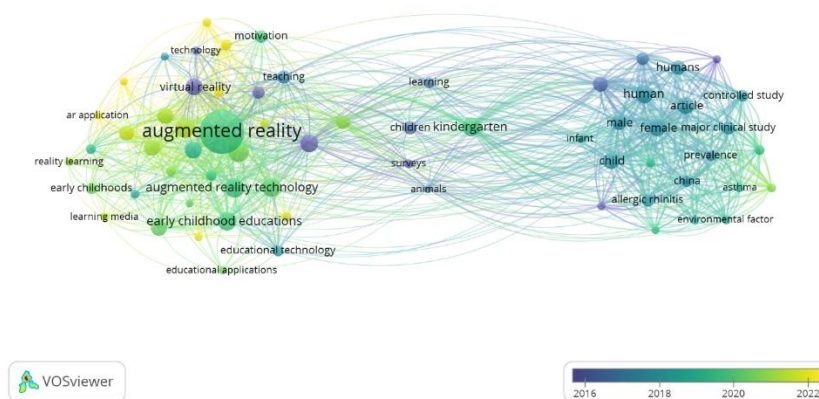
Figure 5. Display visual topic

The use of Augmented Reality (AR) in education offers numerous benefits and has become a significant topic of research. AR innovations can help develop English language skills by transforming picture cards into 3D models, as demonstrated by Wordtastic Kids. Research by Mamani and Yao shows that using this technology enhances children's language abilities (Mamani-Calapuja et al., 2023; Yao et al., 2024). Additionally, AR-connected storybooks and the Quiver 3-D Coloring app have increased children's interest in reading by making the experience more engaging than traditional books (Aisha & Kaloeti, 2021; Singh et al., 2023). AR has also proven effective in teaching complex concepts, such as the Hajj pilgrimage, to children. An AR mobile application for learning Hajj simplifies the explanation of rituals and processes, making the learning experience more interactive and easier for children to understand (Madi et al., 2020). This reduces the need for monotonous, one-directional teaching methods and enhances overall student comprehension. This approach demonstrates that technology can simplify teaching without diminishing the essence of the material being taught. Moreover, AR plays a crucial role in preserving traditional cultures and languages. For example, using AR to teach the Quechua language in kindergartens blends traditional and modern teaching methods. This helps children learn the language more easily while maintaining cultural authenticity. This combination shows that technology not only facilitates the learning process but also supports the preservation of cultural heritage.

Tabel 1. Literature review using AR

Study	Population/Sample (N; Age)	Intervention/Program	Outcome Summary
(Yao et al., 2024)	Early Childhood Student	combining animated films, 3D models, and picture cards that have been designed	Enhance and expand preschoolers' aptitude for learning math and English.

Study	Population/Sample (N; Age)	Intervention/Program	Outcome Summary
(Singh et al., 2023)	Early Childhood Student	Using augmented reality and storybooks to give a literacy primer	Engaging and adaptable educational exercise that is easily incorporated into the classroom
(Mamani-Calapuja et al., 2023)	Early Ages	Wordtastic kids	It demonstrates to be an instrument that enhances preschoolers' acquisition of English language
(Aisha & Kaloeti, 2021)	Early Childhood	Quiver 3-D Coloring based on augmented reality Technology	Children's creativity is greatly developed through digital storytelling learning with 3-D coloring based on AR applications.
(Madi et al., 2020)	Children	AR mobile application for learning Hajj	This smartphone application could attract and deliver unique information to children in learning about Hajj via AR.
(Zapata-Paulini et al., 2023)	Early Childhood	Preserve cultural identity by using AR to preserve our mother tongue and contribute to its proliferation.	The proposed application significantly improves the written and audiovisual acquisition of the Quechua language in preschool students.

4. Discussion

The findings from this comprehensive bibliometric analysis illuminate the expanding role of Augmented Reality (AR) in early childhood education. The marked increase in publications from 2020 to 2023 underscores a burgeoning academic and practical interest, particularly during a period characterized by rapid technological advancements in Industry 5.0. This surge aligns with significant innovations in educational methodologies and interactions, suggesting that AR is not only enhancing educational practices but also revolutionizing them. Integrating AR into early childhood education has shown to significantly enrich learning experiences by making them more interactive and engaging. The creation of appropriate techniques and applications is required for the integration of AR into education, which offers worthwhile research opportunities (Pochtoviuk et al., 2020). The research indicates that AR applications help in the development of cognitive skills and creativity among young learners. This integration is supported by previous studies (Vega-Muñoz et al., 2022) that have discussed the effectiveness of AR in enhancing educational outcomes. Furthermore, the collaborative patterns observed among high-citation authors and institutions emphasize the global effort to leverage AR for educational advancements.

However, these findings also bring to light several contradictions in the field. For instance, while some studies highlight the seamless integration of AR into educational settings, others (Leefmann et al., 2016) point out challenges such as accessibility, the digital divide, and the need for teacher training in AR technology. These discrepancies underline the necessity for ongoing research to address these gaps and to ensure the equitable and effective implementation of AR in education. The potential of AR to transform early childhood education is immense (Kiryakova et al., 2018), yet the research also acknowledges its limitations. The need for standardized frameworks to facilitate the widespread adoption of AR and the importance of longitudinal studies to evaluate its long-term impacts are recurrent themes. Such frameworks could guide future research, helping to integrate AR more deeply into the educational infrastructure and curriculum.

Looking forward, the exploration of AR's impact on educational equity and its potential to personalize learning presents a promising direction for future studies. The ability of AR to provide tailored educational experiences to meet the diverse needs of young learners could be a game-changer

in educational technology. In conclusion, the integration of Augmented Reality in early childhood education is poised at a critical juncture. The insights derived from this study not only contribute to the existing body of knowledge but also pave the way for developing new theories or modifying existing ones to better understand and harness the power of AR in education. The collective effort of researchers, educators, and policymakers will be crucial in navigating the challenges and harnessing the opportunities presented by AR to enhance educational outcomes for the next generation.

5. Conclusion

The study on the application of Augmented Reality (AR) in early childhood education highlights significant advancements in technological integration and pedagogical outcomes. This bibliometric analysis, spanning publications from 2000 to 2024, revealed a notable surge in AR-related educational research, particularly from 2020 to 2023. This increase aligns with technological progress in the era of Industry 5.0, which has fostered innovative educational practices. AR has shown potential in enhancing interactive learning environments, thus enriching educational experiences for young children by improving engagement and cognitive development. The study underscores the importance of continuing research to address challenges like accessibility and the need for teacher training in AR technologies. The findings suggest that AR could radically transform early childhood education, paving the way for future research to explore its full potential and develop frameworks for its effective implementation.

References

[1] Aisha, I., & Kaloeti, D. V. S. (2021). Digital Storytelling Intervention on Prosocial Behavior Improvement among Early Childhood. *Psympathic : Jurnal Ilmiah Psikologi*, *7*(2), 185–196. https://doi.org/10.15575/psy.v7i2.5713

[2] Ali Khan, H., Jamil, S., Kwon, O.-J., Jalil Piran, M., & Weon Lee, J. (2024). *A Comprehensive Survey on Investigation of Machine Learning-Powered Augmented Reality Applications in Education*. www.preprints.org

[3] Billinghurst, M., & Dünser, A. (2012). Augmented reality in the classroom. *Computer*, *45*(7), 56–63. https://doi.org/10.1109/MC.2012.111

[4] Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). The Classification of Educational Goals. *Taxonomy of Educational Objectives*, 62–197.

[5] Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *The FASEB Journal*, *22*(2), 338–342. https://doi.org/10.1096/fj.07-9492lsf

[6] Hasyim, S. L. (2018). Pendidikan Anak Usia Dini (PAUD) Dalam Perspektif Islam. *Journal Lentera : Kajian Keagaman, Keilmuan Dan Teknologi*, *13*(2), 69–77.

[7] Jin, H., Lu, L., & Fan, H. (2022). Global Trends and Research Hotspots in Long COVID: A Bibliometric Analysis. *International Journal of Environmental Research and Public Health*, *19*(6). https://doi.org/10.3390/ijerph19063742

[8] Kato, P. M. (2012). Evaluating Efficacy and Validating Games for Health. *Games for Health Journal*, *1*(1), 74–76. https://doi.org/10.1089/g4h.2012.1017

[9] Kiryakova, G., Angelova, N., & Yordanova, L. (2018). The potential of augmented reality to transform education into Smart education. *TEM Journal*, *7*(3), 556–565. https://doi.org/10.18421/TEM73-11

[10] Leefmann, J., Levallois, C., & Hildt, E. (2016). Neuroethics 1995-2012. A bibliometric analysis of the guiding themes of an emerging research field. *Frontiers in Human Neuroscience*, *10*(July), 1–19. https://doi.org/10.3389/fnhum.2016.00336

[11] Madi, N. A. M., Albakry, N. S., & Ibrahim, N. (2020). AR mobile application in learning Hajj for children in Malaysia. *International Journal of Interactive Mobile Technologies*, *14*(16), 35–51. https://doi.org/10.3991/ijim.v14i16.12807

[12] Mamani-Calapuja, A., Laura-Revilla, V., Hurtado-Mazeyra, A., & Llorente-Cejudo, C. (2023). Learning English in Early Childhood Education with Augmented Reality: Design, Production, and Evaluation of the "Wordtastic Kids" App. *Education Sciences*, *13*(7). https://doi.org/10.3390/educsci13070638

[13] Muntahanah, M., Toyib, R., & Ansyori, M. (2017). Penerapan Teknologi Augmented Reality Pada Katalog Rumah Berbasis Android (Studi Kasus Pt. Jashando Han Saputra). *Pseudocode*, *4*(1), 81–89. https://doi.org/10.33369/pseudocode.4.1.81-89

[14] Pochtoviuk, S. I., Vakaliuk, T. A., & Pikilnyak, A. V. (2020). Possibilities of application of augmented reality in different branches of education. *CEUR Workshop Proceedings*, *2547*(June 2020), 92–106. https://doi.org/10.31812/educdim.v54i2.3867

[15] Priscilla, C., & Yudhyarta, D. Y. (2021). Implementasi Pilar-Pilar Pendidikan UNESCO. *Asatiza: Jurnal Pendidikan*, *2*(1), 64–76. https://doi.org/10.46963/asatiza.v2i1.258

[16] Singh, M., Bangay, S., Grossek, H., & Sajjanhar, A. (2023). Forest Classroom: A Case Study of Educational Augmented

Reality Design to Facilitate Classroom Engagement. *Multimodal Technologies and Interaction*, *7*(5). https://doi.org/10.3390/mti7050046

[17] Vega-Muñoz, A., Salazar-Sepúlveda, G., Contreras-Barraza, N., & Araya-Silva, L. (2022). Scientific Mapping of Coastal Governance: Global Benchmarks and Trends. *Journal of Marine Science and Engineering*, *10*(6). https://doi.org/10.3390/jmse10060751

[18] Yao, W., Wang, L., & Liu, D. (2024). Augmented reality-based language and math learning applications for preschool children education. *Universal Access in the Information Society*, 0–14. https://doi.org/10.1007/s10209-024-01101-6

[19] Zapata-Paulini, J., Beltozar-Clemente, S., Sierra-Liñan, F., & Cabanillas-Carbonell, M. (2023). Development and evaluation of a didactic tool with augmented reality for Quechua language learning in preschoolers. *Indonesian Journal of Electrical Engineering and Computer Science*, *30*(3), 1548–1557. https://doi.org/10.11591/ijeecs.v30.i3.pp1548-1557

The Dual Impact of Technology in Teaching and Learning: A Balance of Advantages and Disadvantages

Sudiyono

English Education Department, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
E-mail: sudiyono_fbs@uny.ac.id

Abstract. The integration of technology in education has become a ubiquitous phenomenon that is changing the way students learn and teachers teach. While technology offers many benefits such as increased engagement, collaboration, and accessibility, it also creates significant challenges such as distraction, fraud, and technical issues. This article examines the dual impact of technology on teaching and learning, highlighting both its advantages and disadvantages. The benefits of technology include greater communication and collaboration, easy access to information and learning resources, cost savings, and preparation for the future. Disadvantages, however, include distraction, cheating, and over-reliance on technology. To maximize the benefits of technology, teachers must strike a balance between its use and traditional teaching methods. By understanding the dual impact of technology, educators can harness its power to enhance learning while minimizing its potential drawbacks.

1. Introduction

Technology has rapidly developed in recent decades, bringing significant changes in various aspects of life, including education. Especially during the covid 19 pandemic, technology is crucial in overcoming the problems of the teaching and learning process during lockdowns and restrictions on gatherings of large numbers of people. During the pandemic, the use of technology in education increased rapidly and had a significant impact, especially in developing countries such as Indonesia where the availability of the infrastructure was not so ready yet, so at the beginning of the implementation of distance learning there was a shock and many problems. But over time the problem can be identified and solved.

The use of technology in teaching and learning has become a topic that has been widely discussed and researched. Technology offers a variety of tools and resources that can be used to improve the teaching and learning process. However, behind the benefits offered, challenges and potential drawbacks need to be considered. This article will discuss the dual impact of technology in teaching and learning, balance the advantages and disadvantages, and provide references to support the discussion.

2. Advantages of Technology in Teaching and Learning

As a means and source of learning, technology provides many benefits. Here are some examples of the benefits of technology for education.

2.1 Broad and fast access to information
One of the main advantages of technology in education is wide and fast access to information. With the internet, students and teachers can access a wide range of information sources from all over the world.

It is as if information can be accessed without being bound by space and time. E-books, academic journals, video tutorials, and online courses are available with just a few clicks anywhere and anytime. This allows students to learn independently and deepen their understanding of a particular topic according to their interests and needs (Warschauer & Matuchniak, 2010).

When a student has difficulty understanding a topic or material taught by his teacher in class, the student can look for explanations or information through the internet or YouTube and does not depend on the teacher. On YouTube, for example, the same topic can be explained from various sources so that students' understanding can be better. However, students need to be given an understanding that not all information in cyberspace is valid. Especially with the existence of social media where everyone can upload anything without filters such as editors in standard publications (Watkins, 2017)

Placeholder text is used from this point to demonstrate the layout across several pages, including a placeholder figure and table.

2.2 *Interactive and engaging teaching methods*

Technology allows for more interactive and engaging teaching methods. The use of devices such as interactive boards, learning apps, and virtual simulations can increase student participation in the teaching and learning process. These tools help in the visualization of complex concepts and make learning more engaging and enjoyable (Tamim et al., 2011). For example, in a pronunciation lesson, when the teacher explains the concept of voiced and voiceless sounds by explaining how the vocal cords work to produce these sounds when without technology it is very difficult because students cannot see the vocal cords in the throat. However, with the technology used for Indoscopi where the camera can be inserted into the esophagus and can record the process of the vocal cords working, students can easily understand it. What was previously difficult to understand because like something abstract, with technology it can become real so that it becomes easy to understand. This also applies to teaching other vocabulary. To introduce objects that are unfamiliar to students because they are not in the area or place where students study, teachers can use pictures or photos available through the internet.

Also, the existence of various applications that can be used for learning makes learning variations more diverse, interesting, and not monotonous (Kiswanto, H, 2022). Some apps offer interactive learning features. For example, when students do exercises and the answers given by students are wrong, then students will immediately get feedback and get the correct answer so that students know the reason why the answer is wrong. One example is when students learn through https://www.esl-lab.com/ website where when students answer questions there will be feedback when the answer is wrong.

2.3 *Personalization of Learning*

With technology, learning can be personalized according to the needs of each student. E-learning platforms and educational applications allow teachers to tailor subject matter to students' learning abilities and pace. This can improve learning effectiveness and help students with special needs to follow lessons better (U.S. Department of Education, 2017). For example, to learn listening, applications on the internet allow students to choose the material that suits their level. Students with high abilities can choose materials with a higher level of difficulty, while students with a low level of ability can choose materials with a lower level of difficulty.

Technology allows students' needs to be accommodated according to their conditions. This follows the theory of differentiated learning where individual needs get attention and fulfillment according to each student.

2.4 *Flexibility of teaching and learning activities and savings*

The use of technology such as mobile phones and computers using the internet allows the teaching and learning process to be online so that it can be done anywhere and anytime so that students and teachers are not bound by space and time (Kiswanto, H. 2022).

This flexibility also has an impact on cost savings. Institutions that hold online classes do not need a room so expenses for the procurement of classrooms can be saved. This, of course, also has an impact on saving on the procurement of traditional classroom equipment such as tables and chairs which of course are not needed.

In addition, the use of technology can also save because teaching and learning activities become paperless, thereby reducing expenses for paper costs. Materials that should be shared through copies, can be shared through screens via computers/laptops and LCDs or shared in the form of soft files via email or WhatsApp, telegram, or other media.

2.5 *digital skills development*

The use of technology in education also helps students develop digital skills that are crucial in the modern era. Skills such as software use, searching for information on the internet, and an understanding of digital security are important parts of the curriculum. These skills are not only useful in the context of education but also in the future world of work (Voogt & Knezek, 2008). This is because students who master digital skills will certainly be better able to compete both in study and work in the future.

3. Disadvantages of Technology in Teaching and Learning

In addition to having many benefits, technology also hurts the world of education. Here are some of the weaknesses that exist in technology.

3.1 *Over-dependence on technology*

One of the main concerns regarding the use of technology in education is the over-reliance on technology devices and applications. Students who use technology too often may experience a decline in critical thinking skills and the ability to solve problems independently. They tend to seek instant answers through search engines rather than analyzing and understanding the material in depth (Turkle, 2011). Because students' understanding is not deep, when they are faced with the same problem, they cannot solve it. In addition, because their understanding is only superficial to the material taught, they also tend to quickly forget the material they get.

Dependence on technology can also cause students to become lazy because they are used to getting anything through technology easily.

3.2 *Declining social skills*

Excessive use of technology can also reduce direct social interaction between students and teachers and between fellow students. Communication through screens can reduce opportunities to develop social skills such as empathy, cooperation, and the ability to communicate effectively. This can hurt students' social and emotional development (Hogan, 2020). Many students cannot communicate and socialize well so when they face problems, they are only borne by themselves and can have fatal consequences such as suicide. Also, because students tend to be cool with their gadgets, they don't care about the surrounding environment. People tend to be individualistic. The easiest example is many boarding school students who do not know each other, even though their rooms are close to each other.

3.3 *The digital divide*

Although technology offers many benefits, not all students have equal access to technology and the Internet. The digital divide is a serious issue in many countries including Indonesia, especially in rural

areas and among low-income families. Students who do not have access to technological devices and a stable internet can fall behind in the teaching and learning process, creating inequities in education (Van Dijk, 2006). This was seen at the beginning of the covid 19 pandemic, where students in rural areas or students from poor families had difficulty attending lessons due to the lack of facilities and infrastructure.

3.4. Health issues

Excessive use of technology can also lead to health problems, such as eye fatigue, sleep disturbances, and lack of physical activity. Students who spend a lot of time in front of screens may experience a negative impact on their physical and mental health. Therefore, it is important to limit the time spent using technological devices and ensure students stay physically active (Straker et al., 2017). That is why in some schools students are not allowed to use cell phones in the classrooms except when they are required to by the teachers.

4. Strategies for Achieving Balance

By considering the benefits and negative effects of technology, it is necessary to pay attention to balance the two. Some steps can be taken to do so.

4.1 The use of technology as a tool, not a substitute

One way to achieve balance is to use technology as a tool, not a substitute for traditional teaching methods. Technology can be used to complement and enrich the learning experience, but face-to-face interaction and hands-on teaching methods remain important. Teachers should ensure that the use of technology does not reduce the quality of teaching and still pay attention to student involvement in group discussions and activities (Higgins, Xiao, & Katsipataki, 2012). The combination of traditional teaching methods and using technology can be applied proportionally. For example, in learning to write, the teacher asks students to write in class using paper and pen to measure the students' actual abilities because they can't copy-paste, but at one point, the teacher also asks students to use their gadgets when writing and use existing applications to help them. Teachers and students can compare the work written with their abilities and the work produced with the help of technology. That way there is a balance between traditional teaching and teaching using technology.

4.2 Training and professional development for teachers

Teachers need to get adequate training to integrate technology into their teaching effectively. This training should include the use of technology tools and applications, as well as strategies for overcoming challenges that may arise. With the right knowledge and skills, teachers can maximize the benefits of technology and minimize the associated risks (Ertmer & Ottenbreit-Leftwich, 2010). It must also be realized that not everyone can learn to use technology quickly, especially for the older generation. They as digital immigrants certainly need time to learn to use technology tools and applications.

4.3 Improving technology accessibility

To support the use of technology in the teaching and learning process, the government and educational institutions must work together to improve the accessibility of technology for all students. The development of internet or telecommunication networks in rural and inland areas needs to be improved, and the development of this infrastructure should not be for the project alone, but it must be for the benefit of the people so that in determining and deciding the goods must also be by what is needed. This should be done on a bottom-up basis because it is the end users who know their real needs.

5. Conclusion

Technology has brought about significant changes in education, helping to improve access to information, improve efficiency, and improve digital skills. However, technology also has negative effects, such as over-dependence, interfering with health, and reducing direct social interaction. To achieve a balance, the use of technology should be an aid, not a substitute for traditional teaching methods, and teachers should ensure that the use of technology does not reduce the quality of teaching. Professional training and development for teachers is also essential to integrate technology in teaching effectively. In addition, educational institutions must pay attention to the digital divide and develop strategies to address health problems arising from excessive use of technology. Thus, technology can be used effectively to improve the quality of education and help students develop the digital skills necessary in the modern era.

References

[1] Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology integration and perceived control: A mixed-methods study. Journal of Educational Computing Research, 42(3), 251-275

[2] Higgins, S., Xiao, E., & Katsipataki, M. (2012). The impact of technology on student learning outcomes. Journal of Educational Technology Development and Exchange, 5(1), 1-14.

[3] Hogan, K. (2020). The impact of technology on student learning outcomes. Journal of Educational Technology Development and Exchange, 13(1), 1-15.

[4] Straker, L. M., Straker, L. M., & Straker, L. M. (2017). The impact of technology on student learning outcomes. Journal of Educational Technology Development and Exchange, 10(1), 1-14.

[5] Tamim, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F. (2011). What forty years of research says about the impact of technology on learning: A second-order meta-analysis and review of the literature. Review of Educational Research, 81(1), 4-28

[6] Turkle, S. (2011). Alone together: Why we expect more from technology and less from each other. Basic Books.

[7] U.S. Department of Education. (2017). The condition of education 2017. Retrieved from https://nces.ed.gov/programs/coe/condition-of-education/2017/

[8] Van Dijk, J. A. G. M. (2006). The network society: Social aspects of new media. Sage Publications.

[9] Voogt, J., & Knezek, G. (2008). Exploring the connection between technology and learning. Journal of Educational Computing Research, 38(4), 347-364.

[10] Warschauer, M., & Matuchniak, T. (2010). New technology, new equity: Digital literacy and the digital divide. Teachers College Record, 112(5), 1131-1166.

[11] Watkins, P. (2017). Teaching and Developing Reading Skills. In Cambridge University Press (Vol. 4, Issue 1).

Harnessing the Paradox of AI for Teaching Creativity According to English Education's Master Students

Yuli Ari Sandy[1*]

English Education, Sanata Dharma University, Yogyakarta, Indonesia
yulia.mrtwiyono@gmail.com

Abstract. This study explored an English Education Masters students' perspectives on harnessing the paradoxical nature of Artificial Intelligence (AI) to promote creativity in teaching. The research question in this study is how the paradox of AI can be effectively used to teach creativity from the perspective of masters students in English teaching?. Ten English Education Master's students batch 2023 at Sanata Dharma University were interview extracted. This qualitative research applied coding and triangulation for analysed the data. The results show that while AI can offer new ways to plan creative lessons, personalize learning experiences, and generate dynamic content. At the same time, it also raises concerns about over-reliance on technology and the potential loss of spontaneous, human-driven creativity. The students argue for a balanced approach that embraces the benefits of AI while at the same time preserving the essential human elements of teaching. This research contributes to the broader discourse on AI in education by highlighting the critical need for thoughtful integration of AI to enhance rather than stifle creative teaching practices.

Keywords: artificial intelligence, educational technology, teaching creativity

1. Introduction

Artificial Intelligence (AI) is rapidly transforming many industries, education is no exception, over the last three years. Applying AI to education, known as literacy, has also received particular attention. This topic has become phenomenal in policy debates (Miao & Holmes, 2021). With the potential to revolutionise the processes of teaching and learning, it offers innovative solutions that can address long-standing challenges in the education sector. Grassini (2023) emphasized the technological changes that have been crucial in this transformation. From personalised learning experiences to efficient administrative processes, the integration of AI into the education sector has the potential to improve both the quality and accessibility of education. In the fast-changing landscape of education, the integration of AI is challenging the paradox of how to use it to enhance human creativity, critical thinking, and deep understanding (Pane et al., 2019; Esling & Devis, 2020; Villarreal, 2023; Scherpereel, 2024).

ChatGPT, a generative AI, offers a pedagogical revolution and incredible learning experience. Its focus is on realistic output, as well as rapid response to user needs. However, it has limitations including inaccurate information, biased output, and dehumanization. This raises concerns from the humanitarian side, especially human creativity. Other challenges of AI in education are technology issues, teacher-student roles, and socio-ethical issues (Zhai et. al., 2021). This trend is partly due to the limitations of human cognitive ability to innovate outside of the previous art space that continues to evolve. The potential to overcome these limitations and change the observed trends of the future lies in the integration of creative AI into the innovation process. Actually, AI promises transformative potential,

especially in fostering creativity. By utilizing the power of AI, teachers can increase creativity in the teaching and learning process, provide a variety of learning materials, and stimulate students' critical thinking skills (Dillenbourg, 2020; Zhu et. al., 2023; Rudolph, 2024).

Creativity in education fosters critical thinking and problem solving skills. It helps students to better understand and retain information. Engaging in creative activities can contribute to personal fulfilment and a sense of well-being. It provides an outlet for self-expression, reduces stress and can improve mental health by fostering a sense of achievement. Here, the role of teachers in promoting creativity is crucial, including training in creative pedagogy, risk-taking classroom management and creativity assessment methods (Craft, 2022). The integration of AI into educational frameworks has sparked a dynamic debate about its potential to revolutionise teaching methods, particularly in relation to the development of creativity. Inevitably, as AI technology develops, its paradoxical role in education is becoming more and more clear. While AI can streamline and automate various learning processes, there are concerns about its impact on the development of creative skills. This paper explores the strategies proposed by Master's students in English Education to use AI in a way that balances these opposing forces By analyzing the perspectives of future teachers in detail, the researcher aims to explain how AI can be effectively integrated into creative education practices without compromising the human element that is essential for teaching. In brief, the research aims are summarised by the research question, based on the above background and literature is how the paradox of AI can be effectively used to teach creativity from the perspective of Masters students in English teaching?

2. Method

This study explored the perspectives of English Education Masters students on using the paradoxical nature of AI to promote creativity in the classroom. Therefore, to answer the research question "How can the paradox of AI be used effectively to teach creativity from the perspective of English Education Masters students?", the researcher adopted a descriptive qualitative research approach. The research involved ten masters students in English Education Batch 2023 at Sanata Dharma University. These participants were selected on the basis of purposive sampling with the criteria that they should participate in this study because they are future teachers in the dynamic world of education. A qualitative method was applied in this study. It required in-depth discussions with the subjects to develop views, address strategic, ethical and personal issues, and understand biases, opinions and personal origins. To triangulate the data, the researcher first conducted a pre-interview by raising some interview questions (Creswell & Creswell, 2018).

The data are analysed in five steps. They were organising and preparing data, understanding data tones, coding data, creating descriptions and representing narrative descriptions. The first step was data management, the second was reading the data, the third was coding, the fourth is creating descriptions and themes, and the fifth is representing these themes in qualitative narratives to understand the context and meaning of the data. In order to facilitate the process of analysing the data, the researcher first made a transcription and notes of the result of the preliminary interview. Then, during the follow-up interview, the researcher took notes while the participants elaborated on their experiences. After the interviews were completed, the researcher transcribed the interviews again. The final process of this research was to draw conclusions and write the report.

3. Finding and Discussion

The finding of the study suggest that effectively using AI to teach creativity means integrating AI technologies in a way that enhances, rather than replaces, human creativity. Creativity is fundamental to the development and survival of human thought. It should be included in teachers' education to

develop their knowledge and skills needed to shape students' development, especially creativity development (Kaplan, 2019; Henriksen et. al., 2021). AI is reshaping the educational landscape, offering powerful tools to improve learning, teaching and administrative processes (Tam et al., 2023). While the potential benefits are significant, it is crucial to address the associated ethical, privacy, and equity challenges. Masters students have a unique vantage point that they are both recipients of advanced educational methodologies and aspiring teachers. Their insights provide a valuable interface between theory and practice. By examining their views, this study aims to uncover the nuanced ways in which AI can be both a facilitator and a potential barrier to creative learning. The paradox of AI in education lies in its dual capacity to support and constrain creativity. On the one hand, AI tools can provide personalised learning experiences, foster engagement through interactive platforms, and offer vast resources for creative expression. On the other hand, the mechanisation of certain educational processes risks stifling the imaginative and critical thinking skills that are critical to creativity. AI can have a significant role in the development of creativity, but its implementation must be carefully managed. The assessment of creativity remains a challenge. Recent advances suggest the use of a combination of formative and summative assessments, including portfolios, self-assessment and peer assessment. These methods provide a more comprehensive view of a student's creative skills and progress (Kaufman et. al., 2022). AI technologies, such as natural language processing and machine learning, have the ability to analyse large amounts of data, provide personalised learning experiences, and offer creative prompts. These tools can stimulate students' creativity by offering new ways of approaching writing, critical thinking, and literary analysis. However, there is a risk that AI could lead to a mechanised form of creativity, where students rely too heavily on algorithmic suggestions, potentially dampening their intrinsic creative abilities. Some teachers are worried that students will outsource their work to ChatGPT and cheat on it (Lim et al., 2023).

Teachers can create environments where AI and human ingenuity work in synergy to foster innovative thinking and problem-solving skills in students by using AI as a creative assistant, fostering collaboration, personalising learning experiences, and encouraging ethical reflection (Amabile, 2019; Mishra et. al., 2023). Creating an environment where students can develop their creative thinking skills is what teaching for creativity is all about. It is different from simply teaching for creativity, where the focus is on making lessons interesting. The need to address identity in teacher training was emphasised by Beauchamp and Thomas (2009). The process of creativity teaching can be seen as a process of professional identity development. There is an increasing societal demand for approaches to education that not only acquire knowledge and skills, but also learn to apply them in order to discover and realise new possibilities. This approach not only prepares students for future challenges, but cultivates a deeper appreciation for the intersection of technology and human creativity. Educational strategies that enhance these components, such as the provision of opportunities for skills development, the encouragement of creative thinking techniques and the fostering of a supportive environment are crucial for the promotion of creativity in students. However, combining knowledge-based and data-driven approaches is a natural way forward for educational applications. Data-driven AI provides the basic processing of information, such as the recognition of patterns (Holmes, 2022). They also see the paradox of AI as a valuable asset in the promotion of creativity. Teachers can create a balanced environment that fosters both creative freedom and structured learning by using AI for idea generation, personalised feedback, structured creativity exercises, reflective practice, collaborative projects, multimodal learning and critical analysis. Thoughtful integration of AI into creative teaching practices promises to help develop innovative, critical and digitally literate students.

4. Conclusion

There are both opportunities and challenges in harnessing the paradox of AI to teach creativity. Insights from English Education Master Students offer valuable perspectives on how AI can be effectively integrated into teaching practices to enhance students' creativity. They emphasise the importance of balancing AI tools with traditional teaching. Human teachers have a crucial role to play in providing guidance, inspiration, and nuanced feedback that AI cannot offer. AI can enhance collaborative learning, facilitating communication, and idea sharing. The paradox is that AI can provide both structured support and creative freedom. AI can provide the flexibility to experiment and take creative risks while guiding students through structured learning paths.While AI can offer new ways to plan creative lessons, personalize learning experiences, and generate dynamic content. At the same time, it also raises concerns about over-reliance on technology and the potential loss of spontaneous, human-driven creativity (Aldridge, 2018; Tam et al., 2023). The students argue for a balanced approach that embraces the benefits of AI while at the same time preserving the essential human elements of teaching. More research needs to be done to explore the lasting impact of AI on educational creativity. Studies should investigate how different AI tools have an impact on different aspects of creative thinking, and how these tools can be optimised to support different learning needs.

References

[1] Aldridge, D. (2018). Cheating education and the insertion of knowledge. Educational theory, 68(6), 609-624. https://doi.org/10.1111/edth.12344

[2] Amabile, T. M. (2019). Creativity in Context: Update to the Social Psychology of Creativity. Westview Press.

[3] Craft, A. (2022). Creativity and Education Futures: Learning in a Digital Age. Trentham Books

[4] Creswell, J.W., & Creswell, J.D. (2018). *Research design: Qualitative, quantitative, and mixed method approaches* (5th ed.). Thousand Oaks, CA: Sage.

[5] Dillenbourg, P. (2020). Design for Classroom Orchestration. Routledge

[6] Esling, P., & Devis, N. (2020). Creativity in the era of artificial intelligence. *arXiv preprint arXiv:2008.05959*.

[7] Grassini, S. (2023). Shaping the future of education: exploring the potential and consequences of AI and ChatGPT in educational settings. Education Sciences, 13(7), 692. https://doi.org/10.3390/educsci13070692

[8] Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education*, *57*(4), 542-570. https://doi.org/10.1111/ejed.12533

[9] Kaplan, D. E. (2019). Creativity in education: Teaching for creativity development. *Psychology*, *10*(2), 140-147.

[10] Kaufman, J. C., & Beghetto, R. A. (2019). The Four C Model of Creativity: Culture and Context. Psychology of Aesthetics, Creativity, and the Arts, 13(2), 121-131.

[11] Henriksen, D. (2021). Creative Thinking in Education. Routledge.

[12] Lim, W. M., Gunasekara, A., Pallant, J. L., Pallant, J. I., & Pechenkina, E. (2023). Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators. *The international journal of management education*, *21*(2), 100790.

[13] Miao, F., & Holmes, W. (2021). *AI and education: Guidance for policy-makers*. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000376709

[14] Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R., & Gerardou, F. S. (2023). Challenges and opportunities of generative AI for higher education as explained by ChatGPT. https://doi.org/10.3390/educsci13090856

[15] Mishra, P., & Koehler, M. J. (2019). The Future of Creativity and Technology in Education. Educational Technology, 59(4), 22-28.

[16] Pane, J. F., Steiner, E. D., Baird, M. D., Hamilton, L. S., & Pane, J. D. (2019). Continued Progress: Promising Evidence on Personalized Learning. RAND Corporation.

[17] Robinson, K. (2020). Creative Schools: The Grassroots Revolution That's Transforming Education. Penguin Books.

[18] Rudolph, J., Ismail, M. F. B. M., & Popenici, S. (2024). Higher education's generative artificial intelligence paradox: The meaning of chatbot mania. *Journal of University Teaching and Learning Practice*, *21*(6), 1-35.

[19] Tam, W., Huynh, T., Tang, A., Luong, S., Khatri, Y., & Zhou, W. (2023). Nursing education in the age of artificial intelligence powered Chatbots (AI-Chatbots): Are we ready yet? Nurse Education Today, 105917. https://doi.org/10.1016/j.nedt.2023.105917

[20] Scherpereel, C. M. (2024). The AI Paradox: Unpacking the Potential and Perils in Business Education. In *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference* (Vol. 51).

[21] Zhai, X., Chu, X., Chai, C. S., Jong, M. S. Y., Istenic, A., Spector, M., ... & Li, Y. (2021). A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, *2021*(1), 8812542. https://doi.org/10.1155/2021/8812542

[22] Zhu, C., Sun, M., Luo, J., Li, T., & Wang, M. (2023). How to harness the potential of ChatGPT in education? Knowledge Management & ELearning, 15(2), 133–152. https://doi.org/10.34105/j.kmel.2023.15.008

Increased Improving Writing and Reading Poetry Text Skills Through the Flipped Classroom Model for Class VIII-A Students at SMPN 8 Yogyakarta

Agustina Purwanti

SMPN 8 Yogyakarta
agustinapurwanti.2021@student.uny.ac.id

Abstract. This study aims to improve learning to write and read poetry texts through the Flipped Classroom model for class VIII A students of SMP Negeri 8 Yogyakarta. This study is a classroom action research (CAR). The results of this study indicate that the Flipped Classroom model can improve the skills of writing and reading poetry texts of class VIII A students of SMP Negeri 8 Yogyakarta. Students' poetry writing learning from pre-action was 68.78 (68.78%), cycle I was 73.75 (73.75%), and cycle II became 81.22 (81.22%). The ability to write poetry increased by 7.47 (7.47%). Students' poetry reading learning from pre-action was 61.98 (61.98%), cycle I was 72.29 (72.29%), and cycle II became 81.77 (81.77%). Students' poetry reading ability increased by 19.79 (19.79%). The process of learning to write and read poetry also increased. The results of the observation of the learning process from pre-action were 68.59 (68.59%), cycle I was 74.22 (74.22%), and cycle II became 87.66 (87.66%). Based on these results, it can be seen that the learning process of writing and reading poetry increased by 19.07 (19.07%).

Keywords: improvement, reading and writing, learning media

1. Introduction

Indonesian Language Learning consists of four components. "In the world of education, the implementation of language learning is packaged into four aspects of language skills, namely listening, reading, speaking, and writing skills." The four components are taught in literature materials. This opinion is in line with opinion (1) which states that "Indonesian Language Learning in Junior High School aims for students to be able to enjoy and utilize literary works to develop their personality, life insights and knowledge, and language skills." One type of literature taught in grade VIII is poetry text. Poetry texts can foster creativity, attitudes, morals, self-confidence, courage to face many people, be responsible, and have an artistic soul. In addition, learning to read and write poetry can also develop speaking skills, understanding, experiencing, memorizing, communicating, playing a role, the ability to actualize oneself into the social situation faced. (2) states, "Initially writing was interpreted as making letters, numbers, names, and any linguistic signs with a writing tool. Next (3); (4); (5) states, writing fiction or literature is very difficult." Therefore, literature teaching is only focused on teaching reading literary works or activities to study literary works.

In practice, learning to read and write poetry in class VIII-A SMP Negeri 8 Yogyakarta experiences two problems, namely teachers are too monotonous in teaching and learning is still theoretical. One way to maximize the results of learning to read and write poetry texts is to use a learning model that emphasizes more on active learning activities and student creativity during learning.

Learning to read and write poetry texts through the Flipped Classroom model can involve students to be active, creative, and critical in seeing the situations and conditions around their environment. In addition, the use of the Flipped Classroom model is expected to improve students' reading and writing skills in poetry texts.

Opinion (6) states that "The flipped classes utilized either a blended learning approach where students first watched online lectures as homework, and then completed their assignments and practical work in class; or utilized a guided inquiry approach at the beginning of class using this same process. During the class the lecturers were present to help the students, and in addition, the students were advantaged by being able to help one another." Flipped classrooms use a blended learning approach where students first watch online learning as homework, and then complete their assignments and practical work in class; or use a guided inquiry approach at the beginning of class using this same process. During class, teachers are present to help students, and in addition, students benefit from being able to help each other. After considering the problems in learning to read and write poetry texts, the researcher offers the Flipped Classroom model to overcome these problems. The application of the Flipped Classroom model is expected to be able to improve learning to read and write poetry texts for class VIII students of SMP Negeri 8 Yogyakarta so that it becomes better. In relation to this, relevant and previous research on improving students' writing and reading skills with the help of learning models has been conducted by (7); (8); (9); (10) overall, these studies provide contributions related to references, data presentation methods and data analysis described in this study. The novelty of the research conducted lies in the learning model and learning media used.

2. Method

This research is included in the type of Classroom Action Research (action research). This PTK uses the Kemmis and Mc. Taggart model which consists of planning, implementation, observation, and reflection (11). This research was conducted on August 18 to September 11, 2023 at SMP Negeri 8 Yogyakarta. The subjects of this study were 32 students of Class VIII-A SMP Negeri 8 Yogyakarta. The subjects of this study consisted of 16 female students and 16 male students. The procedure for implementing this PTK consists of four stages. The stages are as follows; (1) Planning; (2) action; (3) observation and; (4) reflection. The researcher conducted observations during learning, distributed initial questionnaires, conducted interviews with teachers and students, the researcher analyzed problems in learning.

After that, the researcher prepared instruments in the form of observation sheets, assessment guidelines, field notes that would be used in the action stage. The researcher implemented the planning that had been made. The teacher carried out the learning process of reading and writing poetry texts according to the previously made planning by implementing the Flipped Classroom model. The learning process of reading and writing poetry texts was carried out using the steps that had been planned. Observations were carried out during the action stage. Student activities are the main focus of observation, both participation in groups or after leaving their groups.

The results of observations, field notes, and recordings are used as qualitative and quantitative data to assess the success of the research process. The above data will also be analyzed as the results of observations or observations on the cycle action. Reflection is carried out by researchers and teachers to assess the level of success of learning to read and write poetry texts by applying the Flipped Classroom model. Deficiencies and obstacles during the research will be discussed with the principal and solutions will be sought as a basis for the next cycle. Data collection techniques are carried out using questionnaires, observations, interviews, and documentation.

This study will use qualitative and quantitative descriptive analysis techniques, namely to describe drama playing skills before and after the implementation of the action. Qualitative analysis is used for

qualitative data in the form of field observations, field notes, and interviews. Quantitative data is obtained from the results of drama playing assessments before and after being given action. The skills of reading and writing poetry texts in students are assessed using predetermined assessment guidelines.

3. Research Results and Discussion

The Following is a Summary of the Initial Information Questionnaire for Learning to Write and Read Poetry Texts. Based On the Results Of The Initial Information, The Researcher Conducted A Pre-Action For Learning The Skills Of Reading And Writing Poetry Texts. This Pre-Action Was Intended To Determine The Initial Information Of Class Viii A Students Of Smp Negeri 8 Yogyakarta In Learning The Skills Of Reading And Writing Poetry Texts. The Results Of Students' Pre-Action In Practicing Reading And Writing Poetry Texts Can Be Seen In The Following Graph.
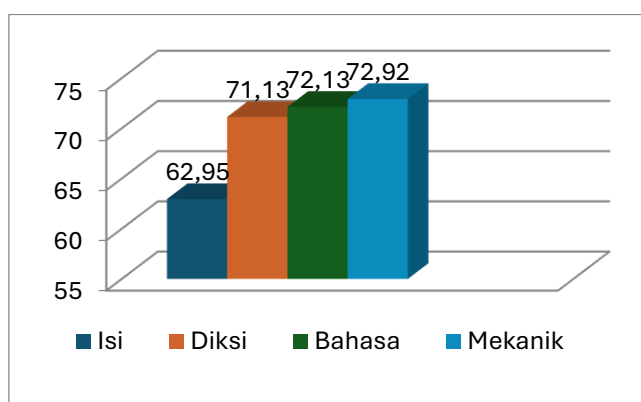
Figure 1. Results of Writing Poetry in Pre-Action

The average score of students in learning to write poetry as a whole has only reached 68.78 or if expressed as a percentage, it becomes 68.78%. The results of this pre-action show less than optimal results. The following are the results of students' pre-action in practicing reading poetry
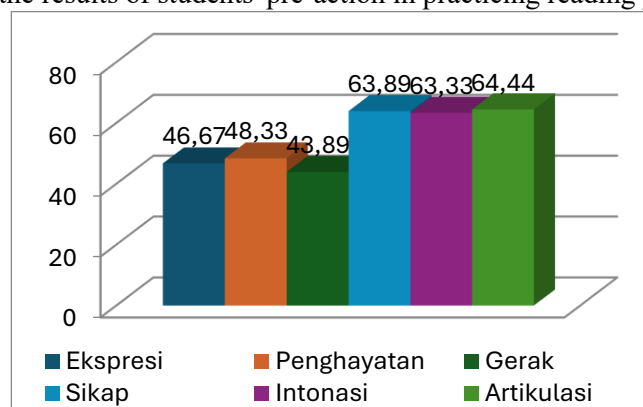
Figure 2. Results of Reading Poetry in Pre-action

The average score obtained by students from all aspects assessed was 960 (61.98%). If converted to the assessment, the average score of all aspects obtained by students reached 61.98. The following are the results of students' pre-action during the learning process.
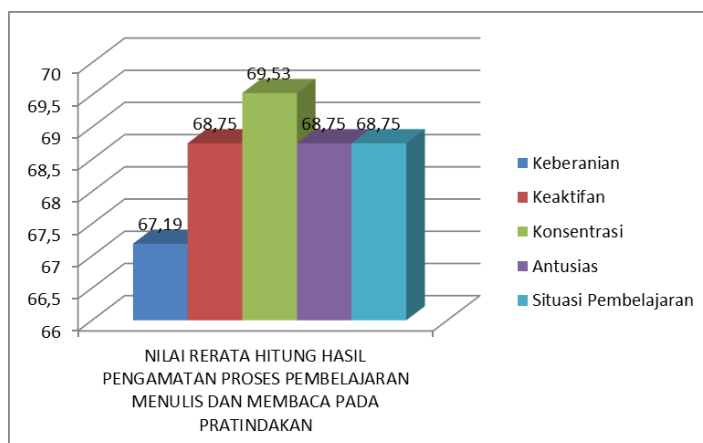
Figure 3. Results of Observation of the Learning Process in Pre-action

The total average score obtained by students from all aspects assessed was 68.59 (68.59%). If converted to an assessment, the average score of all aspects obtained by students reached 68.59. Based on the results of learning to write poetry, read poetry, and also observations of the learning process, the researcher decided to carry out the action using the Flipped Classroom model.

4. Initial Cycle Results

Cycle I was carried out with three meetings. The teacher taught by applying the Flipped Classroom model to learning to write and read poetry. The following are the results of learning to write poetry in Cycle I.
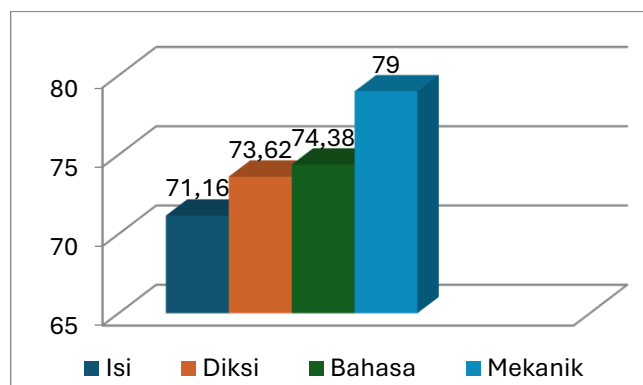
Figure 4. Results of Writing Poetry in Cycle I

The average score of students in poetry writing learning as a whole only reached 73.75 (73.75%). The results of this pre-action showed less than optimal results. Only 13 (40.62%) students managed to achieve a score above the KKM in this poetry writing learning, namely S4, S7, S8, S15, S16, S17, S18, S21, S22, S23, S24, S28, and S30. The highest score reached 91 obtained by S28. The lowest score was 56 obtained by S11. The following are the results of cycle I of students in practicing reading poetry texts.
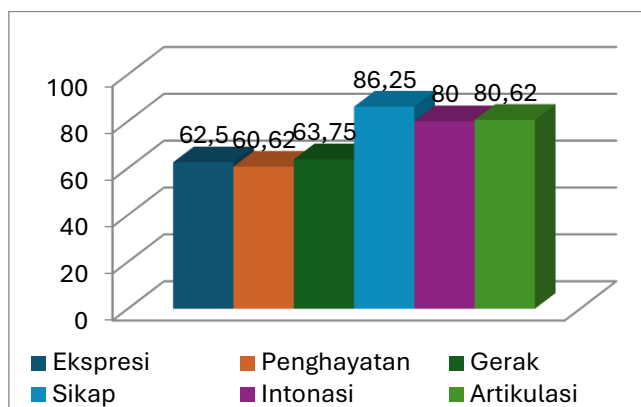
Figure 5. Results of Reading Poetry in Cycle I

The average score obtained by students from all aspects assessed was 694 (72.29%). If converted to the assessment, the average score of all aspects obtained by students reached 72.29. The following are the results of cycle I of students during the learning process.
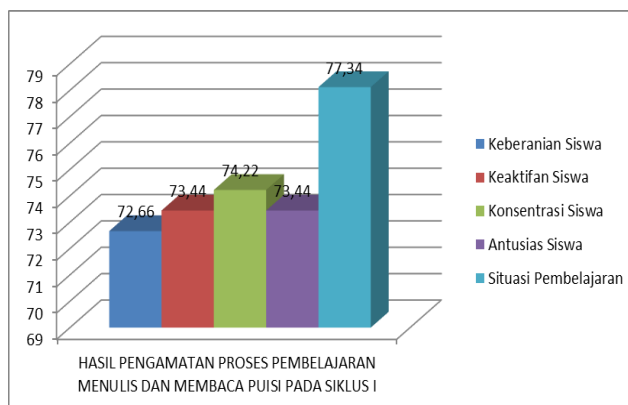
Figure 6. Results of Observation of the Learning Process in Cycle I

The average score of students' overall calculations reached 74.22 or if expressed as a percentage, it became 74.22%. Based on the results of learning to write poetry, read poetry, and also observations of the learning process in cycle I, the researcher obtained results that were still not optimal. Therefore, the researcher decided to carry out an action, namely cycle II.

Results of Cycle II
Cycle II was carried out with four meetings. The teacher taught using the Flipped Classroom model and emphasized aspects that had not yet achieved the research success criteria

The following are the results of learning to write poetry in Cycle II.
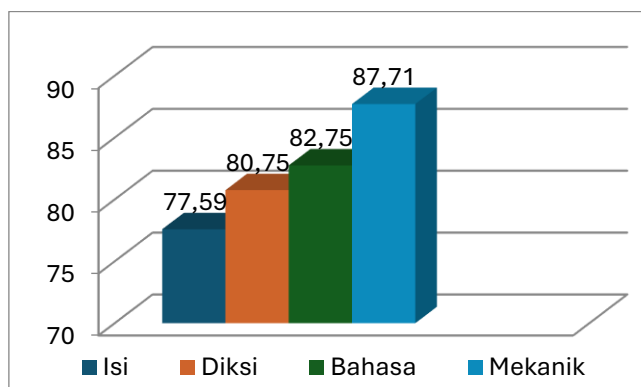
Figure 7. Results of Writing Poetry in Cycle II

The average score of students in poetry writing learning as a whole has only reached 81.22 (81.22%). The results of cycle II show optimal results. A total of 27 students (84.37%) managed to achieve scores above the KKM in poetry writing learning. The following are the results of cycle II of students in practicing reading poetry texts.
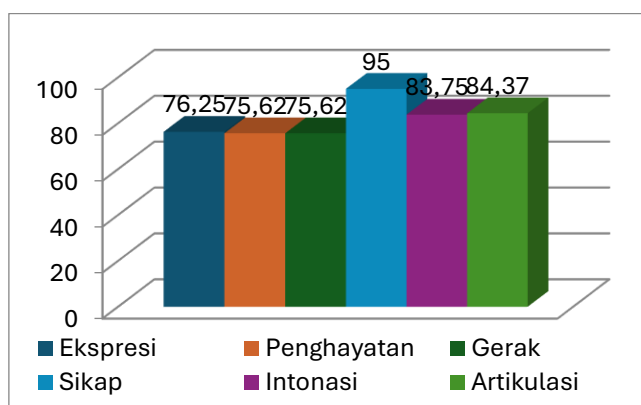
Figure 8. Results of Reading Poetry in Cycle II

The average score obtained by students from all aspects assessed is 785 (81.77%). If converted to 81.77. This number has met the criteria for research success. The following are the results of cycle II of students during the learning process.
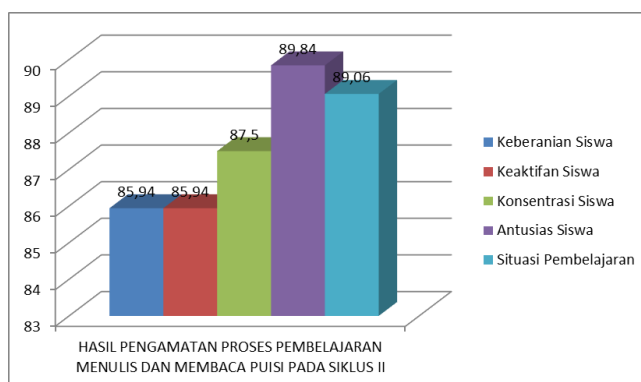
Figure 9. Results of Observation of the Learning Process in Cycle II

The average score of students' calculations overall reached 87.66 or if expressed as a percentage, it became 87.66%. The results of the last meeting of cycle II showed a significant increase. The implementation of actions with the Flipped Classroom model, both in cycle I and cycle II, was able to improve students' learning to write and read poetry.

Based on the results of this study, it can be explained that the Flipped Classroom learning model applies technology as a medium in learning. The principle of using the media itself is effective and efficient, helps shorten the time for delivering teaching materials and can stimulate the imagination of educators when getting factual information through the media (Budiyono, 2020). This is as expressed by (van Alten et al., 2019) that students in Flipped Classroom learning will prepare materials before implementing learning in class. Flipped Classroom encourages students to learn independently through links to learning materials that have been built by teachers on the web in the form of online videos before coming to class (Rindaningsih et al., 2019).

The Flipped Classroom model can be designed and implemented by combining several other learning activities. Several studies combine Flipped Classroom with approaches, methods, and learning models such as combining Flipped Classroom with cooperative learning, course review horay, peer instruction, problem based learning, collaborative learning, and experiential learning (12); (13); (14) The results of the study (Chiang, 2017) show that Flipped Classroom learning combined with problem-solving strategies is more effective than the old model of problem-solving learning.

5. Conclusion

Based on the results of the study, it can be concluded that the quality of students' poetry writing and reading learning increased with the implementation of the Flipped Classroom model. The average value of students' poetry writing learning in the pre-action was 68.78 (68.78%), cycle I was 73.75 (73.75%), and cycle II was 81.22 (81.22%). So, there was an increase of 7.47 (7.47%) in poetry writing learning. Meanwhile, the average value of students' poetry reading learning in the pre-action was 61.98 (61.98%), cycle I was 72.29 (72.29%), and cycle II was 81.77 (81.77%). So, there was an increase of 19.79 (19.79%) in poetry reading learning. The implementation of the Flipped Classroom model was also able to provide motivation and enjoyment in the process of learning to write and read poetry. Students looked more enthusiastic and more excited in the process of learning to write and read poetry. This is evident from the results of observations of the learning process. The average value of the student learning process in the pre-action was 69.59 (69.59%), cycle I was 74.22 (74.22%), and cycle II was 87.66 (87.66%). So, there was an increase of 19.07 (19.07%) in the learning process of writing and reading poetry.

References

[1] Himawan R, Fujiastuti A, Suwartini I. Cultivation of Character Education Through Learning to Listen to Speech Based on Flash Media in the Digital Age. Teknodika. 2020;18(2):116.

[2] Aeni ES, Lestari RD. Penerapan Metode Mengikat Makna dalam Pembelajaran Menulis Cerpen pada Mahasiswa IKIP Siliwangi Bandung. Sematik [Internet]. 2018;7(1):1–13. Available from: http://www.e-journal.stkipsiliwangi.ac.id/index.php/semantik/article/view/682

[3] Suprayogi S, Pranoto BE, Budiman A, Maulana B, Swastika GB. Pengembangan Keterampilan Menulis Siswa SMAN 1 Semaka Melalui Web Sekolah. Madaniya. 2021;2(3):283–94.

[4] Purnanto AW, Mustadi A. Analisis Kelayakan Bahasa Dalam Buku Teks Tema 1 Kelas I Sekolah Dasar Kurikulum 2013. Profesi Pendidik Dasar. 2018;3(2):101.

[5] Daryanti EW, Laila A, Saidah K. Pengembangan Media Karikatur Berbasis Kearifan Lokal Kediri bagi Siswa Sekolah Dasar. Efektor. 2022;9(1):11–22.

[6] Danker B. Using Flipped Classroom Approach to Explore Deep Learning in Large Classrooms. IAFOR J Educ. 2015;3(1):171–86.

[7] Hudhana WD. Pengembangan Media Video Scribe dalam Peningkatan Kemampuan Menulis Cerpen Berbasis Karakter

Siswa Kelas X SMA se-Kabupaten Tangerang. Pena J Pendidik Bhs dan Sastra. 2019;9(1):31–46.

[8] Budiani SA, Salatiga MAN. Peningkatan Ketrampilan Menulis Teks Eksposisi dengan Menggunakan Metode Brainwriting. 2018;13(1):37–42.

[9] Sutriyati S, Mulawarman WG, Hudiyono Y. Pengembangan Bahan Ajar Menulis Esai dengan Memanfaatkan Kearifan Lokal melalui Pembelajaran Berbasis Proyek (PBP) Siswa SMA. Diglosia. 2019;2(1):39–46.

[10] Aryanti Agustina D. Pengembangan Bahan Ajar Membaca Kritis Untuk Mahasiswa. J Bind Sastra. 2021;5(1):25–32.

[11] Setiawan L, Wardani NS, Permana TI. Peningkatan kreativitas siswa pada pembelajaran tematik menggunakan pendekatan project-based learning. J Pembang Pendidik Fondasi dan Apl. 2021;8(1):163–71.

[12] Ristiasari T, Priyono B, Sukaesih S. Model Pembelajaran Problem Solving Dengan Mind Mapping Terhadap Kemampuan Berpikir Kritis Siswa. J Biol Educ. 2012;1(3).

[13] Gutiérrez-Ángel N, Sánchez-García JN, Mercader-Rubio I, García-Martín J, Brito-Costa S. Digital literacy in the university setting: A literature review of empirical studies between 2010 and 2021. Front Psychol. 2022;13.

[14] Himawan R, Nurgiyantoro B. Analisis butir soal latihan penilaian akhir semester ganjil mata pelajaran bahasa Indonesia kelas VIII SMPN 1 Bambanglipuro Bantul menggunakan program ITEMAN (Analysis of exercise items for odd semester end of semester Indonesian language subjects class. Kembara J Keilmuan Bahasa, Sastra, dan Pengajarannya. 2022;8(1):160–80.

Role Conflict and Group Sustainability: Exploring Accounting Educators' Switching Behavior in Faultline Groups

Angelia Pribadi[1*], Choirunnisa Arifa[2], Suyanto[3]

[1] Faculty of Economics and Business Gadjah Mada University, Yogyakarta, Indonesia
[2] Faculty of Economics and Business Gadjah Mada University, Yogyakarta, Indonesia
[3] Faculty of Economics and Business Gadjah Mada University, Yogyakarta, Indonesia

*angeliapribadi@mail.ugm.ac.id

Abstract. This study examines faultlines within accountant educator groups, which are based on social categories and have no office requirements. Accountant educators with complex tasks often face role conflicts but must maintain performance, leading them to seek compatible groups and threatening faultline stability. Data from 103 accountant educators with side jobs show those with high role conflicts often switch groups without considering proactive personality. However, those who factor in a proactive personality tend to stay within their faultline and find opportunities to improve performance. That climate indicates that faultlines are not permanent groups, and reciprocity is essential for sustaining group climate.

Keyword: Faultline; accountant educator; role conflict; proactive personality; performance

1. Introduction

Accountant educator usually intersects with understanding or regulations related to the accounting profession, which influences learning material. Furthermore, to understand the regulation, they wrote research-related articles. To support their interest, they build a group that fits their scheme. For example, accountant educators build a group related to accounting education. They will write research, conduct a conference, engage the community, and share updated accounting information. The groups are usually created using WhatsApp.

In Indonesia, WhatsApp is popular for connecting users. Consequently, accountant educators often form groups outside their university colleagues, creating faultlines. A faultline is a group formed based on social similarity and mutual attraction (Tian et al., 2016; Antino et al., 2019). They have some goals to increase information about accounting materials in those groups. But, they have to be careful with consensus bias. As Krueger and Clement (1995) said, consensus bias is the private projection from some onto others; accountant educators in a faultline group cannot always expect desired outcomes. If they gain nothing and their cognitive capacity decreases, the group may become silent, with no sharing of new information on regulations, teaching materials, or research. That problem occurs because members have various job roles, and sharing information is not their primary responsibility. The group is voluntary and has no obligation to share information regularly.

Unfortunately, accountant educators have various responsibilities as lecturers, auditors, consultants, etc. It indicates they have task complexity, and it raises role conflict in the faultline. Montani et al. (2020) said that role conflict arises from somebody responding to their task complexity because of out of their expectation. Furthermore, Lai et al. (2021) said that someone with a role conflict

would do two alternatives. First, they are still in the group and try to find a new opportunity to increase their performance (Bendersky & Hays, 2012; Antino et al., 2019), and second, they switch to another faultline. That response depends on their proactive personality. A proactive personality is how people face the situation change with stability (Lam et al., 2018; Alikaj et al., 2021; Lai et al., 2021). This research will show that accountant educators who will increase their performance should know with their member proactive personality. It looks simple, but we do not need to waste time finding a steady group.

This research provides novelties as follows. First, studies from Antino et al. (2019), Van Peteghem et al. (2018), Bezrukova et al. (2016), and Tian et al. (2016) show a proactive personality as a moderating variable. This research introduces proactive personality as a bridge from role conflict to the intention of accountant educators to switch to another faultline or find the opportunity to increase their performance. Second, Antino et al. (2019) and (Tian et al., 2016) studies discuss faultline rise in conflict organizations. That research indicates that faultlines will occur in adverse situations. This research refers to the study by Tian et al. (2016) and Raskovic (2021), who found that faultline represents social identity theory. It posits that people will be interested in building a faultline based on social similarity. Third, this research does not find the faultline caught from experiment treatment as Tian et al. (2016) and Van Peteghem et al. (2018) research. It found group members who had faultlines and gave them questionary. The point is that this research directly measures members in faultline groups.

This research uses two theories. Social Identity Theory (SIT) was discussed by Ashforth and Mael (1989), and reciprocity was referred to by Falk and Fischbacher (2006). These theories explain faultline member groups when they were facing role conflict. Somebody who feels benefits from the group will endure. It indicates that the group's climate is their expectation. Otherwise, they will intend to switch when they don't get as expected.

This result shows that the activation of a proactive personality decreases for accountant educators with high role conflicts. Based on that situation, accountant educators with role conflicts try to find opportunities to increase their performance. It describes that accountant educators with job complexity don't have much time to do something out of their responsibility.

2. Research Literature and Hypothesis Development

2.1 Social Identity theory (SIT) and reciprocity on the faultline side

Social Identity Theory (SIT) is a perception of some group. People tend to make a social self-classification and establish social categories such as organization, religious affiliation, gender, and age. Ashforth and Mael (1989) mention that SIT has two functions. First, social classification shapes the social environment and helps define others, though these classifications may not be reliable. Second, social classification enables self-identification within a social environment, with social identity being an aggregate of perceptions within the group.

SIT showed us that a social group is created from a person's cognitive perception of social classification. Further, social groups usually interact more with each other. That interaction creates reciprocity among group members. Falk and Fischbacher (2006) explain that reciprocity is a response to kindness or unkindness perception, which consists of fairness distribution and intention to impartiality. That argumentation means that the occurrence of a faultline arises from social perception and response to fairness distribution. This statement confirms Tian et al. (2016) that people create a group based on their cognitive perception of themselves. The mental perception leads them to build a social group based on their social classification. This statement shows that the cognitive perception of the social category describes the faultline that the accountant educator establishes. Furthermore, fair interaction in that social group makes it more attractive.

2.2 Occurrences of faultline based on role conflict

According to Undang-Undang Guru dan Dosen No. 15 of 2005, accountant educators have three responsibilities: education, research, and community engagement, to be fulfilled each semester. However, balancing these tasks is challenging for those with additional jobs. They struggle to prioritize their roles as lecturers and practitioners, leading them to seek communities with similar social categories for solutions. As Tian et al. (2016) research and definition of SIT, accountant educators form a faultline based on their social category as an accountant educator, practitioner, or both. They expect group members to share updated information, which they need reciprocally. This information helps members gain knowledge and quickly fulfill their responsibilities.

2.3 Proactive Personality as Role Conflict Controller

Everyone has a personality that guides them through changes. This research focuses on proactive personality, which is linked to emotional stability. Emotional stability is developed through long-term education, making individuals more polite. A proactive personality helps someone face changing environments with stable emotions. Seibert et al. (1999), Onyemah (2008), and Sumiyana and Sriwidharmanely (2020) said that a person who has a proactive personality can find opportunities in their conflict and act based on their initiative and impact on their environment.

Accountant educators with role conflict try to manage their roles to fulfil all task responsibilities. They find the social community to help them find the best solution (Onyemah, 2008; Sumiyana & Sriwidharmanely, 2020). Unfortunately, many accountant educators struggle to fulfill their primary job duties, some merely participating in groups without providing feedback. Additionally, they may switch groups without receiving feedback, solving problems based on their personalities. A proactive personality helps them seek optimal solutions when their expectations are not met.

2.4 Role Conflict Inducing Intention to Switch

Accountant educators attempt to fulfil their tasks by establishing faultlines based on their social category as accountants. Moreover, accountant educators usually have many job responsibilities (Duff et al., 2023) and cannot balance their responsibilities. Role conflict describes somebody feeling confused about their role (Rizzo et al., 1970; Onyemah, 2008; Park & Nam, 2020; Maden-Eyiusta, 2021). Because of that condition, they can't share updated information in groups or get feedback. On the other side, they get pressed to fulfil the task. Based on the research of Liang et al. (2013) and Lai et al. (2021), when somebody is not comfortable with group attendance, they will have the intention to switch. Intending to switch groups means accountant educators will propose their reasons for leaving the current group. Based on that argumentation, the hypothesis in this research is:

H1a: Accountant educators who have role conflict have a positive impact on their intention to switch

Everybody has a personality that guides them to make some intention or decision to do something. Lai et al. (2021) said that group members decide to exchange group is driven by proactive personalities. Accountant educators who have role conflicts attempt to find the best solution. When they don't get their expectation, a proactive personality does not cause them to do some damage but drives them to switch groups as the best solution. Based on that argumentation, the hypothesis in this research is:

H1b: Accountant educators who have role conflict have a positive impact on proactive personality
H1c: Accountant educators who have role conflicts positively impact their intention to switch to a proactive personality, such as meditating.

2.4 Role Conflict Inducing Performance Level

Accountant educators with role conflicts try to find an opportunity to improve their performance. Because of that situation, they form a faultline based on their social perception as an accountant educator. Urhahne and Wijnia (2023) said that motivation to increase performance rises when they have a stimulus to drive it. Including role conflict situations as a stimulus to encourage them to perform well and improve their performance. Based on that argumentation, the hypothesis of this research is:

H2a: Accountant educators who have role conflict have a positive impact on performance

Moreover, personality is one tool that guides a person in finding a solution to their problem. Even though accountant educators have role conflict, they must increase their performance. A proactive personality guides them to face climate exchange with stable emotions, and they can find the best solution (Lam et al., 2018; Alikaj et al., 2021; Lai et al., 2021). Research shows that a proactive personality guides accountant educators to face role conflict with stable emotion and change it into an opportunity. An opportunity is a way to raise the performance level. Based on that argumentation, the hypothesis of this research is:

H2b: Accountant educators with role conflict impact performance and proactive personality as a mediating.

3. Research Methodology

3.1 Population, Research Sample, and Data Collection

The research focuses on accountant educators with multifaceted roles both within and outside academia. Adjunct lecturers were not included as research samples. Data collection involved sending questionnaires via a Google form, preceded by seeking participants' consent. It took approximately two weeks to collect responses. Warp-PLS was employed for data processing.
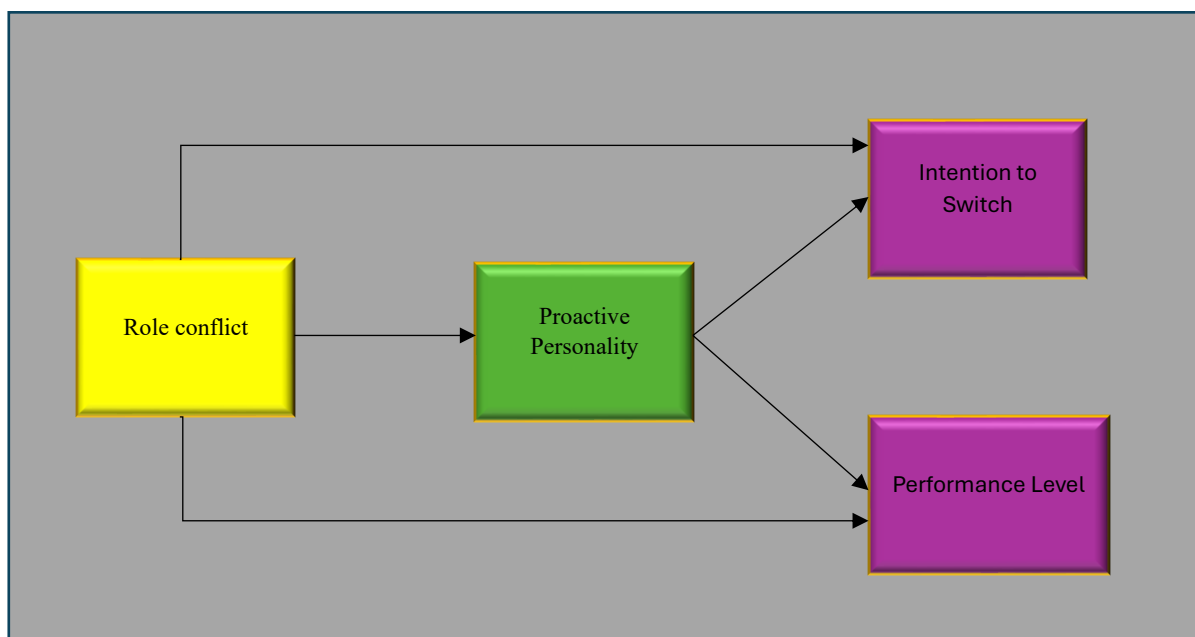
Figure 1. Research Model and Relationship among Variable

3.2 Operational Definition and Variable Measurement
This study uses two dependent variables (intention to switch and performance level), one independent variable (role conflict), and one intervening variable (proactive personality). That variable was measured with a Likert scale in a questionnaire. The variables are as follows.

Role conflict arises from the perceived confusion between a lecturer's and a practitioner's complex responsibilities. Accountant educators believe they must simultaneously fulfill all tasks to maintain performance, leading to uncertainty in task prioritization. This research utilizes the instrument of Rizzo et al. (1970) to measure this variable.

A proactive personality refers to the stabilization of emotions when facing environmental exchange. Accountant educators with complex tasks don't do damage because they feel frustrated. They attempt to discover the best opportunity to solve the problem. This research refers to Crant (1995) instrument to measure this variable.

The intention to switch reflects a perception of inconvenience. Faultline group members, being volunteers, are not obligated to share new information constantly. An accountant educator in this group seeks opportunities to enhance performance and will, therefore, join a new group to achieve this goal. This variable refers to the research of Bhattacherjee et al. (2012), which measures the intention to switch.

Performance level denotes the outcome of an accountant educator's efforts to sustain and enhance their performance. Opportunities for improvement arise from job complexities and information exchange within the group, which are utilized to maintain and elevate performance. This variable measurement refers to Long et al. (2015) and is adapted to this study.

4. Result and Discussion

4.1 Result of Participant Demography
This study collected data via a questionnaire completed by 103 accountant educators. Respondents required at least one year of experience as both a lecturer and a practitioner. The data indicate that the majority of those with dual roles are aged 25-35, while the fewest are over 50. Younger lecturers often pursue multiple side jobs to gain experience.

Young lecturers (25-35) gain significant practical knowledge, enriching academic material with real-world industry insights. They primarily focus on theoretical research rather than practical applications. Lecturers over 50, nearing retirement, typically limit themselves to one professional role. Those aged 35-40 are more established in their careers, sharing experiences and knowledge with peers. Mature social groups benefit from their feedback, comparing practical insights with theoretical frameworks.

4.2 Result of Research Instrument
This research uses validity and reliability to test instrument robustness. Convergent validity is used to test constructs in sequence. It must have a factor loading above 0.70 and a p-value of <0.05. Moreover, validity discriminant refers to a test construct in order not to correlate to another construct. Fulfill validity discriminant is described from the AVE value. The result is shown in Tables 1 and 2 below.

Table 1. Convergent Validity of Instrument

Construct	Loading Factor	P *value*
RC2	0.738	<0.001
RC3	0.822	<0.001
RC4	0.741	<0.001
TC1	0.716	<0.001
TC2	0.696	<0.001
TC4	0.769	<0.001
TT3	0.699	<0.001
TT4	0.679	<0.001
TT5	0.783	<0.001
TT6	0.676	<0.001
TT7	0.756	<0.001
PR1	0.728	<0.001
PR2	0.831	<0.001
PR3	0.729	<0.001
PR4	0.654	<0.001
SI1	0.819	<0.001
SI2	0.815	<0.001
SI3	0.761	<0.001
SI4	0.662	<0.001
SI5	0.689	<0.001

The result described that constructs are not mutually correlated, and reliability's value indicates that the instrument can be used for recurring measurement. Moreover, this result shows that it can continue to test the research model.

Table 2. Discriminant Validity and Reliability of Instrument

	Composite reliability	Cronbach Alpha	Role Conflict	Proaktive Personality	Intention to Switch	Performance Rating
Role Conflict	0.812	0.652	(0.768)	-0.055	0.712	0.038
Proaktive Personality	0.897	0.869	-0.055	(0.0723)	0.102	0.678
Intention to Switch	0.866	0.805	0.712	0.102	(0.752)	0.070
Performance Rating	0.826	0.718	0.038	0.678	0.070	(0.738)

4.3 Result of Research Model and Hypothesis

Path analysis reveals that the R-squared value for the role conflict to intention to switch model is 0.52, indicating that 52% of the variance is explained by this model, with the remainder attributed to external variables. The correlation between role conflict and performance level is 0.50, showing a 50% model fit, with the rest explained by external factors. The significant correlation between role conflict and proactive personality ($p < 0.01$) supports H1a and H1b. However, the relationship between proactive personality and intention to switch is not significant ($p = 0.11$), indicating that proactive personality does not mediate between role conflict and intention to switch, thus not supporting H1c. Lastly, the correlation between role conflict and performance level is insignificant ($p = 0.46$), not

supporting H2a. The significant p-value (< 0.01) for the relation between role conflict and proactive personality supports H2b, indicating that proactive personality mediates this relationship.

Table 3. Result of Hypothesis Test

Correlation	R-Square	Path Coefficient	P-Value	Result
Role Conflict to Intention to Switch	0.52	0.71	<0.01***	Support
Role Conflict to Proactive Personality	0.10	-0.37	<0.01***	Not support
Proactive Personality to Intention to Switch	0.52	0.12	0.10	Not support
Role Conflict to Performance Level	0.50	0.46	<0.01***	Support
Proactive Personality to Performance Level	0.50	0.70	<0.01***	Support

Sig Level: *)0.10; **)0.05; ***)0.01

4.4 Discussion of Correlation Between Variables

The results indicate that a proactive personality helps accountant educators remain in a group despite task confusion. Those experiencing higher role conflict do not rely on their proactive personality and tend to switch groups without consideration. While a proactive personality typically stabilizes emotions during environmental changes, it is not utilized by accountant educators with high role conflict in their decision-making.

A proactive personality helps individuals decide to stay in a group by providing emotional stability to find opportunities in unpredictable situations, particularly for accountant educators with role conflict. These educators, confused by their responsibilities and needing to maintain performance, often seek out social communities and form faultline groups. Since these groups are voluntary, there is no obligation to give feedback or share knowledge, leading to inactivity. However, using a proactive personality helps them maintain performance without intending to switch groups. This proactive approach drives them to discover opportunities within the group, enhancing their performance.
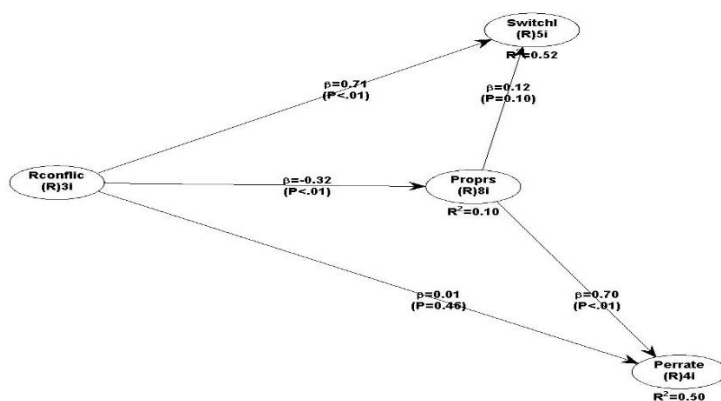
Figure 2. Result of Research Model and Relationship Between Variables

This research confirms to SIT in Ashforth and Mael (1989) that faultline members consist of people with the same social category. When they feel the group climate has changed, it makes them intend to find a new community. Moreover, reciprocity, as stated by Falk and Fischbacher (2006), means that people want to give their response in accordance with what they get. Accountant educators in faultline groups share knowledge and receive feedback from peers. This research shows that those with high role

conflict struggle to adapt to the group climate and seek new groups. In contrast, those with proactive personalities are more likely to stay in groups and explore opportunities to enhance their performance.

5. Conclusion

Many types of research about faultlines are to be done (Lau & Murnighan, 2005; Jehn & Bezrukova, 2010; Bezrukova et al., 2012; Cooper et al., 2014; Ren et al., 2015; Bezrukova et al., 2016; Antino et al., 2019), and only discuss how faultline is composed. They don't discuss member movements in voluntary groups, as faultlines form based on the social category of accountant educators without official requirements. Consequently, faultline groups are temporary, allowing members to join and leave at will. This research introduces the proactive personality from Onyemah (2008), (Lam et al., 2018), Sumiyana and Sriwidharmanely (2020), and Alikaj et al. (2021) as a mediator among accountant educators with role conflict to compose their problem-solving on their role conflict. The expectation of a proactive personality can guide accountant educators with role conflict to maintain and increase their performance.

This research investigates how group members experiencing role conflict and ambiguity maintain their presence and performance within the group. The findings indicate that accounting educators with high role conflict do not involve proactive personalities—conversely, those striving to enhance their performance leverage proactive traits to identify opportunities within the group.

This research contributes to clarifying the theory that proactive personalities guide individuals' emotions during environmental exchanges. Confirm with the reciprocity concept, individuals are motivated to exchange based on received benefits. Knowledge sharing ceases without feedback from group members. Practically, this research illustrates how proactive personalities stabilize decision-making in unpredictable job climates.

This research is limited by its lack of specificity regarding the distribution of high and low role conflict. Future studies should explicitly differentiate between high and low levels of role conflict. Moreover, it it desirable to consider a proactive personality, to be more exact, as Onyemah (2008) research found, in order to find which type of proactive personality really guides someone to increase their performance.

References

[1] Alikaj, A., Ning, W., & Wu, B. (2021). Proactive personality and creative behavior: examining the role of thriving at work and high-involvement HR practices. *Journal of Business and Psychology*, *36*(5), 857-869. https://doi.org/0.1007/s10869-020-09704-5

[2] Antino, M., Rico, R., & Thatcher, S. M. (2019). Structuring reality through the faultlines lens: The effects of structure, fairness, and status conflict on the activated faultlines–performance relationship. *Academy of Management Journal*, *62*(5), 1444-1470. https://doi.org/10.5465/amj.2017.0054

[3] Ashforth, B. E., & Mael, F. (1989). Social identity theory and the organization. *Academy of Management Review*, *14*(1), 20-39. https://doi.org/10.5465/amr.1989.4278999

[4] Bezrukova, K., Spell, C. S., Caldwell, D., & Burger, J. M. (2016). A multilevel perspective on faultlines: Differentiating the effects between group-and organizational-level faultlines. *Journal of applied psychology*, *101*(1), 86. https://doi.org/10.1037/apl0000039

[5] Bezrukova, K., Thatcher, S., Jehn, K. A., & Spell, C. S. (2012). The effects of alignments: Examining group faultlines, organizational cultures, and performance. *Journal of applied psychology*, *97*(1), 77. https://doi.org/10.1037/a0023684

[6] Cooper, D., Patel, P. C., & Thatcher, S. M. (2014). It depends: Environmental context and the effects of faultlines on top management team performance. *Organization Science*, *25*(2), 633-652. https://doi.org/10.1287/orsc.2013.0855

[7] Crant, J. M. (1995). The proactive personality scale and objective job performance among real estate agents. *Journal of applied psychology*, *80*(4), 532. https://doi.org/10.1037/0021-9010.80.4.532

[8] Falk, A., & Fischbacher, U. (2006). A theory of reciprocity. *Games and economic behavior*, *54*(2), 293-315. https://doi.org/10.1016/j.geb.2005.03.001

[9] Jehn, K. A., & Bezrukova, K. (2010). The faultline activation process and the effects of activated faultlines on coalition formation, conflict, and group outcomes. *Organizational behavior and human decision processes*, *112*(1), 24-42. https://doi.org/10.1016/j.obhdp.2009.11.008

[10] Lai, F.-Y., Lin, C.-C., Lu, S.-C., & Chen, H.-L. (2021). The Role of Team–Member Exchange in Proactive Personality and Employees' Proactive Behaviors: The Moderating Effect of Transformational Leadership. *Journal of Leadership & Organizational Studies*, 15480518211034847. https://doi.org/10.1177/15480518211034847

[11] Lam, W., Lee, C., Taylor, M. S., & Zhao, H. H. (2018). Does proactive personality matter in leadership transitions? Effects of proactive personality on new leader identification and responses to new leaders and their change agendas. *Academy of Management Journal*, *61*(1), 245-263. https://doi.org/10.5465/amj.2014.0503

[12] Lau, D. C., & Murnighan, J. K. (2005). Interactions within groups and subgroups: The effects of demographic faultlines. *Academy of Management Journal*, *48*(4), 645-659. https://doi.org/10.5465/amj.2005.17843943

[13] Long, J. H., Mertins, L., & Vansant, B. (2015). The Effects of Firm-Provided Measure Weightings on Evaluators' Incorporation of Non-Contractible Information. *Journal of Management Accounting Research*, *27*(1), 47-62. https://doi.org/10.2308/jmar-50837

[14] Maden-Eyiusta, C. (2021). Role conflict, role ambiguity, and proactive behaviors: does flexible role orientation moderate the mediating impact of engagement? *The International Journal of Human Resource Management*, *32*(13), 2829-2855.

[15] Montani, F., Setti, I., Sommovigo, V., Courcy, F., & Giorgi, G. (2020). Who responds creatively to role conflict? Evidence for a curvilinear relationship mediated by cognitive adjustment at work and moderated by mindfulness. *Journal of Business and Psychology*, *35*(5), 621-641. https://doi.org/10.1007/s10869-019-09644-9

[16] Onyemah, V. (2008). Role Ambiguity, Role Conflict, and Performance: Empirical Evidence of an Inverted-U Relationship. *Journal of Personal Selling & Sales Management*, *28*(3), 299-313. https://doi.org/10.2753/PSS0885-3134280306

[17] Park, H. I., & Nam, S. K. (2020). From role conflict to job burnout: A mediation model moderated by mindfulness. *The Career Development Quarterly*, *68*(2), 129-144. https://doi.org/10.1002/cdq.12218

[18] Ren, H., Gray, B., & Harrison, D. A. (2015). Triggering faultline effects in teams: The importance of bridging friendship ties and breaching animosity ties. *Organization Science*, *26*(2), 390-404. https://doi.org/10.1287/orsc.2014.0944

[19] Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative science quarterly*, 150-163. https://doi.org/10.2307/2391486

[20] Seibert, S. E., Crant, J. M., & Kraimer, M. L. (1999). Proactive personality and career success. *Journal of applied psychology*, *84*(3), 416. https://doi.org/10.1037/0021-9010.84.3.416

[21] Sumiyana, S., & Sriwidharmanely, S. (2020). Mitigating the harmful effects of technostress: inducing chaos theory in an experimental setting. *Behaviour & Information Technology*, *39*(10), 1079-1093. https://doi.org/10.1080/0144929X.2019.1641229

[22] Tian, Y., Tuttle, B. M., & Xu, Y. (2016). Using incentives to overcome the negative effects of faultline conflict on individual effort. *Behavioral Research in Accounting*, *28*(1), 67-81. https://doi.org/10.2308/bria-51147

[23] Urhahne, D., & Wijnia, L. (2023). Theories of motivation in education: An integrative framework. *Educational Psychology Review*, *35*(2), 45.

[24] Van Peteghem, M., Bruynseels, L., & Gaeremynck, A. (2018). Beyond diversity: A tale of faultlines and frictions in the board of directors. *The Accounting Review*, *93*(2), 339-367. https://doi.org/10.2308/accr-51818

School Partner Involvement in Work Transition Programs for Students with Mild Intellectual Disabilities: A Case Study of Collaboration with Farming Industries

Salsabila Tulus Rinindra[1*] and Atien Nur Chamidah[1]

[1] Special Education Study Program, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

[*]E-mail: salsabilatulus.2020@student.uny.ac.id, atien@uny.ac.id

Abstract. This study details how school partners are involved in transition programs that get individuals with minor intellectual disabilities ready for the workforce. Case studies are employed in this qualitative study. Two cattle businesses that have partnered with the school and career skill guidance teachers are the study's subjects. Interviewing and documenting methods were used to gather data. Three types of data analysis are used: reduction, display, and conclusion drawing. According to the study's findings, the cattle industry is involved in the transition program's implementation through conversations, cooperation, the supply of practice materials and equipment, specialized training, and discussion. The participation of educational partners in the transition program's execution is an example of how building an extensive and cooperative community resource network to support the needs of kids with intellectual disabilities is being achieved.

Keywords: Collaboration, Transition Program, Student with Intellectual Disabilities.

1. Introduction

Transition is a time of frequent change that everyone experiences in life, even special needs children. The process of changing behavior status, mainly from being a student to assuming adult roles in society, is known as the post-school transition phase (Halpern, 1994 dalam Shogren & Wehmeyer, 2020). Transitions must be implemented based on each person's requirements, taking into account their interests, skills, and talents, and encouraging cooperation among stakeholders. Students with intellectual disabilities are encouraged to prepare for independent living, the workforce, social skills, and self-confidence through transition services.

Transition are a frequent part of life, according to Sugini et al., (2022), but they can be challenging for kids with special needs. There are two key periods of transition. The first shift happens when a person leaves the school shelter and enters early intervention programs. The second transition involves moving from childhood to adulthood and entails significant life changes for both the individual and their family. Enhancing post-school performance is the goal of transition program implementation (Azizah et al., 2017). This accomplishment include social skills development, career success, independence, and equitable access to a range of community programs.

There are eight types of children with exceptional needs, and children with intellectual disabilities, or intellectually challenged children, is one of them (Kristiana, 2021). Three traits are indicative of children with intellectual disabilities: lower-than-average IQs, deficiencies in adaptive behavior manifested in conceptual, social, and practical adaptive behavior skills (Schalock et al., 2021). Furthermore, before the child turns 22 years old, these deficiencies in adaptive behavior usually become

apparent. Mild intellectual disability is one of three categories into which intellectual disabilities can be divided. Functional motor skill deficiencies are a common feature of children with minor intellectual disabilities, impeding everyday tasks, social interactions, and vocational capabilities (Pratiwi et al., 2019). These restrictions make it more difficult for students with intellectual disabilities to become independent workers. As a result, more assistance is required, such as that provided by transition program services.

Kohler et al., (2016) state that a taxonomy of transition programming comprising five categories student-focused planning, student development, parent involvement, stakeholder collaboration (inter-agency), and structured programming can be incorporated to create effective transition practices. According to Williams-Diehm et al., (2018), transition programs should start to be implemented as soon as kids turn 14 years old. The school curriculum includes an organized transition program. Before the transition program is implemented, various components such as assessment documents, Individualized Education Programs (IEP), suggestions for occupational skills, and others linked to the program's execution must be ready. To fulfill the objectives of a successful transition program, this is essential.

All special schools All special schools do not, however, actually have the procedures in place to facilitate the execution of transition plans. The school uses a transition program, according to information obtained from an interview with the vice principal in charge of curriculum. The curriculum of the school includes the transition program, however it's unclear if it's an extracurricular or intramural activity. By the time students complete their final two years of schooling, they can enroll in the transition program. In light of the fact that (Williams-Diehm et al., 2018) state that the transition program ought to begin at the age of 14, this school's execution of the program is either out of date or not starting at the appropriate time. Assessment findings, IEPs, and suggestions for vocational skills all of which are necessary for the transition program's implementation are not readily available. The results of assessments are derived exclusively from student observations as they adjust to the new semester's curriculum. In actuality, nevertheless, the transition program is successfully implemented by children with intellectual disabilities.

According to teacher interviews about the transition program, students with intellectual disabilities who participate in vocational skills activities show that they are successful in the implementation of the program. Vocational skills training, particularly in animal farming, is incorporated with the transition program. Students with modest intellectual disabilities were found to be capable of managing and producing chicken on their own during the implementation. This suggests that children with intellectual disabilities have good employment potential attributed to the occupational skills training in livestock farming provided by the transition program.

The school works with the livestock business through collaborations in chicken farming and alumni internship programs, according to interviews with the guidance instructor on livestock farming. By working together, the school is able to best utilize the vocational capabilities of students with intellectual disabilities, giving them the best opportunity to build communication and responsibility skills. As a result, the implementation of the transition program may be influenced by the presence of optimal occupational skills. This shows how partners have been involved in SLB Bhakti Pertiwi's transition program implementation.

An interesting area for investigation is the cooperation between the school and the livestock business in carrying out the transition program for students with modest intellectual disability. As a result, it is crucial to explain how partners are involved in the transition program's implementation for children with modest intellectual disabilities in this study.

2. Method

The study This study employs a case study methodology and is qualitative in essence. The method and meaning are prioritized in qualitative research, and theoretical frameworks are employed as guidelines to guarantee congruence with field data (Pahleviannur et al., 2022). According to John W. Creswell (in Assyakurrohim et al., 2022), the case study method is a methodology that expresses an issue with precise boundaries, involves extensive data collection, and incorporates a variety of information sources. The purpose of this study is to describe in detail and depth the engagement of business and industrial partners in the execution of transition programs that prepare students with minor intellectual disabilities for the workforce. For this reason, this type and technique of research were chosen.

The study's respondents are two livestock industries that were chosen based on the following factors: willingness to participate as research respondents; cooperation between the industries and the school regarding vocational skills; and availability of internship opportunities for alumni. Additionally, SLB Bhakti Pertiwi instructors and their readiness to contribute research data were taken into consideration when choosing vocational skills guidance teachers in the field of cattle husbandry.

In order to acquire data for this study, interviews and documentation are used. These are in-depth interviews that have been performed. Data on the partnerships is gathered in order to complete the documentation. The Miles and Huberman paradigm, which comprises of data reduction, data display, and conclusion drawing, is followed in the data analysis used in this work.

3. Result and Discussion

The researcher's findings provide an explanation for the various forms of partner engagement, such as conversations, cooperation, addressing practical requirements, and collaborative decision-making. The results and conversation are presented as follows:

The operational curriculum documents reveal that SLB Bhakti Pertiwi works with a number of industries, such as the agriculture department's Toko Kelontong Bu Minah, the livestock department's PT Barokah Mitra Wijaya, the laundry department's Jiha Laundry, and the department of batik Marenggo's Pak Heri's farm for the internship program. But for the time being, Mr. Heri's farm and PT Barokah Mitra Wijaya are the partners in the ongoing cooperation.

In the area of livestock farming, both partners work together: Pak Heri's farm acts as an internship and learning site, while PT Barokah Mitra Wijaya (PT BMW) works together in the chicken farming industry. With the exception of personnel and space, PT BMW serves as a supplier for poultry maintenance needs. These necessities include a variety of planned service programs, poultry feed, water, vitamins, vaccinations, and vaccinations. This is consistent with the assertion that follows:

> "We, PT BMW, collaborate with breeders. Cooperation in terms of chicken cultivation follows a profit-sharing system: profit for profit and loss for loss. So with this profit-sharing cooperation system, there are several things that must be understood by all of us, the parties involved in this cooperation: first, the seeds; second, chicken feed; third, vaccines, medicines, and vitamins in SLB's coop are our responsibility. The chicken seeds are ours, which we send to the SLB coop to be taken care of by SLB. We send chicken feed to SLB for chicken feeding. We also have health programs, vaccination programs, and programs like antibiotics and multivitamins, for which we have created guidelines for them". (M1, interview February 29, 2024)

Internships and educational opportunities are offered at Mr. Heri's animal farm. In an attempt to give students with intellectual disabilities the chance to hone their poultry farming skills in preparation for the job, the school and the organization are collaborating. The following assertion corroborates this:

> "My own farm collaborates with the school to provide student internships and also for learning. For example, during this session, we will learn about administering vaccines. If it turns out that it's the time for vaccines in my farm, I will bring the students to my farm.

There, we will explain how to administer the vaccine and how to complete the vaccination process. So the collaboration is in terms of internships and as a place of learning, so that the students better understand how to raise chickens when they work later." (M2, interview March 12, 2024)

The provision of specialized training and conversations between partners and the school are other indications of partners' involvement in the transition program. In actuality, though, neither couple performs any specialized training. This is due to the fact that students with intellectual disabilities are regarded as skilled and autonomous in the poultry farming industry because they already possess strong work skills. The assertion that follows corroborates this:

"We don't have any particular and special training." (M1, interview February 29, 2024)

The above statement is confirmed by the following statement:

"No special training, because Hendi can already understand how to feed at that time, give water at that time, so there is no special training, as there is enough time at school." (M2, interview March 12, 2024)

Regarding the talks that M1 has, they take place by accident when issues arise during the poultry rearing procedure. Unfortunately, M2 and the school have not yet had any conversations. The following assertions align with this:

"On the way, if there are issues with sick chickens or anything, then there will be communication between us to find a solution. So, there is still intensive communication, meaning there was intense assistance at the beginning of keeping them. But for now, there is no such thing. But in the beginning, it was like that. So in the past, every time there was a case, I handled it myself. For now, I don't have the ability. Pak Heri himself already has independence and he has been running on his own. I see, at this time it's just incidental." (M1, interview February 29, 2024)

"There aren't any at the moment." (M2, interview March 12, 2024)

The partners provide for the needs of the livestock during the chicken raising process. Since this fulfillment is all-inclusive, the partners will take care of the livestock's requirements to the best of their abilities. This is consistent with the assertion that follows:

"In principle, in accordance with the company's values, we provide comprehensive support based on our capabilities. Whatever is needed in the coop, we help. After the chickens are harvested, before introducing new seeds, there is a cage sterilization process that needs to be done. Many coops don't have the ability to do that, so our team handles it. We clean the coop of dirt, then our team comes to the SLB coop and sterilizes it, and it's free of charge." (M1, interview February 29, 2024)

Teachers' commitment to enable students with intellectual disabilities to prepare for the workforce after graduation led to the formation of the partnership between the school and its partners. Furthermore, the choice to work together was predicated on the students' potential and future employment opportunities. This is consistent with the assertion that follows:

"Initially, I had my own farm, and then we collaborated with BMW. BMW already had facilities for seeds, feed, vaccines, medicine, etc., so I thought there was potential to teach chicken farming to these children, and I took the initiative to develop their chicken farming skills. Until now, I still collaborate with BMW." (G3, interview February 19, 2024)

Tabel 1. Research Findings

Aspect	Data
Cooperation	a. Chicken farming b. Intership site
Specialized Training	a. No specific training is provided b. Students with intellectual disabilities already possess work skills
Discussion	Incidental
Collaboration Decision-Making	Teacher initiative

Stakeholder participation in the transition program's implementation is one of the programming taxonomies that has been applied in SLB Bhakti Pertiwi. According to Kohler et al. (1996), referenced in Shogren & Wehmeyer, (2020), schools must prepare a number of elements to ease the transition process from education to the workforce. These elements include work experience, social skills development, parental involvement, vocational or occupational skills training, and individual transition planning. The accomplishment of the transition goal—to get students with intellectual impairments ready for the workforce is implied by partners' participation in the program's implementation.

The school works with the livestock industries to provide the best possible execution of the transition program based on the study findings. This cooperation is done through collaborations with the farms of Pak Heri and PT. Barokah Mitra Wijaya. The school works in partnership with the livestock industries to develop innovative post-school programs that are all-inclusive and can give the school an advantage in empowering children with intellectual disabilities in the community.

Studies by Rojaki et al., (2021), which highlight the necessity of the Business and Industrial sectors' involvement in helping to meet the demands of students in terms of education, employment, and independent living, provide additional support to the research findings. Furthermore, Aprilia et al.'s research from 2019 indicates that in order to implement transition programs and show measurable improvements in the academic performance of students with intellectual disabilities, partners must be included.

This is demonstrated by the fact that PT. Barokah Mitra Wijaya serves the needs of the coop and that Pak Heri's farm completes internship programs that help students become ready for the workforce in order to fulfill job criteria and prepare for independent living. By working together with the livestock sector, it is possible to realize the transition program's aim of preparing students for independence in the profession and to obtain measurable outcomes from the performance of students with intellectual disabilities. Students are therefore aware of the steps required to make a respectable living.

4. Conclusion

The research findings support the conclusion that involving partners or stakeholders in the transition program's implementation is a way to put one of the transition programming taxonomies into practice. For PT. Barokah Mitra Wijaya, partner involvement takes the shape of cooperative poultry farming, while for Pak Heri's farm, it takes the form of internship and educational possibilities. Partners don't offer any special training to students with intellectual disabilities throughout the transition program implementation because they already have strong work capabilities. When problems emerge, the school and partners have inadvertent discussions. In general, the partners fully satisfy the needs. Collaboration decisions are made by teachers on the basis of student potential and future employment opportunities.

References

[1] Aprilia, I. D., Permana, J., & Prihatin, E. (2019). *Life Skill Educational Management Based on Vocational for Students with Disabilities to be Ready for Work. 258*(Icream 2018), 134–138. https://doi.org/10.2991/icream-18.2019.28

[2] Assyakurrohim, D., Ikhram, D., Sirodj, R. A., & Afgani, M. W. (2022). Metode Studi Kasus dalam Penelitian Kualitatif. *Jurnal Pendidikan Sains Dan Komputer*, *3*(01), 1–9. https://doi.org/10.47709/jpsk.v3i01.1951

[3] Azizah, F., Ginting, H. F. B., & Utami, R. S. (2017). Evaluasi Pelaksanaan Program Layanan Bimbingan Dan. *Prosiding Seminar Bimbingan Dan Konseling*, *1*(1), 177–188. http://pasca.um.ac.id/conferences/index.php/snbk/article/view/219

[4] Ika Febrian Kristiana, C. G. W. (2021). *Buku ajar psikologi anak berkebutuhan khusus 1*. 1–110.

[5] Kohler, P. D., Gothberg, J. E., Fowler, C., & Coyle, J. (2016). *Taxonomy for Transition Programming 2.0: A Model for Planning, Organizing, and Evaluating Transition Education, Services, and Programs.* Western Michigan University.

[6] Pahleviannur, M. R., Grave, A. De, Sinthania, D., Hafrida, L., Bano, V. O., & Saputra, D. N. (2022). Metodologi Penelitian Kualitatif. In *Pradina Pustaka*.

[7] Rojaki, M., Fitria, H., Martha, A., Sama, K., Usaha, D., & Industri, D. (2021). Manajemen Kerja Sama Sekolah Menengah Kejuruan dengan Dunia Usaha dan Dunia Industri. *Jurnal Pendidikan Tambusai*, *5*(3).

[8] Schalock, R., Luckasson, R., & Tassé, M. (2021). Twenty questions and answers regarding the 12th edition of the AAIDD manual: Intellectual disability: definition, diagnosis, classification, and systems of supports. *American Association on Intellectual and Developmental Disabilities.*, *June*, 1–5.

[9] Shogren, K. A., & Wehmeyer, M. L. (2020). Handbook of Adolescent Transition Education for Youth with Disabilities. In *Handbook of Adolescent Transition Education for Youth with Disabilities*. Routledge. https://doi.org/10.4324/9780429198342

[10] Sugini, Sunardi, Martika, T., & Prakosha, D. (2022). Kesiapan sekolah luar biasa dalam memfasilitasi Post-School Transition Bagi Anak Berkebutuhan Khusus. *Journal of Special Education*, *5*(2), 67–71. https://doi.org/10.31537/speed.v5i2.638

[11] Williams-Diehm, K. L., Rowe, D. A., Johnson, M. C., & Guilmeus, J. F. (2018). Transition focused coursework: A systematic content analysis. *Career Development for Exceptional Individuals*, *41*(1). https://doi.org/https://doi.org/10.1177/2165143417742404

Strategic Planning for The Advancement of Islamic Education in Indonesia's National Education System

Anggi Puspita Sari[1]*

[1] Sharia Banking Study Programme, Faculty of Islamic Economics and Business, Raden Mas Said State Islamic University Surakarta, Surakarta, Central Java, Indonesia

*E-mail: anggipuspitasari0520@gmail.com

Abstract. Education provides humans with a purpose and a structured way of life, therefore education is directly related to human interests. Education is one of the most important things in life because it allows individuals to have a complete knowledge base. The objective in this research study is the determination of strategic planning through Islamic education management in the national education system in Indonesia. The literature study approach is used in this research a data collection methodology. The National Education System includes Islamic education as a fundamental and important component. Islamic education has the right to survive and develop in Indonesia as one of the components of the national education system in an effort to fulfil the educational needs of Muslims. Setting the direction, goals and tactics of an Islamic education institution is essential to accelerate the development of its quality, attract more students, and survival in this period of globalisation.

1. Introduction

Human problems are closely related to education because education gives human beings a purpose and a regular direction in life. Education can also be considered as a lifelong cultural process that enhances human dignity and is conducted in the context of family, community and school [i]. As such, the family, community and government have equal responsibility for education. A harmonious and integrated system must oversee education in order to achieve its goals. Humans endeavour to grow both mentally and physically through education, either by themselves or by other individuals. Self-confidence, independence of thought, speech and action can all be properly developed through education. After Indonesia was taken over by the Dutch government, a secular education system was implemented, which prioritised religion over general knowledge [ii]. However, Islamic education in pesantren did not focus on general knowledge until after Indonesia's independence, although initially it still maintained a dualistic education system. The long history of education in Indonesia has been characterised by a number of challenges and shortcomings in a number of areas, including the curriculum, objectives, resources and administration of Islamic education.

The importance of education in a nation is stated in Law No. 20/2003 Article 3 on the National Education System which contains the purpose of education so that students become human beings of faith and devotion. While the purpose of Islamic education is to guide physical and spiritual growth. Management is the most fundamental aspect of the education sector, yet it has its own problems and ways of managing. If management is successful, then education as a whole will also be successful [iii]. Historically, Islamic propagation and the expansion of Islamic education in Indonesia have a close relationship. For the best results, Islamic education management institutions need to have a well-thought-out Islamic education plan or planning [iv].

Modern civilisation develops according to a certain direction, which is closely related to the field of science and technology education [v]. However, the problem that often arises is regarding graduates, which is very evident in terms of industry demands. The standard of our nation's human resources is inadequate. There are some education experts who state that the system and administration of education delivery is a contributing factor. Planning is an important and strategic component of any action, which serves as a roadmap on how to carry out activities in the best way to fulfil the desired goals, objectives and targets [vi].

2. Research Methods

An literature study was conducted to prepare this work. The researcher used various research methods, including combination research where data was analysed using deductive and inductive methods as well as interview data. Finding patterns and deriving interpretations from combination research data may be useful. The descriptive analysis techniques used in this style of writing are qualitative and normative, with adjustments made to the original material. On the other hand, the topic of study goes further into educational planning in general and Islamic educational institutions in particular.

3. Discussions

3.1 Education, National Education and Islamic Education

Education is the deliberate direction given by teachers to the physical and spiritual growth of students with the aim of helping them build the ultimate human self [1]. According to Article 1 paragraph 2 of the 2003 National Education Law, national education is education based on Pancasila and the 1945 Constitution of the Republic of Indonesia. National education is education that is rooted in the nation's culture and responsive to the demands of the times [2]. The Preamble of the 1945 Constitution states that education should be used to educate the nation. Therefore, the purpose of education was adjusted to the needs of the Indonesian nation and included in Law No. 20/2003, which is related to the National Education System (Sisdiknas). National education is organised in accordance with Pancasila and the 1945 Constitution of the Republic of Indonesia based on religious principles, the civilisation of the Indonesian nation, and adaptability to the needs of the modern world.

Islamic education is a process that shapes a person's mentality and modifies their views and behaviour to conform to Islamic principles. Basically, Islamic education seeks to build the whole Muslim (kaffah) and realise the potential of every human being, both physically and spiritually [3]. The purpose of Islamic education is to equip the next generation with the skills necessary to uphold the ideals of Islam and to live in accordance with human nature, doing good deeds in this world and reaping blessings in the hereafter. The education system offered was quite fundamental, thus marking the beginning of the development of the pesantren system and formal education in the form of madrassas [4].

3.2 The Position of Islamic Education Within the Framework of the National Education System

According to the National Education System Law No. 20 of 2003, Chapter I on General Provisions, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control,

personality, intelligence, noble character, and spiritual strength needed by themselves, society, nation and state. On the other hand, national education as defined by the law is defined as education based on Pancasila and the 1945 Constitution of the Republic of Indonesia, which is rooted in religious values, Indonesian national culture and responsive to the demands of changing times. And the national education system consists of all elements of education that work together to achieve national education goals.

The term "Islamic education" is often related to the definition and history of the terms that make up the word "education" in relation to Islamic teachings [5]. The overall goal of Islamic education is to guide and develop human nature in order to fulfil its purpose as an obedient servant of Allah. But in reality, human beings are diverse creatures with different skill sets. The purpose of national education in Law No. 20/2003 on the National Education System is to develop the potential of students to become human beings of faith and devotion to God, noble character, physically and mentally healthy, capable, knowledgeable, creative, independent, and responsible democratic citizens.

3.3 Islamic Education Management

The right idea for the situation and purpose is what makes good management. Planning, organising, coaching, and supervising are all part of the cyclical processing process [6]. In Islamic educational institutions in particular, education management is very important. The ability to handle education well and efficiently is a necessity for Islamic education institutions. Using all available resources in accordance with its strategy is essential for the management of Islamic educational institutions to achieve optimal results. The process of creating or supervising an Islamic educational institution that incorporates Muslim human resources and motivates them to achieve the goals of Islamic education successfully and efficiently is, thus, the concept of Islamic education management [7]. Islamic education is one of the many domains that apply strategic management. Today, Islamic education is necessary as a basis for all individuals to organise their lives. Humans can find a better way through Islamic education. Strategic management of Islamic education refers to a set of procedures designed to oversee the implementation of Islamic education within an organisation.

Basically, Islamic education management refers to the methods used to effectively and efficiently conduct management to achieve the goals of Islamic education in accordance with predetermined guidelines [8]. The tasks of planning, organising, supervising and guiding Islamic education management are the same as general management. The Qur'an and Hadith serve as the sole operational basis for Islamic education. In addition, there are a number of guiding principles of Islamic education administration, including responsibility, justice, dynamism, practicality, honesty, integrity, and adaptability. The first, which is the fundamental drive to devote oneself to Allah SWT, is included in the urgent need to manage Islamic education. Second, the purpose of working and striving is only for God. Third, the Islamic education system is prospective.

3.4 Islamic Education Strategic Planning System

Islamic education is particularly important in this era of globalisation because conditions are unpredictable and rapidly changing. This is the dilemma facing Islamic education: while it must maintain the idea that there is mercy (lil-alamin), it must also adjust to new developments and ideals generated by the advent of Science and Technology (Science and Technology) [vii]. Consequently, an Islamic education development plan must define the objectives of Islamic education itself, which must then adhere to pre-established guidelines, including the use of appropriate teaching methodologies.

Islamic education must balance maintaining its unique qualities as a response to the moral and spiritual concerns facing society with not overshadowing other educational trends generated by the process of globalisation.

3.5 Creation and Achievement of Religious Education in Islam

This purpose for which God created mankind is then seen as the pinnacle of Islamic education. Islamic education is the process of utilising all the resources at one's disposal (Muslims, educational institutions or otherwise), both hardware and software. This utilisation is done through collaboration with others in an efficient, productive and effective manner to achieve world peace and prosperity and international peace. In order for Islamic educational institutions to achieve their goals, it is necessary for them to have practical leaders with strong managerial skills who can create successful learning experiences, organise, monitor and control in accordance with the teachings of the Qur'an.

4. Recomendations

In terms of the education system in Indonesia, the hope is to build a national education paradigm that is oriented towards citizens in the Islamic curriculum. With the aim of realising quality education that can produce competent and competitive citizens, the education sector is expected to receive greater attention. To ensure that its citizens are successful and able to develop throughout their lives, Indonesian education must be able to produce highly competitive individuals in the future. To achieve educational goals, all educational units and activities are integrated into the education system. Setting the direction, goals and tactics of an Islamic education institution is essential to accelerate the development of its quality, attract more students, and survival in this period of globalisation. In terms of direction, the goals of the institution are determined by the direction of national education policy, which is general and Islamic.

5. Conclusions

As Islamic principles are disappearing from society, Islamic education must be managed strategically today. Especially in the religious field, Indonesian culture is fading away due to the increasing influence of foreign cultures. Strategy formulation, strategic planning, programming and budgeting are some of the processes that make up the strategic management of Islamic education. To achieve the greatest results, the four procedures of strategic management of Islamic education must be applied carefully and thoroughly. When the progress achieved in the implementation of strategic management of Islamic education is still lacking. Several things such as undirected strategy, planning paralysis, and overemphasis on process, can affect how successful Islamic education is in strategic management. One of the reasons for all these factors that might lower the success rate is the lack of careful preparation and effective teamwork among team members. In order for Islamic education management to be successfully implemented in real life, it is necessary to build a careful plan at every step.

The National Education System includes Islamic education as a fundamental and important component. Islamic education has the right to survive and thrive in Indonesia as one of the components of the national education system in an effort to fulfil the educational needs of Muslims. Islamic educational institutions are well positioned to grow with the help and focus of the government. Therefore, the state has the responsibility to foster and preserve the Islamic education system, which has a special place in the national education system as one of the forms of religious teaching in the formal, informal, and non-formal education systems.

References

[1] Achadi, Muh. Wasith. "PENDIDIKAN ISLAM DALAM SISTEM PENDIDIKAN NASIONAL." *Jurnal Al Ghazali* 1, no. 4 (2018): 152–167. https://www.jstor.org/stable/40971965 REFERENCES.

[2] Alamsyah, Muhammad, and Kemas Rosadi Imron. "BERPIKIR KESISTEMAN: KONSEPSI AL-QURAN DAN HADIS DALAM MENINGKATKAN MUTU PENDIDIKAN ISLAM Muhammad." *Jurnal Pendidikan Islam* 5, no. 2 (2018): 133–141.

[3] Arif Musthofa, M., and Hapzi Ali. "Faktor Yang Mempengaruhi Berpikir Kritis Dalam Pendidikan Islam Di Indonesia: Kesisteman, Tradisi, Budaya." *Jurnal Ilmu Manajemen Terapan* 3, no. 1 (2021): 1–19.

[4] Choir, Abu. "Urgensi Manajemen Pendidikan Dalam Pengembangan Lembaga Pendidikan Islam." *J-MPI (Jurnal Manajemen Pendidikan Islam)* 1, no. 1 (2016).

[5] Dkk, Iqbaltullah. "Meninjau Manajemen Pendidikan Islam Secara Deskriptif." *Jurnal Pendidikan Indonesia (Japendi)* 2, no. 8 (2021): 1355.

[6] Fahrurazi, Fahrurazi, and Kemas Imron Rosadi. "Faktor Yang Mempengaruhi Model Sistem Pendidikan Islam: Jenis Kesisteman, Konstruksi Kesisteman, Berpikir Kesisteman." *Jurnal Manajemen Pendidikan Dan Ilmu Sosial* 2, no. 1 (2020): 18–30.

[7] Fauziah, Ratna, and Siti Masyithoh. "Pendidikan Islam Dalam Sistem Pendidikan Nasional." *Tadzkirah:Jurnal Pendidikan Dasar* 6 (2023): 37–49.

[8] Jauhari, Irfan. "Sistem Informasi Manajemen Pendidikan Islam." *Tarbawi Ngabar: Jurnal of Education* 2, no. 2 (2021): 190–208.

[9] Manik, M. Adlin. "Tantangan Manajemen Pendidikan Islam Dalam Menghadapi Era Globalisasi." *Jurnal Ihya' Al 'Arabiyah* 2, no. 1 (2016): 61.

[10] Munawar, Indra. "Pendidikan Islam Dalam Konteks Sistem Pendidikan Nasional." *Waratsah: Jurnal Ilmu-ilmu Keislaman dan ...* (2015). http://www.waratsah.com/index.php/waratsah/article/download/11/10.

[11] Na'im, Zaedun, Agus Yulistiono, Opan Arifudin, Irwanto, Eny Latifah, Indra, and Ambar Sri Lestari. *Manajemen Pendidikan Islam*. *Widina Bhakti Persada Bandung*, 2021.

[12] Sahabuddin, M, and Syahrani. "Kepemimpinan Pendidikan Perspektif Manajemen Pendidikan." *Educatioanl Journal: General and Specific Research* 2, no. Februari (2022): 102–112.

[13] Sarpendi, and Maya Ayu Komalasari. "The Role of Islamic Education Management in Improving Human Resources: A Review of the Implementation of Islamic Education in Indonesia." *Bulletin of Science Education* 3, no. 1 (2023): 60–67.

[14] Tenriwaru, Andi, Safaruddin Safaruddin, and Juhaeni Juhaeni. "Pentingnya Manajemen Pendidikan Islam Dalam Tri Pusat Pendidikan." *Jurnal Inovasi Penelitian dan Pengabdian Masyarakat* 2, no. 2 (2022): 120–128.

The Interest Analyse of the Flight Program Corps in The Industrial Management Cadets at Indonesian Air Force Academy (IDAFA)

Septi Ardhia Angkasa Putri[1], Belrake Qurrota Ayun Kun Dendiana[2] and Gagat Riano[3]

[1]Department of Industrial Management Engineering, Air Force Academy, Indonesia

[1]E-mail: ardhia2020665@gmail.com
[2]E-mail: dendianabelrake@gmail.com
[3]E-mail: gagat.riano@aau.ac.id

Abstract. The interest of cadets in the Industrial Management Engineering Study Program to join the flight school program is the lowest among other programs. However it is influenced much factors. This research is descriptive qualitative which allows in-depth research into unstructured problems with the Soft System Methodology (SSM) method.

1. Introduction

The responsive aspect is one of the advantages that cadets must have, aimed about basic academic skills in air force. Implementation is carried out through three main educational programs (prodi), namely Aeronautics (AE), Electronics (Lek), and Industrial Management Engineering (TMI). Education in each study program is carried out for three years, and continues with branch education in the final year. The Aviation Corps, as one of the branches that Cadets participate in, is aimed at preparing Cadets to become flight corps of both manned and unmanned aircraft and navigators. The phenomenon that has occurred in the last five years shows that there are always fewer cadets from the TMI study program than other study programs, for this reason it is necessary to carry out an depth analysis.

2. Soft System Methodology (SSM)

SSM is a systems approach used to help an organization whose problem situation is not well or complex, where this approach can later be used as a suggestion to overcome various existing problems, both soft and hard problems related to human activities. [1]. Therefore, because this research has a social problem that is still abstract and unstructured, the SSM approach is deemed capable of providing the best problem solving solution. In SSM there are seven stages that can be carried out, these stages are not rigid so in practice these stages can be adjusted according to the process. These stages can be seen in Figure 1 below.
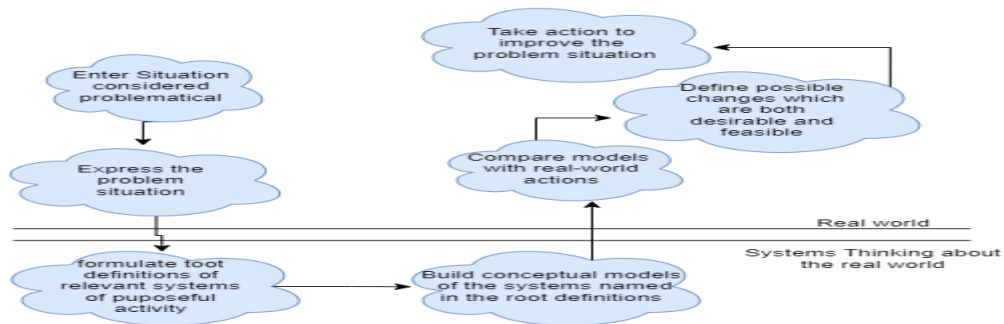
Figure 3. Method Stages SSM [2]

SSM developed from systems thinking theory, which uses a conceptual framework. It is intended to be able to view a problem as a whole system (holistic), and identify situations that occur not only dynamic processes but also partial systems. SSM The conceptual framework was developed from systems thinking theory, which uses a conceptual framework. It is intended to be able to view a problem as a whole system (holistic), and identify situations that occur not only dynamic processes but also partial systems. SSM is developed from systems thinking theory, which uses a conceptual framework. It is intended to be able to view a problem as a whole system (holistic), and identify situations that occur not only dynamic processes but also partial systems.

[3].Gencoglu [4], using the SSM method to overcome problems in the textile chain supply industry. In this research, it can be seen that the use of rich pictures and CATWOE makes it easier to understand the perspectives of all stakeholders, so that the solution that will be developed can accommodate all interests. Francisci and Azevedo [5], applies SSM in a harmonious collaborative network among partners in small and medium (UMKM) in Brazil. Education at AAU experiences quite a lot of complex problems, so by using SSM it is hoped that it can explain the problems that occur. Mehregana, Hosseinzadeha, and Kazem [6] use the SSM method to overcome lecture scheduling problems faced with limited class availability and time. By using this method, problems that occur in lecture scheduling can be identified, making it easier to have a good solutions.

3. Research and Analysis

The analysis in this study used seven SSM steps with the following explanation :

3.1. Situation Considered Problematic. The results of initial studies in the field found that cadets of the Industrial Management Engineering Study Program had the smallest number compared to Electronics and Aeronautics to enter the aviation corps from year to year. In detail, the problem situations that occur in the interest of Industrial Management Engineering cadets in the aviation corps are as follows:

a. Mentally Factor. This factor is related to the cadets' view of the Aviation Corps. Based on the results of the questionnaire, the cadets felt that the education and life at pilot school was quite difficult and long to endure, where the freedom to live life became a consideration after undergoing four years of education.
b. Family Factor. The lack of support the family to become a pilot then influences in to selection of the Cadet Corps.

c. Healthy Factors. In carrying out educational, injury is an obstacle that can occur to the cadets. These things can affect the pilot school test. This is what made Cadet give up to his intention become a pilot.

d. Study Program Factors. Cadets of the Industrial Management Engineering Study Program consider that the administration and training corps education is much relaxed than the pilot corps.

e. Lecturer Factors. Lecturers who teaches in study program do not really provide views about Pilot corps, and they have never served in an aviation work environment (air squadron).

The existing problems. This stage is a description of the problem situation that occurs using a rich picture, as shown in the picture below.
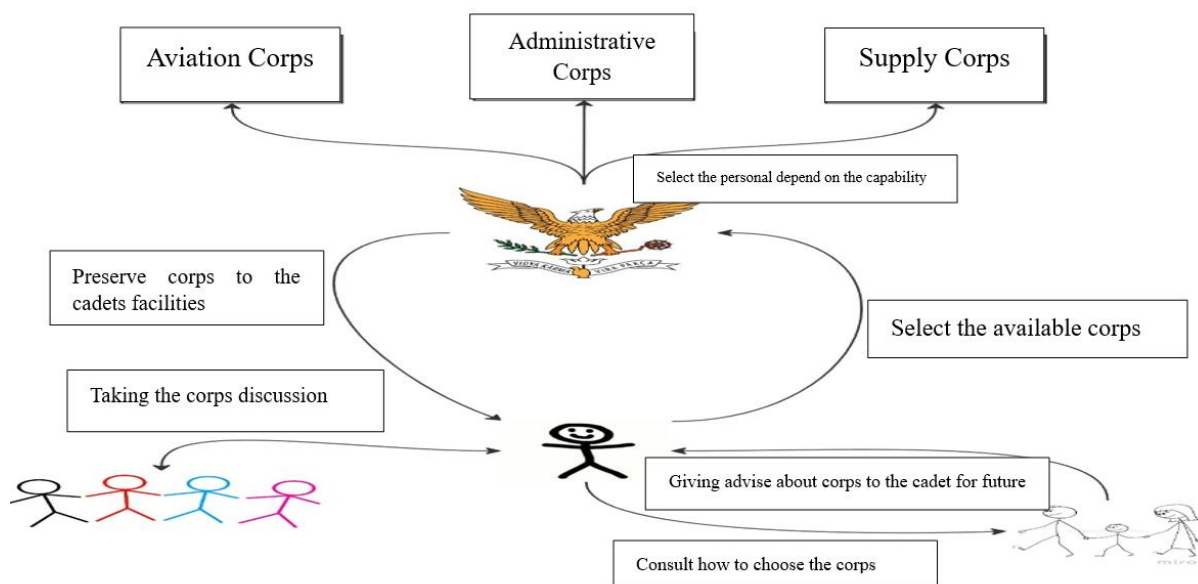
Figure 4. Rich Picture situasipermasalahan.

3.2. The relevant definition of Root System. This stage is to determine the root of the problem based on the relevant point of view and the rich picture that has been created. This root definition will later be explained with CATWOE to facilitate and understand the problem situation that occurs. Root definition and CATWOE of this research are as follows:

a. Root Definition. One of the corps which is in the main interest to become AAU cadets (X) because they are personnel who man the main military equipment of the Indonesian Air Force in the form of aircraft and have a great opportunity to become leaders of the Indonesian Air Force and Indonesian Military in the future (Y) where they have to go through a longer and more difficult education period compared to other corps (Z)

b. CATWOE. Check at table 1

Table 1. CATWOE

Customers	Tectical Industry Management Cadets
Actors	Cadets, Lecturer, Trainer, Caregiver and personels AAU
Transformation Process	Select the Corp being an Officer

World View	An officer which is tough, responsive, skilled and ready to carry out the duties of the Indonesian Air Force
Owner	Indonesian Air Force academy
Environmental Constraints	A lack motivation and an overview of the life that cadets will face in the future, where currently cadets only get an overview from their parents or lecturers, caregivers, coaches and staff at AAU.

Conceptual of Definition Model Description Root . The Conceptual Model is developed based on the existing root definition, describing the transformation process that occurs. This model is built based on ideas and does not refer to the real situation in real the field.

3.3.   This conceptual model and evaluation model can be seen in Figure 3 and Table 2.
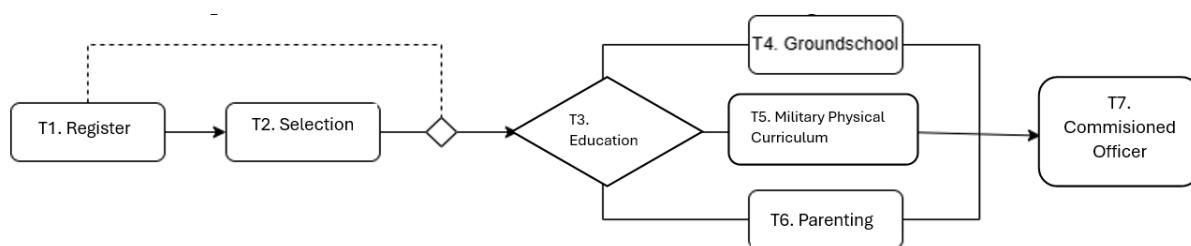
Figure 3. Conceptual Model at The IDAFA

Table 2. Evaluasion Concept

E1	Selection activities are often carried out by the Indonesian Air Force every year to recruit human resources who will become Indonesian Air Force soldiers.
E2	The implementation of this activity has been structured in a structured manner starting from TNI Headquarters, Air Force Headquarters, down to implementing units at lower levels
E3	This selection system has succeeded in obtaining human resources who will be educated and trained to become TNI AU soldiers so that they are ready to be an Airmanship.

The comparison between the model and the facts. This is carried out to find differences between the current running conditions so as to obtain possible changes that are expected in the new systems.

3.4.   From the conceptual model above, the cadet education at AAU is intended to form the First Officers of the Air Force characterized by professional Saptamarga warriors who have basic potential academic abilities of the air force and are physically fit to support the duties of the Air Force. The assignments carried out later will be adjusted to the branch corps that will be obtained in the final year of education. The Aviator Corps as one of the main officer branches in the Air Force is certainly the main goal of all AAU cadets. If the conceptual model is compared with the reality in the field, the following facts are obtained:
   a. Selection and Recruitment. To be a pilot requires more intellectual, physical, psychological and health requirements compared to other corps. However, the selection and recruitment standards to become AAU cadets are only to become soldiers and not become pilots. So when the pilot corps selection was held at the end of level III, not all cadets met the requirements.
   b. forming a reliable Air Force Officer, the implementation of education at IDAFA is carried out through classroom teaching, physical fitness development and nurturing for cadet character development [7]. Some of the obstacles that occur in the field are as follows:

1) The basic academic abilities that differ from the cadets' home regions provide their own handicap in providing learning, so that learning cannot be carried out optimally

2) The study program Followed each cadet must becarried out at the beginning of the second semester. Some of the things that happen are as follows

   a) Influence of parents to choose certain study programs and avoid other study programs makes the study program majors less in accordance with the interests and abilities of cadets. This parental influence continues to the selection of the branch corps. The doctrine about corps life in the unit later tends to be more often in the form of a description of the advantages and disadvantages of certain corps based on the parents' point of view. It is feared that this will reduce the fighting spirit of cadets in filling and developing themselves, because motivation is directed to certain corps. So that when later getting an inappropriate corps can affect the mentality and motivation of cadets in

   b) TMI study program is the youngest study program among the three existing study programs. TMI study program first existed in 1995, which was a change from the Administration study program. This makes this study program synonymous with administration lessons, which are generally considered easier than other study programs. This led to the assumption that cadets in this study program have weaker academic abilities, which then gave rise to an inferior nature to the mentality of TMI study cadets Programs

1) The activities of senior cadets of the Aviator Corps are quite dense (due to the pursuit of class hours) at the Aviator School (Sekbang), making them have to undergo longer lecture or training hours. Even special Flying School(Sekbang) rules that limit the right to cruise, overnight permits (IB), Long Week End and Week End, which is a separate consideration for junior cadets. Not to mention the longer education period at Sekbang (± 2 years) and the possibility of failure in the education and training process, making cadets TMI choose the basic corps .

2) The pattern of life before entering at IDAFA and physical unpreparedness made some cadets constrained by physical injuries that hampered the implementation of education, especially physical preparation to become a Pilot.

3) At IDAFA Parenting pattern implemented is not optimal, because some caregivers, lecturers and personels do not yet have the knowledge and experience as a caregiver. Moreover, with not much service experience outside AAU, especially in the field of operations, cadets do not get an overview of life in the unit later. The description in the unit can only be obtained from parents (from military families) or by looking at the profiles of antap and caregivers at AAU, which in reality are mostly not from the aviator corps. This certainly affects the motivation of cadets to choose a corps other else than a Flying School

   Changes : Systematically Desirable, Culturally Feasible and Action To Improve The Problem Situation. It is the sixth and seventh stages of SSM, By establishing a recommended improvement and implementing it into real situations. This final stage is a recommendation for improvement that needs to be made for changing. It can be seen in table 3.

Table 3. Sixth and Seven Stages of SSM

SUGGESTED CHANGES	CHANGE STEPS
1. Recruitment and selection patterns carried out with minimum standards to become a Pilot to get more pilot candidates	*Socialization regarding the vision and mission as well as the education pattern at Air Force Academy which applies education, training and care with the main aim of forming a pilot. This is done so that all students are physically and mentally ready to take part in education at Academy. * Changing of an academic selection into an academic potential test (TPA) to eliminate differences in academic learning levels from various regions Through this test, it is also hoped that students will have academic abilities in several aspects, such as verbal abilities, quantitative abilities and reasoning abilities. *Using MRI technology and involving orthopedic specialists and medical surgeons to reduce the risk of injury during education
The Majoring program mechanism is implemented in cadet admission selection to obtain more precise results	* Apart from the TPA test, academic selection can be continued with a study program competency test, where the questions given are in accordance with the study programs at AAU.
Increasing parenting/raising patterns that provide an overview of unit life, especially the aviation corps	* Set a short-term assignment pattern (6 months) on a rotational basis for airmen in the operating unit to become caregivers for cadets. This is expected to provide an overview of the lives of aviators in the unit as well as provide motivation to cadets. * Increase aviation-related skills activities such as introduction to flying and the use of flight simulators to increase cadet motivation
Returning to the Majoring corps is carried out after graduates become officers	Change the educational curriculum in semesters 7 and 8. Semester 7 can be used to finalize the lessons for each study program and complete final assignments, which are currently being done in semester 6. Meanwhile in semester 8 basic knowledge can be given for each corps branch.

4. Conclusion

By applying of steps 1 and 2 in the SSM method, the problem situation that influences the cadets of the TMI study program towards the selection of an Pilot corps is obtained, namely mental factors, family, health, study program and lecturers. Furthermore, with steps 3 to 5, these factors are described to get suggestions for changes and steps, as listed in steps 6 and 7. The recommended changes with this method are changes to the recruitment and selection patterns, changes to the study program majors, changes to the parenting pattern and changes to the timeline corps majors.

References

[1] S. Burge, System Thinking: Approaches and Methodologies, 2015.

[2] P. Checkland and J. Poulter, Learning for Action: A Short Definitive Account of Soft System Methodology and its use for Practitioners, Teachers and Students, Chichester: John Wiley and Sons, Ltd., 2006.

[3] H. Nugroho, "PENDEKATAN SOFT SYSTEM METHODOLOGY UNTUK MEMBANGUN SEBUAH SISTEM INFORMASI PROYEK AKHIR," in *Konferensi Nasional Sistem Informasi 2012At: STIKOM BALI*, 2012.

[4] G. Gencoglu, G. Altman, R. Smith and D. Mckay, "Using Soft Systems Methodology to Address Supply Chain Management Problems," *Australian Journal of Information Systems,* vol. 9, no. 2, pp. 49-56, 2007.

[5] R. d. P. Francisco and A. L. Azevedo, "An SSM-Based Approach to Implement a Dynamic Performance Management System," in *IFIP Advances in Information and Communication Technology*, 2009.

[6] M. R. Mehregana, M. Hosseinzadeha and A. Kazem, "An Application of Soft System Methodology," in *The First International Conference on Leadership, Technology and Innovation Management*, Teheran, 2012.

[7] Akademi Angkatan Udara, Program Taruna Gemilang, 1 ed., Yogyakarta, 2021.

[1] Akademi Angkatan Udara, Program Taruna Gemilang, 1 ed., Yogyakarta, 2021.

[2] S. Hardjosoekarto, Soft Systems Methodology (Metodelogi Serba Sistem Lunak), Jakarta: Universitas Indonesia Press, 2012.

[3] Marshal, Peter and J. McKay, The Dual Imperatives of Action Research Information Technology & People, vol. 14, MCB Universitu Press, 2001.

[4] H. Nugroho, "PENDEKATAN SOFT SYSTEM METHODOLOGY UNTUK MEMBANGUN SEBUAH SISTEM INFORMASI PROYEK AKHIR," in *Konferensi Nasional Sistem Informasi 2012At: STIKOM BALI*, 2012.

[5] P. Checkland and J. Scholes, Soft Systems Methodology in Action : A 30-year Retrospective, UK: John Wiley & Sond, Ltd., 1999.

[6] R. d. P. Francisco and A. L. Azevedo, "An SSM-Based Approach to Implement a Dynamic Performance Management System," in *IFIP Advances in Information and Communication Technology*, 2009.

Deployment Analysis of Multi-Role Combat Aircraft Dassault Rafale TR3 and Boeing F15 EX Eagle II to Optimize Indonesia's National Air Defense System Using the AHP Method

Marshal Bhakti Ma'ruf[1], Gagat Riano[2]

[1,2] Department of Industrial Management Engineering, Air Force Academy, Yogyakarta, Indonesia
[1]marufmarshal@gmail.com, [2]kryptonsmo@gmail.com

Abstract. Indonesia needs a strong national defense system, one of which is the air defense system (Sishanudnas). For this reason, it is currently planned to procure the Dassault Rafale TR3 and Boeing F-15 EX Eagle II multi-role fighters, equipped with a variety of weapons that can be carried. The placement uses several criteria that have been considered and the results of questionnaires that have been answered by Air Force officials who are experts in their fields. The selected airbases will be the placement airbases for Rafale, F15, F16, and Sukhoi fighter aircraft which will be divided into several scenarios using the AHP method. This research results in an airbase that has been ranked in order of priority for the placement of fighter aircraft. The airstrips are HND (16.47%), RSN (14.38%), SPO (13.31%), ELI (12.93%), IWJ (12.59%), and Halim (7.48%). The selected airstrips will be the deployment airstrips for Rafale, F15, F16, and Sukhoi fighter aircraft which will be divided into several scenarios.

1. Introduction

Determining a strategic location is a critical component of strategic facility planning from the business sector and military sector [1]. This relates to the efficiencies achieved if the chosen location relates to minimising costs/expenses or maximising the facility's accessibility to other related locations. The era of globalization creates new challenges for determining a strategic location [2]. The challenge is to choose the right location to place resources and facilities to anticipate events that cannot be predicted and require a fast response, by minimizing costs that must be incurred, especially if the demand to be met is geographically dispersed. This has become a modern problem generally faced by countries or world institutions, because in reality this problem has a lot to do with logistics management in dealing with natural disasters and national defense. This research attempts to analyse the strategic positioning of Dassault Rafale TR3 and Boeing F-15 EX Eagle II aircraft in support of Sishanudnas. Sishanudnas is an order in implementing Hanudnas operations that aims to ward off all threats using aerial vehicles by involving Hanud elements. The Systems are precautionary and are expected to be able to destroy air threats long before they enter the sovereign territory.

2. Analitycal Hierarchy Process

The method used in this research is the Analytical Hierarchy Process (AHP), a method often used to evaluate and make multi-criteria decisions. This method evaluates different alternatives based on

different criteria and provides a relative score for each alternative. AHP allows users to integrate subjectivity and objectivity in the decision-making process and helps to identify the most important factors in a complex problem [3]. The AHP method is divided into several stages [3]. The first step is to determine the goals to be achieved. The second step is to model the problem into a hierarchical structure, The third step is to generate pairwise comparison matrices. The basic concept of AHP is using a pairwise comparison matrix to produce a relative weighting between the criteria and alternatives. Pourghasemi et al [4] states that in filling the matrices, Saaty scale as shown in Figure 1 is used.

Intensity Of Importance	Definition	Explanation
1	Equally	Two activities contribute equally to objective
3	Moderately	Experince and judgment slightly to moderately favor one activity over another
5	Strongly	Experince and judgment strongly or essentially favor one activity over another
7	Very Strongly	An activity is strongly favored over another and its dominance is showed in practice
9	Extremely	The Evidence of favoring one activity over another is of the highest degree possible of an affirmation
2,4,6,8	Intermediate values	Used to represent compromises between the preferences in weight 1,3,5,7 and 9
Reciprocals	Opposites	Used for inverse comparison

Figure 1. The Scale Of Preference Between Two Parameters In AHP Saaty [3]

The fourth step is to select the best alternative based on the weight while checking the consistency of the comparison matrices. To determine the best alternative, the absolute weight of each alternative needs to be calculated. The weight of each alternative is obtained by populating the weight of criteria and sub-criteria that are hierarchically above it. The weight of each alternative becomes a reference in selecting the best alternative. Saaty [5] states Filling in the criteria and alternative weights must be done consistently. The consistency of filling is done by using the calculation of the eigenvalue to get the value of the consistency index (CI) and the consistency ratio (CR). Data is considered inconsistent if the consistency ratio has a value of more than 0.1

3. Research Framework

This research aims to determine the 10 primarily airbase that will be used as the placement of Dassault Rafale TR3 and Boeing F-15 EX Eagle aircraft using the AHP method. Respondents are 5 Air Force officials who have an important role in the preparation of Indonesia's Sishanudnas, so it is hoped that they will get an overview of the deployment of Air Force combat aircraft, in maintaining the sovereignty of Indonesian territory in the air.

3.1. Selected Primarily Airbase Criteria.

The criteria used in this study are follows [6]:

 a. Deterrence strategy. This strategy aims to ward off all threats to Indonesia's sovereignty, including border areas, ALKI lines, military units and vital objects, both from within the country and abroad.
 b. Balance Strategy. This is considered a strategy that can realize the balance of power between the two strongest neighboring countries and is assumed to be a threat for twenty years to come.
 c. How the natural environment including climate, geography, topography, infrastructure, security, transportation and the presence of military air bases affect the environment and social conditions of the surrounding population.

d. Runway, apron, air traffic control tower (ATC), fueling station, fire unit and electronic communication facilities are ready as supporting flight operation facilities.

e. Energy (water and electricity), personnel and other essential support services (logistics, maintenance, hangars, intelligence, other personnel support, including personnel and family residences and health services), as well as base security and defense facilities are well accessible as base support facilities. The hierarchical structure of the AHP is shown in Figure 2, below:
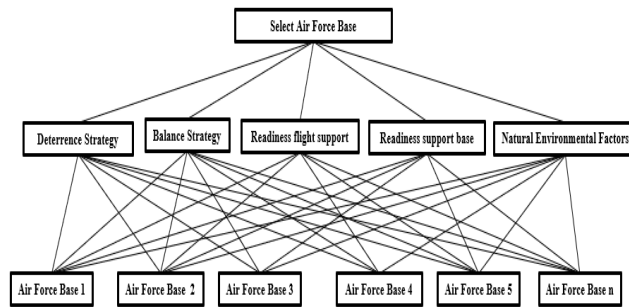
Figure 2. The Stucture of AHP Hierarchy

3.2 Creating a Pairwise Comparison Matrix.

The criteria specified above are arranged in the form of an n x n matrix for comparison as shown in figure 3.

Figure 3. Criteria Comparison Matrix

Alternative options are also arranged in the form of a comparison matrix n x n for each criterion in point 3.1, as figure 4

Figure 4. Alternative Comparison Matrix

How to fill the matrix elements in the two pictures above is as follows:

a. Element a[i,j] = 1, where i = 1,2,3,..... n. For this study, n = 5 for criteria and n = 10 for alternatives.

b. The upper triangular matrix element as input (according to figure 1) and the lower triangular matrix element have the formula a[i,j] = 1/ a[i,j] for For i ≠ j.

c.   Create a normalization table by dividing the column cell values by the total number of those columns.

d.   Determine the weight of the element by dividing the number of rows in the normalized table by n.

e.   Test consistency.

f.   Determine the results of alternative choices by multiplying the results of the weighting of criteria by the weighting of alternatives on each criterion.

3.3 Geometricmean of five respondents.

To obtain one comparison matrix of five respondents (R), geometricmean answers from five respondents are performed using the formula:

$$GM_{ij} = \sqrt[5]{R_1 x R_2} x\ R_3 x R_4 x R_5$$

ij : Indicates the position of the criteria being compared.

4. Result and Discussion

The results of data processing are as follows:

4.1. Respondents' Answers.

The results of data processing from five respondents can be explained as follows:

a. **Responden 1**. From the questionnaire answers, it was found that the balance strategy factor was the most considered criterion in determining the main base with a weight of 36% followed by the base support factor (34%%), followed by the deterrence strategy (19%) and finally aviation support and environmental factors (6% and 5%).   The selected airbase is RSN (18.92%) and ELI (12,41%)

b. **Responden 2.** From the questionnaire answers, it is found that the deterrence strategy and environmental factors are the two main factors for determining the carrier base of fighter aircraft with a weight of 57% and 19% followed by aviation support (11%), base support (10%) and balancing strategy (3%) For the top two lanes, the priority choices are HND and ELI at 25.87% and 25.2%.

c. **Responden 3.** From the questionnaire answers, it was found that environmental factors and deterrence strategies were the two main factors for determining the fighter carrier base with a weight of 52% and 24%, followed by the balance strategy (12%), aviation support and base support both at (6%).   MNA Airbase is the priority choice with a value of 20.88% and IWJ Airbase is the second choice with a value of 13.14%.

d. **Responden 4.** From the questionnaire answers, it was found that the factors of deterrence strategy and aviation support were the two main factors for determining the carrier base of fighter aircraft with a weight of 50% and 20%, followed by base support (17%), balance strategy and environment (6%). HND and IWJ airstrips are the two prioritized airstrips, with weights of 16.56% and 12.38%.

e. **Responden 5.** From the questionnaire answers, it was found that the deterrence strategy and balance strategy were the two main factors for determining the carrier base of fighter aircraft with a weight of 41% and 38%, followed by aviation support (10%), base support (8%) and the environment (3%) For the 2 selected airstrips to be prioritized are IWJ and RSN, with a weight of 22.14% and 21.9%.

4.2. Geometricmean Process

The results of geometricmean processing can be described as follows:

a.   **Criteria.** From the geometricmean answer, it was found that the deterrence strategy is main factor (44,89%), followed by balance strategy (15,70%), followed the air base support factor (15,23%), followed by environmental factors (12,67%) and finally aviation support and (11,51%).

b.   **Deterrence Strategy.** From the geometricmean answers, the order of precedence of Airbase is RSN (17,73%), SPO (16,55%), ELI (16,35%), HND (14,08%), MNA(9,12%), SRI (8,58%), IWJ(7,81%), SPR (5,73%), HLM (2,13%) dan ABD (1,92%)

c.   **Balance Strategy.** From the geometricmean answers, the order of precedence of Airbase is ELI (16,35%), SPO (16,98%), HND (16,39%), RSN (16,38%), IWJ (8,38%), SRI (8,37%), MNA(9,12%), SPR (4,95%), ABD (2,98%) dan HLM (2,40%)

d.   **Aviation Support.** From the geometricmean answers, the order of precedence of Airbase is IWJ (21,60%), HND (20,54%), HLM (18,01%), RSN (9,80%), ELI (7,84%), SPO (6,80%), ABD (5,43%), MNA (3,93%), SRI (3,35%) dan SPR (2,71%)

e.   **Air Base Support.** From the geometricmean answers, the order of precedence of Airbase is IWJ (22,71%), HND (18,18%), HLM (16,21%), RSN (11,82%), SPO (10,18%), ABD (7,06%), ELI (5,88%), MNA (2,94%), SRI (2,74%) dan SPR (2,27%)

f.   **Environment.** From the geometricmean answers, the order of precedence of Airbase is HND (19,31%), IWJ (14,35%), HLM (12,67%), MNA (10,80%), ELI(8,54%), SPR(8,45%), RSN(7,28%), SPO (6,98%), ABD (6,85%) dan SRI (4,76%)

4.3. Final Calculation Results.

From the final calculation, the results of HND and RSN land were obtained into the two highest weighted lanuds, namely 16.47% and 14.38%. Full results see table 1

Table 1. Final Result

PRIORITY WEIGHT							
CRITERIA	**DETERRENCE**	**BALANCE**	**AVIATION**	**AIRBASE**	**ENVIRONMENT**	**RESULT**	**RANK**
AIRBASE	**44,89%**	**15,70%**	**11,51%**	**15,23%**	**12,67%**		
SPO	16,55%	16,98%	6,80%	10,18%	6,98%	**13,31%**	3
RSN	17,73%	16,38%	9,80%	11,82%	7,28%	**14,38%**	2
HND	14,08%	16,39%	20,54%	18,18%	19,31%	**16,47%**	1
HLM	2,13%	2,40%	18,01%	16,21%	12,67%	**7,48%**	6
ABD	1,92%	2,98%	5,43%	7,06%	6,85%	**3,90%**	10
IWJ	7,81%	8,38%	21,60%	22,71%	14,35%	**12,59%**	5
MNA	9,12%	5,91%	3,93%	2,94%	10,80%	**7,29%**	7
ELI	16,35%	17,26%	7,84%	5,88%	8,54%	**12,93%**	4
SRI	8,58%	8,37%	3,35%	2,74%	4,76%	**6,57%**	8
SPR	5,73%	4,95%	2,71%	2,27%	8,45%	**5,08%**	9

4.4. Visualisasi Covering.

Currently and in the future the Indonesian Air Force has five fighter squadrons, namely 2 squadrons F-16, 1 squadron SU 27/30 and 2 squadrons Rafale / F-15 EX. The deployment scenario is carried out by shifting the existing fighter aircraft in the selected Airbase to the Airbase with the next priority weight. So the Rafale/F-15 EX will be stationed at HND and RSN, F-16 at SPO and IWJ and SU 27/30 at ELI. The visualization can be seen in figure 5.
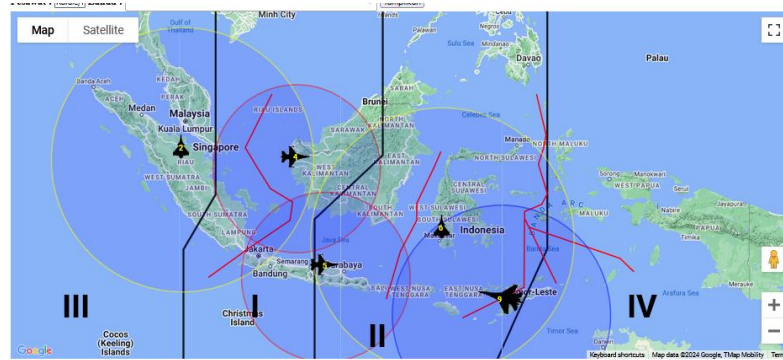
Figure 5. Covering Visualization Of Fighter Squadrons

5. Conclusion

The results of the visualization of these illustrate that the placement of these five squadrons is only able to cover the central and western regions of Indonesia including the Indonesian ADIZ over the islands of Java and Bali and the IKN area as a candidate for the new capital city of Indonesia, but has not yet reached Eastern Indonesia. So it has not been able to overcome air defense problems in the region.

Implementing Human Security Principles in the Management of Islamic Boarding Schools (A Case Study of PPM Baitussalam Prambanan)

Novianto Ari Prihatin[1*]

[1] Master of Social Education Program, PGRI University of Yogyakarta

[*]noviantoari29@gmail.com

Abstract. The application of human security principles is important in managing boarding schools to provide a sense of security and comfort in the learning process. This study examines the process and impact of applying the principles of Human Security at PPM Baitussalam Prambanan. This research uses a qualitative approach with a case study design. Observation, interviews, and documentation were used in data collection. The results showed that the implementation of the principle of human security at PPM Baitussalam Prambanan was realised through several things, *first*, in the aspect of economic security, the availability of smartcards in every student financial transaction service. *Second*, in the aspect of food security, PPM Baitussalam standardises the types of food consumed by students. *Third*, in the aspect of health security, the availability of Health Clinic services at the 24-hour Pondok Heakth Unit (UKP) and has cooperation with PDHI Kalasan Hospital. *Fourth*, in the aspect of environmental security, the availability of rubbish bins and programmes for the recycling process. *Fifth,* in the aspect of personal and community security, santri will get 24-hour assistance in the dormitory by musyrif/musyrifah and counselling by counseling teachers and counselling institutions. *Sixth,* in the field of political security, there is an election process for the Student Council chairman and Scout Coordinator which is carried out directly by students without any pressure from anyone. The impact of this policy is the increased awareness of students regarding human security, the existence of a well-organised student management pattern, and the creation of a comfortable environment.

Keywords : Implementing, principles, human security, boarding schools

1. Introduction

Human security is an attempt to fundamentally re-conceptualise security. It is primarily an analysis that focuses on ensuring security for individuals rather than states [1]. Substantially, the notion of human security is not new to the discipline and the study of security in reaction to problems such as child trafficking, conflict refugees, physical violence [2]. Security studies then underwent a transformation, from a militaristic concept of national security to the scope of discussions on democracy, human rights, the environment, structural violence, and socio-cultural conflicts [3]. More specifically, the concept of human security that becomes the referent object is no longer the state but humans as individuals who have the right to obtain security guarantees in their lives [4].

UNDP 1994 released seven components of human security that must receive attention, includes, 1) economic security, 2) food security, 3) health security, 4) environmental security, 5) personal security, 6) community security and 7) political security [5]. Meanwhile, to realise the components in human security, UNDP adds that development should focus on people rather than the security of their borders alone, and on improving health, education, and political freedom, in addition to economic well-being [6]. So the components in human security should be applied in the process of managing educational institutions.

Islamic boarding schools are Islamic educational institutions that have quite a lot of goals, roles, and functions in the midst of society in line with the goals, roles, and functions of Islamic education. Islamic boarding schools are also Islamic educational institutions that play an important role in empowering Indonesian Muslims so that they have resilience in facing various changes and dynamics of life [7]. The application of human security principles is important as an effort to create a safe and comfortable boarding school environment for students, so that their rights are fulfilled. The application of the Human Security concept in schools is very important to do considering the Right to Education Index (RTEI), the lowest indicator of Indonesia's education quality is the safety learning environment, meaning that schools are still unsafe places from various threats to children, both threats to students' physical or mental health.

2. Research Methode

This was a qualitative research conducted at PPM Baitussalam Prambanan with the object of the environment around PPM Baitussalam Prambanan. This research method uses descriptive qualitative. The subjects of this research are the head of the boarding school, the principal, the dormitory guardian, the head of student affairs and the students.

The data collection process uses observation, interviews, and documentation. Observations were made by observing objects around the school area, the boarding school health unit (UKP), and the students' dormitory section. Interviews were conducted with the head of the boarding school, the principal, the head of the male/female dormitory section, and the students about the efforts that have been made by the boarding school to provide a sense of security and comfort while studying at the boarding school. The documentation technique is used to identify facilities and infrastructure in relation to the implementation of human security at PPM Baitussalam.

3. Profile of PPM Baitussalam Prambanan

PPM Baitussalam Prambanan is a modern boarding school located in Prambanan, Sleman, Yogyakarta. This boarding school has several school units, ranging from PAUD, SD, SMP, and SMA. PAUD and SD use the fullday school system, while SMP and SMA use the boarding school system [8]. The total number of students in this pesantren is around 1634 students spread from PAUD to SMA.

Junior and senior high school students who use the boarding school system are required to live in the dormitory. Dormitory-based education is a characteristic of a boarding school in which it is organised as a place of learning for students [9]. In PPM Baitussalam there are 2 (two) dormitory complexes with different locations. The men's dormitory is located in the central unit of Pulerejo, Bokoharjo, Prambanan. Meanwhile, the women's dormitory and classrooms are located in unit II Klurak, Tamanmartani, Kalasan which is approximately 1 Km from the central unit.

Each unit is equipped with several facilities that support the learning process, including a library, computer lab, UKP, school canteen, and other facilities that support the student learning process. Meanwhile, facilities that can be used for sports include a basketball court, futsal court, badminton court, soccer field and swimming pool. Some facilities are intended to optimise the teaching-learning process so that students can absorb knowledge optimally.

4. Procces of Implementing Human Security

The function of the school (Education) is the cradle of human security. Olsson, Gericke, & Rundgren [10] revealed that in order to secure human capabilities, education must be directly considered because education in all aspects empowers humans to realise their potential. The concept of Human Security consists of 3 important principles: Freedom from fear, Freedom from want, and Freedom to live in dignity [11]. So based on these principles, the implementation of human security principles (1) economic security, 2) food security, 3) health security, 4) environmental security, 5) personal security, 6) community security and 7) political security) at PPM Baitussalam can be described below.

4.1 Principal of Economy Security

The application of the principle of human security in the economic field in managing students includes, First, regarding pocket money management. Students who attend PPM Baitussalam are divided into 2 groups, namely full day students and boarding students. To manage student finances, PPM Baitussalam implements a smart card system for each student's financial transaction. Smart Card is a product of smart system, a financial system integrated with school payments. Some of the advantages of smart cards are, (1) parents can set the amount of student pocket money, (2) transactions are carried out cashless so as to minimise money loss, (3) parents can monitor student transaction history.

Second, with regard to students' daily consumption. PPM Baitussalam provides minimarkets, canteens, and student canteens, and catering to meet students' needs. The economic centre is located in each dormitory (male and female dormitories). The minimarket provides various daily needs, including toiletries, consumption needs, uniforms, and student school needs. Next is the student canteen managed by the student council as a means of practising entrepreneurship and a catering service to provide students' daily meals. Boarding students will get 3 meals a day with snacks during the day. Meanwhile, fullday students will get 1 meal and snack at noon.

4.2 Principle on Food Security

The application of human security in terms of food security is applied in several ways. First, for students' daily consumption needs, there is a consumption schedule that has been arranged in such a way that students' nutritional needs are well met. Students are given a varied menu every day with additional fruit snacks during the day. All student consumption schedules are organised by the head of catering. The head of catering at PPM Baitussalam is someone who understands nutritional needs because he is a nutritionist alumni. So from human resources the concept of safety in the food sector can be fulfilled.

Second, regarding food supervision in canteens and minimarkets. PPM Baitussalam strictly supervises the types of food and drinks sold in minimarkets or school canteens. For example, types of food and beverages that do not have halal certification (halal logo), BPOM registration number, P-IRT, will not be allowed to be sold in school minimarkets. In addition, types of drinks that are indicated to contain sweeteners, preservatives, and artificial colours that exceed the legal limit will also not be sold. This policy is a preventive measure taken by the school to keep students healthy.

4.3 Principle on Health Security

Health services for students is one of the things that is very concerned at PPM Baitussalam Prambanan. PPM Baitussalam provides several health services that can be used by the residents of the boarding school. PPM Baitussalam has a Pondok Health Unit (UKP) which is open 24 hours with adequate facilities as a unit for first aid. UKP officers are several experienced nurses and doctors. Nurses will be on duty alternately at the UKP for 24 hours. UKP is also equipped with an ambulance that can be used if further treatment is needed. PPM Baitussalam also has cooperation with PDHI Kalasan Hospital if there are students who need further treatment.

PPM Baitussalam has cooperation with Prambanan Health Centre (Puskesmas) in several ways. The cooperation is in the form of distribution of blood supplement tablets and socialisation in creating a clean environment in the school environment. The distribution of blood supplement tablets is given

regularly to students in collaboration with the School Health Unit (UKS). The provision of blood supplement tablets is intended for female students as an effort to avoid anaemia in female students. Another collaboration with the Prambanan Health Centre is in terms of screening and socialisation to students regarding efforts for a clean environment around the school. In addition to cooperation with the Puskesmas, the UKS also has a programme of activities including health screening, nail health checks, OSBA Health picketers who routinely monitor sick students, as well as a hair trimming programme for male students, and joint gymnastics activities.

In relation to maintaining physical health, there are several sports facilities including soccer fields, footsal courts, badminton courts, basketball courts, and swimming pools around the boarding school. These facilities are usually used by students during lessons, extracurricular activities, and sports activities in the students' spare time.

An important thing in the health problems of students in boarding schools is about mental health. Therefore, PPM Baitussalam tries to implement stress management so that students still feel happy when they are in boarding school. This unhappy condition of students requires serious handling, because if left unchecked, it can result in unfavourable conditions for their psychological development, such as lack of concentration in learning, difficulty in interacting socially, lack of independence, and lead to stress [12]. Dormitory assistants also have a role to anticipate any type of bullying that usually occurs between students. Verbal and racist bullying cause more depression than physical bullying [13]. So the presence of dormitory assistants becomes very vital to create conduciveness between students.

4.4 Principle on Enviromental Security

The implementation of human security in the aspect of enviromental security can be seen from several policies made by PPM Baitussalam. The policy in this aspect is also a step to become PPM Baitussalam as an eco-pesantren. There are several indicators to realise the concept of eco-pesantren, namely (1) management of environmentally friendly pesantren supporting facilities, (2) development of participatory-based environmental activities, (3) environmental-based curriculum development, and (4) pesantren policies care and environmental culture [14]."

To create the principle of environmental security and eco-pesantren, there are several policies made, namely First, in terms of providing facilities and infrastructure, PPM Baitussalam provides trash bins based on the type of waste (organic, an organic). The location of the bins can be found in almost every corner of the school room. The division of these types of waste is then followed up by each school unit including the Pancasila Student Strengthening Project (P5), one of which has been carried out by the SMP IT Baitussalam unit by conducting integrated waste processing. Waste is processed into several products that can be reused, such as fertiliser, fish feed, and crafts.

Secondly, the student association section has a special policy to maintain boarding school environment that is free from waste, especially plastic waste, namely a day without plastic. At least once a week students are prohibited from using plastic packaging to buy or consume food and drinks. So students are required to bring a place to eat and drink if they want to buy it at the canteen or minimarket. This policy aims to provide education to students so that they can get used to minimising plastic waste so that one day baitussalam zero plastic waste will be realised.

Third, another policy implemented to keep the environment clean and comfortable is cleaning activities in the school environment. This activity is realised in the form of *Jum'at Bersih* activities, the *Gerakan Pungut Sampah* (Gerpusa), and class hygiene competitions. The activities are an educational tool for students to instil a sense of concern for the cleanliness of the school environment. Then for the class group that wins the class hygiene competition championship will get a prize in the form of class cleaning equipment and become one of the pilot classes.

4.5 Principle on Personal and Community Security

The implementation of policies with human security principles in the aspect of personal and community security can be divided into two, namely preventive and curative policies. As one of the preventive

measures, PPM Baitussalam collaborates with the Indonesian Child Protection Commission (KPAI) and PusPaga counselling agency to provide socialisation about the dangers of bullying and violence.

Counselling activities are also carried out regularly in each school unit. In the junior high school unit, for example, counselling activities are carried out routinely every week accompanied by the Counselling Guidance (BK) teacher. The counselling contains psychological assistance to students, sharing sessions if there are problems during the learning process, and mapping the talents of students. If a problem is found, the counselling teacher will follow up the findings personally with the relevant parties.

The dormitory management section also has the responsibility to oversee students' personal and community security. Dormitory assistants will be fully responsible for 24 hours to accompany students so that they feel safe and comfortable during their education. Dormitory assistants also have a function to assist in learning, enforcing student discipline, and helping the student adaptation process in pesantren [15].

In terms of self-protection from natural disasters, disaster mitigation training can be conducted in villages or schools. Disaster mitigation training is very important to do so that students are able to make the right decisions when natural disasters occur [16]. PPM Baitussalam through the junior high school unit in collaboration with private institutions organises disaster mitigation in the boarding school environment including mitigation for earthquakes, windstrom, and fires.

4.6 Principle on Political Security

The aspect of political security in the principle of human security emphasises that a person can exercise their personal rights without any pressure from any party. The implementation of this aspect is also related to instilling the spirit of nationalism in students. There are several policies that have been implemented related to this aspect.

First, PPM Baitussalam organises routine flag ceremonies every Monday and ceremonies to commemorate national holidays, such as Teacher's Day, National Education Day, Pancasila Day, etc. Another policy is to sing the Indonesian national anthem, Indonesia Raya, which is sung together at the beginning of learning or at 10am. All students and teachers who hear the Indonesia Raya song are required to sing it with a solemn attitude.

Secondly, one of the democratic traditions at PPM Baitussalam is the election of the chairman and vice-chairman of the Baitussalam Student Council and the Scout Coordinator. This election is carried out directly by students and teachers. With this direct election process, the political rights of students as citizens are guaranteed. The election of student council chairman and scout coordinator is also a form of democratic education for students, that everyone has the right to elect and be elected without any pressure from any party. The culture of democracy in the process of electing student council leaders and Scout coordinators is the growth of tolerance, freedom of opinion, openness, mutual respect, and togetherness [17].

5. The Impact of Implementation Human Security in PPM Baitussalam Prambanan

The implementation of human security in the management of PPM Baitussalam has a good impact on the continuity of the education process. The results of the application of human security can be seen in several ways. *First*, there is a positive response from parents towards the smartcard policy as a financial transaction service. Apart from being an educational tool for students themselves to learn to manage finances, on the other hand, parents can also monitor the use of pocket money including what items are purchased by students.

Second, the emergence of an attitude of mutual respect between fellow students who come from various regions in Indonesia. There is a gap between students from one region to another due to different cultural and ethnic backgrounds. This certainly affects the way students interact and communicate, which often causes friction between students. However, with the mentoring efforts carried out in dormitories and schools, the gap between students disappears by itself.

Third, the positive impact of applying the principle of human security also provides positive things in improving student achievement. The sense of security and comfort that arises from the conditions of schools and dormitories gives students a sense of happiness so that it can provide positive energy. This positive energy then materialises in achievements in the academic and non-academic fields. Many students have achieved championship achievements, ranging from sports, arts, research, to achievements in the field of memorising the Quran continue to experience a positive trend. If a sense of comfort arises in the boarding schools environment, then homesickness, strict rules and schedules, adjustment to the environment will be easily overcome.

Fourth, increasing student awareness in terms of environmental care. The elimination of corporal punishment and switching to a more educative punishment (cleaning the environment) makes students realise that environmental cleanliness is a shared responsibility. Another evidence is the works made by utilising unused waste into more useful items. Thus, the application of human security in the aspect of environmental security is effective and has a positive impact.

Fifth, in relation to the availability of health services, students who must receive medical treatment are more quickly handled. The existence of UKP in each dormitory unit and 24-hour ambiulance transportation received very good appreciation from parents. Parents feel that it is very helpful if students have to get medical treatment. With a quick response, sick students are handled more quickly so as to minimise the risk of greater illness.

References

[1] Jackman, D., Konkin, J., Yonge, O., Myrick, F., & Cockell, J. 2020. "Crisis And Continuity: Rural Health Care Students Respond To The COVID-19 Outbreak." Nurse Education In Practice, 48, 102892

[2] Ahdiani, S. S. M. 2019. "Kontribusi UNICEF Dalam Mengatasi Perdagangan Anak Dan Pengaruhnya Terhadap Eksploitasi Seks Komersial Anak Di Indonesia." Skripsi, Universitas Pasundan.

[3] Sudiar, S. 2019. "Pendekatan Keamanan Manusia Dalam Studi Perbatasan Negara." *Jurnal Hubungan Internasional*, 7(2),:152-160

[4] Caroline Thomas. 2000. *Global Governance,Development and Human Security: The Challenge of Poverty and Inequality*, Virginia: Pluto Press.

[5] UNDP, Human Development Report 1994, New York: United Nations Development Programme, 1994.

[6] King, Gary dan Murray, Christopher J. L., 2001, 'Rethinking Human Security'. *Political Science Quarterly*. Vol.116. No.4.

[7] Karimah, Ummah., dkk. "Pondok Pesantren Dan Tantangan: Menyiapkan Santri Tangguh Di Era Society". Dalam Al Fikri: Jurnal Studi dan Penelitian Pendidikan Islam. Vol. 6 No. 1 Juni 2023, Halaman:42-59 doi: http://dx.doi.org/10.30659/jspi.6.1.42-59

[8] https://baitussalam.sch.id/home/sejarah/

[9] M. Bahari Ghazali. 2003. Pesantren berwawasan lingkungan, Jakarta: CV prasasti.

[10] Olsson, D., Gericke, N., & Rundgren, S. (2016). "The effect of implementation of education for sustainable development in Swedish compulsory schools – assessing pupils' sustainability consciousness". Environmental Education Research, Volume 22 (2). 176–202. https://doi.org/10.1080/13504622.2015.1005057.

[11] Wuryandani, W. 2020. "Penguatan Pendidikan Karakter Di Sekolah Dalam Rangka Pembentukan Manusia Yang Berkualitas." Majelis (105)

[12] Darmayanti, Nefi., Daulay, Nurussakinah. "The Effects of Stress Management Training on Students Happiness in the Pesantren", dalam *Gadjah Mada Journal Of Professional Psychology*. Vol. 6, No. 2, 2020: 128- 139. http://dx.doi.org/10.22146/gamajpp.55682.

[13] Cardoso, J. B., Szlyk, H. S., Goldbach, J., Swank, P., & Zvolensky, M. J. (2018). General and Ethnic-Biased Bullying Among Latino Students: Exploring Risks of Depression, 216 https://snpm.unusa.ac.id Suicidal Ideation, and Substance Use. Journal of Immigrant and Minority Health, 20(4), 816–822. https://doi.org/10.1007/s10903-017-0593-5

[14] Mangunjaya,Fachruddin M, 2006. *Hidup Harmonis Dengan Alam (esai-esai pembangunan lingkungan, konservasi dan keanekaragaman hayati Indonesia),* Jakarta: Yayasan Obor Indonesia.

[15] Abdul Mu'ti., dkk. "Psikologi Santri (Analisis) Proses Adaptasi dan Penyesuaian Diri Santri di Indonesia", *Edukasi Islami: Jurnal Pendidikan Islam*, Vol: 12/NO: 02 Mei 2023. https://doi.org/10.30868/ei.v12i02.4067

[16] Finali, Z., A'la, M. Z., & Yunanto, R. A. (2020). Pelatihan Mitigasi Bencana pada Santri Usia Sekolah di Yayasan Subulus Salam Kabupaten Jember. *Jurnal Pengabdian Masyarakat Ilmu Keguruan Dan Pendidkan*,

[17] Zamroni. 2001. *Pendidikan Untuk Demokrasi*. Yogyakarta: Bilgraf Publising.

Improving the Quality of Education through International Accreditation (Study on Education Management Study Program, Universitas Negeri Yogyakarta)

Higar Iman Pribadi[1] , Regina Sinta Wati[2], Lia Yuliana[3] , Maya Novita Sari[4]

Department of Education Management, Universitas Negeri Yogyakarta, DIY, Indonesia

higariman.2023@student.uny.ac.id , reginasinta.2022@student.uny.ac.id , lia_yuliana@uny.ac.id , mayanovitasari@uny.ac.id

Abstract. This study aims to analyze the improvement of education quality through international accreditation at the Education Management Study Program of Yogyakarta State University. This research uses a qualitative approach with a case study method at the Education Management Study Program of Yogyakarta State University through interviews, observation and analysis of documents and literature. From this research, it is explained that the implementation of international accreditation in the UNY education management study program is that there are cultural changes caused by international accreditation that make staff and lecturers need to adjust quickly and appropriately. International accreditation has an impact on increasing the reputation of study programs abroad, student comfort and alumni opportunities to compete internationally, the ASIC framework also helps study programs to develop through IT-based educational services according to the times. However, the challenges in adjusting to international standards through accreditation involve various parties, so the time required is quite long. The conclusion of this research is that international accreditation has improved several educational qualities in UNY's education management study program. The benefits obtained are increasing global competitiveness, academic quality, transparency and accountability. Accreditation also facilitates international collaboration and mobility of students and lecturers.
Keywords: Quality of Education, International Accreditation.

1. Background

In the era of increasingly stringent globalization, improving the quality of higher education is a must to ensure the competitiveness of graduates in the international market. International accreditation emerges as one of the effective mechanisms to improve the quality of education. It ensures that study programs meet global standards and provide international recognition, thereby enhancing the reputation of higher education institutions. International accreditation also provides evidence of transparency and accountability to add value and benefits to universities (Sziegat, H., 2021). Coutet (2022) notes that there was significant growth in the market of international schools affiliated with various international accreditation institutions to 10,400 with 5.8 million students in 2019, providing the basis for international schools to operate using accreditation as a force to align school practices and produce graduate outputs that can meet global requirements.

Indonesia has many universities, but only a few university study programs have achieved international accreditation, namely 430 study programs from 35 universities compared to 3,923 study

programs accredited A by BAN PT, or only 11% in 2019 (Junaidi, 2020). This accreditation is important because it shows that a study program meets recognized global standards, both in terms of curriculum, teaching methods and quality of graduates. Without this accreditation, graduates from study programs may be considered less competitive than graduates from internationally recognized institutions. As an example of previous research with the title Analysis of the Potential of Chemistry Study Programs Towards International Accreditation by the Royal Society of Chemistry (RSC) by Candra & Nurhasni (2021), it was found that the Chemistry study program has followed the development of the industrial revolution 4.0 which can be seen in terms of resource support for the ability to use good technology. RSC accreditation criteria have also been achieved by the Chemistry Education study program. However, the study did not specifically explore how internal factors of the study program such as the readiness of lecturers and the availability of facilities affect the international accreditation process.

This research with the title "Improving Education Quality through International Accreditation: Study on Education Management Study Program of Yogyakarta State University" will explore areas that are less explored in previous studies such as analyzing the improvement of education quality through international accreditation. With the development of the world of education due to global challenges and the demand of the global community for quality education, educational institutions are competing to obtain international accreditation. This is a factor for educational institutions in improving educational quality assurance (Collins, 2015; Raharjo et al., 2019). Therefore, international accreditation is needed for universities so that quality improvement can be oriented towards developing standards at the international level. This research can also contribute to the field of education management studies as material for reflection and evaluation for other study programs that want to apply for international accreditation.

2. Literature Review

Accreditation is a recognition that is obtained at a university about the quality management system that exists in a study program / college. International accreditation in education is also an association or institution that evaluates recognized educational institutions and these institutions have met the criteria and requirements of predetermined quality standards. accreditation is also seen as a promotional strategy carried out by universities to build trust in the community. According to Rosyidah & Rosyid (2020), global recognition through international accreditation is an effective step in building international trust so that it can support promotional strategies. In addition, institutions can publish programs through the media, form special teams for internationalization affairs, engage in international events and provide scholarships for foreign students to gain global recognition.

In addition, international accreditation also has principles, namely 1) expanding access and ensuring the development of higher education; 2) promoting system renewal and reform and improving quality and relevance; 3) ensuring resources and funds to ensure the needs of higher education and 4) supporting development and partnerships in international cooperation. Dudin & Shishalova (2019) state that international accreditation is obtained in order to ensure knowledge and human resources in the socio-economic development of the country and increase competitiveness in the global market of educational services.

Accreditation is one of the steps for universities to implement Total Quality Management (TQM) (Kistiani & Permana, 2020). In several stages of TQM implementation, in addition to collaborating with foreign countries, a department in higher education applies for ASIC (Accreditation Service for international Colleges) international accreditation which focuses on facilities and infrastructure to support teaching and learning activities in order to provide comfort to students. In another perspective, Kurdistan Hewler University in improving quality assurance, also cooperates with ASIC through a comprehensive internal quality assurance process for 2 years by focusing on the quality of learning and

teaching, course delivery, quality assurance and improvement, premises and health and safety, student welfare, management and staff resources, and marketing and recruitment (Kafoor, 2019). Furthermore, the ASIC Framework is even used by Vin University to integrate with an innovative technology-based learning curriculum (Ha et al., 2023). The above explanation proves that ASIC accreditation has a significant impact on improving the quality of education in higher education, provided that the institution needs to make a preparation plan through internal quality assurance, including allocating the necessary budget.

The importance of international accreditation is also reflected through the support of the Indonesian government. To make it easier for study programs to obtain international recognition, the Directorate General of Learning and Student Affairs of the Ministry of Research, Technology and Higher Education implements four strategic programs, namely 1) study program facility program, to ensure that study programs that have started the recognition process are successful in the process; 2) study program acceleration program, which is to encourage the preparation of potential study programs and those that are in the process of accelerated preparation to obtain international recognition; 3) study program assistance program, which is to provide technical assistance and institutional strengthening to both study programs and institutions that are preparing internal steps towards international recognition; 4) study program maintenance and nurturing program, which is to ensure that study programs that have achieved international recognition can maintain the status that has been obtained and can contribute to providing experience to other study programs / institutions to strengthen the equality of the quality of education in Indonesia in the eyes of the world (Junaidi, 2020). Based on this Indonesian government program, it is hoped that universities in Indonesia will compete in submitting their study programs to obtain international recognition. so that it will improve the quality of higher education in Indonesia to answer global challenges.

3. Method

This research uses research with a qualitative approach. According to Sujarweni, W (2014) qualitative research is a type of research that produces findings that cannot be achieved using statistical procedures or quantification (measurement) methods. This research is case study research. This type of case study research is conducted in the Education Management Study Program which already has international accreditation. The methods used were interviews, observation, participant observation, document analysis and literature (Abdussamad, H. Z., & Sik, M. S., 2021). This study aims to analyze the improvement of educational quality through international accreditation in study programs in a university. The research subject is one of the study programs of Yogyakarta State University. Data analysis uses the Miles and Huberman model. According to Sugiyono (2016), data analysis includes data *reduction*, data *display* and *conclusion drawing/verification.* Data validity tests in this study include *credibility* (internal validity), *transferability* (external validity), *dependability* (reliability) and *confirmability* (objectivity) tests (Sugiyono, 2016). The sample in this study was the Dean of the Education Management Study Program at Yogyakarta State University.

4. Findings

The Education Management Study Program is one of 11 study programs that received ASIC accreditation with the title "*Premiere Institution"* in 2020, where this predicate is the highest predicate given by ASIC to institutions that get perfect scores in 8 areas that are the focus of ASIC's examination. Based on the results of the interview, it is known that each accreditation agency has a different examination cycle and focus. In this difference, the main objective is the same, namely to increase the accountability and transparency of educational institutions internationally. So that the accreditation

process is generally in the context of quality assurance of study programs or universities. With international accreditation, the study program has adequate capacity internationally.

One of the targets and objectives of international accreditation is to relieve national accreditation obligations, provided that the international accreditation institution is standardized or recognized by the ministry. This means that of the many international accreditation agencies, not all are recognized by the ministry and therefore not all accreditations can be accounted for.

Based on its implementation, the Master of Education Management Study Program obtained international accreditation from ASIC through several 3 main stages. The first stage is the examination of the application form which includes the collection of materials regarding the 8 areas to be examined by ASIC. Before entering this stage, in addition to preparing the report structure and completeness of documents, a long process can occur when making other preparations such as security facilities, for example security for students with disabilities. In general, this first stage takes about 2 weeks, but for general facilities preparation, it may take longer depending on the readiness of the institution.

The second stage is an inspection by ASIC inspectors, in this case the ASIC CEO, Mr. Lee Hammond, together with Osman Suleman, conducted an assessment of the MP S2 study program. The components assessed by ASIC inspectors include *Premises, Health, and Safety; Government, Management and Staff Resources; Learning, Teaching and Research Activities; Quality Assurance and Enhancement; Student Welfare; Award and Qualification; Marketing and Recruitment; and System Management. The* assessment begins with an interview with leaders such as the Dean, Deputy Dean, Head of Division, and Head of Study Program. This is done to see the extent to which learning practices, administrative management, and other important aspects have met the required standards. In addition to the leadership, the inspectors also conducted interviews with lecturers, students and alumni. Some of the questions asked related to comfort when moving on campus, safety procedures and facilities. During the inspection, there are also observations of learning in MP, inspection of supporting documents, as well as conducting *site visits,* which is visiting and seeing firsthand some of the facilities provided such as laboratories, department rooms and canteens. This stage is usually completed in 6-8 weeks.

The next stage is the inspection report which is a decision issued by the ASIC accreditation body. This stage of the process is completed within 6-8 weeks after the inspection. Based on the interview results, it was found that the process from the first stage of collecting application forms to inspection took about 2-3 months. While the process of preparing all the fulfillment of criteria ranging from documentation to facilities takes longer. So the length of the accreditation process is determined by the readiness of each Institute or institution itself.

Best practice during the accreditation process is when there is a process of consolidation and coordination of various units, where all elements work together to meet the criteria provided by ASIC. The implementation of international accreditation by S2 MP has been reflected in various services, governance, system management, teaching, qualifications, and student comfort.

For students, the benefit of international accreditation is as a requirement to apply for a job. An internationally accredited diploma will help the Institute's graduates become a priority to be accepted in a job. In addition, it is also useful for improving student abilities as self-development. With international accreditation, it will open up opportunities for international students to join, so that competition in the nature of self-development between students will be more intense. With quality assurance in learning and other services, students receive more benefits from the accreditation results.

For the study program, accreditation by ASIC is beneficial for the development of the study program, where the academic community and employees are more professional and have credibility in their work. With this accreditation, another effect is the many offers of grants, assistance, loans intended for study programs. So that the study program has the opportunity to develop further, one of which is by utilizing these grants for research purposes. On the other hand, accreditation is also useful to support the competitiveness of the institution, so that the institution or in this case the study program will gain more trust from the public regarding its credibility and transparency.

5. Discussion

5.1 Accreditation of the Education Management Study Program at Yogyakarta State University ASIC (Accreditation Service for International Schools, Colleges and Universities)

ASIC (*Accreditation Service for International Schools, Colleges and Universities*) is an independent accreditation service for international universities with offices in the UK. ASIC provides assurance to education authorities, students, parents and employers that accredited institutions are fit to deliver high quality education and services. ASIC inspections include checks on the content and standards of the curriculum and the quality of its delivery to learners. Based on the results of observations and interviews above, the institution, in this case the UNY Master of Education Management Study Program, has completed several stages that cover the above matters. Among the inspections carried out are regarding the management system to the learning process to see the extent to which the learning process and services to students are maximized.

The ASIC accreditation process requires two visits to the institution which are usually combined into one. The visit in stage 2 focuses on location, health and safety, educational facilities, teaching and learning processes, student welfare, and marketing and recruitment processes. The visit in stage 3 focuses on management, staff qualifications and meetings with staff, delivery of academic programs and meetings with students as well as compliance with immigration requirements and meetings with institutional leaders. Both visits are conducted after the institution has completed the first stage, which is submitting a complete ASIC application form. To prepare for the visit, the study program uses the ASIC assessment instrument as a reference material to complete the requirements. This process takes place before the study program makes payment and submits the initial form to ASIC.

The ASIC assessment also focuses on the place and supporting facilities for the continuity of learning activities. all general facilities such as classrooms and their supports have been available for a long time. However, what takes longer is the fulfillment of facilities for students such as support for students with disabilities, health facilities and fulfillment of safety for students. To fulfill the 8 areas that are the focus of the ASIC inspection, the study program has created a special accreditation team where each division jointly conducts documentation and reporting to complete the required criteria. In addition, in the implementation of international accreditation, the challenge of the study program is when synergizing with various parties internal to the study program and external. Therefore, it takes a long time to prepare for this accreditation from the beginning of the submission to the running of the accreditation process. The cultural changes caused by international accreditation make the staff and lecturers need to adjust quickly and appropriately, so that these changes will make them worthy of international standards by ASIC in terms of services and learning processes in the classroom.

After this process, the Master of Education Management study program, which at that time was together with 10 other study programs at UNY, finally succeeded in achieving the *Premiere Institution* predicate, which is the highest predicate of ASIC. The achievement of this predicate is the result of the hard work of all elements of the Study Program, where all units have synergized to achieve ASIC criteria. In addition, the main objective is to ensure and improve the quality of the Study Program, so that the community and students get the best service and education. This success is considered as a result of the readiness of MP Study Program's internal quality assurance in preparing for international accreditation which has carried out internal quality assurance for more than 1 year before applying for accreditation using ASIC criteria, including preparing lecturers, especially in learning, teaching and research activities in order to meet ASIC international criteria. This is important and directly proportional to what was found at Kurdistan Hewler University through internal quality assurance by Kafoor (2019).

5.2 The Impact of International Accreditation on the Education Management Study Program of Yogyakarta State University

The international accreditation implemented by the Master of Education Management Study Program has a gradual and direct impact on the overall quality of the study program. Of the 8 ASIC examination areas, (1) Premises, Health and Safety, (2) Governance, Management and Staff Resources, (3) Learning, Teaching and Research Activities, (4) Quality Assurance and Improvement, (5) Student Welfare, (6) Awards and Qualifications, (7) Marketing and Student Recruitment, and (8) System Management and Compliance with Immigration Regulations, the greatest impact is on the area of marketing and student recruitment. Since the study program obtained ASIC accreditation, the number of students in the s2 Education Management study program increased, partly because the study program marketed the study program through the website that they were internationally accredited. Furthermore, the reputation of the study program rose gradually, opening up opportunities for cooperation with foreign countries. Educational facilities and student comfort have also improved since the international accreditation. The study program began to provide IT-based and *up to date* services according to the needs of lecturers and students, so that the development of lecturer competence as well as the quality of students and graduates gradually increased and could compete internationally. In line with the opinion of Kumar et al., (2020) states that improving the quality of education which includes academic/non-academic services, transparency and accountability is influenced by accreditation which includes professionalization of quality assurance, learning, research and innovation, resource utilization, policies and their application. The improvement of these dimensions has a significant impact in attracting more global students, exchange programs, cooperation with international universities, organizations, research collaborations, conferences, workshops and student success & progress, etc. This also reinforces that the ASIC framework has been successfully integrated in technology-based education services where education service standards need to keep up with the times (Ha et al, 2023). Student welfare has become important since international accreditation, as evidenced by regular guidance for students and for students working on their final project. Students are also given space to provide all input for the learning process that takes place in each course. All of these accreditation processes are directly proportional to what Kafoor (2019) said, that the status of education quality through the ASIC accreditation process has improved well with the recommendation that the study program needs to make evaluation reports from all aspects of the accreditation assessment in stages to maintain and develop the quality assurance of study program education.

For the study program itself, the implementation of international accreditation has become a benchmark for educational quality and a standard *checkpoint* that the quality of all aspects that have been achieved must be maintained and improved. However, based on the determination of the Indonesian Ministry of Education, ASIC is now not a registered international accreditation body. Therefore, the study program may not renew the international accreditation through ASIC and may switch to other international accreditation agencies registered by the Ministry of Education.

6. Conclusion

Based on the findings, it can be concluded that international accreditation has improved several educational qualities in MP UNY study programs. The benefits obtained are increasing global competitiveness, academic quality, transparency and accountability. Accreditation also facilitates international collaboration and mobility of students and lecturers. However, realizing the phenomena that occur in the journey of MP UNY study program to achieve ASIC international standards, the researchers provide several recommendations for other study programs that want to apply for international accreditation. (1) the number of assessment standards required in applying for international accreditation requires extra work for institutions that will affect the main tasks of lecturers and staff, therefore it is better to prepare for accreditation submission well in advance of sending the

form so as not to interfere with educational services for students, especially in class. (2) for UNY, as a fairly large university in Indonesia, the cost of applying for international accreditation may still be affordable, but for other universities the costs required will be very high. Therefore other universities need to prepare a budget well to apply for international accreditation. (3) To avoid failure in accreditation assessment, it is recommended to conduct a comprehensive internal quality assurance process by referring to the assessment indicators provided by the accreditation agency. (4) Since the delivery of the study program international accreditation facilitation program from the Indonesian government, universities can follow the instructions so that it will accelerate the process of achieving international accreditation. (5) After the assessment process, the study program is advised to conduct periodic evaluations to maintain the quality of international standards.

References

[1] Abdussamad, H. Z., & Sik, M. S. (2021). *Metode penelitian kualitatif*. CV. Syakir Media Press.

[2] Candra, A., & Nurhasni, N. (2021). Analisis Potensi Program Studi Kimia Menuju Akreditasi Internasional oleh Royal Society Of Chemistry (RSC). Shautut Tarbiyah, 27(2), 141-159.

[3] Collins, I. (2015). Using international accreditation in higher education to effect changes in organisational culture: A case study from a Turkish university. *Journal of Research in International Education*, *14*(2), 141-154.

[4] Coutet, K. (2022). International school accreditation: An isomorphic force against creativity in a growing competitive market. *Journal of Research in International Education*, *21*(2), 105-122.

[5] Dudin, M. N., & Shishalova, Y. S. (2019). Development of Effective Education and Training System in the Context of the Transition to International Accreditation. *European Journal of Contemporary Education*, *8*(1), 118-127.

[6] Ha, T. M., Hoang, D., Huynh, C. D., & Le, L. (2023). Integrated educational technology in teaching anatomy using the ASIC framework: a case study from VinUniversity. *Advances in Medical Education and Practice*, 669-681.

[7] Junaidi, A. (2020). Petunjuk Teknis Program Hibah Fasilitasi Akreditasi Internasional Program Studi.

[8] Kafoor, S. (2019). Quality Assurance and Accreditation at University of Kurdistan Hewler. *UKH Journal of Social Sciences*, *3*(1), 62-66.

[9] Kistiani, D. P., & Permana, J. (2020, February). The Importance of Application Total Quality Management at Higher Education. In *3rd International Conference on Research of Educational Administration and Management (ICREAM 2019)* (pp. 177-180). Atlantis Press.

[10] Kumar, P., Shukla, B., & Passey, D. (2020). Impact of accreditation on quality and excellence of higher education institutions. *Investigación Operacional*, *41*(2), 151-167.

[11] Makhoul, S. A. (2019). Higher education accreditation, quality assurance and their impact to teaching and learning enhancement. *Journal of Economic and Administrative Sciences*, *35*(4), 235-250.

[12] Nguyen, H. C., & Ta, T. T. H. (2018). Exploring impact of accreditation on higher education in developing countries: a Vietnamese view. *Tertiary Education and Management*, *24*, 154-167.

[13] Rosyidah, N., & Rosyidi, U. (2020). Internationalization in Higher Education: University's Effective Promotion Strategies in Building International Trust. *European Journal of Educational Research*, *9*(1), 351-361.

[14] Sujarweni, Wiratna. 2014. Metodologi Penelitian. Yogyakarta: Pustaka Baru Press.

[15] Sugiyono. (2016). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: PT Alfabet.

[16] Sziegat, H. (2021). The response of German business schools to international accreditation in global competition. *Quality Assurance in Education*, *29*(2–3), 135–150. https://doi.org/10.1108/ QAE-01-2020-0008

[17] Zuliana, S. U., & Futhona, A. K. (2024). Manajemen Program Studi Matematika UIN Sunan Kalijaga yang Profesional Berbasis Akreditasi Internasional ASIIN. *Mauizhah: Jurnal Kajian Keislaman*, *14*(1), 19-31.

Leadership Development of Vice Principals at Colombo Sleman High School Through Mentoring Program

S. Nudia Mastur[1], Irfan[2]

[1] Educational Management, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] PGMI, Sunan Kalijaga State Islamic University, Yogyakarta, Indonesia

[*]snudia.2022@student.uny.ac.id[1], 21204082006@student.uin-suka.ac.id[2]

Abstract. This study investigates the practice and development of leadership in Colombo Sleman High School. The focus of this study is how the implementation of leadership development conducted by the principal to the vice principal in the field of curriculum to improve their leadership skills to achieve school goals optimally. The research method used in this study is descriptive qualitative with a case study design. The findings show that the principal's leadership development is carried out through unstructured mentoring activities; the principal acts as a mentor and a coach, while the mentee is the vice principal. The results showed that the vice principal for curriculum had been able to develop his leadership in creating effective implementation of activities and relationships with implementing education personnel. Mentoring by school principals to vice principals for curriculum be conducted more structured so that process indicators and program achievements can be better formulated.
Index Terms—*Leadership Development, Mentoring, School Leadership*

1. Introduction

Mentoring for leadership development is a process that involves a mentor providing guidance, support, and feedback to the mentee to help them develop their leadership skills. Effective mentoring requires practical considerations [1]. Mentoring programs have become a mainstay for developing leadership skills in various contexts [2].

Mentoring is a companion activity that involves a mentor as a companion and a mentee as a person who gets assistance [3]. Mentors are essential in shaping leaders' views and preferences regarding leadership development and highlighting differences in perceptions between formally and informally mentored leaders [4]. Formally mentored leaders prefer external programs as a means of leadership development. In contrast, informally mentored leaders prefer internal leadership development programs [5].

Mentoring aims to develop the mentee's ability to gain knowledge, skills and confidence to become a better leader [6]. The primary purpose of mentoring is to develop various aspects of educational leadership, such as principals' knowledge, skills, character and courage to prioritise student learning [7]. The hallmark of mentoring practice is the long-term dedication of both mentor and mentee, regular interaction, and formal and informal investment in personal growth, career development, psychosocial development, and leadership empowerment [8]. Although mentoring is designed to develop the mentee, the influence in a mentoring relationship is reciprocal rather than unidirectional [9].

The expected outcomes of mentoring for mentees are improved psychological health, greater positivity, and achievement [6]. For mentors, positive outcomes include increased pride and satisfaction,

sharpened leadership competencies, greater self-confidence, better job performance, and higher generativity. Better job performance and higher generativity [1]. Allen and Eby (2010) argue that effective mentoring relationships meet the need to form and maintain a positive relationship, which links mentoring to positive affective, cognitive, and behavioural outcomes [10].

Irby et al. (2022) developed a leadership mentoring model in education, noting that leadership coaching is critical in improving leadership capabilities, especially in rural schools [11]. The developed model aims to prepare and retain educational leaders for successful school employment. The model promotes experiential learning for aspiring leaders, suggesting practical approaches and hands-on experience as the primary means of learning.

Samora et al. (2022) argued that mentoring can improve leadership skills. The role of a mentor in educational leadership is not limited to modelling or advising. A good mentor goes beyond just giving advice or being a role model and provides constructive feedback [12]. Good mentors provide general direction and interact specifically with leadership practices.

Mentoring tends to be more effective or successful when the mentor and mentee have much in common in certain respects, such as values, background, experience, and outlook [13]. Mentors are expected to provide advice, guidance, and assistance to mentees to help them in their personal and professional development. Not only that, mentors serve as a source of knowledge and experience to help mentees achieve their goals.

Structured mentoring is a systematically designed method with focused goals for both mentor and mentee. This approach involves predetermined content coverage, a specific mode of delivery, and an explicit philosophy [14]. This structured mentoring is essential so that mentors and mentees can work in a focused manner without excessive confusion or uncertainty that can hinder learning opportunities. It provides a clear direction for the mentor and mentee in the learning process and allows for crossing a specific timeline with a better understanding of what needs to be achieved.

Unstructured mentoring is informal, and meetings between mentor and mentee can occur as needed or as time allows. Content and delivery methods emerge naturally in this mentoring and may vary over time without a clear plan or structure [14]. Mentors provide mentees guidance, advice, and experience without following a detailed plan.

Based on research by Robinson and Searcy (2017), strategic mentoring must have specific characteristics, namely reliable and systematic. Mentors who do not have a clear structure or organized plan cannot take the necessary steps to improve or develop the mentoring process. This shows that when the mentoring approach is not structured, there is no broad understanding or sufficient understanding of how to conduct effective and successful mentoring [15].

Through this research, the author wants to explore the practice and development of leadership implemented at Colombo High School Sleman. The focus of this research is how the principal conducts the implementation of leadership development for the vice principal in the field of curriculum to improve their leadership skills and achieve school goals optimally.

This research is expected to be a benchmark in improving and enhancing leadership development activities at Colombo High School Sleman for the principal and the parties involved.

2. Method

The method used in this research uses descriptive qualitative research [16]. The purpose of using this research method is so that researchers are more able to collect data from sources and documentation found in the field. Data collection in qualitative research is carried out with primary and secondary data [17]. The primary data is taken through interviews conducted by interacting with the object of research; in this case, the data source is the subject of the data obtained. The research subjects in this study were

the principal of Colombo Sleman High School and the vice principal of the curriculum of Colombo Sleman High School.

In this study, researchers used in-depth interviews to obtain data and a complete picture of the topic under study. Meanwhile, secondary data is taken through documentation found by researchers in the field. Furthermore, the data analysis technique used in this study uses Miles Huberman and Spradley data analysis. Miles and Huberman suggested that activities in qualitative data analysis are carried out interactively and occur continuously at each stage of the research until it is complete and the data is saturated. Activities in data analysis, namely data collection, data reduction, data display, and conclusion drawing/verification. Furthermore, the data is presented as the results of this study.

3. Findings and discussion

3.1. Development Considerations

The vice principal for curriculum, in this case, Dra. Sri Rejeki Andadari, M.Pd., must have personality, social, managerial and academic competencies. The principal assists the vice principal with the curriculum to ensure she can successfully carry out her duties and functions effectively and efficiently. The vice principal for the curriculum is responsible for the administration, management, development, supervision and services related to the academic field in the form of intracurricular, co-curricular and extracurricular activities that support the education process in the education unit.

3.2. Types of Activities

The principal does not routinely assist the vice principal for curriculum in carrying out his duties but coordinates with each other to provide assistance or find solutions when the vice principal for curriculum finds obstacles in carrying out his duties. Furthermore, principals conduct routine activities to assist and evaluate weekly activities and those that have been carried out and jointly plan activities to be carried out in the future in the form of briefings, biweekly meetings, and activity evaluations. The author's understanding of the briefing conducted by the principal is almost in line with the concept of mentoring. The principal also acknowledged this, as he said:

"Because the vice curriculum has served as principal before me and he has also completed a master's degree in education management, so for leadership, we are more about discussing and only asking things that are unknown, and I try to explain", said Mr Sukarsono.

Thus, the skill development carried out by the head of Colombo Sleman High School is mentoring. However, further analysis is needed to determine whether the mentoring is of good quality.

3.3. Skills Developed

Based on interviews and documentation studies with the principal of Colombo Sleman High School, the activities carried out to strengthen the leadership abilities of the vice principal of the curriculum are carried out through the briefing process. The activities carried out are in the form of mentoring. Next, the author also conducted interviews and documentation studies with the vice principal of curriculum as the party whose leadership was developed, whittling down the understanding of leadership development carried out by the principal to the vice principal of curriculum further explained that the development carried out was mentoring as a form of leadership development on the job training in the form of unstructured mentoring.

3.4. Program Design

Mentoring conducted by the principal aims to improve the performance of the vice principal for curriculum at SMA Colombo Sleman in the form of discussions to develop their skills and knowledge.

The principal's strategy for improving the performance of TU staff is through regular mentoring, coordination of task distribution, training, performance evaluation, and measuring the program's success rate with monthly meetings.

Through mentoring provided by the principal, the vice principal for curriculum can feel the support and appreciation from the principal to increase motivation and work enthusiasm and improve their performance. In addition, mentoring also helps in overcoming problems or challenges that may arise.

In the mentoring process, the principal acts as a supporter and counsellor. The principal was motivated to carry out tasks sincerely, with direction and support from the deputy head of curriculum. Based on the results of interviews with the principal of Colombo High School Sleman and the Vice Principal for Curriculum at Colombo High School Sleman, regular meetings are held monthly to provide support, consultation, and performance evaluation to all education personnel, including the vice principal for curriculum.

3.5. Program Implementation Analysis

As a mentor, the principal has a less clear framework in developing the leadership of the vice principal for curriculum. Scheduled mentoring with education personnel is short and long-term to help the vice principal of curriculum achieve significant personal and professional development. The relationship between the principal and the deputy principal for the curriculum is very close, as there has been much trust-building and experience-sharing in the previous period.

Although this mentoring activity is carried out in an unstructured manner, the achievement of leadership development by the principal to the vice principal of curriculum is successful because the vice principal of curriculum has been able to develop his leadership in creating effective implementation of activities and relationships with implementing education personnel. It is in line with the theory of leadership development put forward by Dumbar & Kinnersley (2011) that mentoring tends to be more effective or successful when the mentor and mentee have a lot in common, such as values, backgrounds, experiences, and views [13].

The role of the principal of Colombo Sleman High School as a mentor is as follows: 1) The principal is a supporter; the principal encourages to maintain the confidence of the vice principal of curriculum. In addition, the principal motivates them to carry out their duties sincerely, remembering that every job is considered an act of worship. 2) As a principal who acts as a counsellor, his main task is to provide a forum for discussion and coordination to the head of the curriculum to increase the effectiveness of achieving his duties.

3.6. Pros and Cons of the Program

Based on the interview results, this program is considered adequate. It is due to the background of the deputy principal for curriculum, who was the principal in the previous period and has completed his master's degree in education management, so he already has a good leadership base. However, mentoring activities must continue to be carried out to evaluate the achievement of educational goals.

This program has several advantages, such as strengthening the relationship between the principal and the curriculum vice principal through developing interpersonal skills. Through this mentoring, the principal can understand the problems, challenges and obstacles faced by the deputy head of curriculum and help find solutions. On the other hand, the disadvantage is that this unstructured mentoring approach does not provide a broad understanding or sufficient insight into conducting effective and successful mentoring.

4. Conclusion

The results of the study that the author has researched about developing the leadership of the vice principal of the curriculum at Colombo Sleman High School through mentoring activities using descriptive qualitative methods. The results showed that the mentoring activities carried out by the principal to the vice principal of curriculum were in the form of mentoring. The mentoring is unstructured. This unstructured mentoring happens because the background of the curriculum vice principal, who is a master's graduate in education management and also the principal of the previous period, makes his leadership experience very good. The principal, as a mentor, only acts as a supporter and discussion partner, and the rest as a coach only during meetings and evaluation of activities.

Based on the field study that has been conducted related to the principal's mentoring in developing the leadership of the vice principal of curriculum, the author recommends that the implementation of mentoring activities by the principal to the vice principal of curriculum is more structured so that process and achievement indicators can be formulated better.

References

[1] Hastings, L. J., & Sunderman, H. M., "Evidence-Based Practices in Mentoring for Leadership Development," New Directions for Student Leadership, vol. 2020, no. 168, hlm. 75–84, 2020, doi: https://doi.org/10.1002/yd.20410.

[2] Sipe, L. J., & Testa, M, "A Dynamic Model of Mentoring for Hospitality Leadership Development," Open Journal of Leadership, vol. 09, no. 01, hlm. 11–33, 2020, doi: https://doi.org/10.4236/ojl.2020.91002.

[3] Morales, D. X., Grineski, S. E., & Collins, T. W, "Effects of mentor–mentee discordance on Latinx undergraduates' intent to pursue graduate school and research productivity," Annals of the New York Academy of Sciences, vol. 1499, no. 1, hlm. 54–69, 2021, doi: https://doi.org/10.1111/nyas.14602.

[4] Smith, D. L, "The role of mentoring in the leadership development of pre-service school librarians.," Education Libraries, vol. 36, no. 1, hlm. 15–23, 2013.

[5] Siegel, P. H., Schultz, T., & Landy, S, "Formal versus informal mentoring of MAS professionals," The Journal of Applied Business Research, vol. 27, no. 2, 2013.

[6] Hastings, L. J., & Kane, C, "Distinguishing Mentoring, Coaching, and Advising for Leadership Development," New Directions for Student Leadership, vol. 2018, no. 158, hlm. 9–22, 2018, doi: https://doi.org/10.1002/yd.20284.

[7] Frels, R. K., Onwuegbuzie, A. J., Bustamante, R. M., Garza, Y., Nelson, J. A., Nichter, M., & Soto Leggett, E, "Purposes and approaches of selected mentors in school-based mentoring: A collective case study," Psychology in the Schools, vol. 50, no. 6, hlm. 618–633, 2013, doi: https://doi.org/10.1002/pits.21697.

[8] Campbell, C. M., Smith, M., Dugan, J. P., & Komives, S. R., "Mentors and College Student Leadership Outcomes: The Importance of Position and Process," The Review of Higher Education, vol. 35, no. 4, hlm. 595–625, 2012, doi: https://doi.org/10.1353/rhe.2012.0037.

[9] Crisp, G., & Cruz, I, "Mentoring College Students: A Critical Review of the Literature Between 1990 and 2007," Research in Higher Education, vol. 50, no. 6, hlm. 525–545, 2009, doi: https://doi.org/10.1007/s11162-009-9130-2.

[10] Eby, L. T., Butts, M. M., Durley, J., & Ragins, B. R., "Are bad experiences stronger than good ones in mentoring relationships? Evidence from the protégé and mentor perspective," Journal of Vocational Behavior, vol. 77, no. 1, hlm. 81–92, 2010, doi: https://doi.org/10.1016/j.jvb.2010.02.010.

[11] Irby, B. J., Pashmforoosh, R., Tong, F., Lara-Alecio, R., Etchells, M. J., Rodriguez, L., Prickett, C., & Zhao, Y, "Virtual mentoring and coaching for school leaders participating in virtual professional learning communities.," International Journal of Mentoring and Coaching in Education, vol. 11, no. 3, hlm. 274–292, 2022, doi: https://doi.org/10.1108/IJMCE-06-2021-0072.

[12] Bertrand, L. A., Stader, D., & Copeland, S., "Supporting new school leaders through mentoring.," School Leadership Review, vol. 13, no. 2, hlm. 82–94, 2018.

[13] Dumbar, D. P., & Kinnersley, R. T., "Mentoring female administartion toward leadership success.," International Journal for Professional Educators, vol. 77, no. 3, 2011.

[14] Hairon, S., Loh, S. H., Lim, S. P., Govindani, S. N., Tan, J. K. T., & Tay, E. C. J, "Structured mentoring: Principles for effective mentoring," Educational Research for Policy and Practice, vol. 19, no. 2, hlm. 105–123, 2020, doi: https://doi.org/10.1007/s10671-019-09251-8.

[15] Robinson, Q. L., & Searcy, D. Y, "Strategic mentoring as a culturally responsive approach for mentoring fatherless black boys," International Academic Conference Proceedings, hlm. 43–58, 2017.

[16] Cooper, C., Pereira, V., Vrontis, D., & Liu, Y., "Extending the resource and knowledge based view: Insights from new contexts of analysis," Journal of Business Research, 2023.

[17] Mosweu, T. L., "Use of social media platforms for increased access and visibility by the Botswana National Archives and Records Services.," In Research Anthology on Applying Social Networking Strategies to Classrooms and Libraries, hlm. 946–968, 2023.

Modelling of Fighter Squadron Deployment System to Optimize the Covering of Indonesian Airspace with Set Covering Problem (SCP) Method and P-Median Problem (PMP) Methods

Salma El M. P. Achzaabi[1,3], Gagat Riano[2,4]

[1,2] Department of Industrial Management Engineering, Air Force Academy, Yogyakarta, Indonesia

[3]salmaachzaabi123@gmail.com
[4]kryptonsmo@gmail.com

Abstract. Creating a model of the results of simplifying a complex system, namely the placement of all Air Force fighter aircraft such as F-16, SU 27/30, and Rafale / F-15 EX using the Set Covering Problem (SCP) mathematical model. Then maximized by minimizing the average distance with the P-Median Problem (PMP) method. The result of the modelling is that five air bases are needed to optimize the ability to cover the entire territory of Indonesian sovereignty. The difference between the results of the two methods is 674 km which shows a more effective and efficient system model.

1. Introduction

Modeling can be defined as a set of activities in modeling as a representative or abstraction of an object in the form of an actual situation which is a simplified form of a complex reality. In modeling, objects are designed as a description of the operation of the real system accurately and ideally in order to provide information or show important interrelationships [1]. Structurally, there are five kinds of models, one of which is a mathematical model, which is a model that uses mathematical formulations (equations or inequalities) to explain the behavioral functions of real systems [2]. This research tries to use mathematical models to find the right location for the placement of fighter aircraft owned by the Indonesian Air Force. In 2023, the Air Force immediately realized the acquisition of multi-role combat aircraft, F-15 EX and Dassault Rafale [3], to complement the two F-16 Fighting Falcon fighter squadrons and one Sukhoi SU 27/30 squadron that the Air Force already has [4]. These fighter aircraft will later be used to cover the entire territory of Indonesia by air, which until now has not been able to be implemented optimally [5]. By using this modeling, it is expected to know the optimal placement of the above fighter aircraft, so as to destroy air threats long before entering sovereign territory and ensure the security of Indonesian airspace.

2. Literature Review

Simarmata and Ispriyanti [6] define a model as a simple core picture and can represent something that you want to show, or in the sense that the model is an abstraction of the system. The model is a representation of the system, meaning that the model does not have to and does not need to have all the characteristics of the system, just a small part of it, but it is problem-oriented. This is related to the use of models to help find solutions to problems [7].

The use of mathematical models to solve locating problems was discovered by Toregas, Swain, ReVelle, & Bergman [8] in their research on locating emergency services. This model became known as the Set Covering Problem (SCP). This model was then developed by many other researchers, including the P-Median problem (PMP) model. Hakimi [9] [10] stated that PMP aims to determine the exact location of P, which can minimize the average distance (based on demand) between the demand node and the location where the facility is placed, so as to estimate the total cost of goods distribution. In this model, capacity constraints in facilities are ignored.

3. Research Framework

3.1. Research Objectives.
This research will try to model the placement of three types of Air Force fighter aircraft quadrons to protect the entire Indonesian airspace with the following conditions:

    a.   Able to protect all vital objects from at least one airbase by minimizing the number of squadrons needed and the response time of fighter aircraft.
    b.   Maximize the protection capability of fighter aircraft by minimizing the overall distance or average distance per network location.

3.2 Data Collection.
The data in this paper is obtained from documents or literature that supports this research. The data needed in this research include:

    a.   The fighter aircraft to be used in this study are the F-16 Fighting Falcon and SU 27/30 [11] and Rafale/F-15 EX [12].
    b.   Using 34 airstrips [13] and four outer islands of Indonesia. The distance between airstrips is calculated by calculating the distance between airstrip coordinates using the Google Earth application.
    3.3 Pengolahan Data

In this study, development costs are ignored, so they are assumed to be one. The position of the airstrips to be selected is evenly distributed throughout Indonesia, and is generally close to vital objects, border areas and Indonesian Archipelagic Sea Lane (IASL) routes. So the position of the area to be covered is assumed to be the same as the position of all the airstrips to be selected. The two mathematical models used are as follows:

    a. Set Covering Problem (SCP). This method was used to solve the first and second objectives of this study. The notation used is:

- $i \in I$ = Notation for covered airfields.
- $j \in J$ = Notation for airstrips selected as main/operating airstrips
- $k \in K$ = Notation for aircraft type. 1 = F-16, 2 = SU 27/30/35, 3 = Rafale/F-15 EX
- d_{ij} = The shortest distance between airstrip i and airstrip j.
- S_{ijk} = Maximum distance that can be reached from selected airstrip j to airstrip i based on *Radius of Action* (ROA) Aircraft k. that is: F-16 with ROA 350 NM ∞ 648 KM, SU 27/30/35 ROA 450 NM ∞ 833 KM and Rafale/F-15 with ROA 550 NM ∞ 1.019 KM
- C_j = The cost of building facility j is assumed to be identical and has a value of 1
- n_{ik} = Set of airstrips i that can be covered with the required distance from airstrip j by airplane. k. $n_i = \{j/d_{ij} \leq S_{ijk}\}$;
  - a_{ijk} = The parameter is a binary number, worth 1 if airstrip i is covered from airstrip j by aircraft k. 0 otherwise. $a_{ij} \in n$.

- $X_{jk} \in \{0,1\}$ = the decision number is a binary number, 1 if candidate airfield j is selected for aircraft k and 0 if not..

The SCP mathematical model is as follows:

1) Objective function. . :

$$\text{Minimize} \sum_j \sum_k C_j X_{jk} \tag{1}$$

2) Constraint Function

$$X_{jk} = \sum_j \sum_k X_{jk} \tag{2}$$

$$\sum_j^n \sum_k a_{ijk} X_{jk} \geq 1 \ \forall \ i \ (i = 1, \dots, m) \tag{3}$$

$$\sum_{j \in J} X_{j1} = 4 \tag{4}$$

$$\sum_{j \in J} X_{j2} = 1 \tag{5}$$

$$\sum_{j \in J} X_{j3} = 2 \tag{6}$$

$$X_{j1} + X_{j2} + X_{j3} \quad = 1 \tag{7}$$

$$X_{jk} \in \{0,1\} \ j = 1, \dots, n \quad k = 1,2,3 \tag{8}$$

The objective function (1) is to minimize the number of airstrips used as main airstrips. Constraint (2) states that the number of airstrip xjk that will be occupied by F-16, SU 27/30/35 and Rafale/F-15 EX. Constraint (3) ensures that each base i will be covered by at least one base j with a distance of S (ROA). Constraints (4), (5) and (6) are the number of aircraft squadrons owned. Constraint (7) ensures that one carrier airbase will operate one type of fighter aircraft. Constraint (8) is an integrality constraint.

b. *P-Median* (PMP). In this method all airstrips are assumed to have the same importance weight, given that the objective of this study is to maximize fighter squadron capability. Other assumptions used are the same as in the SCP method, with the maximum number of airstrips used (P) as in the SCP method. The mathematical model developed is as follows:

1) Objective function :

$$Minimize \sum_i \sum_j \sum_k h_i d_{ij} Y_{ijk} \tag{9}$$

2) Constraint :
:

$$\sum_{i\in I} Y_{ijk} = 1 \quad \forall i \in I \quad \forall k \in K \tag{10}$$

$$Y_{ijk} \leq X_{jk} \quad \forall i \in i \quad \forall j \in J \quad \forall k \in K \tag{11}$$

$$\sum_{j\in J} X_{jk} = p \tag{12}$$

$$\sum_{j\in(1,2...10)} x_{j1} = 4 \tag{13}$$

$$\sum_{j\in(1,2...10)} x_{j2} = 1 \tag{14}$$

$$\sum_{j\in(1,2...10)} x_{j3} = 2 \tag{15}$$

$$x_{j1} + x_{j2} + x_{j3} = 1 \tag{16}$$

$$Y_{ijk} = 1 \quad \in \{0,1\} \quad \forall j \in J \ \forall i \in I \ \forall k \in K \tag{17}$$

The objective function (9) minimizes the dij distance between lanes i and j. Constraint (10) ensures that base i will be covered by aircraft k from base j. Constraint (11) says that base i can be covered by fighter squadron k from airbase j only if there is fighter squadron k at airbase j. Constraint (12) states the number of airstrips to be used. Constraints (13), (14) and (15) give the number of fighter squadrons owned. Constraint (16) ensures that one main airbase will operate one type of fighter aircraft. Constraint (17) is an integrality constraint.

4. Result and Discussion

The results of data processing are as follows:

4.1. Airplane Speed.

If the assumed turn around time (time to complete a mission) is 1 hour [14]. The aircraft speeds used are [13], F-16 is 1555.2 km/hour, SU 27/30 is 2,271.81 km/hour and Rafale/F-15 EX is 2776.36 km/hour..

4.2. Data Processing Results with SCP Method

a. The minimum number of fighter aircraft squadrons needed to cover all of Indonesia's airspace is five squadrons, with details of two F-16 squadrons, which will be stationed at SRI and SWO Airstrips, one SU 27/30 aircraft squadron with placement at TDN Airstrip, and two Rafale / F-15 EX squadrons which will be stationed at HND and DMN Airstrips. The placement of the squadron and the area covered by each occupied airstrip can be seen in figure 1.
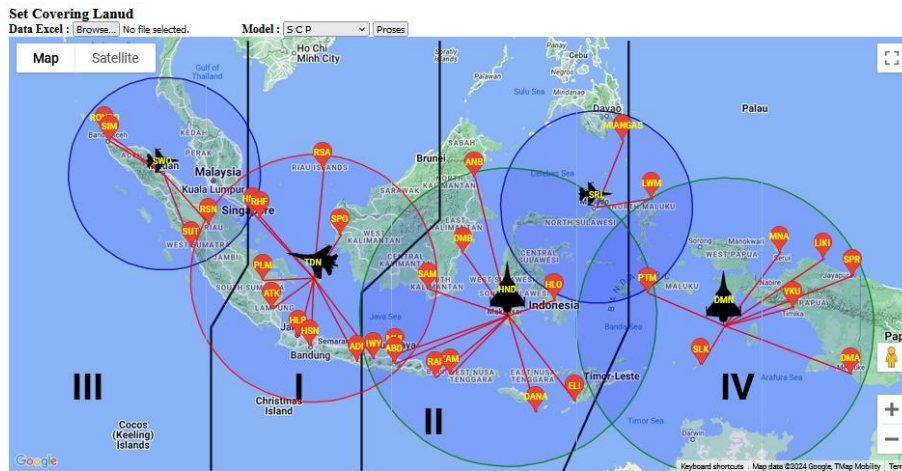
Figure 1. Covering Area SCP Method

b. The total covering distance for F-16 Aircraft is 2,774 KM, with the farthest distance of 516 KM, namely from SWO to SUT and the closest distance of 382 KM from SRI to LWM. The total covering distance for Sukhoi Aircraft is 5,134 KM, with the farthest distance of 744 KM, from TDN Airbase to RSA and the closest distance of 339 KM from TDN Airbase to PLM. While the total covering distance for Rafale / F-15 EX Aircraft is 11,140 KM, with the farthest distance of 960 KM, namely from HND Airbase to ANB, and the closest distance of 228 KM, namely from DMN Airbase to SLK. So that the total distance covering the SCP method is 19,048 KM or an average of 6,349 KM. The average maximum travel time is 22 minutes 05 seconds and the average minimum time is 10 minutes, 42 seconds. The total average covering distance that must be traveled from all airfields is 546.68 KM, with an average travel time per airfield network of 15.39 minutes.

4.3. Results of Data Processing with the PMP Method

The results of data processing can be explained as follows:

a. With the same number of aircraft squadrons as the PMP method, to get maximum coverage, there is one displacement of the placement of fighter aircraft squadrons and several shifts in covering the airstrip, namely the Rafale / F-15 EX Aircraft Squadron which was originally placed at DMN airstrip, moved to YKU airstrip, Covering PTM airstrip, moved from DMN airstrip to HND airstrip, covering ABD and MUL airstrips are the responsibility of the aircraft squadron at TDN airstrip. The placement of the squadron and the area covered by each airstrip can be seen in figure 2.
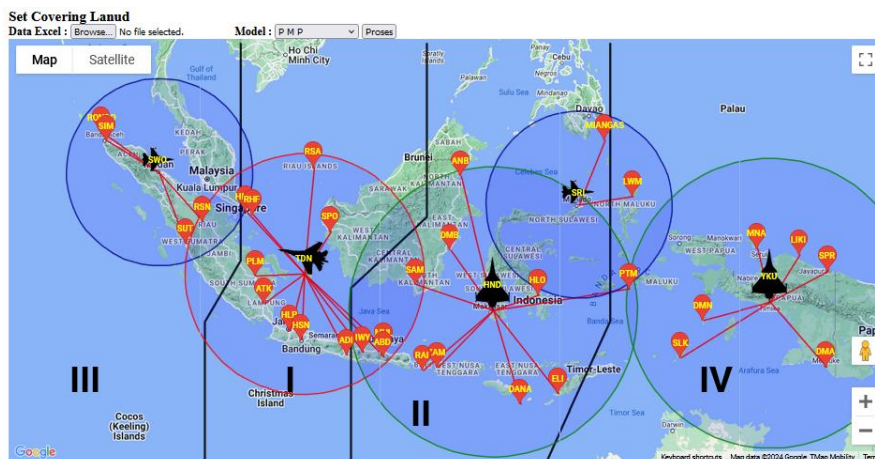
Figure 2. Covering Area PMP Method

b. There is no change in the covering of the F-16 Aircraft either, the total distance or the farthest and closest distances. The total covering distance for Sukhoi Aircraft increased to 6,688 KM, with the farthest distance of 796 KM, namely from TDN Airbase to ABD and the closest distance of 339 KM, namely from TDN Airbase to PLM. While the total covering distance for Rafale / F-15 EX decreased to 8,912 KM, with the farthest distance of 960 KM, namely from HND Airbase to ANB, and the closest distance of 337 KM, namely from HND Airbase to HLO. So that the total distance covering the PMP method is 18,374 KM or an average of 6,125 KM. The maximum travel time averages 22 minutes 36 seconds and for the minimum time averages 11 minutes, 07 seconds. The average total time to reach the target has also decreased, to 14.96 minutes or 14 minutes, 57.6 seconds.

5. Conclusion

With the SCP method, the first objective of this research can be achieved, namely being able to protect all of Indonesia's airspace. Five fighter squadrons are needed to cover all of Indonesia's airspace, consisting of two F-16 squadrons, one SU 27/30 squadron, and two Rafale/F-15 EX squadrons. The total average covering distance that must be traveled from all airfields is 546.68 KM, with an average travel time per airfield network of 15.39 minutes.

The P-Median Problem (PMP) method is used to maximize the protection capability of fighter aircraft by minimizing the overall distance or average distance per network location. There are several shifts, namely. the shift of the selected airstrip for Rafale/F-15 EX aircraft from Dominicus Dumatubun Airstrip (DMN) to Yohanes Kapiyau Airstrip (YKU). and the shift of several airstrips that must be protected. This minimized the covering distance and thus automatically reduced the time needed to cover Indonesia's sovereign territory. The total distance traveled is reduced from 19,048 KM to 18,374 KM with an average distance reduced from 6,349 KM to 6,125 KM. The total average covering distance that must be traveled from all airstrips is reduced to 524.82 KM, with the average travel time per airstrip network being 14.96 minutes.

References

[1]   M. Arif, Pemodelan Sistem, Sleman: Deepublish, 2017.

[2]   U. Brawijaya, "Dasar Pemodelan," in *Bahan Ajar Jurusan Teknik Industri*, 2015.

[3]   Detik.com, "News.detik.com/berita," 2023. [Online]. Available: https://news.detik.com/berita/d-5385662/indonesia-lirik-jet-tempur-f-15-ex-dan-dassault-rafale-ini-kecanggihannya. [Accessed 7 September 2023].

[4]   Mabesau, "Peraturan Kepala Staf Angkatan Udara N0 36 Tahun 2015 tentang Postur TNI AU Tahun 2005-2024 (RevisiTahun 2015)," *2015,* 2015.

[5]   F. Prasetyo, BOBCAT: Transformasi Kekuatan Udara di Era Modern, Satu ed., Jakarta: PT. Elex Media Komputindo, 2021.

[6]   R. Simarmata and D. Ispriyanti, Penanganan Overdispersi pada Model Regresi Poisson Menggunakan Model Regresi Binomial Negatif, Jakarta: Media Statistika, 2011.

[7]   A. Hidayatno, Prinsip dan Konsep Pemodelan Sistem, Jakarta: UI Publishing, 2022.

[8]   C. Toregas, R. Swain, C. ReVelle and L. Bergman, "The Location of Emergency Service Facilities," *Operations Research,* vol. 19, no. 6, pp. 1363-1373, 1971.

[9]   S. Hakimi, "Optimum locations of switching centers and the absolute centers and medians of a graph.," *Operations Research,* vol. 12, pp. 450-9, 1964.

[10]   S. L. Hakimi, "Optimum distribution of switching centers in a communication network and some related graph theoretic problems.," *Operations Research,* vol. 13, p. 462–75., 1965.

[11]   G. Riano and Komarudin, "Location Optimization of The Fighter Squadron For Indonesian Air Defense," in *APCORISE 2020: 3rd Asia Pacific Conference on Research in Industrial and Systems Engineering 2020*, Jakarta, 2020.

[12]   Airspace-Review Aviation & Defense, "Prabowo pastikan Indonesia membeli Jet Tempur Rafale, Mirage 2000, dan F-15EX," Airspace_review.com, 2023.

[13] B. W. Nugraha and G. Riano, "Optimizing the Placement of Fighter Aircraft Squadrons Using the Set Covering Problem (SCP) Method in Indonesia," *The International Journal of Advance in Scientific Research and Engineering (IJASRE) ,* vol. 10, no. 1, pp. 7-15, Januari 2024.

[14] H. A. R. Ramadhani, "Optimalisasi Penempatan Skadron Pesawat Tempur Guna Mendukung Sistem Pertahanan Udara Nasional Dengan Metode Set Covering Problem Di Wilayah Kedaulatan Indonesia," p. 83, 2022.

Analysis of the Tanggon Aspect of the Taruna Gemilang Program Using Soft System Methodology at the Air Force Academy

Abdul Haris Pujiantoro,4, Shawn Asher Caleb Mongan² and Gagat Riano³,6

[1,5,6] Department of Industrial Management Engineering, Air Force Academy, Indonesia

[1]E-mail: abdulharis240601@gmail.com
[1]E-mail: shwnmongan@gmail.com
[6]E-mail: gagat.riano@aau.ac.id

Abstract. The Taruna Gemilang program is a research-based program in which there is a consistent determination and effort to change destructive negative traditions into constructive traditions that form a new culture with a modern and positive life. The coaches and cadets must transform into individuals who are committed to coaching to prepare competent and characterized Air Force officers. This research is descriptive qualitative in nature with the aim of analyzing the problem situation with the Soft System Methodology (SSM) method.

1. Introduction

The Air Force Academy (AAU) as one of the official military educations in Indonesia, has an important role in preparing human resources at the first officer level of the Indonesian Air Force. These officers are expected to be able to carry out their duties as TNI AU soldiers well, and show reliable character and behavior. This could be implied in one of the targets of the Trisakti Viratama education philosophy, namely tanggon, which means a moral attitude that is reliable, ~~resilient~~ and resilient, by having a mentality based on Pancasila and the 1945 Constitution, the national fighting spirit, the Sapta Marga code of ethics, a soldierly character and TNI leadership [1]. To support these targets since May 2019, AAU has a Taruna Gemilang program, which is a research-based program aimed at changing destructive negative traditions, into constructive traditions that form a new culture with a more modern and positive life, to create cadets with character and prioritize personality (Tanggon) in every aspect of daily life at the Air Force Academy.

This research offers Soft System Methodology (SSM) as a framework to analyze and formulate suggestions for the implementation of the Taruna Gemilang program. The use of SSM in this study is expected to provide an overview of the problem situation faced in the implementation of the Taruna Gemilang program, as well as provide suggestions for action in overcoming these problems

2. Taruna Gemilang Program

The Taruna Gemilang program is designed to explore character values and competencies from various sources, to then be translated into leadership and management models that cadets are expected to have [1]. So it is hoped that AAU graduates will be able to apply the values of truth in their capacity as multi-dimensional leaders in the future. The essence of the Taruna Gemilang model is to become a

person who is able to use Godly values as inspiration and strength in building character and competence, as part of ideal leadership and managerial abilities. The Taruna Gemilang program was implemented as a solution to the cadet problems that have occurred so far. For this reason, the strategy of this program focuses on the staffing of cadet coaches, which consist of caregivers, educators and trainers. Coaches who have high integrity will be the optimal leading sector in the formation of cadets to become young officers with brilliant capabilities.

3. Research Method

This research uses the Soft System Methodology (SSM) approach, which is a method that prioritizes the search for information and desires from stakeholders in the real world, as a consideration for formulating suggestions for improvement of the problem situation of the object of research [2]. The purpose of this type of research is not only to find solutions by making changes to a problem situation, but also to generate new insights and knowledge about the activities under study [3]. SSM is a method developed by Peter Checkland in the 60s at Lancaster University in the UK. This method was originally used as a modeling tool to facilitate understanding of problems through "real" depictions, then developed its use for learning and interpretation activities. [4]. Nugroho further said that SSM was developed from the theory of system thinking, which is the concept of thinking using a conceptual framework. It is intended to be able to view a problem as a whole system (holistic), and identify the situation that occurs as a dynamic process and not just see the system partially. SSM is often used to develop the vision and mission of an organization as well as plan all activities, including analyzing problems that occur and offering solutions Checkland & Scholes [5] state that SSM is conducted within a conceptual framework, where the complexity of the problem will be described using seven stages, as shown in Figure 1 below.

Figure 1. Research Thinking Framework [3]

4. Results/Model Implementation and Discussion

The systematic discussion will follow the seven steps of SSM, with the following explanation :

4.1 Situation Considered Problematic.
Data on the problem situation that occurred was carried out by conducting a Focus Group Discussion (FGD) which was held in the AAU Trengginas room on February 8, 2023. The results of the initial study in the field found that the Taruna Gemilang Program has not been able to be implemented optimally due to the lack of knowledge of the Taruna Gemilang program from both caregivers, lecturers and cadets, and has not scheduled an effective and efficient time for the Taruna Gemilang Program in

the Tanggon Aspect, causing the Taruna Gemilang program not to be able to run optimally in its implementation. In detail, the problem situations that occured in the Taruna Gemilang Program at the Air Force Academy are as follows:

e. The lack of software and socialization of the implementation of this program has led to differences in perception and understanding among existing stakeholders. The absence of standardized parameters for implementation and evaluation standards has led to different interpretations of implementation and assessment, which in turn has led to conflicts of interest.

f. The number of unscheduled protocol activities made it difficult for lecturers, instructors and trainers to develop learning and training plans for cadets, this caused the lack of awareness and respect of cadets towards lecturers, instructors and trainers who are not from caregivers, created the impression of underestimating what is taught or trained to them.

g. The number of aspects and indicators that must be assessed every day made it difficult for caregivers, lecturers, instructors and trainers to conduct assessments. The lack of a common perception of how to assess caused unfair assessments for cadets.

h. The lack of socialization of the implementation of the Taruna Gemilang Program has created confusion in the life of the Cadet Corps Wing, especially for senior cadets, about the pattern of senior and junior relationships and coaching that may or may not be implemented. On one hand, this insecurity then led to the apathy of senior cadets and fear of "trouble" in providing guidance to juniors, and on the other hand slightly eliminated the respect and loyalty of junior cadets to their seniors. It is feared that this will affect life in the unit later. Some senior cadets argued that the tougher basic education model in the Candradimuka Regiment has a more positive effect on the formation of cadets' mentality and attitude than the implementation of the Taruna Gemilang program. The restriction of senior cadets' guidance to their juniors reduces the opportunity for senior cadets to practice their leadership skills.

4.2 Problem Situation Expressed

This stage is a depiction of the problem situation that occurs using a rich picture, as can be seen in Figure 2 below.

Figure 2. Rich Picture

4.3. Root Definition (RD) of Relevant Systems

It is a stage to define the root of the problem based on the rich picture that has been created. RD is then described with CATWOE to make it easier to understand the problem situation that occurs. In this study, RD is limited to caregivers , with the following explanation:

a. Root Definition : A method of coaching AAU cadets based on research (X) with the aim of forming officers with integrity and excellence in the field of Tanggon (Y) whose implementation has not been accompanied by software and equalization of perceptions of all stakeholders, unclear implementation and assessment parameters (Z).

b. CATWOE can be seen in table 1.

Table 1. CATWOE Table

Customer	:	Caregiver
Actor	:	AAU cadets, caregivers, officials and Antap
Transformation	:	Provide understanding, cultivation and implementation of moral values, character and leadership to cadets.
Worldview	:	Forming a coaching pattern that is far from negative and destructive traditions, by adjusting to the latest dynamics and optimizing the potential of each cadet in upholding the noble values of warriorship.
Owner	:	AAU
Enviromental	:	The absence of software that regulates the parameters of implementation and evaluation has led to differences in perception, conflicts of interest between stakeholders and unscheduled protocol activities, aspects and assessment indicators that are difficult to understand and implement

4.4. Conceptual Models of Describe of Root Definition

The Conceptual Model is developed based on the existing root definition, to explain the transformation process that occurs. This model is built based on ideas and does not refer to the real situation in the field. The conceptual model in this research can be seen figure 3

Figure 3. Conceptual Model of Caregiver Daily Activities

4.5. Comparison of Models and Real Word.

Comparisons are made to find differences between the current state of affairs to get possible changes that are expected in the new system. The results of the comparison of the conceptual model for both the daily activities of caregivers and cadets with the facts found in the real world can be described in

three aspects, namely organization, attitudes and procedures, with an explanation can be seen in table 2.

Table 2. Comparison Of The Conceptual Model With The Real World

ASPECT	FOSTER	CADET
Organization	Upgrading the rank of cadet caregivers aimed at increasing motivation to become caregivers is not followed by the ability of binprof (profession development agency) of each corps to send its best officers to become caregivers. Appointment of caregivers for Dan elements many of Setukpa graduates who do not understand the life of Cadet Corps Wing.	With the changes in the education curriculum, especially at level IV, making Cadet Corps Wing, as a forum for cadet organizations is not manned by cadets who have the appropriate and expected capabilities and competencies. Of course, this has an unfavorable influence on the cadet coaching pattern.
Attitude	There are still caregivers who are not confident and hesitant to reprimand or give direction to cadets. This is exacerbated by the fact that many parents of cadets are TNI / TNI AU officials who often intervene in coaching	The mindset of senior cadets who get privilege is a handicap in the implementation of the Taruna Gemilang program, which builds character through training and practice so that it becomes a habit.
Procedure	Many aspects and indicators of the Tanggon field assessment and the absence of socialization and common perception of the assessment, make it difficult for caregivers to carry out the assessment, especially if it is related to the number of cadets who must be assessed every day.	1. Changes in coaching patterns that have not been socialized make Senior Cadets "Apathy" to avoid trouble. 2. Foster family mechanisms that have not been maximized. 3. Placement of cadets only as objects in the ALO assessment system

4.6. Changes: Systematically Desirable, Culturally Feasible

This is the sixth stage of SSM, which provides recommendations for improvements or changes to resolve the problem situation that occurs. Recommendations for improvement can be seen in table 6.

Table 3. Recommendations For Improvement And Change

ASPECT	FOSTER	CADET
Organization	1. Supervision of caregivers from AAU alumni on a rotating assignment (BP) basis for 1 to 2 semesters at least 1 person for each level who serves as a mentor for other caregivers. 2. Caregivers have instructor and gumil qualifications so that they can act as instructors and lecturers to maximize care. 3. Engage caregivers from Flight instructors to maintain cadets' motivation to become aviators.	1. Supervision of caregivers from AAU alumni on a rotating assignment (BP) basis for 1 to 2 semesters at least 1 person for each level who serves as a mentor for other caregivers. 2. Caregivers have instructor and gumil qualifications so that they can act as instructors and lecturers to maximize care. 3. Engage caregivers from Flight instructors to maintain cadets' motivation to become aviators..

ASPECT	FOSTER	CADET
Attitude	1. A short course for AAU caregivers, to equalize perceptions and mentally prepare caregivers, as well as introduce the culture and traditions of Cadet Corps Wing life. 2. Streamline the AAU communication forum with cadets' parents to reduce parental intervention in AAU education. All information about education and life at AAU is conveyed through this forum.	1. Equalization of perceptions of cadet coaching patterns that will be implemented from all stakeholders. 2. Standardization and strictness in the application of press and perduptar rules 3. Socialization of coaching patterns through discussions with cadets to obtain a uniform understanding of the application of the rules.
Procedure	1. It is necessary to form a working group to prepare the ALO assessment, which currently does not have a legal authority and is different from the assessment system of other Force Academies. 2. The assessment system is structured based on cadet activities, making it easier for caregivers and stakeholders to assess the Tanggon aspect, without causing different perceptions.	1. Socialization to all AAU officers about joint responsibility in fostering cadets. 2. Make the role and relationship of foster families effective in the development of seniors and juniors through asah, asih and asuh. 3. Make cadets not only objects, but also act as subjects in the ALO assessment system.

4.7. Action To Improve The Problem Situation.

This final stage is a recommendation of activities that can be carried out to support the changes or improvements that have been recommended in the previous stage.

a. Optimizing the Character Development Center (CDC) which functions as a forum for the development and character building of cadets to match expectations, with the following explanation:

1) The CDC can invite all stakeholders who play a role in shaping the character of the cadets of the gemilang tanggon aspect to hold discussions in a working group (pokja) that discusses the pattern of coaching in the tanggon field, starting from determining the goals and objectives achieved, the methods used and the division of tasks and roles of each stakeholder.

2) The CDC formed a working group to develop the required tanggon assessment standards, including inviting all user units (in this case the Corps Supervisor.

3) CDC can carry out a working group to develop an ALO assessment system that is more user friendly, namely assessment points based on activities carried out by cadets and easily observed / assessed and not based on indicators or aspects only.

b. Currently, the mechanism for recording achievements and trouble is done through the cadet pocket book. To support the proposed changes, it is necessary to improve the function of this cadet pocket book by creating a digital pocket book application. The explanation is as follows:

1) This pocket book is a web-based information system that can be used to record all cadet activities in the field of tanggon, both positive and negative.

2) The system also allows cadets to act as subjects of assessment, for example by giving themselves a target score to achieve that day (adopting Colonel Tek Herman's suggestion). This will train cadets to recognize their potential and learn to motivate themselves to achieve.

References

[1] Akademi Angkatan Udara, Program Taruna Gemilang, 1 ed., Yogyakarta, 2021.

[2] S. Hardjosoekarto, Soft Systems Methodology (Metodelogi Serba Sistem Lunak), Jakarta: Universitas Indonesia Press, 2012.

[3] Marshal, Peter and J. McKay, The Dual Imperatives of Action Research Information Technology & People, vol. 14, MCB Universitu Press, 2001.

[4] H. Nugroho, "PENDEKATAN SOFT SYSTEM METHODOLOGY UNTUK MEMBANGUN SEBUAH SISTEM INFORMASI PROYEK AKHIR," in *Konferensi Nasional Sistem Informasi 2012At: STIKOM BALI*, 2012.

[5] P. Checkland and J. Scholes, Soft Systems Methodology in Action : A 30-year Retrospective, UK: John Wiley & Sond, Ltd., 1999.

[6] R. d. P. Francisco and A. L. Azevedo, "An SSM-Based Approach to Implement a Dynamic Performance Management System," in *IFIP Advances in Information and Communication Technology*, 2009.

A Bibliometric Analysis Using Vosviewer: Research Trend on Teacher Well Being

Riza Fatimah Zahrah*¹, Cece Rakhmat² and Turmudi³

¹ Primary Education, Indonesia University of Education, Bandung, Indonesia
² Special Education, Indonesia University of Education, Bandung, Indonesia
³Math Education, Indonesia University of Education, Bandung, Indonesia

*E-mail: rizafatimah@unper.ac.id

Abstract. This study aims to conduct bibliometric analysis mapping of articles on teacher wellbeing issues sourced from Google Scholar using the VOSviewer application. Data collection is done using reference manager software, namely Publish and Perish. Publish and Perish software was used to conduct a literature review on the topic of teacher wellbeing issues. The keywords used in collecting data are teachers and wellbeing. The article publications used were articles published from 2015 to 2024. The results showed 500 articles relevant to the topic of teacher welfare issues that have been published in the last 10 years. Research trends in the world based on research publications on teacher wellbeing have increased from 2015 to 2020. However, from 2020 to 2024 the trend of research on teacher wellbeing continues to decline. Based on the results of bibliometric analysis, the term teacher welfare has 152 links. It can be concluded that research publications on teacher wellbeing are still limited to research and have great opportunities for further research in the future.

1. Introduction

Teacher wellbeing refers to the overall health, happiness, and satisfaction of teachers in their professional lives. It encompasses various aspects of a teacher's experience, including physical health, mental and emotional wellbeing, job satisfaction, work-life balance, and professional fulfillment. Key components of teacher wellbeing may include:

a. **Physical Health**: Maintaining good physical health through regular exercise, proper nutrition, and adequate rest.
b. **Mental and Emotional Wellbeing**: Managing stress effectively, coping with challenges, and fostering resilience in the face of job demands.
c. **Job Satisfaction**: Feeling fulfilled and motivated in their teaching role, finding meaning and purpose in their work.
d. **Work-Life Balance**: Achieving a balance between professional responsibilities and personal life, which is crucial for overall wellbeing.
e. **Supportive Work Environment**: Having access to supportive colleagues, leadership, and resources that promote a positive work environment.
f. **Professional Development**: Opportunities for ongoing learning and growth that enhance job satisfaction and confidence in teaching. (Fretes et al., 2023; Hidalgo et al., 2010)

Addressing teacher wellbeing is important not only for the individual teacher's health and happiness but also for the overall effectiveness of education systems. When teachers are well-supported and feel valued, they are more likely to perform better in their roles, positively impacting student outcomes and school culture. Schools and educational organizations increasingly recognize the importance of promoting teacher wellbeing as part of creating a healthy and thriving educational community. Research on teacher well-being is still a significant trend in education and psychology. Studies continue to be conducted to understand the factors that influence teacher well-being, the consequences of good or poor teacher well-being on teaching quality and student learning outcomes, and effective strategies to improve teacher well-being. Some of the reasons why this research remains relevant and continues to grow include:

a. Impact on Teaching and Learning: Teacher well-being has a direct impact on classroom teaching and learning. Teachers who feel satisfied and supported in their work tend to provide more effective and supportive teaching.
b. Mental Health and Wellbeing: Teachers' well-being affects not only their professional aspects but also their overall mental and physical health. This is important to prevent burnout and improve teacher retention.
c. School Quality and Organizational Culture: Teacher well-being also contributes to overall school quality and creates a positive organizational culture where teachers feel supported and valued.
d. Changes in the Educational Environment: Changes in education, such as adaptation to new technologies, curriculum changes, and social, economic or political challenges, can affect teacher well-being. Recent research continues to identify how teachers can adjust and remain empowered in changing contexts.
e. Sustainability of the Teaching Profession: Maintaining teacher well-being is key to sustaining the teaching profession as a whole. Improving teacher well-being can help in recruiting and retaining qualified professionals in education. (Weber et al., 2016; Zewude & Hercz, 2021)

Recent research on teacher well-being often includes a multidimensional approach that incorporates factors such as job stress, social support, job satisfaction, time management and recovery strategies. This is a growing field due to the important role teachers play in achieving educational goals and building the future of future generations. If teacher welfare is low, it can have a significant impact both on the teacher personally and on the education environment as a whole. Here are some of the impacts of low teacher well-being:

a. Burnout and High Stress: Teachers who experience low well-being tend to be more prone to burnout, which is characterized by emotional exhaustion, depersonalization towards students, and feelings of lack of competence in their work. High stress can also lead to physical and mental health problems.
b. Decreased Teaching Quality: Low teacher well-being can compromise the quality of teaching. Teachers may lose motivation and energy to structure and deliver subject matter in an effective manner. This can affect students' academic achievement and make them less motivated to learn.
c. High Teacher Turnover: Low welfare is often associated with low levels of job satisfaction and increased teacher turnover. Teachers who feel dissatisfied or overly stressed in their jobs may be inclined to leave the profession, causing instability in teaching staff in schools.
d. Poor Quality of Life: Low teacher well-being can affect overall quality of life. Chronic stress and dissatisfaction at work can create a negative impact on their personal relationships, physical health and emotional well-being outside of the work environment.

e. Unhealthy School Atmosphere: Dissatisfied or stressed teachers can affect the overall school culture. This can create a less supportive work environment, with the potential for increased conflict between staff or between staff and administration.

f. Impact on Students: Teacher well-being is closely linked to students' learning experiences. Teachers who feel unhappy or incompetent can have a negative influence on students' motivation, confidence and learning behavior.(Cann et al., 2021; Doménech-Betoret et al., 2015)

Efforts to improve teacher well-being are important in ensuring that teachers can make optimal contributions to students' education. This includes paying attention to factors such as professional support, stress management, work-life balance and a supportive work environment.

2. Method

The research method used in this study is bibliometric analysis. This approach was chosen because it is able to accurately measure and analyze publications in the database under study. Research using bibliometric analysis makes it possible to search, record, analyze and view publication documents related to the specified theme (Marín-Marín, 2021). This research uses the google scholar database which is considered as one of the indexing that can be accessed easily. The use of the analytical tools provided by google scholar was sufficient to obtain most of the results required in this study.

To obtain research data, it is assisted by the use of Harzing's Publish or Perish application which serves to conduct a literature review according to the chosen theme, namely Teacher Well Being. The stages in this study are as follows: 1) Collecting publication data using Harzing's Publish or Perish application on the google scholar database. 2) The bibliometric data of the articles obtained is processed using the Numbers application 3) Perform computational mapping using the VOSViewer application.4) Analyze the results of computational mapping.

Article data collection using Harzing's Publish Or Perish application on the google scholar database using the keyword "Teacher Well Being". Data collection was carried out in June 2024 where the publication range was determined for 10 years from 2015 to 2024. The article data obtained and according to the analysis criteria are exported in two clear files with the format (*csv) and (*.ris). Files with the format (*csv) are processed with the numbers application and files in the format (*.ris) are processed with VOSViewer. The VOSviewer application was used to visualize and evaluate trends using bibliometric maps. The VOSviewer application is able to visualize bibliometric maps in 3 forms, namely network visualization, density visualization, and overlay visualization based on the network (co-citation) between existing items.

3. Result and Disscussion

3.1 Publications Data Search Result

The results of obtaining data on Teacher Well Being from the Google Scholar database using Harzing's Publish Or Perish application obtained 498 article data that match the research criteria. The article metadata obtained consists of author name, article title, year of publication, journal name, publisher, number of citations, DOI, and related URLs. Table 1 shows some examples of published data used in the VOSviewer analysis of this study. The sample data taken is the best 20 articles that have the highest number of citations over the last 10 years. The total number of citations of all articles used in this study was 45393, the total number of citations per year was 4539, the average number of citations article was 91.15 and the average citations a year was 9.11.

Table 1. Teacher Well Being Publication Data Based on Citation

Cites	Authors	Title	Year	Source	Publisher
1203	L Oktaviani, Y Fernando, R Romadhoni… (Oktaviani et al., 2021)	Developing a web-based application for school councelling and guidance during COVID-19 Pandemic	2021	Journal of Community …	ejournal.umm.ac.id
922	KC Herman, J Hickmon-Rosa… (Herman et al., 2018)	Empirically derived profiles of teacher stress, burnout, self-efficacy, and coping and associated student outcomes	2018	Journal of Positive …	journals.sagepub.com
654	B Shen, N McCaughtry, J Martin, A Garn… (Shen et al., 2015)	The relationship between teacher burnout and student motivation	2015	British Journal of …	Wiley Online Library
582	S Bücker, S Nuraydin, BA Simonsmeier… (Bücker et al., 2018)	Subjective well-being and academic achievement: A meta-analysis	2018	Journal of Research in …	Elsevier
568	KA Arnold (Arnold, 2017)	Transformational leadership and employee psychological well-being: A review and directions for future research.	2017	Journal of occupational health psychology	psycnet.apa.org
530	A Sverdlik, NC Hall, L McAlpine… (Sverdlik et al., 2018)	The PhD experience: A review of the factors influencing doctoral students' completion, achievement, and well-being	2018	International Journal of …	informingscience.org
526	S Bostock, AD Crosswell, AA Prather… (Bostock et al., 2019)	Mindfulness on-the-go: Effects of a mindfulness meditation app on work stress and well-being.	2019	Journal of occupational …	psycnet.apa.org
499	U Klusmann, D Richter, O Lüdtke (Klusmann et al., 2016)	Teachers' emotional exhaustion is negatively related to students' achievement: Evidence from a large-scale assessment study.	2016	Journal of Educational …	psycnet.apa.org
454	PD MacIntyre, T Gregersen… (MacIntyre et al., 2019)	Setting an agenda for positive psychology in SLA: Theory, practice, and research	2019	… Modern Language Journal	Wiley Online Library
424	M Tadić, AB Bakker… (Tadić et al., 2015)	Challenge versus hindrance job demands and well-being: A diary study on the moderating role of job resources	2015	Journal of Occupational …	Wiley Online Library
422	J Perryman, G Calvert	What motivates people to teach, and why do they leave?	2020	British Journal of Educational Studies	Taylor &Francis

Cites	Authors	Title	Year	Source	Publisher
	(Perryman & Calvert, 2020)	Accountability, performativity and teacher retention			
414	R Acton, P Glasgow (Acton & Glasgow, 2015)	Teacher wellbeing in neoliberal contexts: A review of the literature	2015	Australian Journal of Teacher Education …	search.informit.org
405	DM Netolicky (Netolicky, 2020)	School leadership during a pandemic: navigating tensions	2020	Journal of professional capital and community	emerald.com
398	LL Hadar, O Ergas, B Alpert, T Ariav (Hadar et al., 2020)	Rethinking teacher education in a VUCA world: student teachers' social-emotional competencies during the Covid-19 crisis	2020	European journal of teacher …	Taylor &Francis
366	K Bluth, RA Campo, WS Futch, SA Gaylord (Bluth et al., 2017)	Age and gender differences in the associations of self-compassion and emotional well-being in a large adolescent sample	2017	Journal of youth and …	Springer
328	MM Vainio, D Daukantaitė (Vainio & Daukantaitė, 2016)	Grit and different aspects of well-being: Direct and indirect relationships via sense of coherence and authenticity	2016	Journal of Happiness Studies	Springer
319	T Dicke, F Stebner, C Linninger, M Kunter… (Dicke et al., 2018)	A longitudinal study of teachers' occupational well-being: Applying the job demands-resources model.	2018	Journal of …	psycnet.apa.org
316	M González-Carrasco, F Casas, S Malo, F Viñas… (González-Carrasco et al., 2017)	Changes with age in subjective well-being through the adolescent years: Differences by gender	2017	Journal of Happiness …	Springer
313	AI Drever, E Odders-White, CW Kalish… (Drever et al., 2015)	Foundations of financial well-being: Insights into the role of executive function, financial socialization, and experience-based learning in childhood and youth	2015	Journal of Consumer …	Wiley Online Library
303	LE Kim, L Oxley, K Asbury (Kim et al., 2022)	"My brain feels like a browser with 100 tabs open": A longitudinal study of teachers' mental health and well-being during the COVID-19 pandemic	2022	… Journal of Educational Psychology	Wiley Online Library
302	Y Nie, BL Chua, AS Yeung, RM	The importance of autonomy support and the mediating role of	2015	International journal of …	Wiley Online Library

Cites	Authors	Title	Year	Source	Publisher
	Ryan… (Nie et al., 2015)	work motivation for well-being: Testing self-determination theory in a Chinese work organisation			
298	JM DEWAELE, AF Magdalena… (DEWAELE et al., 2019)	The effect of perception of teacher characteristics on Spanish EFL learners' anxiety and enjoyment	2019	… Language Journal	Wiley Online Library
297	KA Schafft s (Schafft, 2016)	Rural education as rural development: Understanding the rural school–community well-being linkage in a 21st-century policy context	2016	Peabody Journal of Education	Taylor &Francis
294	M Schmidt, E Hansson (Schmidt & Hansson, 2018)	Doctoral students' well-being: A literature review	2018	… studies on health and well-being	Taylor &Francis
294	S Bahl, GR Milne, SM Ross, DG Mick… (Bahl et al., 2016)	Mindfulness: Its transformative potential for consumer, societal, and environmental well-being	2016	Journal of Public …	journals.sagepub.com
291	T Lomas, JC Medina, I Ivtzan, S Rupprecht… (Lomas et al., 2017)	The impact of mindfulness on well-being and performance in the workplace: an inclusive systematic review of the empirical literature	2017	… Journal of Work and …	Taylor &Francis
284	KD Schwartz, D Exner-Cortens… (Schwartz et al., 2021)	COVID-19 and student well-being: Stress and mental health during return-to-school	2021	Canadian journal of …	journals.sagepub.com
283	T Cumming (Cumming, 2017)	Early childhood educators' well-being: An updated review of the literature	2017	Early Childhood Education Journal	Springer
281	F Rahimnia, MS Sharifirad (Rahimnia & Sharifirad, 2015)	Authentic leadership and employee well-being: The mediating role of attachment insecurity	2015	Journal of Business Ethics	Springer
279	J Gustems-Carnicer, C Calderón… (Gustems-Carnicer et al., 2019)	Stress, coping strategies and academic achievement in teacher education students	2019	… Journal of Teacher …	Taylor &Francis

Table 2 shows some examples of published data used in the VOSviewer analysis of this study. The sample data taken is the best 20 articles that have on 20ᵗʰ GS Rank over the last 10 years.

Table 2. Teacher Well Being Publication Data Based on 20th GS Rank

GSRank	Cites	Authors	Title	Year
1	252	RJ Collie, JD Shapka, NE Perry… (Collie et al., 2015)	Teacher well-being: Exploring its components and a practice-oriented scale	2015
2	39	L Manasia, A Pârvan, M Macovei (Manasia et al., 2020)	Towards a model of teacher well-being from a positive emotions perspective	2020
3	219	H Yin, S Huang, W Wang (Yin et al., 2016)	Work environment characteristics and teacher well-being: The mediation of emotion regulation strategies	2016
4	121	F Ortan, C Simut, R Simut (Ortan et al., 2021)	Self-efficacy, job satisfaction and teacher well-being in the K-12 educational system	2021
5	39	F Doménech-Betoret, S Lloret-Segura… (Doménech-Betoret et al., 2015)	Teacher support resources, need satisfaction and well-being	2015
6	17	RJ Collie (Collie, 2023)	Teacher well-being and turnover intentions: Investigating the roles of job resources and job demands	2023
7	56	R Cansoy, H Parlar, ME TURKOGLU (Cansoy et al., 2020)	A Predictor of Teachers' Psychological Well-Being: Teacher Self-Efficacy.	2020
8	43	HL Walter, HB Fox (Walter & Fox, 2021)	Understanding teacher well-being during the COVID-19 pandemic over time: A qualitative longitudinal study	2021
9	69	V Squires (Squires, 2019)	The well-being of the early career teacher: A review of the literature on the pivotal role of mentoring	2019
10	59	KA Kwon, TG Ford, L Jeon, A Malek-Lasater… (Kwon et al., 2021)	Testing a holistic conceptual framework for early childhood teacher well-being	2021
11	115	J Glazzard, A Rose (Glazzard & Rose, 2020)	The impact of teacher well-being and mental health on pupil progress in primary schools	2020

GSRank	Cites	Authors	Title	Year
12	**23**	GT Zewude, M Hercz (Zewude & Hercz, 2021)	Psychological Capital and Teacher Well-Being: The Mediation Role of Coping with Stress.	2021
13	**135**	J Ramberg, S Brolin Låftman, T Åkerstedt… (Ramberg et al., 2020)	Teacher stress and students' school well-being: The case of upper secondary schools in Stockholm	2020
14	**163**	D Price, F McCallum (Price & McCallum, 2015)	Ecological influences on teachers' well-being and "fitness"	2015
15	**110**	I García-Moya, F Brooks, A Morgan… (García-Moya et al., 2015)	Subjective well-being in adolescence and teacher connectedness: A health asset analysis	2015
16	**37**	J Shepherd, K Pickett, S Dewhirst… (Shepherd et al., 2016)	Initial teacher training to promote health and well-being in schools–A systematic review of effectiveness, barriers and facilitators	2016
17	**160**	SS Braun, KA Schonert-Reichl, RW Roeser (Braun et al., 2020)	Effects of teachers' emotion regulation, burnout, and life satisfaction on student well-being	2020
18	**150**	S Wolf, JL Aber, JR Behrman… (Wolf et al., 2019)	Experimental impacts of the "Quality Preschool for Ghana" interventions on teacher professional well-being, classroom quality, and children's school readiness	2019
19	**209**	KM Zinsser, CG Christensen, L Torres (Zinsser et al., 2016)	She's supporting them; who's supporting her? Preschool center-level social-emotional supports and teacher well-being	2016
20	**260**	R Alves, T Lopes, J Precioso (Alves et al., 2021)	Teachers' well-being in times of Covid-19 pandemic: factors that explain professional well-being	2021

3.2 Research Development in the Field on Teacher Well Being

The development of research in the field of teacher well being is shown in table 2. There are 498 articles published in journals in the google scholar database in the 10-year span between 2015-2024. In 2020 there were 74 publications related to the theme of teacher well being and became the most research year on the topic. In 2023 there were 32 articles, in 2024 there were 7 articles and became descrending number of publications.

Table 3. Teacher Well Being Publication Data in 10 years

Year	*Number of Publications*
2015	51
2016	55
2017	51
2018	53
2019	73
2020	74
2021	58
2022	44
2023	32
2024	7
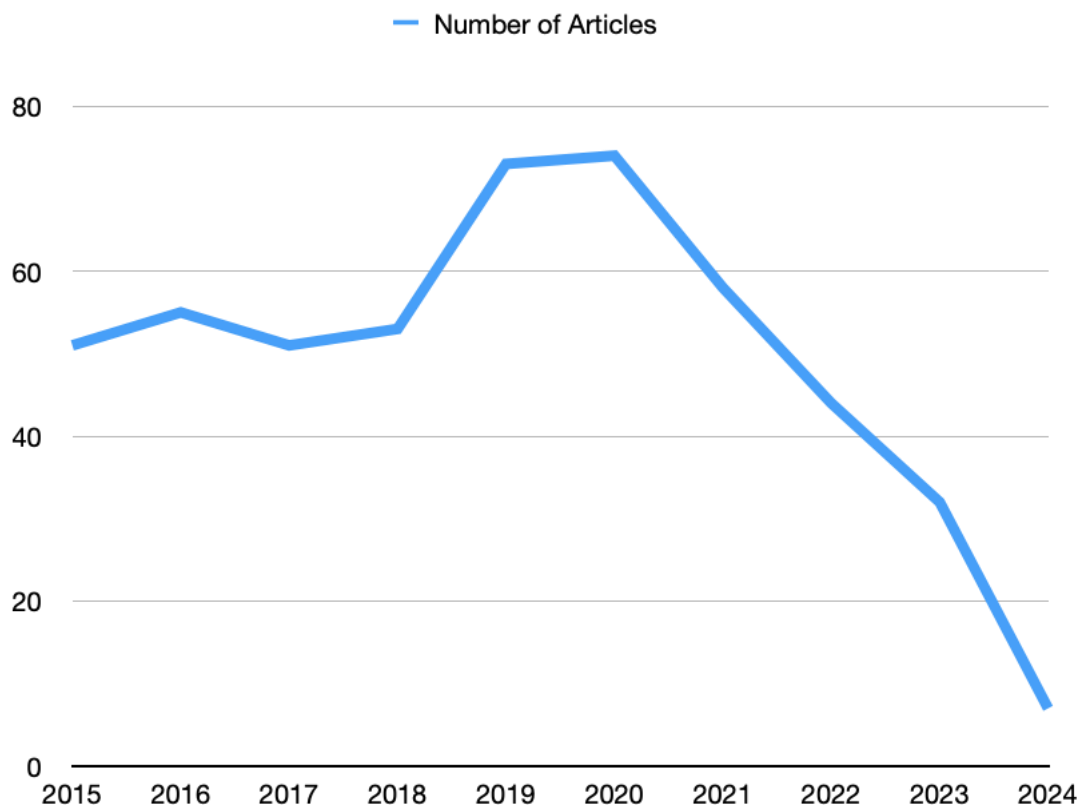
Figure 1. Level of Research Development in Teacher Well Being

The level of research development on Teacher's Well Being in Figure 1 shows the research trend in the last 10 years from 2015-2024. Based on the data in Figure 1, it shows that the development of research

fluctuates every year. Experiencing the highest peak of research publications on Teacher's Well Being is in 2020-2021 with a total of 73-74 research publications. A very significant decline occurred in 2022-2024, namely in 2022 there were only 44 publications, in 2023 there were 32 publications and in 2024 there were 7 publications.

3.2 Visualization of Teacher Well Being Topic Areas Using VOSViewer

The use of the VOS Viewer application produces a computational mapping of articles on Teacher Well Being. All items are grouped into 7 clusters with 152 items. The following is the mapping of the 7 clusters.

1) Cluster 1 is shown in red color, consisting of 32 items there are academic achievement, adolescence, agency, association, child, connection, country, current study, education, evidence, experience, family, happiness, health, higher level, implication, language teacher, life, mental health, outcome, paper, parent, person, school, self esteem, social support, society, state, teacher rating, teacher support, understanding, way.

2) Cluster 2 is shown in green, the 27 item are achievement, adolescent, age, care, change difference, emotional well, extent, future, hope, individual, measure, mindfulness, order, predictor, problem, program, quality, resilience, sample, school engagement, self, study, subjective well, wellbeing, year, young person.

3) Cluster 3 is shown in blue colour, the 27 items are aspect, community, condition, day, educator, effort, emotion, environment, impact, importance, investigation, issue, job satisfaction, kind, learning, level, practice, reason, retention, sense, teacher, teacher candidate, teacher education, teacher educator, teacher effectiveness, teaching, university.

4) Cluster 4 is shown in yellow color, the 26 items are case, context, employee, engagement, job, job resource, literature, model, need, perception, present study, psychological capital, relationship, review, role, satisfaction, stress, stressor, support, teacher well being, well, word, work, work engagement, workplace, workplace spiritually.

5) Cluster 5 is shown in purple color, the 18 items are addition, adult, author, burnout, effect, emotional intelligence, influence, mediating role, psychological, psychological well, relation, scale, school climate, self efficacy, student, teacher burnout, teacher self efficacy, teachers stress.

6) Cluster 6 is shown in sky blue, the 12 items are covid, early childhood, example, factor, indicator, life satisfaction, longitudinal study, mediator, pandemic, strategy, teacherstudent relationship, time

7) Cluster 7 is shown in orange, the 10 items are children, classroom, development, effectiveness, intervention, meta analysis, motivation, performance, research, systematic review,

All of the clusters, it shows the relationship between one item and another. Each term is labeled with a colored circle. Each circle has a different size depending on the frequency of occurrence. The size of the circle shows a positive correlation with the occurrence of the term in the title. The more frequently the term appears, the larger the size of the circle label. The visualization of computational mapping is analyzed based on 3 parts: network visualization (Figure 2), overlay visualization (Figure 3), and density visualization (Figure 4).

Figure 2. Network Visualization of Research about Teacher Well Being

Figure 3. Overlay Visualization of Research about Teacher Well Being

Figure 4. Density Visualization of Research about Teacher Well Being

Figure 2 shows the relationship between terms. The relationship between terms is depicted in an interconnected network. Figure 2 shows the clusters of terms that are frequently researched and associated with teacher's well being research topics. Figure 3 shows the visualization of overlay on teacher's well being research.

Figure 4 shows that research on teacher's well being was carried out from 2015 to 2024. In that period, the popularity of research on teacher's well being amounted to a lot but decreased in the following year. Thus, we can easily create new research on teacher's well being because there are still many opportunities for research on the subject. Figure 4 shows the density of visualization. This means that a lot of research on related terms has been done. Vice versa, if the color of the term fades close to the background color, then the amount of research on the term is small. Based on Figure 3, it can be seen that research related to the terms teacher's well being, teacher, stress, well, relationship, school, impact, rolemodel, wellbeing, development, study,practice, student has a high number of research.

Figure 5. Network Visualization of Research about Teachers

Figure 6. Network Visualization of Research about Wellbeing

From the data, it can be seen that the term teacher's wellbeing has a relationship with other terms. Based on the mapping results, the term teacher is in Cluster 3 by having 151 links and connected with 1344 link strength, while the term wellbeing is in cluster 2 by having 85 links and 210 link strength. Based on the linkage and connectedness between teacher wellbeing both have a small linkage and connectedness. It can be concluded that research publications on teacher wellbeing are still limited to be researched and have a great opportunity to conduct research in the future, so that it can have a higher impact on the novelty of research.

4. Conclusion

This study aims to conduct a bibliometric analysis mapping of research articles on teacher's well being sourced from Google Scholar using VOSviewer. The keywords used in data collection are teacher and well being . The article publications used were those published from 2015 to 2024. The results showed 498 relevant articles published in the range of 2015 to 2024. Research publications on teacher's well being have decreased from 2020 to 2023. The results of the bibliometric analysis that has been carried out indicate that there are opportunities to conduct future research on teacher's well being in elementary schools or others grade.

Referensi

[1] Acton, R., & Glasgow, P. (2015). Teacher wellbeing in neoliberal contexts: A review of the literature. *Australian Journal of Teacher Education* …. https://doi.org/10.3316/ielapa.441680081120104

[2] Alves, R., Lopes, T., & Precioso, J. (2021). Teachers' well-being in times of Covid-19 pandemic: factors that explain professional well-being. *International Journal of Educational Research and Innovation*, *2021*(15), 203–217. https://doi.org/10.46661/ijeri.5120

[3] Arnold, K. A. (2017). Transformational leadership and employee psychological well-being: A review and directions for future research. *Journal of Occupational Health Psychology*. https://psycnet.apa.org/journals/ocp/22/3/381/

[4] Bahl, S., Milne, G. R., Ross, S. M., Mick, D. G., & ... (2016). Mindfulness: Its transformative potential for consumer, societal, and environmental well-being. *Journal of Public* …. https://doi.org/10.1509/jppm.15.139

[5] Bluth, K., Campo, R. A., Futch, W. S., & Gaylord, S. A. (2017). Age and gender differences in the associations of self-compassion and emotional well-being in a large adolescent sample. *Journal of Youth and* …. https://doi.org/10.1007/s10964-016-0567-2

[6] Bostock, S., Crosswell, A. D., Prather, A. A., & ... (2019). Mindfulness on-the-go: Effects of a mindfulness meditation app on work stress and well-being. *Journal of Occupational* …. https://psycnet.apa.org/record/2018-19565-001

[7] Braun, S. S., Schonert-Reichl, K. A., & Roeser, R. W. (2020). Effects of teachers' emotion regulation, burnout, and life satisfaction on student well-being. *Journal of Applied* …. https://www.sciencedirect.com/science/article/pii/S019339732030143X

[8] Bücker, S., Nuraydin, S., Simonsmeier, B. A., & ... (2018). Subjective well-being and academic achievement: A meta-analysis. *Journal of Research in* …. https://www.sciencedirect.com/science/article/pii/S0092656618300199

[9] Cann, R. F., Riedel-Prabhakar, R., & Powell, D. (2021). A model of positive school leadership to improve teacher wellbeing. *... Journal of Applied Positive* …. https://doi.org/10.1007/s41042-020-00045-5

[10] Cansoy, R., Parlar, H., & TURKOGLU, M. E. (2020). A Predictor of Teachers' Psychological Well-Being: Teacher Self-Efficacy. In *International Online Journal of* …. academia.edu. https://www.academia.edu/download/64857210/48_tam_metin_iojes_v12_sayı4.pdf

[11] Collie, R. J. (2023). Teacher well-being and turnover intentions: Investigating the roles of job resources and job demands. *British Journal of Educational Psychology*. https://doi.org/10.1111/bjep.12587

[12] Collie, R. J., Shapka, J. D., Perry, N. E., & ... (2015). Teacher well-being: Exploring its components and a practice-oriented scale. *Journal of* …. https://doi.org/10.1177/0734282915587990

[13] Cumming, T. (2017). Early childhood educators' well-being: An updated review of the literature. *Early Childhood Education Journal*. https://doi.org/10.1007/s10643-016-0818-6

[14] DEWAELE, J. M., Magdalena, A. F., & ... (2019). The effect of perception of teacher characteristics on Spanish EFL learners' anxiety and enjoyment. *... Language Journal*. https://doi.org/10.1111/modl.12555

[15] Dicke, T., Stebner, F., Linninger, C., Kunter, M., & ... (2018). A longitudinal study of teachers' occupational well-being: Applying the job demands-resources model. *Journal of* …. https://psycnet.apa.org/record/2017-04399-001

[16] Doménech-Betoret, F., Lloret-Segura, S., & ... (2015). Teacher support resources, need satisfaction and well-being. *The Spanish Journal of* …. https://www.cambridge.org/core/journals/spanish-journal-of-psychology/article/teacher-support-

resources-need-satisfaction-and-wellbeing/61333CBE37DE3EE471418BE4146635C1

[17] Drever, A. I., Odders-White, E., Kalish, C. W., & ... (2015). Foundations of financial well-being: Insights into the role of executive function, financial socialization, and experience-based learning in childhood and youth. *Journal of Consumer ...*. https://doi.org/10.1111/joca.12068

[18] Fretes, G., Llurba, C., & Palau, R. (2023). Influence of Teaching Activities, Environmental Conditions and Class Schedules on Teacher Stress Measured with a Smartwatch: A Pilot Study. *Journal of Technology and Science Education*. https://eric.ed.gov/?id=EJ1407474

[19] García-Moya, I., Brooks, F., Morgan, A., & ... (2015). Subjective well-being in adolescence and teacher connectedness: A health asset analysis. *... Education Journal*. https://doi.org/10.1177/0017896914555039

[20] Glazzard, J., & Rose, A. (2020). The impact of teacher well-being and mental health on pupil progress in primary schools. In *Journal of Public Mental Health*. emerald.com. https://doi.org/10.1108/JPMH-02-2019-0023

[21] González-Carrasco, M., Casas, F., Malo, S., Viñas, F., & ... (2017). Changes with age in subjective well-being through the adolescent years: Differences by gender. *Journal of Happiness ...*. https://doi.org/10.1007/s10902-016-9717-1

[22] Gustems-Carnicer, J., Calderón, C., & ... (2019). Stress, coping strategies and academic achievement in teacher education students. *... Journal of Teacher ...*. https://doi.org/10.1080/02619768.2019.1576629

[23] Hadar, L. L., Ergas, O., Alpert, B., & Ariav, T. (2020). Rethinking teacher education in a VUCA world: student teachers' social-emotional competencies during the Covid-19 crisis. *European Journal of Teacher ...*. https://doi.org/10.1080/02619768.2020.1807513

[24] Herman, K. C., Hickmon-Rosa, J., & Reinke, W. M. (2018). Empirically Derived Profiles of Teacher Stress, Burnout, Self-Efficacy, and Coping and Associated Student Outcomes. *Journal of Positive Behavior Interventions*, *20*(2), 90–100. https://doi.org/10.1177/1098300717732066

[25] Hidalgo, J. L. T., Bravo, B. N., Martínez, I. P., Pretel, F. A., Postigo, J. M. L., & Rabadán, F. E. (2010). Psychological well-being, assessment tools and related factors. *Psychological Well-Being*, 77–113.

[26] Kim, L. E., Oxley, L., & Asbury, K. (2022). "My brain feels like a browser with 100 tabs open": A longitudinal study of teachers' mental health and well-being during the COVID-19 pandemic. *... Journal of Educational Psychology*. https://doi.org/10.1111/bjep.12450

[27] Klusmann, U., Richter, D., & Lüdtke, O. (2016). Teachers' emotional exhaustion is negatively related to students' achievement: Evidence from a large-scale assessment study. *Journal of Educational ...*. https://psycnet.apa.org/record/2016-16651-001

[28] Kwon, K. A., Ford, T. G., Jeon, L., Malek-Lasater, A., & ... (2021). Testing a holistic conceptual framework for early childhood teacher well-being. *... of School Psychology*. https://www.sciencedirect.com/science/article/pii/S0022440521000297

[29] Lomas, T., Medina, J. C., Ivtzan, I., Rupprecht, S., & ... (2017). The impact of mindfulness on well-being and performance in the workplace: an inclusive systematic review of the empirical literature. *... Journal of Work and ...*. https://doi.org/10.1080/1359432X.2017.1308924

[30] MacIntyre, P. D., Gregersen, T., & ... (2019). Setting an agenda for positive psychology in SLA: Theory, practice, and research. *... Modern Language Journal*. https://doi.org/10.1111/modl.12544

[31] Manasia, L., Pârvan, A., & Macovei, M. (2020). Towards a model of teacher well-being from a positive emotions perspective. In *European Journal of Investigation in ...*. mdpi.com. https://www.mdpi.com/2254-9625/10/1/35

[32] Netolicky, D. M. (2020). School leadership during a pandemic: navigating tensions. In *Journal of professional capital and community*. emerald.com. https://doi.org/10.1108/JPCC-05-2020-0017

[33] Nie, Y., Chua, B. L., Yeung, A. S., Ryan, R. M., & ... (2015). The importance of autonomy support and the mediating role of work motivation for well-being: Testing self-determination theory in a Chinese work organisation. *International Journal of ...*. https://doi.org/10.1002/ijop.12110

[34] Oktaviani, L., Fernando, Y., Romadhoni, R., & ... (2021). Developing a web-based application for school councelling and guidance during COVID-19 Pandemic. *Journal of Community ...*. https://ejournal.umm.ac.id/index.php/jcse/article/view/17630

[35] Ortan, F., Simut, C., & Simut, R. (2021). Self-efficacy, job satisfaction and teacher well-being in the K-12 educational system. In *... journal of environmental research and public ...*. mdpi.com. https://www.mdpi.com/1660-4601/18/23/12763

[36] Perryman, J., & Calvert, G. (2020). What motivates people to teach, and why do they leave? Accountability, performativity and teacher retention. *British Journal of Educational Studies*. https://doi.org/10.1080/00071005.2019.1589417

[37] Price, D., & McCallum, F. (2015). Ecological influences on teachers' well-being and "fitness." *Asia-Pacific Journal of Teacher Education*. https://doi.org/10.1080/1359866X.2014.932329

[38] Rahimnia, F., & Sharifirad, M. S. (2015). Authentic leadership and employee well-being: The mediating role of attachment insecurity. *Journal of Business Ethics*. https://doi.org/10.1007/s10551-014-2318-1

[39] Ramberg, J., Brolin Låftman, S., Åkerstedt, T., & Modin, B. (2020). Teacher Stress and Students' School Well-being: the Case of Upper Secondary Schools in Stockholm. *Scandinavian Journal of Educational Research*, *64*(6), 816–830. https://doi.org/10.1080/00313831.2019.1623308

[40] Schafft, K. A. (2016). Rural education as rural development: Understanding the rural school–community well-being linkage in a 21st-century policy context. *Peabody Journal of Education*.

https://doi.org/10.1080/0161956X.2016.1151734

[41] Schmidt, M., & Hansson, E. (2018). Doctoral students' well-being: A literature review. ... *Studies on Health and Well-Being*. https://doi.org/10.1080/17482631.2018.1508171

[42] Schwartz, K. D., Exner-Cortens, D., & ... (2021). COVID-19 and student well-being: Stress and mental health during return-to-school. ... *School Psychology*. https://doi.org/10.1177/08295735211001653

[43] Shen, B., McCaughtry, N., Martin, J., Garn, A., & ... (2015). The relationship between teacher burnout and student motivation. *British Journal of ...*. https://doi.org/10.1111/bjep.12089

[44] Shepherd, J., Pickett, K., Dewhirst, S., & ... (2016). Initial teacher training to promote health and well-being in schools– A systematic review of effectiveness, barriers and facilitators. ... *Education Journal*. https://doi.org/10.1177/0017896915614333

[45] Squires, V. (2019). The well-being of the early career teacher: A review of the literature on the pivotal role of mentoring. In *International journal of mentoring and coaching in ...*. emerald.com. https://doi.org/10.1108/IJMCE-02-2019-0025

[46] Sverdlik, A., Hall, N. C., McAlpine, L., & ... (2018). The PhD experience: A review of the factors influencing doctoral students' completion, achievement, and well-being. *International Journal of ...*. https://www.informingscience.org/Publications/4113

[47] Tadić, M., Bakker, A. B., & Oerlemans, W. G. M. (2015). Challenge versus hindrance job demands and well-being: A diary study on the moderating role of job resources. *Journal of Occupational and Organizational Psychology*, *88*(4), 702– 725. https://doi.org/10.1111/joop.12094

[48] Vainio, M. M., & Daukantaitė, D. (2016). Grit and different aspects of well-being: Direct and indirect relationships via sense of coherence and authenticity. *Journal of Happiness Studies*. https://doi.org/10.1007/s10902-015-9688-7

[49] Walter, H. L., & Fox, H. B. (2021). Understanding teacher well-being during the COVID-19 pandemic over time: A qualitative longitudinal study. *Journal of Organizational Psychology*. https://articlearchives.co/index.php/JOP/article/view/4986

[50] Weber, M., Wagner, L., & Ruch, W. (2016). Positive feelings at school: On the relationships between students' character strengths, school-related affect, and school functioning. In *Journal of Happiness Studies*. Springer. https://doi.org/10.1007/s10902-014-9597-1

[51] Wolf, S., Aber, J. L., Behrman, J. R., & ... (2019). Experimental impacts of the "Quality Preschool for Ghana" interventions on teacher professional well-being, classroom quality, and children's school readiness. *Journal of Research on ...*. https://doi.org/10.1080/19345747.2018.1517199

[52] Yin, H., Huang, S., & Wang, W. (2016). Work environment characteristics and teacher well-being: The mediation of emotion regulation strategies. In *International journal of environmental research ...*. mdpi.com. https://www.mdpi.com/1660-4601/13/9/907

[53] Zewude, G. T., & Hercz, M. (2021). Psychological Capital and Teacher Well-Being: The Mediation Role of Coping with Stress. *European Journal of Educational Research*. https://eric.ed.gov/?id=EJ1307367

[54] Zinsser, K. M., Christensen, C. G., & Torres, L. (2016). She's supporting them; who's supporting her? Preschool center-level social-emotional supports and teacher well-being. *Journal of School Psychology*. https://www.sciencedirect.com/science/article/pii/S0022440516300541

The Effect of Emotional Intelligence on Mathematics Learning Achievement of Undergraduate Students of Primary School Teacher Education

Winarti Dwi Febriani[1*], Riza Fatimah Zahrah[2]

[1,2,] Pendidikan Guru Sekolah Dasar, Perjuangan University, Tasikmalaya, Indonesia

[*]E-mail: winartidwi@unper.ac.id

Abstract. This research was motivated by the difficulty of students in understanding and communicating their mathematical ideas, hard work, self-control, empathy, and social skills are still problems at the higher education level, resulting in the emergence of the notion that mathematics is a difficult subject to teach and learn. The purpose of this study was to analyze and find a description of the effect of emotional intelligence on achievement of elementary school teacher candidates (bachelor's degree) in mathematics learning. This is a quantitative research using a survey method with the independent variable is Emotional Intelligence (X) and the dependent variable is Mathematics Learning Achievement (Y). The data collection instrument used was an emotional intelligence questionnaire. The results of the study were obtained from the results of the correlation test, the value of $P = 0.000 < 0.05$ and the result of the t-test was the sig. equal to $0.000 <$ significance level ($\alpha = 0.05$), then the hypothesis is accepted. The conclusion of this study is that there is a positive and significant effect of emotional intelligence partially on the mathematics learning achievement of undergraduate students of Primary School Teacher Education.

1. Introduction

Character education is a major issue in the field of education, not least in higher education. As stated in Law no. 20 of 2003 article 3 concerning the National Education System that "National Education functions to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the nation's life, aiming at developing the potential of students to become human beings who believe and fear God Almighty, have character noble, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen" [1]. The 21st Century skill that every student needs is the quality of character [2]. There are five main character values originating from Pancasila, one of which is the value of independent character. The value of independent character is the attitude and behavior of not depending on others. Independent students have a good work ethic, are tough, have fighting power, are creative, and have courage [3]. Based on some of the opinions above, in order to become professional teacher candidates who master 21st Century skills, students need to develop their emotional intelligence.

According to Shah [4] one of the factor spiritual that can influence results study is intelligence. Intelligence divided into 3 types, namely Intelligence Quatient (IQ), Emotional Quatient (EQ), and Spiritual Equatient (SQ) [5]. As prospective school teacher basics, students must understand learning math at school basic, according to Soedjadi [6] that mathematics school is related with child moderate education - go through the development process cognitive and emotional, they need stages appropriate study - with the development process that. [7] places interpersonal and intrapersonal intelligence as

definition base about intelligence emotions.

However, in reality, based on the results of observations in learning subjects in the field of mathematics at one of the universities in Tasikmalaya City, the learning is still centered on developing intellectual intelligence. Intellectual intelligence is seen from the main focus of students only on exam scores and final grades for each semester. Meanwhile, in the current era, in addition to intellectual intelligence, students – especially elementary school teacher candidates – need to develop emotional intelligence. This is because prospective elementary school teacher students in the future will become educators for their students in the future. In order to be able to become professional educators, prospective elementary school teachers need to have emotional intelligence. In addition, based on the observations of researchers with lecturers in mathematics, it is known that some of the obstacles experienced by lecturers are lack of self-confidence, hard work, self-control, empathy, and student social skills when the learning process occurs in class. Most students are still individualistic in learning activities in class and group study activities. Lack of understanding learning mathematics make many student elementary school teacher candidates feel that mathematics just a row the numbers, symbols, and symbols that must be memorized for get good value, and things the make mathematics considered as hard lesson for students Primary School Teacher Education [8][9].

Based on this background, the urgency in this research is the importance of developing and improving the emotional intelligence of prospective elementary school teacher students, especially in learning mathematics, it is necessary to conduct a study on how emotional intelligence influences on the mathematics learning achievement of students at bachelor's degree. The purpose of this study was to analyze and describe the effect of emotional intelligence on student achievement of elementary school teacher candidates (bachelor's degree) in learning mathematics. Students of Primary School Teacher Education are prospective educators who will later educate children at the basic education level. Along with the development of the 21st century, students are required to develop and improve their intelligence. Not only intellectual intelligence, but also emotional intelligence, especially in learning eye studying mathematics's field. This is in accordance with the opinion of Hawari [10] that there are several intelligences in humans, including: intellectual intelligence; emotional intelligence; creative intelligence, and spiritual intelligence. In the field of education, what is now in the spotlight is character. [11] character can be seen as a way of thinking and behaving that is unique to each individual to live, socialize, and work together in the family, community, nation and state environment. These things are related to emotional intelligence. Goleman defines emotional intelligence as a person's ability to motivate themselves, resilience in the face of failure, control emotions, delay gratification and regulate mental states. In addition, Goleman divides emotional intelligence into five parts, namely three components in the form of emotional competence (self-knowledge, self-control and motivation) and two components in the form of social competence (empathy and social skills).

Emotional intelligence was adapted by David Goleman in [12] to be:

1. Self-awareness knows what we are feeling at any given moment and uses it to make our own decisions.

2. Self-regulation deals with our emotions in such a way that they have a positive impact on task performance.

3. Motivation uses our deepest desires to guide us toward our goals, act effectively, and endure failure.

4. Empathy is feeling what other people feel.

5. Social skills handle emotions well when interacting with others, as well as cooperate and work in teams.

Based on Goleman, the aspects of emotional intelligence used in this study are self-knowledge; self-control; motivation; empathy; and social skills. Learning achievement according to Winkel [13] is a proof of learning success or a student's ability to carry out learning activities in accordance with the weight achieved. Whereas, according [14], achievement is satisfied when students strive to learn particular subjects or acquire difficult skills and are successful in their quest. The meaning of this statement is that achievement is the result when students learn certain material or can master difficult skills and succeed through their efforts. According [15] learning achievement is something that can be

viewed from two sides, namely teachers and students. From the students' learning achievement is a better level of mental development when compared to before learning. Meanwhile, from the teacher's point of view, learning achievement is when the learning material is completed.

Based on these two opinions, the authors conclude that learning achievement is the level of development of student knowledge and insight obtained from experience and mastery of learning materials that have been studied in the form of scores after learning mathematics. Mathematics is universal science that plays a role important in development technology. Meanwhile, according to Minawarti & Basri, education mathematics is a process of change good from side cognitive, affective, and psychomotor to direction maturity in accordance with truth logic. Therefore, the indicators of student learning achievement in mathematics used in this study are the final scores of subjects in mathematics, namely: Basic concepts of mathematics. Hypothesis the research was "Emotional intelligence has a significant effect on mathematics learning achievement for Primary School Teacher Education' undergraduate students.

2. Methods of the research

2.1 Methods

The research approach used is a quantitative approach with survey methods with correlational analysis. Survey research is research conducted on the population big nor small, but the data studied is data from sample taken from population that, so that found events relative, distribution, and relationships between variable sociological nor psychological [16]. This method was chosen according to the research objectives and the author intends to know and analyze empirically about how emotional intelligence influences mathematics learning achievement of students. The population in this study were all Primary School Teacher Education' students at universities throughout the city of Tasikmalaya. The sample technique used is a proportional simple random sampling, so that got sample study this is 86 students from two universities in the City of Tasikmalaya. The independent variable (X) is Emotional Intelligence (EQ) and the dependent variable (Y) is Mathematics learning achievement.

2.2 Instrument

Instruments used was Questionnaire and interview. Questionnaire was used to collect data about the effect of emotional intelligence. The measurement scale used is likert scale. The data used is primary data in the form of results emotional intelligence questionnaire and secondary data, namely score end eye studying draft base math. Data processing was carried out with the help of Ms. Excel 2019 and SPSS software version 26.0 for windows.

2.3 Data Analysis

Data analysis steps: Perform descriptive statistical analysis calculations (calculate the total value of questionnaire for every respondent); Testing the validity and reliability of the item statements of the emotional intelligence instrument using SPSS ver. 26. 0; Perform the prerequisite test for simple linear regression analysis, namely the normality test using the Kolmogorov-Smirnov test; Perform linearity test to find out and prove that the relationship between the variables studied has a linear relationship by using the correlational test; Hypothesis testing using simple linear regression test to see the effect of emotional intelligence on learning achievement.

3. Main Discussion

3.1 Developing and Validating

The results of the research analyzed are in accordance with the purpose of this study, namely to analyze and find out the description of the influence of Emotional Intelligence on the learning achievement of prospective primary school teacher students in learning mathematics. Quantitative data

in this study were obtained from the calculation of the score of the Emotional Intelligence questionnaire. The Emotional Intelligence questionnaire instrument consists of 25 statement items (14 positive statement items, 11 negative statement items). The number of items in the questionnaire is the result of testing the validity of the items in the questionnaire and testing the reliability of the instrument. The lattice of the Emotional Intelligence questionnaire instrument and the Self Confidence questionnaire instrument are as follows are presented in **Table 1.**

Table 1. Grid of Emotional Intelligence Questionnaire Instruments

No.	Aspect	Indicator	Positive Item Number (+)	Negative Item Items (-)
1	Introduction	Self-awareness knows what we are feeling at any given moment and uses it to make our own decisions.	1.2	3.4
2	Self-control	Self-regulation deals with our emotions in such a way that they have a positive impact on task performance.	5,6,9	7
3	Motivation	Motivation uses our deepest desires to guide us toward goals, act effectively, and endure failure.	10,12,13	11.14
4	Empathy	Empathy is feeling what other people feel.	16,17,20	18,19,22
5	Social Skills	Social skills handle emotions well when interacting with others, as well as cooperate and work in teams.	21,24,27	23,25,26

The qualitative data of this study is based on the results of interviews with student representatives of each generation with the aim of assisting in analyzing the results of quantitative data. This study examines the effect of the independent variable (independent variable), namely the Emotional Intelligence variable on one dependent variable (dependent variable), namely the learning achievement variable. The output of descriptive statistics for the three research variables is as follows are presented in **Table 2.**

Table 2. Statistics Descriptive

	mean	Std. Deviation	N
Performance Study	82.30	4.906	86
Intelligence Emotional	103.19	5.513	86

As for the description results data analysis is as following. Before to do simple linear regression analysis, it is necessary do prerequisite test more first, namely normality test and linearity test.

1. Normality Test conducted for knowing the data is normally distributed. Normality test using the Kolmogorov-Smirnov test. Normality test output results is as following are presented in **Figure 1.**

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		86
Normal Parameters ᵃ,ᵇ	mean	0E-7
	Std. Deviation	3.44791437
Most Extreme Differences	Absolute	.066
	Positive	.043
	negative	-.066
Kolmogorov-Smirnov Z		.615
asymp . Sig. (2-tailed)		.844
a. Test distribution is Normal.		
b. Calculated from data.		

Figure 1. Normality Test Output

Based on Figure 1, This normality test uses unstandardized residual value data derived from variable X. data namely Emotional Intelligence and the Y variable is Learning Achievement. The assumption that must be met in this normality test is that the research variables must be normally distributed. Basis for normality test decisions: If Asymp. Sig. (2-tailed) < significance level (α= 0.05) then the data is not normally distributed. However, if Asymp. Sig. (2-tailed) > significance level (α= 0.05) then the data is normally distributed. Based on table 2. Can seen that score asymp. Sig. (2-tailed) of 0.844 > significance level (α= 0.05) then could concluded that the residual data is normally distributed.

2. Linearity Test conducted for knowing connection variable X (emotional intelligence) towards variable Y (learning achievement). Normality test output results is as following are presented in **Figure 2.**

ANOVA Table			Sum of Squares	df	Mean Square	F	Sig.
Learning Achievement * Self Confidence	Between Groups	(Combined)	734,532	26	28.251	2.410	.003
		linearity	365,098	1	365,098	31,146	.000
		Deviation from Linearity	369,434	25	14,777	1.261	.230
	Within Groups		691,607	59	11.722		
	Total		1426.14	85			

Figure 2. Linearity Test Output

Based on Figure 2, could seen that linearity among Emotional Intelligence to learning achievement, value sig. of 0.084 > level significance (α= 0.05), then could concluded that Emotional Intelligence with learning achievement have linear relationship.

3. Correlational Test meant for knowing correlation between variable, that is Emotional Intelligence (X) with Learning Achievement (Y). As for the base taking decision for correlation test this is if sig value. (1- tailed) level significance (α= 0.05) then no there is significant relationship among second variable. However, if sig value. (1-tailed) level significance (α= 0.05) then there is significant relationship among second variable. Normality test output results is as following are presented in **Figure 3.**

Correlations		Learning achieve ment	Emotional Intelligence	Confidence
Pearson Correlation	Learning achievement	1,000	.540	.506
	Emotional Intelligence	.540	1,000	.375
Sig. (1-tailed)	Learning achievement	.	.000	.000
	Emotional Intelligence	.000	.	.000
N	Learning achievement	86	86	86
	Emotional Intelligence	86	86	86

Figure 3. Correlational Test Output

Based on **Figure 3,** could seen that variable Emotional Intelligence to Learning Achievement have score coefficient correlation of 0.540 and the value of significance of 0.000 level significance (α= 0.05), then could concluded that variable Emotional Intelligence have significant relationship to mathematics learning achievement of student.

4. Test Hypothesis simple linear regression test was performed. The coefficient table below provides the results of the t-test, which is intended to see the results of the effect of the independent variable partially to the dependent variable. Basis for decision making: if the value of sig. < level significance (α= 0.05), then H_0 is rejected and H_a is accepted, there is a partial effect of the independent variable (X) on the dependent variable (Y). However, if the value of sig. > level significance (α= 0.05), then H_0 is accepted and H_a is rejected, there is no partial effect of the independent variable (X) on the dependent variable (Y). The output of the test results are as following are presented in **Figure 4.**

Correlations		Learning achieve ment	Emotional Intelligence	Confidence
Pearson Correlation	Learning achievement	1,000	.540	.506
	Emotional Intelligence	.540	1,000	.375
Sig. (1-tailed)	Learning achievement	.	.000	.000
	Emotional Intelligence	.000	.	.000
N	Learning achievement	86	86	86
	Emotional Intelligence	86	86	86

Figure 4. T-test Output

Based on **Figure 4,** it can be seen that the value of sig. of 0.000 < level significance (α= 0.05), then H_0 is rejected and H_a is accepted. That is, the variable Emotional Intelligence partially significant effect on Mathematics Learning Achievement of undergraduate students of Primary School Teacher Education.

After knowing existence influence independent variable (X) simultaneously on the dependent variable (Y), continued to test the coefficient of determination (Test R^2). Coefficient value determination is for give instruction big percentage influence Emotional Intelligence to Learning Achievement. As for the output of coefficient test results determination is as following are presented in **Figure 5.**

Model Summary					Change Statistics				
Mod el	R	R Squar e	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Chang e	df1	df2	Sig. F Change
1	.631 a	.399	.384	3.215	.399	27,497	2	83	.000

a. Predictors: (Constant), Confidence, Emotional Intelligence

Figure 5. Coefficient Test Output Determination

Based on **Figure 5,** it can be seen that the magnitude of the coefficient of determination (*R Square*) is 0, 291 or equal to 29.1 %. So it can be said that the variable Emotional Intelligence (X) partially has an effect of 29.1 % on the variable Learning Achievement (Y). Meanwhile, the remaining 70,9 % (100% -29,1 % = 7 0, 9 %) is influenced by other variables outside the simple linear regression equation this is not researched.

3.2 Discussion

The variable of Emotional Intelligence includes five aspects according to David Goleman, namely self-knowledge, self-control, motivation, empathy, and social skills. In the classical assumption test that has been carried out, namely the normality test, it can be said that the data is normally distributed. The results of the linearity test show that the emotional intelligence variable with learning achievement has a linear relationship. The results of the correlational test, it can be said that the Emotional Intelligence variable has a significant relationship to learning achievement. From the three tests, it can be said that emotional intelligence has a significant relationship to learning achievement.

Proof of the research hypothesis 1, the effect of Emotional Intelligence on Mathematics Learning Achievement of undergraduate students of Primary School Teacher Education, namely from the analysis results obtained Pvalue = 0.000 <0.05 and the t-test result is sig-value. of 0.000 < level significance (α= 0.05). This thing means there is positive and significant influence intelligence emotional partially to the Mathematics Learning Achievement of students of Primary School Teacher Education. Therefore, it can mean that the higher the emotional intelligence of students, the better the mathematics learning achievement of students at the bachelor's degree.

The results of this study are in line with the results of research [17] that emotional intelligence and motivation have a positive and significant effect on learning outcomes for Biology students at SMA Negeri Palopo. In addition, the research results [18] state that emotional intelligence has a positive and significant effect on student learning achievement both simultaneously and partially. From the two opinions above, that emotional intelligence has a positive influence on learning outcomes, students in the learning process can control their emotions, then can recognize their own abilities, are always motivated to correct mistakes made and also always think positively and establish good social interactions. with the surrounding environment. This is in line with Dawson's opinion [19] that individuals who have a better level of emotional intelligence, can become skilled in calming themselves down quickly, are more skilled in focusing attention, are better at understanding people, better able to understand people, and for academic work in schools better.

4. Conclusion

Based on the results and discussion, can drawn conclusion that intelligence emotional take effect positive and significant to mathematics learning achievement of students. Suggestions for researcher next can researching about level intelligence emotional on subject educate others.

References

[1]   Ministry of National Education. (2003). *Law no. 20 of 2003 concerning the National Education System.* Jakarta: Ministry of National Education.

[2]   Ministry of Education and Culture. (2016). *Character Education Strengthening Policy.* [Online]. Accessed from: https://cerdasbercharacter.kemdikbud.go.id/?page_id=132

[3]   Ministry of Education and Culture. (2017). *Strengthening Character Education Becomes the Entrance to Improving National Education.* [On line]. Accessed from: https://www.kemdikbud.go.id/main/blog/2017/07/Penguatan-Pendidikan-Character-jadi- Pintu-Ent-pembenahan- Pendidikan-nasional

[4]   Shah, M. (2004). *Educational Psychology with New Approach*. Bandung: Rosdakarya.

[5] Efendi, A. (2005). *Revolution 21st Century Intelligence Criticism of MI, EI, SQ, AQ, and Successful Intelligence on IQ*. Bandung: Alphabet.

[6] Minwarti, & Basri, M. (2018). Influence Intelligence Emotional on Learning Outcomes Mathematics Elementary School. *Journal Basic Education Research, Vol. 1 (1), p. 56-64.*

[7] Goleman, D. (2003). *Working with Emotional Intelligence (Translation).* Jakarta: PT. Main Library Gramedia.

[8] Handayani, D., & Septhiani, S. (2021). Influence Intelligence Emotional Aspect Awareness Self to Performance Study Mathematics. *Journal Scholar: Journal of Mathematics Education, Vol. 5 (2), p. 1352-1358*.

[9] Suhendri, H. (2011). The Effect of Mathematical–Logical Intelligence and Learning Independence on Mathematics Learning Outcomes. *Formative: Scientific Journal of Mathematics and Natural Sciences Educatio*, *1* (1), p. 29–39.

[10] Hawari, D. (2006). Manajemen Stress, Cemas, dan Depresi. Jakarta: FKUI.

[11] Samani, Muchlas., Hariyanto. (2011). *Concepts and Models of Character Education*. Bandung: Rosdakarya.

[12] Nggermanto, A. (2001). *Quantum Quotient; Kecerdasan Quantum Cara Praktis Melejitkan IQ, EQ, dan SQ yang Harmonis*. Bandung: Nuansa.

[13] Ramlah, Firmansyah, & Zubair. (2015). Pengaruh Gaya Belajar dan Keaktifan Siswa terhadap Prestasi Belajar Matematika (Survey pada SMP Negeri di Kecamatan Klari Kabupaten Karawang). *Jurnal Ilmiah SOLUSI, 1(3).*

[14] Arends, RL, & Kilcher, A. (2010). Teaching for student learning becoming an accomplished teacher. New York, NY: Routledge Published.

[15] Dimyati, & Mujiono. (2016). *Learning and Learning.* Jakarta: PT RINEKA CIPTA.

[16] Sugiyono. (2016). *Educational research methods*. Bandung: Alphabeta.

[17] Daud, F. (2012). The Effect of Emotional Intelligence (EQ) and Learning Motivation on Biology Learning Outcomes of Students at SMA 3 Negeri Palopo. *Journal of Education and Learning*, 19 (2), p. 243-255.

[18] Nursiah, and Tarigan, B. (2013). The Effect of Emotional Intelligence on Learning Achievement. *MBP Scientific Journal,* 1 (1), p. 88-96.

[19] Gusniawati, M. (2015). The Effect of Emotional Intelligence and Interest in Learning on the Mastery of Mathematical Concepts of Senior High School Students in Kebon Jeruk District. *Formative Journal,* 5 (1), p. 26-41.

Improving Teacher's Well-being Using PERMAH Elements

Yeri Ekomunajat

English teacher, SMPN 1 Karangmojo, Special Region of Yogyakarta, IndonesiaI

E-mail: yemunajat@gmail.com

Abstract. In a world where education is as much about moulding the characters of individuals as it is about transferring knowledge and skill, understanding the the importance of teachers'well-being and resilience becomes essential. Enter the PERMA™ model, a groundbreaking approach in positive psychology developed by Martin Seligman that breakdown the essence of psychological well-being into five core elements. Tailored for educators, this paper will guide teachers through the complexities of Positive Emotion, Engagement, Relationships, Meaning, and Achievement, and how these elements can transform not just personal well-being but also the educational landscape. As we dig deeper into each aspect of the PERMA model, we'll explore its profound relevance to the educational setting. We'll discuss practical strategies for teachers and administrators to incorporate the PERMA elements into their practice, benefiting both themselves and students. Furthermore, we will explore how these principles can create a positive school climate—an essential factor in shaping student outcomes. We'll also explore practical resources and techniques for educators to implement while nurturing authentic happiness in themselves, their colleagues, and most importantly their students.
Key words : well-being, PERMA, resilience, positive psychology

1. Introduction

Teaching profession has a responsibility to help students develop in their overall aspects of life whether it is intelectual, social, physical and spiritual. Teachers are individuals who play an important role in education sector. Taking up a profession as a teacher has its own challenge because of its complex nature. The reason is that when being at school, teachers are imposed with numerous administrative assignment which takes as much workload and time as their teaching practice. Based on the report of Indonesian Teacher Union Federation (FSGI) as a result of public hearing with Indonesian Legislative Body (DPR) from 2017-2018, there are four main issues of education in Indonesia, namely : the uneven provision of competence, teacher protection from all forms of violence, teacher distribution to get certified and well-being (Purnomo, 2018).

1.1 Teacher Well-Being

Teacher-well being is one of the major problems in the field of education in Indonesia. Until now, problems related to teacher well-being has not been effectively resolved According to the the report released by Lokadata in the acedemic year 2018/2019, the number of teachers in Indonesia reaches 2,94 millions and since 2014 – 2019 the number dwindled (Rania, 2020). The decrease was caused by so many demands imposed by the school which did not come to par with the well-being felt. The number of demand enforced to the teacher by the school can negatively affect teacher well-being and stress level). Teaching profession in Indonesia is included as a job with the risk of high-level stress.

1.2 Teacher Resilience

Caring professions such as teaching can inflict high emotional cost, leading to high stress levels and career burnout. But tools to develop resilience and healthy engagement strategies are now only a click away. Although teaching can be a highly rewarding career, teachers experience multiple and complex challenges in a profession that has seen work intensification, increased accountability and calls for improvements in teacher quality. Teacher stress and burnout have become of increasing concern, but in contrast, teacher resilience has been associated with positive outcomes such as teacher quality, enthusiasm and commitment, along with positive outcomes for students.

1.3 The PERMA Model – The Elements of Our Wellbeing

In 2011, Martin Seligman offered the PERMA framework in his book 'Flourish'. Many others have since added the H for Health. Each letter in the PERMAH framework refers to a pillar that contributes to our wellbeing, or what Seligman refers to as our level of 'flourishing'. Therefore, the six elements for our Wellbeing are: Positive emotion (P); Engagement (E); Relationships (R); Meaning (M); Accomplishment (A); and Health (H). Each of these can be developed, and the image below captures the six elements.

Positive emotion (P) encourages individuals to "anticipate, initiate, prolong and build positive emotional experiences" and accept and develop healthy responses to negative emotions (Norrish, Robinson & Williams 2013). Experiencing positive emotion has been found to benefit mental and physical health, social relationships and academic outcomes (Lyubomirsky, King & Diener 2005).

Engagement (E) involves living a life high in interest, curiosity and absorption and pursuing goals with determination and vitality (Norrish, Robinson & Williams 2013). Engagement is linked to wellbeing, learning and the accomplishment of important goals (Froh et al 2010; Hunter & Csikszentmihalyi 2003).

Relationships (R) consists of "developing social and emotional skills to enable the development of nourishing relationships with self and others" (Norrish, Robinson & Williams 2013). This is important because social isolation is a risk factor for depression, substance abuse, suicide and other symptoms of mental ill-health (Hassed 2008). On the other hand, supportive school relationships have been linked with child and adolescent wellbeing and resilience (Stewart et al 2004).

Meaning (M) is about developing an understanding of the benefits of serving a cause greater than ourselves and engaging in related activities (Norrish, Robinson & Williams 2013). Having a purpose in life is correlated to good physical health, high life satisfaction and strong relationships and is protective against depression and risky behaviours (Cotton Bronk et al 2009; Damon et al 2003).

Accomplishment (A) involves striving for and achieving meaningful outcomes (Norrish, Robinson & Williams 2013). Research suggests a bi-directional relationship between flourishing and positive accomplishment (Norrish, Robinson & Williams 2013). Mental health is a requisite for effective learning – it makes our minds available for learning (Hendren, Birrel Weisen & Orley 1994). In addition, the accomplishment of worthwhile goals leads to positive emotions and wellbeing (Sheldon et al 2010).

Health (H) refers to establishing habits that support positive physical and psychological health (Norrish, Robinson & Williams 2013). Research asserts that students who thrive physically and psychologically also perform well in their studies (WHO 2011). In addition, developing healthy behaviours in adolescence can carry benefits into later life, which reduces the risk of adverse health conditions such as diabetes or heart disease (Norrish, Robinson & Williams 2013).

The PERMAH model gives structure to Wellbeing and Positive Education. Without structure it is often difficult to set systematic, specific and achievable goals. Often it is good to work on one goal at a time, and as individual behaviours become established then move to the next goal according to motivation and priorities (Hassed 2008). Many of the aspects of PERMAH may benefit from the support and engagement of others such as family members and friends (Hassed 2008).

2. The Appication of Permah Model
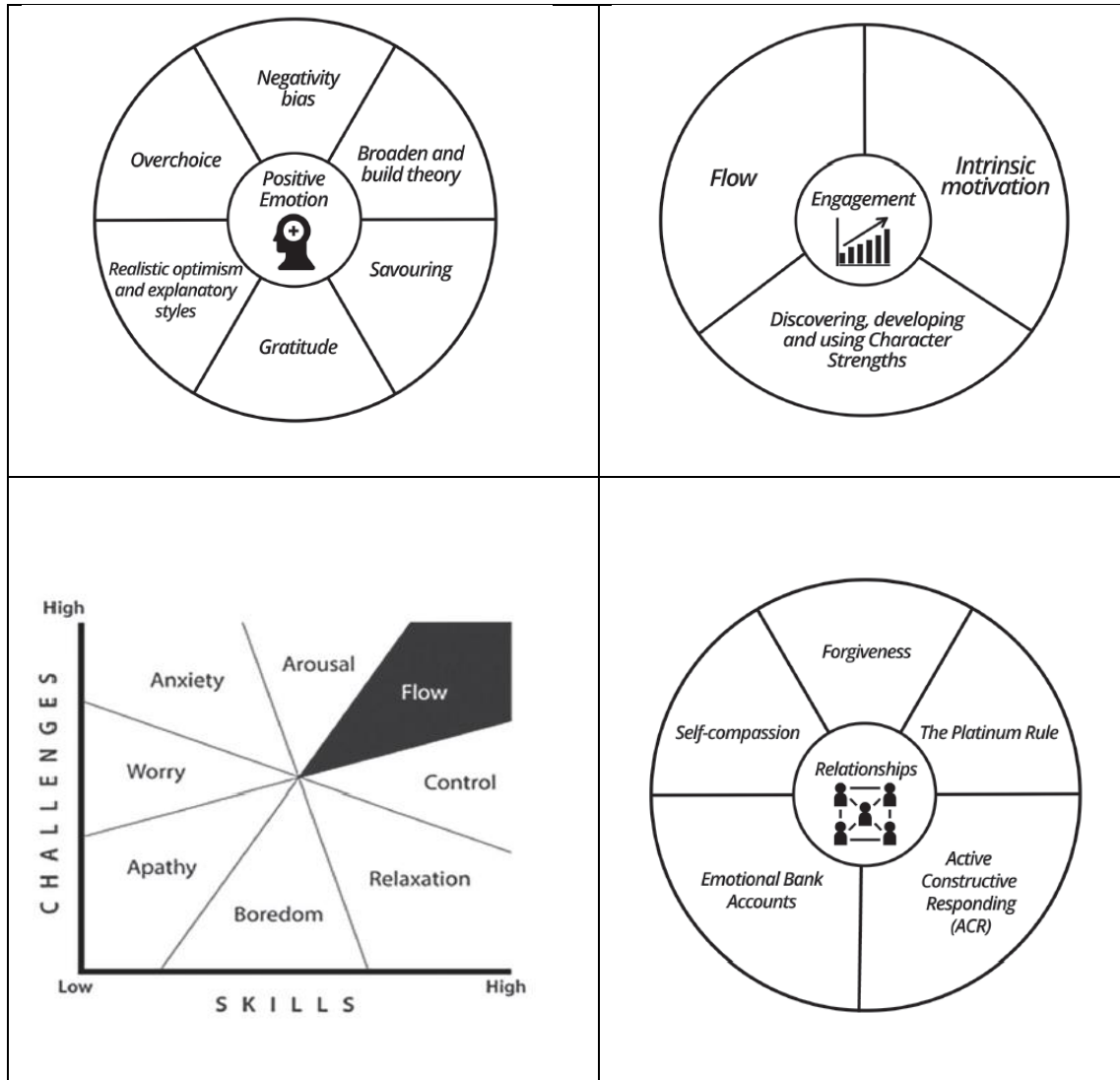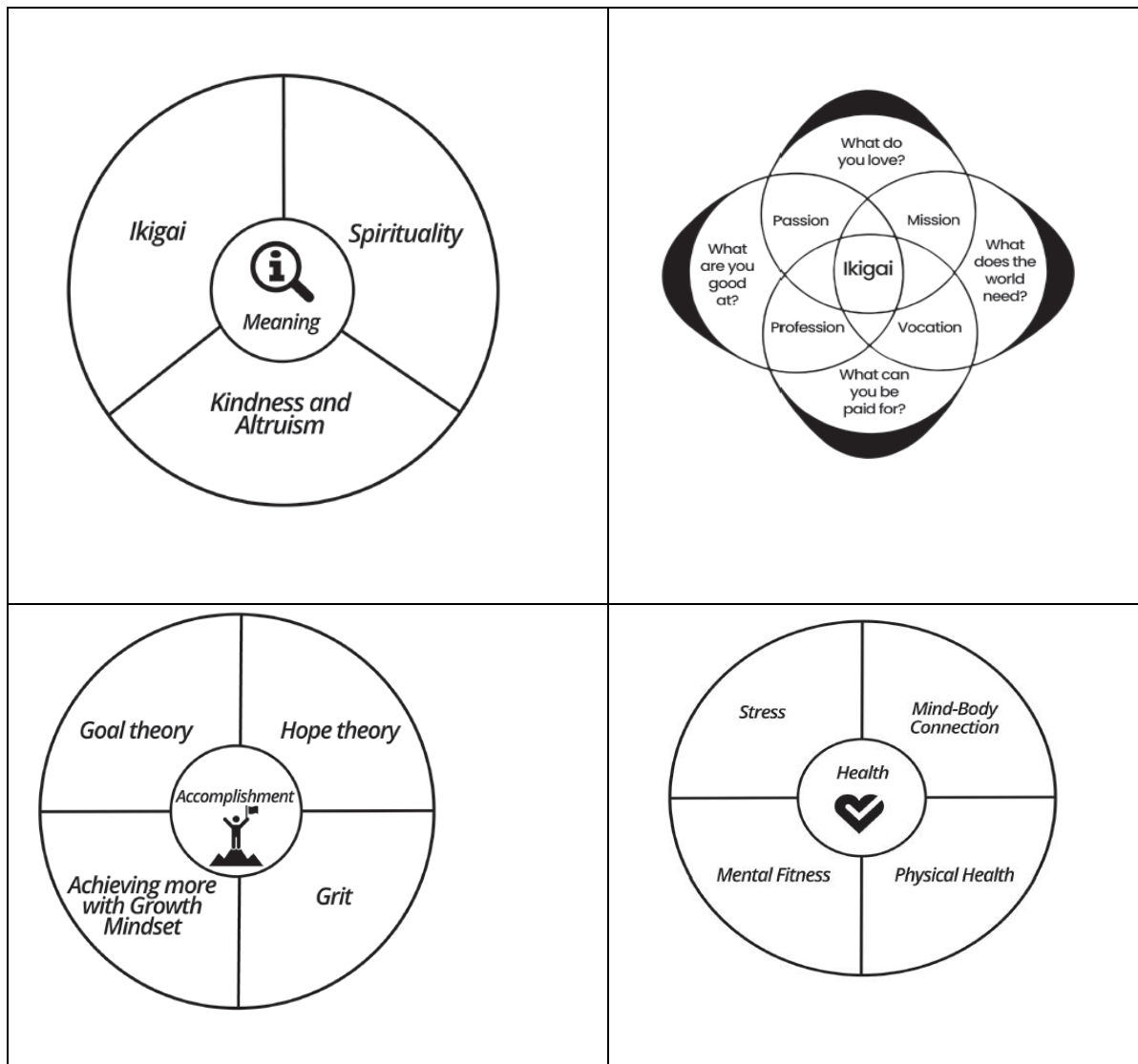
3. Discussion

When the elements of PERMAH are practiced consistently, teachers well-being and resilience will improve and they will thrive professionally and socially. They will be able to withstand work pressure and clutter of life by being able to manage their emotion better. Besides, they will find more satisfaction from their job and social life.

4. Conlusion

The elements of PERMAH has been widely applied in many developed countries and shown positive results. Teachers and students will thrive and flourish at their schools and teachers' positive emotion will increase which will have a significant impact on the students' enjoyment of teaching and learning process as a result.

References

[1]   Cotton Bronk, K., Hill, P.L., Lapsley, D.K., Talib, T.L. & Finch, H. (2009). Purpose, hope, and life satisfaction in three age groups. pp 500- 510 https://doi.org/10.1080/17439760903271439

[2]   Damon, W., Menon, J. & Cotton Bronk, K. (2003). The development of Purpose during adolescence. *Applied Developmental Science.* 7(3) pp 119-128

[3]   Froh, J.J., Kashdan, T.B., Yurkewicz, C., Fan, J., Allen, J. & Glowacki,

[4]   J. (2010). The benefits of passion and absorption in activities: Engaged living in adolescents and its role in psychological wellbeing. *The Journal of Positive Psychology*, 5: 4, 311 — 332.

[5]   Hassed, C. (2008). *The Essence of Health: the seven pillars of wellbeing.*

[6]   Sydney, Random House

[7]   Hendren, R., Birrel Weisen, R. & Orley, J. 1994. *Mental Health Programmes in Schools.* Division of Mental Health, World Health Organisation: Geneva, Switzerland.

[8]   Hunter, J. P., & Csikszentmihalyi, M. (2003). The positive psychology of interested adolescents. *Journal of Youth and Adolescence.* 32, 27-35.

[9]   Lyubomirsky, S., King, L., & Diener, E. (2005). The Benefits of Frequent Positive Affect: Does Happiness Lead to Success? *Psychological Bulletin,* 803-855.

[10] Norrish, J. M., Williams, P., O'Connor, M., & Robinson, J. (2013). An applied framework for positive education. *International Journal of wellbeing.* 3(2), 147-161. doi:10.5502/ijw.v3i2.2.

[11] Purnomo, H. (2018, Maret 14). Pandangan danmasukan dari Federasi Serikat GuruIndonesia, *Laporan Singkat panja Standar Nasional Dikdasmen Komisi X DPR RI.* Rapat Dengar Pendapat Umum.

[12] Rania, A. (2020). *Jumlah guru di Indonesia,2014-2019.*   Lokadata. https://lokadata.id/data/jumlah-guru-di-indonesia-2014-2019-1585298885

[13] Seligman, M. (2011). *Flourish: a visionary new understanding of happiness and wellbeing.* New York: Simon & Schuster.

[14] Stewart, D., Sun, J., Patterson, C., Lemerle, K. & Hardie, M. (2004). *Promoting and Building Resilience in Primary School Communities: Evidence from a Comprehensive 'Health Promoting School' Approach.* Centre for Health Research, School of Public Health, Queensland University of Technology. https://eprints.qut.edu.au/1281/1/IJMHP.pdf

[15] Sheldon, K.M., Abad, N., Ferguson, Y., Gunz, A., Houser-Marko, L., Nichols, C.P. & Lyubomirsky, S. (2010). Persistent pursuit of need- satisfying goals leads to increased happiness: A 6-month experimental longitudinal study. *Motivation and Emotion.* 34(1), 39-48

Comparing the Effectiveness of Democratic Voteand Modeled Teaching Strategies in Enhancing Reading Comprehension Using "Let's Read" Application

Arrisma Delimasari[1], Dhania Puspita Anjarsari[2] and Lilia Indriani[3]

[1,2,3] English Education Department, Universitas Tidar, Magelang, Indonesia
E-mail: arrisma.delimasari@students.untidar.ac.id

Abstract. Learning strategy is an important aspect for teachers to develop student's interest in learning in the classroom, especially in student's reading comprehension. The right learning strategy will encourage students to think independently, and creatively and at the same time be adaptive to various situations that occur and that may occur. This gives researchers reason to analyze the effectiveness of two learning strategies, namely Democratic Vote and Modeled Teaching, in learning for student's reading comprehension. The technique of taking data in this study is to conduct a pre-test and also a post-test to students before and after being given treatment in class. Researchers obtained this data after experimenting with the form of implementing learning strategies when pursuing learning material using a media application called "Let's Read". After getting this data, the researchers processed the data using the Mann-Whitney test which showed the results that these two learning strategies had different effectiveness in learning. Then, implementing these two learning strategies still has its own advantages and disadvantages.

1. Introduction

Reading comprehension is a crucial skill for college students to understand complex information from various sources. It aids not only in academic tasks but also in developing critical thinking and problem-solving skills. Stevani (1977) emphasized the importance of reading as it provides learners with access to a vast amount of language and a means to continue their education. In the information age, reading comprehension is crucial for processing the vast amount of written material available. It's a key part of digital literacy, especially as information is increasingly online. Students with good reading comprehension tend to excel academically. However, many students prefer visual, technology-based learning and have less time for reading due to academic workload. Difficulties in understanding English texts, particularly vocabulary and context, decrease their interest in reading. However, interest, which begins with feelings of happiness and a positive attitude, is crucial for developing reading comprehension. It can be seen as attention given to something due to a liking for it and can motivate someone to engage in activities they enjoy. According to Djali (2011), interest is a feeling of preference for a thing or activity. Student difficulties can be addressed by updating or developing teaching strategies, which involve students in learning activities (Yaumi, 2018) and influence how they process information (Mayer, 1988). New strategies suitable for the current generation include democratic vote and modeled teaching. Democratic vote, as described by Drew (2023), gives students more control by allowing them to vote on lesson plans. Modeled teaching involves the teacher demonstrating a task and breaking it down into manageable steps, aiding students in understanding how to complete it. Technology, particularly applications like "Let's Read", can innovatively enhance learning quality,

especially in reading. As Xiao (2019) suggests, educators should embrace advanced technology to aid English language education at universities. These applications can serve as digital learning programs for students. The "Let's Read" application, a digital library, can enhance students' reading comprehension by offering a variety of texts and interactive features like audio and images. This research introduces Democratic Vote and Modeled Teaching strategies in the classroom using the "Let's Read" application, aiming to compare their effectiveness in improving reading comprehension.

2. Literature Review

2.1 Reading Comprehension

Reading comprehension, as Spear-Swerling in Fitria (2019) stated, is a crucial aspect of language learning that involves understanding the overall meaning of a text. It's a key skill in the educational process at all levels. Influential factors include educational background, vocabulary level, phonological ability (Nurhayati et al., 2023), and motivational factors and reading interest (Wulandari & Setiawati, 2021). Various strategies have been identified to enhance these skills. For instance, project-based learning has been shown to improve reading comprehension in secondary school students (Susanto et al., 2023). Similarly, text-based learning and the integration of technology in English language teaching have been found to be effective (Suryadi et al., 2022). These strategies, when applied appropriately, can significantly enhance a student's ability to understand and interpret text, thereby improving their overall language proficiency.

2.2 Learning Strategies

Hammond (2023) highlights the importance of a student-centered learning approach. In addition, learning strategies are used to obtain, manage, and process information in terms of learning. In current education, research on learning strategies continues to be the main focus for optimizing student learning. Chen and Wang's (2023) research categorizes learning strategies into cognitive, metacognitive, and affective. Cognitive strategies involve understanding and processing information, metacognitive strategies manage the learning process, and affective strategies relate to the emotional and motivational aspects of learning. Liu and Zhang (2022) found that project-based learning and technology use, such as online platforms and interactive software, effectively support these strategies. These strategies apply to both online and offline learning environments.

2.3 Democratic Vote

Democratic vote in learning allows students to participate in decisions affecting their learning process, increasing their engagement (Wijaya et al., 2023). This approach includes students choosing their research topics or projects, which has been shown to increase their responsibility and engagement (Pranoto et al., 2020). Students become more active in seeking information, collaborating, and participating in discussions. This promotes a sense of ownership over their learning and encourages active engagement. However, teachers must ensure that all students are active and the process is fair.

2.4 Modeled Teaching

Modeled teaching is a method where teachers involve students in the learning process, beneficial for language acquisition and teachers must be aware that there is no single learning approach, that there are some learning approaches that are more effective than others, and most importantly, there are actions that teachers can take to maximize students' learning opportunities (Rexhepi, 2021). Albert Bandura, a renowned educational and developmental psychologist, emphasized the importance of social learning through observation. He suggested that people learn behaviors by watching others, a process known as exemplification. Drew (2023) added that the quality of the person modeling the behavior is crucial, as imitation is more likely from models who are recognized, authoritative, or prominent.

2.5 Let's Read Application

Mobile Assisted Language Learning (MALL), supported by devices like cellphones and tablets, is increasingly used for flexible and accessible language learning (Kamasak et al., 2021). It's an effective tool for English learning without time and place limitations (Zou et al., 2018). Research in a Chinese tertiary EFL environment showed that task-oriented MALL-based implementation led to meaningful student discussions (Liu et al., 2017). The "Let's Read" application, containing text and audio stories with visual images, has been proven to improve students' reading comprehension (Stevani et al., 2023). Reading is crucial for improving socio-cultural reading comprehension, especially for EFL students (Jember, 2020; Riadil, 2020), and visualization can help students understand the text and make learning active (Stevani et al 2023).

3. Methodology

Creswell (2014) highlights the value of quasi-experimental design in education and social research when randomization isn't feasible. The author's research uses this design to compare the effectiveness of two learning strategies, "Democratic Vote" and "Modeled Teaching", implemented via the "Let's Read" application. The study involves a specific batch of English Education students at an Indonesian campus, specifically from classes one and four, chosen for their distinct characteristics using Purposive Sampling. Data collection involves a Pre-Test and Post-Test method, with teaching strategies applied between tests to assess improvement in students' understanding of the material. This research involves processing interview data with lecturers and conducting two types of observations to understand students' reading comprehension issues and their understanding during pretests and posttests. The data is analyzed using SPSS to compare the effectiveness of the "Let's Read" application in two different classes. The t-test, as described by Sugyono (Salimun and Sugayanto, 2021: 573), is used to assess the contribution of each independent variable to the dependent variable. The test is conducted with a significance level of 0.05 ($\alpha = 5\%$). In research, the author formulates for Ha and H0:

1. H0: There is no significant difference between the effectiveness of the Democratic vote and Modeled teaching in improving students' reading comprehension of EFL using the "Let's Read" application in higher education.
2. Ha: There is a significant difference between the effectiveness of the Democratic vote and Modeled teaching in improving students' reading comprehension of EFL using the "Let's Read" application in higher education.

Then the Mann-Whitney Test is a statistical test conducted to compare the average of two different samples and not paired or related. Therefore, it can be interpreted that this research was conducted using different samples with the testing principle of seeing differences between two data sets which must first be known whether the variances are equal (equal variances) or different (unequal variances) (Palupi et al., 2021).

4. Finding

This research evaluates the effectiveness of two learning strategies, Democratic Vote and Modeled Teaching, using the "Let's Read" app. The study involves 42 students from Class 1 and 30 from Class 4 Professional Reading. Pre-test and post-test data were collected after experiments with different teaching methods. Data was processed using SPSS and the Mann-Whitney test. A normality test was conducted on the pre-test and post-test data to determine the more effective strategy.

Table 1. Pre-Test and Post-Test Mean Table

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test democratic vote	43	25	100	77.67	16.233
Post-test democratic vote	42	35	100	75.00	14.399
Pre-test modeled teaching	33	30	90	71.21	15.157
Post-test modeledteaching	30	20	100	72.33	18.971
Valid N (listwise)	30				

The data shows that the modeled teaching strategy, with scores increasing from 71.21 to 72.33, is more effective than the democratic vote strategy, which saw scores decrease from 77.67 to 75.00. The author is testing the significance of these results.

Table 2. Table Test of Normality

Tests of Normality

	Kelas	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Score	Pre-test democratic vote	.117	43	.154	.917	43	.004
	Pre-test modeledteaching	.174	33	.012	.903	33	.006
	Post-test democraticvote	.207	42	.000	.890	42	.001
	Post-test modeledteaching	.124	30	.200*	.946	30	.133

The Democratic Vote strategy's Sig. values are 0.004 (pre-test) and 0.001 (post-test), while the Modeled Teaching strategies are 0.006 (pre-test) and 0.133 (post-test). According to Santoso (2014), data is normally distributed if the Shapiro-Wilk test Sig. value is greater than 0.05. The Modeled Teaching data, which is normally distributed, was tested for homogeneity to check if the data set has the same characteristics.

Table 3. Table of Homogeneity

Test of Homogeneity of Variance

		LeveneStatistic	df1	df2	Sig.
Score	Based on Mean	.848	1	61	.361
	Based on Median	.956	1	61	.332
	Based on Median andwith adjusted df	.956	1	58.649	.332
	Based on trimmed mean	.868	1	61	.355

The author's data analysis reveals that the pre-and post-test results from the modeled teaching strategy are homogeneous, as the significance value is above 0.05. However, the data for the two learning strategies were not normally distributed, preventing a comparison using the independent t-test. Instead, the author used the Mann-Whitney test to evaluate the significance of the two methods.

Table 4. Table of Mann-Whitney Test

Test Statistics

	score
Mann-Whitney U	565.500
Wilcoxon W	1030.500
Z	-.746
Asymp. Sig. (2-tailed)	.455

The Mann-Whitney test uses the Asymp. Sig. (2-tailed) value for decision-making. If this value is less than or equal to 0.05, a significant difference is found and the alternative hypothesis is accepted. If it exceeds 0.05, the alternative hypothesis is rejected due to negligible difference. In this case, the author's data shows a result of 0.455, indicating a slight difference between the two learning methods, thus accepting the null hypothesis.

5. Discussion

The study compared the effectiveness of two learning strategies, "Democratic Vote" and "Modeled Teaching", in the "Let's Read" application. The data from pre-tests and post-tests showed that the "Modeled Teaching" strategy was more effective, but the "Democratic Vote" strategy also had its effectiveness (Koedinger and McLaughlin, 2016). The "Modeled Teaching" strategy, which provides different teaching to students, fosters a connection between teachers and students, leading to clearer learning (Rexhepi, 2021). This strategy results in non-teacher-centered learning, providing a more effective learning environment. Furthermore, collaborative learning has significant effects on the development of critical thinking skills and self-confidence in elementary school students (Chen and Wang, 2020). The "Democratic Vote" learning strategy encourages active student participation and choice in the learning process, leading to more effective learning outcomes (Alfarez, 2012). However, limitations in data collection, such as time constraints and lack of focus among students, were encountered. Despite these challenges, researchers gradually increased student focus through games and ice-breaking activities. Factors like students' initial ability, gender, and socio-economic background significantly influence the effectiveness of various learning strategies, suggesting that while some strategies may be generally effective, their success is strongly influenced by students' individual characteristics (Li and Zheng, 2019).

6. Conclusion

The study discovered that the effectiveness of learning strategies is not solely determined by the strategy itself, but also by external factors such as the classroom environment and student characteristics. The modeled teaching-learning strategy was found to be more effective than the democratic vote-learning strategy, but the difference was not significant. This suggests that both strategies can be effective under the right conditions. For future research, it's recommended to increase the scale of research subjects to get a more comprehensive understanding of the effectiveness of these strategies. Additionally, adjusting the learning media to match the sample used can also contribute to obtaining more accurate results. This is because different learning media may be more or less effective depending on the specific group of students being taught. Therefore, it's important to consider these factors when planning and conducting similar studies in the future.

7. Suggestion

For future research expand the scope of research subjects for optimal results. Researchers are also advised to conduct a broader literature review and long-term monitoring of student progress. Evaluations can be done by comparing student outcomes through reading comprehension, such as written tests, student projects, or oral presentations. This could provide additional insight into the effectiveness of both strategies in a broader context. This is expected to deepen understanding and enable a more comprehensive conclusion regarding the effectiveness of the two strategies.

References

[1] Anggraini, G. F., Sunendar, D., & Rahman. (2023). Meta-Analysis: Basic Education Literacy Issues in The 21st Century. *Pedagogia : Jurnal Pendidikan*, *12*(2), 137–153. https://doi.org/10.21070/pedagogia.v12i2.1489 Arguelles Alvarez, I. (2012). Student Choice and Reading in the EFL Classroom. *Online Submission*.

[2] Banditvilai, C. (2020). The Effectiveness of Reading Strategies on Reading Comprehension. *International Journal of Social Science and Humanity*, *10*.

[3] Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1). Prentice Hall.

[4] Carvalho, P. F., McLaughlin, E. A., & Koedinger, K. R. (2022). Varied practice testing is associated with better learning outcomes in self-regulated online learning. *Journal of Educational Psychology*, *114*(8), 1723-1742. https://doi.org/10.1037/edu0000754

[5] Chew, S. W., Huang, X., Hsu, F., & Chen, N. (2020). Enhancing critical thinking skills of elementary school students through collaborative learning. *2020 IEEE 20th International Conference on Advanced Learning Technologies (ICALT)*. https://doi.org/10.1109/icalt49669.2020.00082

[6] Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications.Drew, C. (2023). *List of 107 Classroom Teaching Strategies (With Examples)*. Helpful Professor.

[7] Darmawan, M. (2023). *PENGARUH MODEL PEMBELAJARAN PROBLEM BASED LEARNING (PBL) DAN TEACHING GAMES FOR UNDERSTANDING (TGFU) DAN TERHADAP PENINGKATAN HASIL BELAJAR PJOK PESERTA DIDIK KELAS VIII SMP*. Universitas Negeri Yogyakarta.https://eprints.uny.ac.id/73819/

[8] Dyah Yuniwati, E. (2024). Pemanfaatan Kebun Pangan Universitas Sebagai Sarana Pengajaran Hortikultura: Belajar dariPengalaman Proyek. *Jurnal Penelitian Tindakan Kelas*, *1*(3), 135–143. https://doi.org/10.61650/jptk.v1i3..268

[9] Imamuddin, Y., Dwi Prasetya, D., & Info, A. (2024). *Integrasi Teknologi Mobile Untuk Pembelajaran Dasar Desain Grafis:Pengembangan E-Modul Berbasis Proyek Untuk SMK*. *4*(1), 138–153. https://doi.org/10.51454/decode.v4i1.253

[10] Ismail, M. (2023). *PERBEDAAN KEMAMPUAN KOGNITIF PESERTA DIDIK PAI ANTARA SEKOLAH YANG MENGGUNAKAN KURIKULUM MERDEKA BELAJAR DAN KURIKULUM 2013 DI SMPN KOTA DUMAI*. UNIVERSITAS ISLAM NEGERI (UIN) SULTAN SYARIF KASIM.

[11] JALA, G. T. (2020). Pupils' Reading Comprehension, Problem-Solving Skills and Academic Performance. *Journal of World Englishes and Educational Practices*, *2*(4), 1–9. https://doi.org/10.32996/jweep.2020.2.4.1

[12] Jember, I. (2022). Using cloze strategy to improve students' reading. *Journal of Language Intelligence and Culture*. 4(1), 1– 14

[13] Kamasak, R., Ozbilgin, M., Atay, D., & Kar, A. (2021). *The effectiveness of mobile-assisted language learning (MALL): A review of the extant literature.* Handbook of research on determining the reliability of online assessment and distance learning, 194-212.

[14] Latif, F. (2024). *PENGEMBANGAN PROGRAM PEMBELAJARAN FLIPPED CLASSROOM TERINTEGRASI STEM UNTUKMENINGKATKAN KETERAMPILAN BERPIKIR SISTEM PESERTA DIDIK*.

[15] Liu, H., Tao, W., & Cain, W. (2017). Investigating Mobile Assisted English Foreign Language Learning and Teaching in China.Magdalena, R., & Angela Krisanti, M. (2019). Analisis Penyebab Dan Solusi Rekonsiliasi Finished Goods MenggunakanHipotesis Statistik Dengan Metode Pengujian Independent Sample T-Test Di Pt.Merck, Tbk. Jurnal Tekno, 16(2), 35–48

[16] Palupi, R., Yulianna, D. A., & Winarsih, S. S. (2021). Analisa Perbandingan Rumus Haversine Dan Rumus Euclidean Berbasis Sistem Informasi Geografis Menggunakan Metode Independent Sample T-Test. Jitu: Journal Informatic TechnologyAnd Communication, 5(1), 40–47. Https://Doi.Org/10.36596/Jitu.V5i1.494

[17] Par, L. (2020). The Relationship between Reading Strategies and Reading Achievement of the EFL Students. *International Journal of Instruction*, *13*(2), 223–238. https://doi.org/10.29333/iji.2020.13216a

[18] Pratikno, H. (2023). Pengaruh Aktivitas Penggunaan Media Digital terhadap Kemampuan dan Keterampilan Berbahasa Mahasiswa. *Jurnal Pendidikan Bahasa Dan Sastra Indonesia*, *7*.

[19] Ramadhianti, A., & Somba, S. (2023). Reading comprehension difficulties in Indonesian EFL students. *Journal of English Language Teaching and Literature (JELTL)*, *6*, 1–11.

[20] Rexhepi, B. (2021). THE MODELLING PROCESS AS AN INSTRUCTIONAL STRATEGY IN LANGUAGE TEACHING PROCESS: Strategies in Language Teaching Process. *Pendas Mahakam: Jurnal Pendidikan Dan PembelajaranSekolah Dasar*, 6, 8–16.

[21] Riadil, I. G. (2020). Investigating efl learners reading comprehension problems and strategies in Tidar University. *JELLT (Journal of English Language and Language Teaching)*, 4(1), 48–58.

[22] Stevani, A. M., Ambarini, R., & Setyorini, A. (2023). Enhancing Students' Reading Comprehension Using Let's Read Application In Visualization Strategy. CENDEKIA: *Jurnal Ilmu Sosial, Bahasa dan Pendidikan,* 3(4), 01-08.

[23] Zheng, L., Jiawei, Z., Haibao, H., Jian, S., & Zehua, H. (2019). Operational effectiveness analysis of cluster submarine formation torpedo weapon system based on fuzzy AHP comprehensive evaluation. *Proceedings of the 2019 The World Symposium on Software Engineering - WSSE 2019*. https://doi.org/10.1145/3362125.3362156

Open-Ended LKPD Assisted Mathematics Learning Needs Analysis to Improve Students' Mathematical Problem-Solving Skills

Melania Eva Wulanningtyas[1]* and Yudiani Linling[2]

[1] Matematika, Universitas Katolik Parahyangan, Bandung, Indonesia
[2] PPG Prajabatan Bidang Matematika, Universitas Negeri Yogyakarta, Indonesia

*E-mail: melaniaeva@unpar.ac.id

Abstract. This study aims to measure students' mathematical problem-solving ability through learning using LKPD which is prepared with an open-ended approach, this research is a qualitative research conducted in two private junior high schools in Yogyakarta with research subjects of all grade 8 students in the school totaling 319 students. Data collection in this study was through interviews, observations, tests of students' mathematical problem-solving abilities, and student questionnaires. This study uses research steps which include (1) collecting data, (2) reducing data, (3) presenting data, and (4) verifying data. Research that has been conducted shows the results of 217 students fall into the category of problem-solving ability that is less than enough, 80 students fall into the category of students with sufficient mathematical problem-solving ability, 22 students fall into the category of students with problem solving ability that is more than enough. The results showed that most students were still unable to solve mathematical problems given to the material of two-variable linear equation systems. This condition is caused because the learning activities carried out have not been able to facilitate students to have mathematical problem-solving skills. Therefore, researchers have suggestions (1) Teachers should involve students more in the teaching and learning process so that boredom does not occur, (2) Teachers can apply learning activities with the help of learning media so that students can be interested in learning mathematics and understand the learning outcomes of the material given, (3) Teachers can use an open-ended approach to be able to improve students' problem-solving skills because students will be familiar with open-ended contextual problems so that they can focus on solving problems and not on the final result.

1. Introduction

Mathematics learning activities at school are one of the learning activities designed to be able to help students to be able to analyse mathematical problems so that students can find solutions as problem solving needed because often students make many mistakes that are not only related to the application of mathematical concepts but also errors in calculating numbers. The level of errors made by students also varies, ranging from severe, moderate, to mild errors. This is because in mathematics learning activities not all students can focus on learning, actively participate in learning activities, and are also covered by full teacher assistance [1]. In learning activities, diversity of student errors is a problem that must be solved so that students can understand mathematical concepts and calculations clearly. This is

so that when the mathematical problem is present as a contextual problem, students can solve the problem independently.

One of the efforts that can be made by teachers to be able to analyse student errors is to design learning activities that are carried out actively. These learning activities can be realized with the help of LKPD, where students are given material and contextual problems to be solved which are then resolved in the form of group discussions. Through these learning activities, students will be more actively involved in learning, have the opportunity to express opinions in groups, to produce appropriate problem solving based on the results of group discussions [2]-[3]. In addition, teachers will be able to maximize their duties to be able to become facilitators, help groups or students who have difficulties based on the results of discussions that have been carried out, and of course can facilitate all students in the class [4]-[5]. Learning activities designed with the help of LKPD not only contain routine practice questions, but also contain teaching materials and also contextual mathematical problems that are tailored to the learning objectives to be achieved, namely leading to problem solving.

Problem solving can not only be presented using contextual problems related to everyday life but also designed using specific learning approaches. One application of the approach that can be used is learning using an open-ended approach that presents mathematical problems that have more than one solution [6]. Some contextual problems presented can contain more than one closed answer but can also contain multiple open answers. This open-ended approach does not have a standard syntax in its implementation, but has the following characteristics [7]-[8]:

a. Flexible, meaning that it allows for a variety of answers, responses, and solutions to given mathematical problems. This condition is also not limited or related to the previous answer so that it provides an opportunity for students to express ideas in order to find solutions to mathematical problems given. It also encourages students to be independent and not afraid to make mistakes if the answers obtained are different from other friends.

b. Full involvement, meaning that students are encouraged to be able to explore their abilities in depth as a form of analytical skills. Because in the open-ended approach there are no absolute right and wrong answers, students can get appropriate solutions and diverse perspectives on the mathematical problems given.

c. Open-ended questions, meaning that questions given to students tend to elicit a variety of responses and perspectives. It's not just fixated on a single answer, a short and concise answer, or an absolute answer.

d. Creative and innovative, meaning that through an open-ended approach, student can discuss with each other to express ideas, ideas, and solutions to the mathematical problems given. Even students are allowed to use information outside the field of mathematical science as long as it fits the needs of the mathematical problem presented. Through this learning condition, students are expected not only to find solutions but to be able to create solutions so as to obtain a meaningful learning experience.

The open-ended approach in learning is appropriate to measure students' mathematical problem-solving abilities, because students are encouraged to believe in their abilities and use them in discussing and collaborating to solve problems, to find alternative solutions that are in accordance with the given mathematical problems. Problem-solving abilities that will be analysed in this study are (1) the ability to understand the problem (understanding), (2) the ability to design the required mathematical model (setting), (3) the ability to solve predetermined mathematical models (adjusting), and (4) the ability to interpret the solutions obtained (elaborating) [9]. Problem solving ability is actually a series of activities carried out by students in using their thinking to collect information/ data, analyse information/ data obtained, design various alternative problem solving based on the information/ data obtained, and determine the most appropriate, effective, and efficient problem solving for contextual problems given [10]-[11].

2. Research Methods

This type of research is qualitative descriptive research with the focus in this study is to describe the needs of mathematics learning on the Two Variable Linear Equation System material with the help of LKPD which is prepared with an open-ended approach to improve the mathematical problem-solving ability of grade 8 junior high school students. This research was conducted in two private junior high schools in Yogyakarta with the research subjects of all grade 8 students in the school with a total of 319 students. The research methods carried out are interview methods, observation, tests of students' mathematical problem-solving abilities, and student questionnaires. Interviews were conducted with mathematics teachers in the two schools to find out the characteristics of students, students' mathematical problem-solving abilities, and also students' learning styles. Observation is carried out to observe student attitudes in learning activities to determine learning media and learning approaches that are in accordance with student characteristics. Problem-solving ability tests are given to students to measure the initial problem-solving ability possessed by students. Questionnaires are given to students to obtain information about students' interest in learning activities carried out in class and things that students want and need in classroom learning activities. The steps taken in this study are (1) collecting data, (2) reducing data, (3) presenting data, and (4) verifying data. The steps are presented in figure 1.
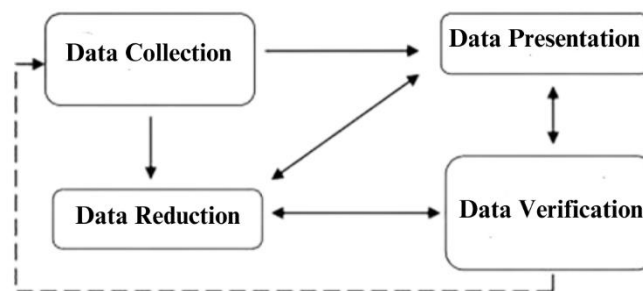
Figure 1. Research steps

Data obtained based on interview results, observation notes, test results, and questionnaire results collected were identified to determine students' mathematical problem-solving abilities. After that, the data that has been collected is reduced to tabulate the data to make it easier to understand the information collected. Then the data is presented in the form of a table containing the results of filling out student questionnaires and also the results of students' mathematical problem-solving ability tests. The results of interviews and observational notes carried out become supporting narratives to explain the table. All of these data will later become a reference to be able to make research conclusions.

3. Results and Discussion

The results of this study are the results of students' mathematical problem-solving ability tests and questionnaires that have been filled out by students which are correlated with the results of interviews with teachers and the results of observations made. The questions used in the problem-solving ability test are 4 questions, namely: 1 two-variable linear equation problem, 1 two-variable linear equation system problem in the form of a story problem, 1 two-variable linear equation system solving problem in graphic form, and 1 two-variable linear equation system solving problem in the form of a story problem. Table 1 below shows the results of students' problem-solving skills obtained based on mathematical problem-solving ability tests that have been conducted.

Table 1. Mathematical Problem-Solving Ability Test Results

Category	Interval	Frequency	Percentage
Very Low	$x \leq 21$	93	29,1356%
Low	$21 < x \leq 33$	124	38,8715%
Enough	$33 < x \leq 45$	80	25,0784%
High	$45 < x \leq 56$	12	3,7618%
Very High	$56 < x$	10	3,1348%

The data in the table shows that 93 students fall into the category of students with very low problem-solving ability, 124 students fall into the category of students with low problem-solving ability, 80 students fall into the category of students with sufficient problem-solving ability, 12 students fall into the category of students with high problem-solving ability, and 10 students fall into the category of students with very high problem-solving ability. This condition shows that the mathematical problem-solving ability of most students is still lacking. Based on this data, teachers need to implement a strategy or way so that students' mathematical problem-solving skills can improve or improve. The material of the two-variable linear equation system is material that can be presented through LKPD media to make it easier for students to learn more structured. In addition, the LKPD developed can be adjusted to the needs of students to be able to improve students' mathematical problem-solving abilities. One of the strategies applied is to develop LKPD using an open-ended approach so that students will be richer in solutions and problem solving obtained. Through an open-ended approach, students will find more than one solution so that students' mathematical problem-solving skills will be further honed.

This is also in line with the questionnaire given to students which stated that 76.1755% of students felt that mathematics learning activities carried out were boring because teachers taught monotonously using the lecture method, as many as 52.9781% of students indicated that interest in learning mathematics was lacking because there were no interesting learning media that could be used so they were only glued to books and routine questions, As many as 61.1285% of students find it difficult to understand the material presented because the language delivered by the teacher is not easy to understand and the questions given are not contextual problems so that students do not understand the use of mathematics in everyday life, and as many as 71.7869% of students do not feel enthusiastic when participating in mathematics learning activities because their focus is only on completing results and not on the process of work so that students are not trained to solve the problem. When there are contextual questions and story problems, students find it difficult to translate the problem to be solved and obtained the results of solving the problem. In the results of filling out this questionnaire, more than 50% or more than half of students stated that learning activities carried out in class could not facilitate students to learn well. Data on student questionnaire results can be seen in Table 2.

Table 2. Student Questionnaire Results

Category	Frequency	Percentage
Statement 1	243	76,1755%
Statement 2	169	52,9781%
Statement 3	195	61,1285%
Statement 4	229	71,7869%

The results of observations and interviews that have been conducted are used to match the results of students' mathematical problem-solving ability tests and also the results of filling out questionnaires that have been carried out by students. Based on observations and interviews, it was found that teachers still use conventional learning methods, refer to textbooks, and do not provide contextual mathematical problems for students to learn and solve. Students themselves are also still many who do not pay attention, do not like to read and write, tend to take pictures of the teacher's writing on the board and the material displayed on the screen, not a few students who also photocopy friends' notes to study. Based on this condition, students are indeed less trained to solve mathematical problems in learning activities. The focus of learning so far is only oriented to learning outcomes and not to the learning process carried out. Based on these results, there needs to be different treatment in classroom learning activities. One treatment that can be applied is to carry out LKPD assisted learning activities with an open-ended approach to improve students' mathematical problem-solving skills.

4. Conclusion

The results of this study show that if clustered, 217 students fall into the category of students with less than enough problem-solving ability, 80 students fall into the category of students with sufficient mathematical problem-solving ability, 22 students fall into the category of students with more than enough problem-solving ability. This means that most students are still unable to solve mathematical problems given on the material of two-variable linear equation systems. This condition is caused because the learning activities carried out have not been able to facilitate students to have mathematical problem-solving skills. This can be seen from the results of questionnaires filled out by students and also supported by the results of interviews and observations made during carrying out research activities. Based on the results of this study, researchers have suggestions (1) Teachers should involve students more in the teaching and learning process so that boredom does not occur, (2) Teachers can apply learning activities with the help of learning media so that students can be interested in learning mathematics and understand the learning outcomes of the material given, (3) Teachers can use an open-ended approach to be able to improve students' problem-solving skills because students will be familiar with open-ended contextual problems so that they can focus on solving problems and not on the final result.

References

[1] L. M. Angraini, A. Sthephani, and S. Q. Ain, "Pengaruh Bahan Ajar Berbasis Penalaran Matematis Untuk Meningkatkan Kemampuan Komunikasi Matematis," *FIBONACCI J. Pendidik. Mat. dan Mat.*, vol. 7, no. 1, p. 11, 2021, doi: 10.24853/fbc.7.1.11-18.

[2] N. F. Shalihah, T. Wibowo, and D. Yuzianah, "Development of Open-Ended-Based Mathematics E-Module on Quadrilateral Material of Junior High School," *JTAM (Jurnal Teor. dan Apl. Mat.*, vol. 6, no. 2, p. 331, 2022, doi: 10.31764/jtam.v6i2.7291.

[3] Y. N. Deda and T. Maifa, "Development of Student Worksheets Using the Context of Local Wisdom on Integers and Fractions," *J. Pendidik. Mat.*, vol. 15, no. 1, pp. 71–82, 2021, doi: 10.22342/jpm.15.1.12824.71-82.

[4] W. S. Bray, "How to Leverage the Potential of Mathematical Errors," *Teach. Child. Math.*, vol. 19, no. 7, 2013.

[5] M. S. Fredagsvik, "The challenge of supporting creativity in problem-solving projects in science: a study of teachers' conversational practices with students," *Res. Sci. Technol. Educ.*, vol. 41, no. 1, pp. 289–305, 2023, doi: 10.1080/02635143.2021.1898359.

[6] G. P. Pamungkas and K. Kowiyah, "The Influence of Open Ended Learning Model on Mathematical Problem Solving Ability," *J. Ilm. Sekol. Dasar*, vol. 5, no. 3, p. 395, 2021, doi: 10.23887/jisd.v5i3.37596.

[7] C. Magelo, E. Hulukati, and I. Djakaria, "Pengaruh Model Pembelajaran Open-Ended terhadap Kemampuan Berpikir Kreatif Matematik Ditinjau dari Motivasi Belajar," *Jambura J. Math.*, vol. 2, no. 1, pp. 15–21, 2020, doi: 10.34312/jjom.v2i1.2593.

[8] P. Pardimin and S. A. Widodo, "Development Comic Based Problem Solving in Geometry," *Electron. J. Math. Educ. e-ISSN*, vol. 12, no. 3, pp. 233–241, 2017.

[9] A. Wijaya, M. van den Heuvel-Panhuizen, M. Doorman, and A. Robitzsch, "Difficulties in solving context-based PISA

mathematics tasks: An analysis of students' errors," *Math. Enthus.*, vol. 11, no. 3, pp. 555–584, 2014, doi: 10.54870/1551-3440.1317.

[10] M. Ilham, S. Syarifuddin, and D. Silviana, "Proses Pemecahan Masalah Matematika Siswa SMP dalam Menyelesaikan Masalah Operasi Aljabar," *J. Pendidik. MIPA*, vol. 11, no. 2, pp. 12–22, 2021, doi: https://doi.org/10.37630/jpm.v11i2.457.

[11] S. V. Hanim, D. Kurniati, E. Oktavianingtyas, S. Susanto, and D. D. H. Jatmiko, "Proses Pemecahan Masalah Numerasi Tipe Uraian pada Materi SPLDV Berdasarkan Tahapan Polya," *Sigma*, vol. 9, no. 1, pp. 25–42, 2023, doi: 10.53712/sigma.v9i1.2067.

Evaluation Model for Inquiry Learning Based on David Merrill's First Principles of Instruction

Moch. Rifai[1]*, Poppy Diana[2], Suhanto[2] and Dhian Supardam[3]

[1] Air Navigation Technology, Aviation Polytechnic of Makassar, Makassar, Indonesia
[2] Airport Technology, Aviation Polytechnic of Makassar, Makassar, Indonesia
[3] Air Traffic Management, Indonesian Aviation Polytechnic Curug, Tangerang, Indonesia

*m.rifai@poltekbangmakassar.ac.id

Abstract. This research aims to develop an inquiry learning evaluation model based on the First Principles of Instruction proposed by David Merrill using the Systematic Literature Review (SLR) method. The SLR approach is used to collect, analyze, and synthesize relevant literature from various scientific sources, to gain an in-depth understanding of the application of the First Principles of Instruction which includes: problem-centered, activation, demonstration, application, and integration in inquiry learning and evaluation methods. effective. This research found that applying the First Principles of Instruction in inquiry learning can increase student engagement, conceptual understanding, and critical thinking skills. The results of the literature review show that an effective evaluation model must include measuring tools that can assess these five principles comprehensively, with a focus on achieving learning goals and improving student performance. This study concludes that the development of an evaluation model based on the First Principles of Instruction can provide clear guidance for educators in designing and evaluating inquiry learning processes that are more effective and efficient.

Keywords: Learning Evaluation Model; Inquiry Learning; First Principles of Instruction; David Merrill; Systematic Literature Review (SLR);

1. Introduction

Inquiry learning is a pedagogical approach that places students at the center of the learning process, by encouraging them to explore, ask questions, and discover knowledge independently. [1]. In contrast to traditional methods which tend to be instructional and based on direct teaching from teachers to students, inquiry learning encourages students to be actively involved in exploring and discovering new knowledge. [2]. Through a series of questions, observations, experiments, and reflections, students are encouraged to find their answers, develop deep understanding, and build critical and analytical thinking skills [3].

This method is rooted in the constructivist theory promoted by Jean Piaget and Lev Vygotsky, which states that knowledge is built through active interaction with the environment and other people. [4]. In inquiry learning, the teacher acts as a facilitator or guide who creates situations where students can ask questions, formulate hypotheses, and test their ideas through experiments or investigations. [5]. This process allows students to take ownership of their learning, increases intrinsic motivation, and develops a deep sense of curiosity [6].

The main goal of inquiry learning is to develop critical thinking, problem-solving, and effective communication skills [7]. Through this approach, students learn to become more independent in their learning process, building confidence in their ability to find and evaluate information [8].

David Merill's "First Principles of Instruction" focuses on identifying the core elements that make learning effective. The theory provides a framework that supports and enriches the inquiry-learning approach. According to Merill, five main principles are effective in the learning process:

a. Problem-Centered Learning:

Inquiry learning is in line with this principle because students face and solve real problems that are relevant to their context. They engage in complex tasks that encourage them to apply the knowledge and skills they learn [9].

b. Activation:

Before starting an investigation, students in inquiry learning often activate relevant prior knowledge. Teachers help students link the experiences and knowledge they already have with new tasks or problems to be solved [10].

c. Demonstration:

Although inquiry learning emphasizes self-discovery, teachers play an important role in demonstrating methods or techniques that students can use in their exploration. This helps students understand the steps required to complete a task or problem [11].

d. Application:

Inquiry learning emphasizes the importance of students applying what they have learned in different situations. They conduct experiments, observations, and investigations that allow them to practice and test new concepts in real contexts [12].

e. Integration:

After going through the investigative process, students integrate their findings into broader knowledge. They reflect on their experiences, discuss findings with peers, and present the results, which deepens their understanding and connects new knowledge to existing knowledge [13].

By integrating Merill's principles, inquiry learning not only emphasizes the process of exploration and discovery but also ensures that students experience holistic and effective learning.

Evaluation of the learning process is very important to determine the effectiveness of a learning process implemented by educators. The purpose of evaluation is to determine the success of the learning process (transfer of knowledge) from educators to students [14]. Apart from that, evaluation helps educators to find out students' abilities comprehensively, including knowledge, concepts, attitudes, values , and process skills [15].

Evaluation of the inquiry model is very important to determine the level of effectiveness of learning in improving students' abilities to understand concepts, intrapersonal intelligence, and students' critical thinking abilities. This evaluation was carried out using various methods, including posttest only, observation, and presentation, and using different research designs. It is important to close the loop of inquiry with evaluation so that it can inform program change and be integrated into the design and testing of new interventions [16].

This research specifically examines the inquiry learning evaluation model according to Merill's learning theory using the Systematic Literature Review method. This research was prepared by reviewing several studies and literature that are relevant to inquiry learning in students. A description of the methodology in this research is described in the next chapter followed by research questions. Then, the final chapter closes with conclusions, research limitations, and suggestions for further research.

2. Methodology

This research is a Systematic Literature Review Study using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) method, which was carried out systematically by following appropriate research stages and protocols. This method aims to evaluate, identify, and analyze all previous research results that are related and relevant to a particular topic, special research, or the latest phenomenon of concern. The facts presented in this review are comprehensive and balanced as they are used to synthesize relevant research findings. The steps in this systematic literature review include: Formulating research questions, conducting a systematic literature search, screening and selecting appropriate research articles, conducting analysis and synthesis of qualitative findings, implementing quality control, and preparing a final report [17].

The stages of the SLR (Systematic Literature Review) study, namely 1) compile Background and Purpose (Background and objectives), 2) Research Question, 3) Search for the literature, 4) Screening Criteria, 5) Data Extraction Strategy, 6) Assess Quality of Primary Studies, 7) Data Synthesis [18].

3.1 Research Question on Literature Review

Table 1. Research Questions on Literature Review

ID	Research Question	Motivation
RQ1	What is the purpose of inquiry learning?	Develop students' critical thinking skills and ability to investigate actively/independently
RQ2	How does the inquiry learning evaluation model fit David Merrill's learning theory?	Provides a comprehensive description of the appropriate evaluation model for measuring critical thinking skills and the ability to investigate actively/independently according to David Merrill's learning theory

3.2 Searching for the literature

This research uses the PoP (Posh or Perish) platform in literature searches. The first stage is to understand in depth the research topic, namely the evaluation model to measure critical thinking skills and the ability to investigate actively/independently according to David Merrill's learning theory. With this strong understanding, appropriate keywords can be formulated to be used in literature searches. The data source uses journal publication period limits in 2019-2024. By collecting data on PoP which has been integrated with the Scopus journal database and then carrying out the data selection stage. There are adjustments in the article search strategy, by pre-setting inclusion criteria to maintain uniformity in article searches and reduce potential bias.

3.3 Screening Criteria

When conducting a systematic literature review using the PRISMA method, it is necessary to observe strict selection criteria to ensure the inclusion of relevant studies and the exclusion of studies that do not match the research objectives. These selection criteria are important guidelines to guide the study search and selection process. Clear inclusion criteria help determine the type of study, population, intervention or exposure, and outcomes that will be included in the literature review [19].

The inclusion criteria used to carry out screening criteria in this research are: containing discussions related to inquiry learning methods (IC1), selecting articles written in English (IC2), and complete articles published in the international journal Scopus with a publication period of 2019 – 2024 (IC3), and project-based evaluation as an evaluation method for applying the inquiry method to students (IC4).

At the criteria screening stage using the PRISMA method, the Covidence platform was used to support systematic literature and meta-analysis. This platform provides various features that make it easier to collaborate, assess the feasibility of studies, and extract data efficiently. The following is a display of the PRISMA Systematic Literature Review chart that researchers obtained from the Covidence platform.
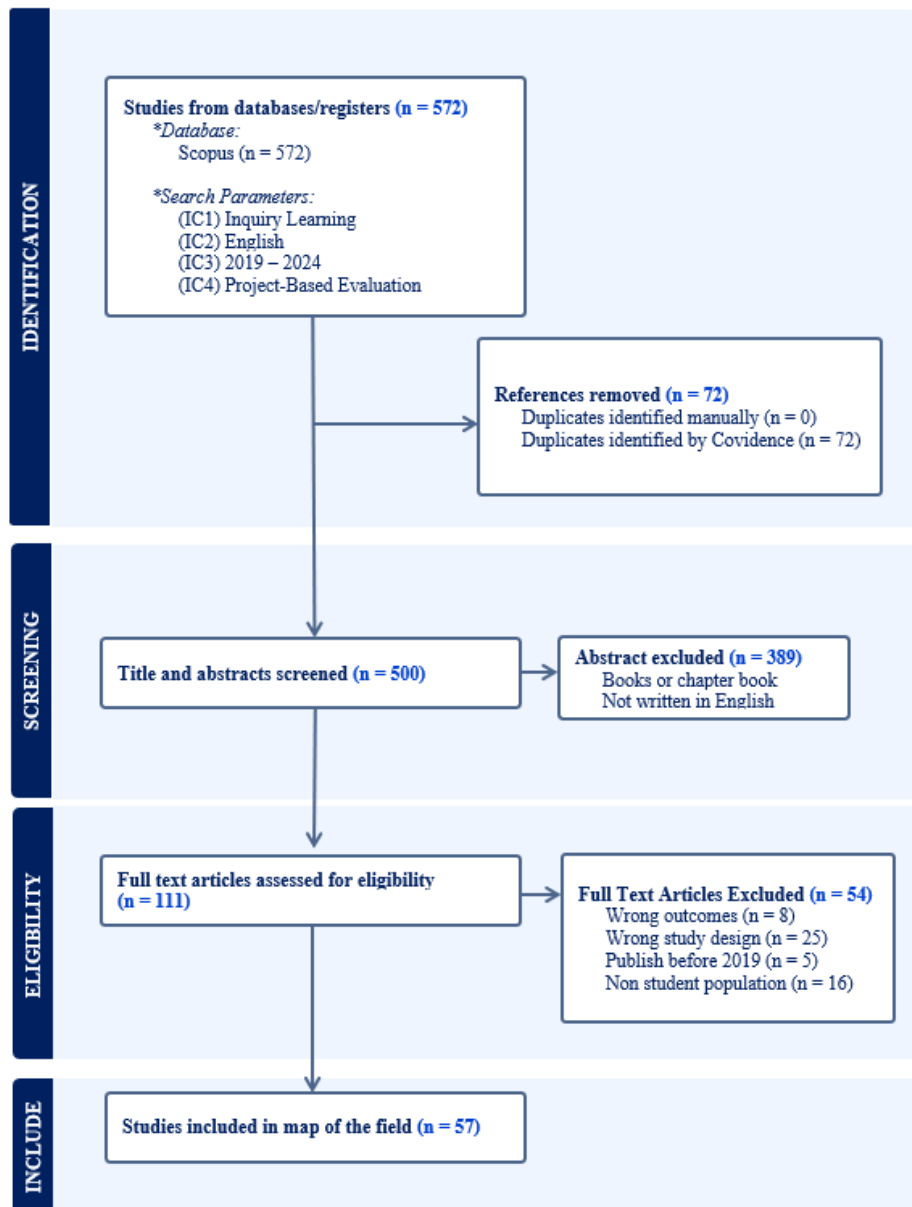
Figure 1. PRISMA Flow Diagram Systematic Review

4. Data Extraction, Assess Quality of Primary Studies, and Data Synthesis

Primary studies were extracted to collect data to help answer research questions. Study quality assessment is used to guide the interpretation of synthesis results and determine the conclusions to be drawn. The purpose of data synthesis is to collect evidence from selected studies to answer research questions.

5. Discussion

In the data processing stage, 572 articles were found in the Scopus journal database using the Posh or Perish (PoP) platform. Then, the data was imported into the Covidence platform to assist researchers in the screening criteria process using the PRISMA method. Of the total 572 articles, 57 articles have passed the abstract screening test stage and the full text assessed articles for the eligibility stage. The description of the stages of this test can be seen in Figure 1.

Challenges in inquiry learning methods are often related to approaches that position students as active learners who ask questions, seek information, and develop their understanding through exploration. One challenge is creating a supportive environment for inquiry learning, where students feel comfortable asking questions, experimenting, and making their discoveries. Other challenges include facilitating the inquiry learning process without compromising the planned coverage of lesson material and ensuring that students are truly actively involved in the learning process [20].

In this context, David Merrill's method, known as "First Principles of Instruction," offers a framework that may help overcome some of the challenges in inquiry learning. These first principles of instruction emphasize: 1) Problem-Centered Learning) 2) activation of previous experiences, 3) demonstration, 4) application, and 5) integration, which can be applied in an inquiry learning setting to help guide students through the process of exploration and discovery they [21].

First, based on analysis of Handayani's article [22] Evaluation models in Problem-Centered Learning (PCL) and evaluation in project-based learning are very suitable approaches as evaluation models in inquiry learning methods. In PCL, students are given complex and authentic challenges or problems to solve, allowing them to actively engage in learning. Meanwhile, evaluation of project-based learning involves assigning students to carry out projects that focus on investigations, experiments, or product development that are relevant to the learning topic. Both emphasize active learning, exploration, and application of concepts in meaningful contexts. By using this evaluation model in inquiry learning, students' abilities can be measured in developing critical thinking, problem-solving, creativity and collaboration skills while exploring topics in depth. Project-based evaluation allows teachers to evaluate students' understanding and their ability to apply knowledge in real contexts, while the PCL evaluation model provides a clear framework for measuring the ability to guide student inquiry and exploration [23]. Thus, the PCL evaluation model and project-based evaluation are very effective tools for measuring the success of inquiry learning models, facilitating deep and meaningful learning experiences for students.

Second, based on several studies conducted by Alman, Coombs, and Zogza [24,25,26], activation learning focuses on using previous experiences to build new understanding. Additionally, by activating prior knowledge, teachers can help students to make deeper and more meaningful connections between new and familiar concepts, which in turn improves their retention and understanding. This could mean relating new material to students' existing knowledge or stimulating their interest by using real-world situations or relevant case studies. By utilizing the learning activation evaluation model, student engagement in the learning process can be measured. Thus, the use of the activation learning evaluation model in inquiry learning can measure the ability to develop a deeper and more integrated understanding of the subject matter [27].

Third, based on several articles compiled by Riyanti, Nafingah, and Chua [28,29,30], Demonstration learning plays an important role in implementing inquiry learning methods. In the context of inquiry, demonstrations are used to show students how the investigation or exploration process is carried out effectively. Teachers can use demonstrations to illustrate scientific methods, data analysis techniques, or problem-solving approaches that are relevant to the learning topic. Through these demonstrations, students can see clearly how theoretical concepts are applied in practice, and how

methodological steps are implemented in a study or experiment. Additionally, demonstrations can also spark students' interest and inspire them to take an active role in their own learning [31]. By watching effective demonstrations, students can gain a better understanding of the scientific process, hone observation skills, and broaden their horizons on a particular topic. Therefore, the use of the evaluation model in demonstration learning as an evaluation model in inquiry learning can measure students' ability to apply steps or experiments to develop practical skills and in-depth knowledge of the subject matter. [32].

Fourth, based on several studies by Pratama and Laksana [33,34], Application learning in an inquiry context involves applying the concepts and skills learned in real situations or relevant contexts. Teachers can provide opportunities for students to apply their knowledge through challenging projects, experiments, or simulations. By applying concepts in a meaningful context, students can experience firsthand how knowledge can be used to solve real problems or produce creative solutions. In addition, applied learning also helps students to develop their critical thinking, problem solving and creativity skills, because they are faced with challenges that are relevant to the real world. Through applied learning, students can deepen their understanding of the subject matter, while gaining the practical skills necessary for future success. Thus, the use of the evaluation model in application learning as an evaluation model in inquiry learning can measure students' ability to develop a deeper and more relevant understanding of the concepts being studied.

Fifth, integration learning in the context of inquiry refers to combining various concepts, skills or knowledge from various scientific disciplines or fields of study. Teachers can design learning experiences that enable students to make connections between learned concepts in meaningful and complex contexts. This allows students to see connections between various topics and discover general patterns or principles that cut across different disciplines [35]. Additionally, integrative learning helps students to develop a more holistic and integrated understanding of a complex and diverse world. By exploring the relationships between different concepts, students can develop deep critical thinking, analytical, and synthesis skills. Through integrated learning, students can also see the relevance and practical application of their knowledge in various real-life contexts. Therefore, the use of the integration learning evaluation model as an evaluation model in inquiry learning can measure students' ability to develop a more complex and in-depth understanding of the world around them. [36].

Implementing key elements from the "First Principles of Instruction," into an inquiry learning evaluation model, can help provide a more structured and targeted evaluation framework for measuring critical thinking skills, solving problems, and exploring concepts in depth. This can help overcome the challenges of evaluation models in inquiry learning by providing clearer direction according to the main elements of David Merrill's first principle of instruction.

6. Conclusion

A systematic Literature Review can be used to identify and analyze data trends to predict the Inquiry learning model evaluation model combined with David Merrill's learning theory. This learning theory offers a valuable framework to support inquiry learning. By emphasizing evaluation models in student-centered learning, namely problem-based learning and project-based learning, activation learning, demonstration learning, application learning, and integration learning, Merrill provides strong guidance for designing meaningful and in-depth evaluation models. This approach creates a motivating learning environment and allows students to become actively engaged in inquiry, exploration, and problem-solving.

Recommendations for implementing learning methods in the future are to strengthen practices based on Merrill's theories and enrich them with technology and innovative learning tools. It is also important to provide opportunities for students to develop critical thinking, creativity, and collaboration

skills through practical and contextual learning. Thus, by consistently and creatively applying the principles of Merrill's theory, we can create more satisfying and meaningful learning experiences for students, preparing them for success in an ever-changing and complex educational era.

References

[1] N. Sugrah, "Implementasi teori belajar konstruktivisme dalam pembelajaran sains," *Humanika, Kaji. Ilm. Mata Kuliah Umum*, vol. 19, no. 2, pp. 121–138, 2019.

[2] H. R. S. Harahap, A. R. Rangkuty, and L. E. Nasution, "The Effect of Inquiry Teaching Method on Students' Vocabulary Achievement," *Edunesia J. Ilm. Pendidik.*, vol. 4, no. 1, pp. 80–93, 2023.

[3] J. S. Akbar *et al.*, *Model & Metode Pembelajaran Inovatif: Teori Dan Panduan Praktis*. PT. Sonpedia Publishing Indonesia, 2023.

[4] S. Rifky *et al.*, *Dasar-dasar Pendidikan: Panduan Untuk Menjadi Pengajar Profesional*. PT. Sonpedia Publishing Indonesia, 2024.

[5] M. H. Rahman, "Implementasi Model Pembelajaran Discovery Dalam Pendidikan Anak Usia Dini," *Early Child. J. Pendidik.*, vol. 5, no. 2, pp. 223–240, 2021.

[6] T. Heri, "Meningkatkan Motivasi Minat Belajar Siswa," *Rausyan Fikr J. Pemikir. dan Pencerahan*, vol. 15, no. 1, 2019.

[7] P. S. M. A. Sembiring, F. E. Gultom, and M. Debora, "The PENERAPAN OPTIMALISASI KETERAMPILAN 4C (CREATIVE THINKING, CRITICAL THINKING AND PROBLEM SOLVING, COMMUNICATION, COLLABORATION) DALAM PEMBELAJARAN CONTEXTUAL ORAL LANGUAGE SKILLSE," *J. Ilm. Korpus*, vol. 7, no. 3, pp. 391–399, 2023.

[8] L. T. Sutrisno, T. Muhtar, and Y. T. Herlambang, "Efektivitas pembelajaran berdiferensiasi sebagai sebuah pendekatan untuk kemerdekaan," *DWIJA CENDEKIA J. Ris. Pedagog.*, vol. 7, no. 2, 2023.

[9] R. Kasi, "Pembelajaran Aktif: Mendorong Partisipasi Siswa," 2023.

[10] N. A. Hrp, Z. Masruro, S. Z. Saragih, R. Hasibuan, S. S. Simamora, and T. Toni, "Buku Ajar Belajar dan Pembelajaran," 2022.

[11] N. Mariyaningsih and M. Hidayati, *Bukan Kelas Biasa: Teori dan Praktik Berbagai Model dan Metode Pembelajaran menerapkan inovasi pembelajaran di kelas-kelas inspiratif*. CV Kekata Group, 2018.

[12] R. A. Darman, *Belajar dan pembelajaran*. Guepedia, 2020.

[13] S. H. Kaif, *Strategi Pembelajaran (Macam-Macam Strategi Pembelajaran yang Dapat Diterapkan Guru)*. Inoffast Publishing Indonesia, 2022.

[14] M. Huljannah, "Pentingnya proses evaluasi dalam pembelajaran Di sekolah dasar," *Educ. (Directory Elem. Educ. Journal)*, vol. 2, no. 2, pp. 164–180, 2021.

[15] N. Antasari, "Penerapan Model Inkuiri Terbimbing Untuk Meningkatkan Pemahaman Konsep IPA Siswa Kelas V," *J. Pendidik. Guru Sekol. Dasar*, vol. 2, no. 3, pp. 1–13, 2017.

[16] G. D. Musoba, "Using evaluation to close the inquiry loop," *New Dir. Institutional Res.*, vol. 130, p. 77, 2006.

[17] A. Wahyudi, M. B. T. Assyamiri, W. Al Aluf, M. R. Fadhillah, S. Yolanda, and M. I. Anshori, "Dampak Transformasi Era Digital Terhadap Manajemen Sumber Daya Manusia," *J. Bintang Manaj.*, vol. 1, no. 4, pp. 99–111, 2023.

[18] R. S. Wahono, "A systematic literature review of software defect prediction," *J. Softw. Eng.*, vol. 1, no. 1, pp. 1–16, 2015.

[19] C. M. G. F. Lamboglia *et al.*, "Exergaming as a strategic tool in the fight against childhood obesity: a systematic review," *J. Obes.*, vol. 2013, 2013.

[20] A. Iskandar, H. A. Aimang, H. Hanafi, N. Maruf, R. Fitriani, and A. Haluti, *Pembelajaran Kreatif dan Inovatif di Era Digital*. Yayasan Cendekiawan Inovasi Digital Indonesia, 2023.

[21] M. D. Merrill, *First principles of instruction*. John Wiley & Sons, 2012.

[22] S. Wijaya and S. L. Handayani, "Pengaruh Process Oriented Guided Inquiry Learning (POGIL) terhadap Kemampuan Berpikir Kritis Siswa di Sekolah Dasar," *J. Basicedu*, vol. 5, no. 4, pp. 2521–2529, 2021.

[23] A. A. Ramadhansyah, M. Mulyana, T. Ulfa, and M. Miftakhuddin, "Eight Javanese teaching issues and its possible solutions: A systematic literature review," *J. Innov. Educ. Cult. Res.*, vol. 3, no. 2, pp. 162–176, 2022.

[24] G. Coombs and M. Elden, "Introduction to the special issue: Problem-based learning as social inquiry—PBL and management education," *Journal of Management Education*, vol. 28, no. 5. Sage Publications Sage CA: Thousand Oaks, CA, pp. 523–535, 2004.

[25] A. E. Ksir, J. M. Allman, N. Hetherington III, M. E. Selbach-Allen, and D. Skipper, "Activating calculus to command the seas: Reflecting on ten years of active and inquiry-based learning at the US naval academy," *PRIMUS*, vol. 31, no. 3–5, pp. 449–466, 2021.

[26] M. ErgaZaki and V. ZogZa, "How does the model of Inquiry-Based Science Education work in the kindergarten: The case of biology," *Rev. Sci. Math. ICT Educ.*, vol. 7, no. 2, pp. 73–97, 2013.

[27] S. Hartanto, *Mobalean maning (model pembelajaran berbasis lean manufacturing)*. Deepublish, 2020.

[28] L. E. Riyanti, C. Kuntadi, B. S. Arrafat, and I. E. Kurniawan, "Project-Based Learning, Inquiry Methods, Demonstration Methods, and Psychomotor Abilities: A Review of The Literature," *Dinasti Int. J. Educ. Manag. Soc. Sci.*, vol. 4, no. 5, pp. 822–833, 2023.

[29] S. Nafingah, M. A. Rokhimawan, A. Mustadi, and M. N. Wangid, "Levels of inquiry-interactive demonstration: Its effect on students' critical thinking ability in online learning with the topic of waves and sounds," *J. Penelit. Pengemb. Pendidik. Fis.*, vol. 6, no. 2, pp. 255–266, 2020.

[30] J. M. T. Chua, "The Effects of Inquiry Demonstration on Students' Conceptual Understanding and Attitude: A Promising Approach in Analytical Chemistry Laboratory," *Sch. Int. J. Chem. Mater. Sci.*, vol. 2, no. 4, pp. 42–48, 2019.

[31] F. Hanaris, "Peran Guru Dalam Meningkatkan Motivasi Belajar Siswa: Strategi Dan Pendekatan Yang Efektif," *J. Kaji. Pendidik. dan Psikol.*, vol. 1, no. 1 Agustus, pp. 1–11, 2023.

[32] A. P. Jufri, W. K. Asri, M. Mannahali, and A. Vidya, *Strategi Pembelajaran: Menggali Potensi Belajar Melalui Model, Pendekatan, dan Metode yang Efektif*. Ananta Vidya, 2023.

[33] F. A. Pratama and M. I. Al Ghozali, "Application of the Inquiry Approach in Learning Social Science to Improve the Quality of Learning," *Action Res. J. Indones.*, pp. 205–216, 2019.

[34] F. A. Pratama, T. G. Laksana, and N. Nurhadiansyah, "Application of Inquiry Type Cooperative Learning Models to Improve Student Learning Outcomes," *Action Res. J. Indones.*, pp. 171–177, 2019.

[35] N. W. Subayani, "Implementasi STEM (science, technology, engineering, and mathematics) dalam kurikulum PGSD," *Didakt. J. Pemikir. Pendidik.*, vol. 28, no. 2, p. 1, 2022.

[36] I. Tejawiani, N. Sucahyo, U. Usanto, and A. Sopian, "Peran Artificial Intelligence Terhadap Peningkatan Kreativitas Siswa Dengan Menerapkan Proyek Penguatan Profil Pelajar Pancasila," *JMM (Jurnal Masy. Mandiri)*, vol. 7, no. 4, pp. 3578–3592, 2023.

The Role of a Professional EFL Lecturer in Performing Teaching Strategies

Sayit Abdul Karim*[1], Muna Zainah Wardah[2], Atina Silmalkarimah[3], Septi Riana Dewi[4]

sayit.a.k@uty.ac.id, munazainahwardah@gmail.com, atinasilmal@gmail.com, riaarkana75@gmail.com

English Language Education Study Program, Faculty of Business & Humanities, Universitas Teknologi Yogyakarta, Indonesia[1,2,3,4]

Corresponding Author Email: sayit.a.k@uty.ac.id

Abstract. This research explores the role of a professional EFL lecturer in implementing effective teaching strategies. The research employs a qualitative research design, utilizing in-depth interviews as the primary data collection instrument. The respondent is an experienced female EFL lecturer who has previously taught at various educational levels, ranging from primary to secondary schools. At present, she teaches at the English Language Education Study Program at the Universitas Teknologi Yogyakarta. The findings revealed that a professional EFL lecturer is crucial in creating an enjoyable learning environment and stimulating students' learning engagement. She constantly updates her teaching methods, integrates technology, and encourages interactive and collaborative learning to cater to the diverse needs of students. The lecturer emphasizes the importance of understanding students' learning styles and adapting teaching strategies accordingly. Furthermore, she also faces challenges, such as overcoming students' disinterest in specific topics and managing the pressure to cover the syllabus. Despite the problems she encountered, she found the effective ways to deal with these challenges. This research highlights the significance of lecturer professionalism, continuous professional development, and the integration of effective teaching strategies in the digital age. In addition, the findings contribute to the understanding of how professional EFL lecturer can optimize teaching and learning outcomes in the rapidly changing educational landscape.

Keywords: EFL, Professional Lecturer, Teaching Strategies

1. Introduction

Educators have an essential role in improving the quality of learning, focusing on shaping effective, engaging, and relevant methods to students' needs. Education must evolve to meet global challenges, such as technological changes, labor market demands, and scientific developments. In learning methodology, innovation is needed to help students to be adaptive and ready to face future challenges. Interactive and collaborative participation in the learning process share the primary motivation. The background of learning methodology development is often rooted in the changing paradigm of

education. Education research continues to produce new insights into effective learning. The curriculum continues to evolve demanding flexible and dynamic learning and teaching strategies.

In this thriving educational landscape, the role of professional lecturers is crucial. They are more than just subject experts; they are dedicated educators who combine their knowledge with their pedagogical skills to create a stimulating learning environment. Lecturer continues to update their teaching methods, use technology, and encourage interactive and collaborative learning. Being a professional and qualified teacher is essential in the education system to improve the quality and profession of learning and teaching (Karim *et al.,* 2020). To EFL teacher educators, bearing in mind the importance of teacher educators' roles and responsibilities in the teaching and learning process, it is recommended that EFL teacher educators understand what student teachers expect from them to accommodate student teachers' learning needs and attain the goals of foreign language teaching (Karim *et al.,* 2020). By aligning their strategies with student expectations and needs, lecturers can significantly enhance the effectiveness and relevance of their teaching practices.

The effectiveness of technology in the classroom is often blurred by an incorrect assumption that students who are regularly involved in social media or mobile devices are also familiar with the designated instructional platforms (Putra *et al.,* 2023). They are committed to understanding and meeting the diverse needs of students, preparing them to adapt to this rapidly changing world. The teacher's creativity will directly affect the effectiveness of language learning and teaching (Putra *et al.,* 2023). This article discusses about the essential qualities that a professional lecturer possesses, with particular emphasis on their role in determining the future of education. This article looks at the essential traits of a professional lecturer, emphasizing their role in shaping education's future and how important inventive teaching strategies are.

Teaching strategies are a plan or series carried out by a lecturer in learning so that learning can run effectively by using strategies to deliver material to students (Hayati *et al.,* 2021). Teaching strategy is one of the supporting factors that will help the lecturer's process in the classroom. In the teaching and learning process, teaching strategies play an essential role. It can help the lecturer to facilitate student learning activities. It can also be one of the ways the lecturer uses to make the teaching and learning process more effective and interesting, so it will significantly affect students because they learn by doing the learning process activities in the classroom, which are not boring. The achievement of learning objectives will be successful (Syafryadin, 2020). Teachers must create new strategies that are more enjoyable, effective, and transferable to new situations. The teaching strategy must be performed by the teachers to achieve learning objectives effectively and efficiently (Jihan *et al.,* 2023). Therefore, innovative and adaptable teaching strategies are crucial for engaging students and achieving educational goals effectively.

It should be noted that a strategy that is effective for use in certain materials is not necessarily effective for other materials. Therefore, teaching strategies are the strategies used by the lecturer to achieve their goals in carrying out the learning process based on methods, efforts, or ways and procedures used by the lecturer in transferring knowledge to students (Hayati *et al.,* 2021). Ultimately, the careful selection and implementation of appropriate teaching strategies are essential for ensuring the success and engagement of students in the learning process.

In the English learning process, the learning objectives desired by the lecturer are usually not achieved well and have an impact on students' low learning outcomes. Several factors affect the process, namely lecturer who still have difficulties in choosing suitable methods and strategies to use, and students who find it difficult to learn English because they are not used to foreign languages in their social environment (Podolsky *et al.,* 2019). The most prominent problem faced by the lecturer is that every student is different because they have differences in knowledge, abilities, and learning styles between one student and another. Borg (2018), also stated that effective CPD can have an impact on

lecturer satisfaction levels, language proficiency, content or subject matter knowledge, instructional skills, attitudes, beliefs, and reflective competencies, which in turn have the potential to influence subsequent lecturer success. Another impact of CPD is to help lecturer maintain their enthusiasm and energy levels throughout their professional careers (Canh, 2016). Therefore, ongoing professional development is crucial for lecturer to effectively address diverse student needs and enhance their teaching efficacy.

Similarly, Zeichner, (2003), systematically reviewed the impact of lecturer research on CPD as reported in various studies conducted in school contexts in the United States. The findings revealed that lecturer research can generate specific student and lecturer learning types that are not associated with typical PD experiences. Specifically, involvement in research increases lecturers' confidence in facilitating student learning, helps them address the teaching challenges they face more effectively, encourages in-depth analysis of their teaching experiences, and increases enthusiasm for their work. From some of these findings, it can be concluded that lecturer professionalism greatly impacts student outcomes.

The effect of teaching experience on student learning outcomes for the same lecturer over time as their experience increases. When implementing CPD, lecturers' professionalism is challenged due to unwanted feedback from students (Summers *et al*., 2005; Corney, 2006). In terms of classroom teaching, find it difficult to arouse students' interest in learning due to the distant topic of sustainable development (Corney, 2006). Students generally perceive that sustainability is something irrelevant to their curriculum. Due to the pressure to catch up on the syllabus, they do not give high marks to CPD (Summers *et al*., 2005; Corney, 2006). In addition, students also feel powerless to create impact, especially when they can only engage on a local scale or cannot even influence those around them to take action (Corney, 2006).

With an unsupportive learning environment, lecturers cannot anticipate more successful teaching outcomes, and thus, they choose not to participate in CPD (Brown & Lent, (2019)., Lent & Brown, 1996)). The teaching strategies used by the lecturer must consider several factors. Based on the interviews, the lecturer considered four factors: the school curriculum, which combines instructional practices, learning experiences, and student performance assessments designed to elicit and evaluate the target learning outcomes of a particular subject. It helps the lecturer to teach by course design or syllabus (Mulyanti *et al.,* 2021). Therefore, addressing lecturer challenges and student perceptions is crucial to creating a successful CPD program to foster a more supportive learning environment.

From the previous studies that have been discussed, there is research that deals with the Professional Teacher's Perspective on the Implementation of Teaching Strategies, such as the research of (Hayati *et al*., 2021). However, in their research, no further explanation is given about the in-depth description of the various types of existing teaching strategies and concrete evaluation of the effectiveness of these strategies in different teaching contexts. Other studies have also discussed the impact of the skills and knowledge of a professional lecturer on learning outcomes (Borg, 2018). Unfortunately, the explanations in this research lack the concrete actions taken by a professional lecturer in managing these variations to achieve optimal learning results. Other studies have covered some challenges in the implementation of teaching strategies and refer to (Summers *et al*., 2005; Corney, 2006; Lent & Brown, 1996; and Mulyanti *et al.,* 2021). However, the discussion was less detailed about the concrete solutions used by professional lecturers to address these challenges and evaluate the effectiveness of such solutions in improving student learning outcomes. Thus, the present research will further discuss the issues that have not been addressed in the previous research.

This research highlights the importance of further research in teaching strategies, technology integration in teaching, the impact of professional development on lecturer, and the importance of combining technology, strategies, and professionalism in creating effective learning environments. A

research approach combining holistic teaching strategies in the digital age will provide more comprehensive insights into optimizing teaching and learning. As such, this research is highly relevant to previous research highlighting teaching strategies, lecturer professionalism, and their impact on student learning outcomes.

The research focuses on an exemplary professional lecture who has experience in the field of teaching. The respondent is a female lecturer who is assigned to the English Language Education Study Program. She is well experienced and has a high academic qualification. The respondent was chosen because she devoted herself to teaching English, not only in the university world but also teaching English at the elementary and secondary levels of education. Experienced lecturers can provide a rich perspective on the challenges and best practices in English language teaching.

This research aims to identify the respondent's perspectives on using innovative teaching strategies to enhance students' learning outcomes, figure out her teaching skills, and explore the challenges she encounters, as well as its impact on students' learning outcomes. To this end, the researchers would like to figure out the role of a professional lecturer in performing teaching strategies by proposing the following questions, they are: 1) What is the professional lecturer's perspective on implementing teaching strategies? 2) How do professional lecturer's skills and knowledge affect learning outcomes, and 3) What are the challenges in implementing teaching strategies and how does she cope with the problems?

2. Method

This research uses a qualitative approach to describe the role of professional EFL lecturer in implementing effective teaching strategies. An in-depth interview was utilized to uncover the respondent's perspectives on using innovative teaching strategies to enhance students' learning outcomes, figure out her teaching skills, and explore the challenges she encounters, as well as their impact on students' learning outcomes. This technique was selected because it allows researchers to dig for more information about the aforementioned issues thoroughly.

An exemplary female lecturer, namely Ms. R participated as a respondent in the present research. The respondent has extensive and diverse experience in teaching English and has gone through various stages of professional development. She started her teaching career in 2007 as an English teacher at SD N Sindurejan Yogyakarta. She was hired by UIN Sunan Kalijaga in 2009 as a non-permanent lecturer, teaching various courses, including Indonesian Language, Indonesian Language for Thai and Australian students, general English, as well as English for the disabled (blind and hearing impaired). Furthermore, she became a mentor for IELTS and TOEFL in 2013 when she became a TOEFL instructor at UGM Vocational School and Veterinary Medicine. In 2005, she was hired by Universitas Ahmad Dahlan (UAD) as a non-permanent lecturer, teaching various courses, including Children's Language Teaching, and Micro Teaching. At Present, she is a permanent lecturer and serves as the secretary of the English Literature Study Program at the Universitas Teknologi Yogyakarta (UTY). At the Study Program, she teaches English Literature, Speech and Debate, English for Daily Conversation, and Grammar.

All data gathered through in-depth interviews were analyzed using an interactive model proposed by Miles and Huberman (1994), namely data reduction, data display, and conclusion. Furthermore, the data will be thematically analyzed and categorized into themes. This analysis allows the researchers to gain a better understanding of the strategies used to achieve their goals. The list of interview questions to obtain data about the respondent's perception of performing teaching strategies.is presented in Table 1 as follows:

Table 1. List of interview questions

No.	Question
	What is the lecturer's perspective regarding implementing teaching strategies?
1	What is your experience in applying different learning strategies in English language learning?
2	What do you think makes a teaching strategy effective in the context of learning English?
	How do professional lecturer's skills and knowledge affect learning outcomes?
1	How do you integrate your skills and professional knowledge in planning and implementing teaching strategies?
2	Do you have special experience or insight in addressing individual differences in terms of students' knowledge, abilities, and learning styles in learning English?
3	How do you see the relationship between professional development and improving the quality of your teaching?
	What are the challenges and solutions in implementing teaching strategies?
1	What are any major challenges you face in applying teaching methodologies in learning English?
2	How do you overcome those challenges and find effective solutions?
3	What is your view of integrating technology in teaching English and its impact on the effectiveness of teaching?

3. Findings and Discussion

Findings

The Lecturer's Perspective on Implementing Teaching Strategies
This section explores professional lecturer perspectives on implementing teaching strategies in English language learning. Ms. R highlighted the importance of adapting strategies based on students' needs. For example, one lecturer described the challenges in an inclusive classroom and the effectiveness of using a blended strategy to cater to diverse students. Overall, achieving student learning objectives emerged as a key factor for effective teaching strategies. The following are Ms. R' viewpoints to answer the first question of the interview, as seen in excerpt 1, as follows:

> *"I have various experiences in implementing teaching strategies. Sometimes it can work well in my classroom, but sometimes it does not. Taking the example from my experience in teaching an inclusive class (25 students are normal and 5 others are disabled), it was hard to put one common strategy in teaching them. Planning a lesson could take almost a week for them. Reading some literature or having counseling seems not effective enough. As time goes by, having mixed strategies in teaching seems better for that condition."* (Ms. R)

Ms. R's experience in teaching an inclusive class highlights the challenges of implementing a single teaching strategy for diverse learners. Ms. R's observation that planning lessons for this class took almost a week underscores the need for lecturer to dedicate significant time and effort to adapting their teaching approaches to meet the individual needs of all students. While reading literature and seeking counseling may not have been sufficient in this particular case, it is essential to recognize that these resources can still be valuable tools for lecturer seeking to enhance their understanding of inclusive teaching practices. Ms. R's eventual adoption of mixed teaching strategies suggests that a flexible and adaptable approach is often necessary to effectively cater to students' diverse learning styles and abilities in inclusive classrooms.

Then, Ms. R continued her explanation of effective teaching strategies in the context of English language learning, as seen in excerpt 2, as follows:

> *"The simple thing that I can say about effective teaching is when the learning goal is achieved by the students."* (Ms. R)

Ms. R's emphasis on achieving learning goals as a key indicator of effective teaching strategies aligns with a widely accepted principle in education. Indeed, successful teaching can be defined as the ability to guide students toward achieving the predetermined objectives of a learning experience. However, it is essential to consider that learning outcomes encompass a broader spectrum than simply meeting specific targets. Effective teaching strategies not only facilitate the acquisition of knowledge and skills but also foster engagement, motivation, and a positive attitude toward learning. Moreover, Ms. R's statement highlights the importance of goal attainment, it is crucial to recognize that effective teaching encompasses a holistic approach that nurtures students' overall development.

Professional Lecturer's Skills and Knowledge Affect Learning Outcomes
This section explores how professionally she integrates her skills and knowledge to influence learning outcomes. Ms. R highlighted the importance of pedagogical and content knowledge in planning and implementing effective strategies. Ms. R described situations with students who have diverse learning styles and needs (visually impaired, deaf, and developmentally disabled students) and the successful implementation of inclusive learning strategies. These experiences demonstrate the important role played by Ms. R in adapting their approaches to meet the needs of individual students. To illustrate this situation, Ms. R , responded to the second question as stated in exert 3, as follows:

> *"We as teachers can integrate skill/competency and professional development by firstly mastering pedagogical knowledge such as models, approaches, strategies, and learning methods according to the subject matter. Then Content knowledge and pedagogical knowledge must be combined in learning to create new knowledge." (Ms. R)*

Her emphasis on integrating pedagogical and content knowledge aligns with established principles in effective teaching. Indeed, a strong foundation in both domains is essential for lecturer to effectively design and implement teaching strategies that foster meaningful learning experiences. Pedagogical knowledge equips a lecturer with an understanding of various teaching approaches, methodologies, and techniques. In contrast, content knowledge provides them with an in-depth understanding of the subject matter they are teaching. Ms. R's assertion that combining these two forms of knowledge leads to the "creation of new knowledge" highlights the dynamic and transformative nature of effective teaching. As lecturer engage learners in acquiring knowledge, they simultaneously facilitate the construction of new understanding and connections. This process goes beyond simply imparting information; it empowers students to participate actively in their learning journey.

Then, Ms. R continued her explanation of special experience or insight in addressing individual differences in terms of students' knowledge, abilities, and learning styles in learning English, as seen in excerpt 4 as follows:

> *"Yes, I did. A few years ago, I had 4 blind students, one deaf, and 20 others who were physically normal in one class. Of course, it was not only about different knowledge, abilities, and learning styles, but it was also about their needs. Every time I came to the class, I would divide the different sessions to teach them together. The inclusive learning strategy was implemented in that classroom. The blind ones were on auditory style, the deaf ones were by sign language, and the normal ones were learning cooperatively."* (Ms. R)

Ms. R's account of their experience teaching students with diverse learning abilities and needs exemplifies the challenges and opportunities of inclusive education. Ms. R's implementation of differentiated instruction strategies, such as auditory learning for blind students, sign language for deaf students, and cooperative learning for typically developing students, demonstrates a commitment to providing all students equitable access to learning opportunities. Ms. R's success in this challenging environment underscores the importance of lecturer adaptability, creativity, and a deep understanding of individual differences.

Ms. R also explained the relationship between professional development and improving the quality of teaching as depicted in excerpt 5 as follows:

"There is a strong relation between professional development to my teaching quality improvement since there are reflection, learning, and sustainable action to improve my (teacher) knowledge and skills, leading to improved teaching practices that have a positive impact on my student learning." (Ms. R)

Ms. R aptly highlights the strong connection between professional development and teaching quality improvement, emphasizing the significance of reflection, learning, and sustainable action in enhancing lecturer knowledge, skills, and teaching practices that positively impact student learning. Effective professional development should be tailored to lecturers' specific needs, fostering collaboration and peer learning, and committing to an ongoing process that empowers lecturer to continuously refine their skills and adapt to evolving teaching standards and student needs. By recognizing the importance of professional development and implementing it effectively, schools and districts can cultivate a corps of highly skilled and effective lecturers who are well-equipped to provide students with the quality education they deserve.

The Challenges and Solutions in Implementing of Teaching Strategies

This section delves into the challenges and solutions professional lecturer encounter when implementing teaching strategies in English language learning. Ms. R highlighted difficulties with class size, finding the most effective methods, and time constraints. To address these challenges, she employed strategies such as creating learning clusters, maintaining teaching journals for reflection, and implementing more thorough pre-lesson planning. Ms. R overwhelmingly viewed technology as a valuable tool, emphasizing its positive impact on student creativity, engagement, progress monitoring, motivation, and overall classroom experience. Mr. R, addressed the issue of challenges, solutions, and the perceived benefits of technology integration in greater detail to responded to the third question seen in excerpt 6, as follows:

"There are various challenges I faced during my teaching experience (16 years):
a. Specific teaching methods did not work well due to the class size. The big size of the class made a complex problem.
b. Trial and error were part of finding the best method in teaching class.
c. Time allocation sometimes is not appropriate in implementing a certain teaching method." (Ms.R 6)

Ms. R's identification of class size, limited resources, and time constraints as significant challenges in implementing teaching methodologies aligns with well-documented obstacles educators worldwide face. Large class sizes can hinder effective teaching by limiting opportunities for individualized attention, fostering a passive learning environment, and making it difficult to cater to diverse learning styles. Moreover, the lack of adequate resources, such as up-to-date materials, technology, and professional development opportunities, can restrict lecturers' ability to implement innovative and engaging teaching strategies. Additionally, time constraints, often due to rigid curriculum requirements and administrative burdens, can limit lecturers' ability to plan and implement effective teaching methods thoroughly.

Then, Ms. R continued explaining the effective solutions to overcome those challenges, as presented in excerpt 7, as follows:

a. To cope with the problem with big class. I tend to create learning clusters. Learning clusters are conducted by grouping the students based on their ability and their needs. With the same topic I share in the class, I teach them using different approaches.

> b. *After experiencing trial and error, I write my teaching journals for my reflection. That journal is helpful enough to assist my teaching plan in recent years.*
> c. *Planning more and more before teaching is effective enough to cope with time problems." (Ms. R)*

Ms. R's strategies for overcoming the challenges of large class sizes, finding effective teaching methods, and managing time constraints demonstrate a proactive and reflective approach to teaching. Implementing learning clusters to provide differentiated instruction caters to individual student needs and abilities, promoting active engagement and personalized learning experiences. Maintaining teaching journals for reflection allows Ms. R to systematically analyze their teaching practices, identify areas for improvement, and refine their strategies over time. Additionally, emphasizing thorough pre-lesson planning ensures that Ms. R can effectively utilize class time, optimize teaching methods, and address potential challenges proactively.

Ms. R also provides an explanation of the integration of technology in teaching English and its impact on the effectiveness of teaching, as seen in excerpt 8, as follows:

> *"The existence of technology integration in English teaching is something fruitful. To me, there are at least five positive impacts from technology integration.*
> a. *The use of new technology allows students to be much more creative and participative in the classroom.*
> b. *Create a unique experience as much for the lecturer as the students.*
> c. *Ease in managing and monitoring student progress. (Making and keeping lists of groups of students, managing courses, evaluating students with tests and exams, and many administrative tasks are managed these days).*
> d. *The use of educational technology to learn English both inside and outside the classroom keeps students motivated.*
> e. *The best ally for lecturer in the face-to-face classroom."*

Ms. R emphasizes the positive aspects of integrating technology in teaching English, including increased creativity, deeper engagement, and personalized learning experiences. They also highlight the transformative potential of technology in reshaping traditional pedagogical approaches, reducing administrative burdens, and allowing lecturer to focus on instructional tasks. Technology also plays a crucial role in motivating students, as interactive experiences like language learning apps and online platforms can sustain interest and engagement over extended periods, leading to better learning outcomes. However, Ms. R acknowledges the challenges of the digital divide and the need for ongoing professional development to equip lecturer with the necessary skills to use technological tools effectively. In conclusion, while technology can enhance teaching and learning, it is essential to address the challenges to ensure equitable implementation.

4. Discussion

After acknowledging the findings of the present research, it can be seen that (Hasdiana, 2018) is in line with the importance of the learning process and continuous professional development for lecturer. It emphasizes that professional development should be ongoing throughout a lecturer's career, not just a one-off event. In addition, both the present research and the previous research recognize that individual lecturer characteristics, such as teaching experience and motivation to learn, are essential factors that influence the effectiveness of professional development. Respondents in the present research agreed with this perspective.

The present research focuses on mastering pedagogical and content knowledge as core competencies for professional lecturer. The findings emphasize the importance of reflection and

practical improvement of teaching practices as the key to successful learning. On the other hand, previous findings (Krumsvik *et al*., 2016; From, (2017), focused on developing lecturers' digital competencies and the importance of updating these skills on an ongoing basis. From this, there is agreement that lecturers' professional development is crucial in improving both traditional and digital skills to ensure quality learning for learners. In approaching the strategy, lecturer should consider the specific needs and characteristics of each lecturer.

In addition, this research highlights the importance of adapting strategies based on students' needs, especially in inclusive classrooms where multiple approaches are required. Teaching effectiveness, defined by achieving learning objectives, requires a combination of pedagogical and content knowledge. In contrast, Antoniou & Kyriakides, (2013) focus on the conceptual framework of teaching strategies more broadly, without providing specific examples as detailed as the present research. Sancar *et al.,* (2021), provide a theoretical overview of the types of teaching strategies and how they can be applied but do not present practical examples of the application of these strategies.

In dealing with students' diverse backgrounds when teaching, Ms. R consistently stated that adaptability and flexibility are core competencies that a professional EFL lecturer should possess. Research conducted by Chung, (2012), supports the present research that is highlighting the importance of teacher professional development, especially regarding the adaptability and flexibility of teaching strategies. Ms. R shared her experience in adjusting teaching approaches to meet the needs of diverse students in an inclusive classroom, where teaching methods must be actively adapted to accommodate students' various learning styles and abilities. Derri *et al.,* (2015) also emphasized the importance of the lecturer's flexibility and ability to adapt teaching methods, highlighting that professional development programs should prepare the lecturer to adapt to different contexts and students' needs.

The findings also suggest that adaptability, flexibility in teaching methods, and adequate digital competence are essential for professional EFL lecturers to perform their roles effectively. The alignment and differences in the findings of this research show that despite the various approaches and focuses, the ultimate goal remains the same: improving the quality of teaching and learning through continuous professional development focused on students' needs.

The relationship between teacher professional development and improving the quality of teaching strategies in the Present research emphasized the integration of pedagogical knowledge and content knowledge in lecturers' application of teaching strategies, with Ms. R explaining how the unique combination of these two types of knowledge creates new understanding and enables the lecturer to respond to students' individual needs. Ms. R provided concrete examples of how lecturer applied their knowledge to develop innovative and holistic teaching approaches. In contrast, although Prenger *et al.,* (2017), also recognize the importance of lecturers' skills and knowledge, they tend to take a broader view by discussing the cumulative impact of these factors on learning effectiveness in general. The former does not include specific illustrations of lecturers' practices in the field. Instead, it presents a conceptual framework linking lecturers' skills and knowledge to student learning outcomes.

In addition, the present research details some specific challenges, such as large class sizes and time constraints. It offers practical solutions to these problems, such as maintaining a teaching journal and thorough lesson planning. The findings also provide clear guidance for the lecturer on overcoming the real constraints they often face in the classroom. However, Sancar *et al.,* (2021) only discuss challenges in the educational environment in general, without providing as detailed and specific as the present research. Pegalajar Palomino, (2018), has focused more on providing broad theoretical insights into issues affecting teaching practice, but less on providing practical guidance for the lecturer on overcoming these problems.

The present research focuses on the significant obstacles lecturer face, such as large class sizes, limited resources, and time constraints. Solutions include forming study groups, keeping a teaching

journal, and careful lesson planning. Hasdiana, (2018), highlighted that challenges related to varying levels of digital competence among lecturer and a lack of resources. Both studies agree that comprehensive professional development, including digital training, and the provision of adequate resources can be effective solutions. They also highlighted the importance of fostering a culture of continuous learning in the educator community, underscoring the potential of technology in enhancing creativity, student engagement, and ease of monitoring progress.

Meanwhile, Hasdiana, (2018), adds another dimension by highlighting the important role digital competencies as part of teacher professional development can play in the solution. Integrating technology into teaching strategies is the key to optimizing the learning process in the digital era. This research shows that lecturers' pedagogical and digital competence are interrelated and improving digital competence can support the effectiveness of teaching strategies in achieving learning objectives.

Mishra *et al.,* (2011), also agree that mastery of technology and digital literacy are absolute must-have skills for today's lecturer. Both highlight the urgent need to increase training and professional development programs focusing on digital competencies. It is essential to address the gap between the demands of digital competencies and lecturers' readiness to use technology, so a comprehensive effort is needed to equip lecturer with the required digital skills.

However, the present research emphasizes the use of technology in teaching and learning and its benefits to increase direct student engagement. This research provides detailed examples of specific teaching strategies used by Ms. R, such as blended strategies for inclusive classrooms and the creation of study groups. It offers first-hand insights into the teaching practices implemented by a lecturer in the field, including concrete examples of their strategies. This research focuses on presenting applicable information that can be directly applied by the lecturer in the classroom.

In contrast, previous research (Mishra *et al.,* 2011), tends to discuss other factors that affect teaching quality more broadly without focusing too much on the role of technology. Hasdiana, (2018), is more oriented towards providing a theoretical overview of the types of teaching strategies and how they can be applied, but does not present practical examples of the application of these strategies.

In addition, the methodological approach in this research also reflects the different focus of this research. Previous research by Hall *et al.,* (2014), may have relied on more structured digital competency frameworks or models and emphasized the importance of institutional support. Such research often highlights challenges in the educational environment in general without providing solutions that are as detailed and specific as those in the present research. In contrast, the present research is more oriented toward developing competencies through reflective practice and collaborative learning among lecturers.

Thus, while there is agreement on the importance of professional development and digital competencies, there are differences in the perspectives and approaches to achieving them. Present research offers a more applied and contextualized view, whereas previous research tends to provide more theoretical and generalized insights.

5. Conclusion and Recommendations

Conclusion

This research has highlighted several critical findings in understanding the role of professional EFL lecturer in performing effective teaching strategies. The research focused on three primary objectives: exploring the perspectives of professional lecturer on teaching strategies, understanding how their skills and knowledge influence learning outcomes, and identifying the challenges and solutions in implementing these strategies. The research revealed that professional EFL lecturer like Ms. R emphasizes the importance of adapting teaching strategies to meet the diverse needs of students. The

use of mixed strategies, especially in inclusive classrooms, is crucial to address the varied learning styles and abilities of students. The findings underscore that integrating pedagogical knowledge with content expertise is vital for creating effective learning environments. Professional development plays a significant role in enhancing teaching quality, as it equips lecturer with the necessary skills and knowledge to innovate and improve their teaching practices continuously. The research identified significant challenges such as large class sizes, limited resources, and time constraints. Effective solutions implemented by Ms. R include creating learning clusters, maintaining teaching journals for reflection, and thorough pre-lesson planning. Additionally, integrating technology is a beneficial tool for enhancing student engagement and learning outcomes.

Recommendations

Based on the findings of this research, several recommendations are proposed for different stakeholders and future researchers. Lecturers should actively seek out and participate in professional development opportunities to stay updated with the latest teaching strategies and technological advancements. To cater to diverse student needs, the lecturer should employ various teaching methods and adapt their strategies to different learning styles and abilities. Educational institutions should provide adequate support and resources for lecturers to engage in ongoing professional development. This can include workshops, seminars, and access to relevant teaching resources. Institutions should invest in educational technology and provide training for lecturer to incorporate these tools into their teaching practices effectively. Future studies should consider utilizing different research methods, such as quantitative approaches or mixed methods, to gain a more comprehensive understanding of teaching strategies and their impacts. Researchers could investigate the effectiveness of teaching strategies in different contexts and with diverse respondent groups, including varying educational levels and cultural backgrounds. Future research could explore variables such as student motivation, lecturer-student interactions, and the long-term impacts of specific teaching strategies on learning outcomes.

The implications of this research are significant for enhancing the quality of English language teaching. By understanding and addressing the diverse needs of students, lecturers can create more inclusive and effective learning environments. The findings also highlight the importance of continuous professional development and technology integration in modern teaching practices. Future research building on these findings can provide deeper insights and more robust strategies to improve further educational outcomes in English language teaching.

6. References

[1] Antoniou, P., & Kyriakides, L. (2013). A Dynamic Integrated Approach to teacher professional development: Impact and sustainability of the effects on improving teacher behavior and student outcomes. *Teaching and Teacher Education*, *29*(1), 1–12. https://doi.org/10.1016/j.tate.2012.08.001

[2] Borg, S. (2018). Evaluating the Impact of Professional Development. *RELC Journal*, *49*(2), 195–216. https://doi.org/10.1177/0033688218784371

[3] Brown, S. D., & Lent, R. W. (2019). Social Cognitive Career Theory at 25: Progress in Studying the Domain Satisfaction and Career Self-Management Models. *Journal of Career Assessment*, *27*(4), 563–578. https://doi.org/10.1177/1069072719852736

[4] Canh, L. Van. (2016). Key issues in language teaching [Book Review]. *English Australia Journal*, *32*(1), 113–116.

[5] Chung, P. (2012). Professional Capital: Transforming Teaching in Every School by Andy Hargreaves & Michael Fullan. *Multidisciplinary Journal of Educational Research*, *2*(3), 322–324. https://doi.org/10.4471/remie.2012.17

[6] Corney, G. (2006). Education for sustainable development: An empirical study of the tensions and challenges faced by geography student teachers. *International Research in Geographical and Environmental Education*, *15*(3), 224–240. https://doi.org/10.2167/irgee194.0

[7] Derri, V., Vasiliadou, O., & Kioumourtzoglou, E. (2015). The effects of a short-term professional development program on physical education teachers' behavior and students' engagement in learning. *European Journal of Teacher Education*, *38*(2), 234–262. https://doi.org/10.1080/02619768.2014.947024

[8] Dwiyana Putra, I. D. G. R., Karim, S. A., & Kaslan, I. (2023). Exploring Qualities that Prevent EFL Teachers from Redundancy. *Register Journal*, *16*(1), 95–111. https://doi.org/10.18326/register.v16i1.95-111

[9]   From, J. (2017). Pedagogical Digital Competence—Between Values, Knowledge and Skills. *Higher Education Studies*, *7*(2), 43. https://doi.org/10.5539/hes.v7n2p43

[10]   Hall, R., Atkins, L., & Fraser, J. (2014). Research article: Defining a self-evaluation digital literacy framework for secondary educators: The DigiLit Leicester project. *Research in Learning Technology*, *22*(March), 0–17. https://doi.org/10.3402/rlt.v22.21440

[11]   Hasdiana, U. (2018). No 主観的健康感を中心とした在宅高齢者における 健康関連指標に関する共分散構造分析Title. *Analytical Biochemistry*, *11*(1), 1–5. http://link.springer.com/10.1007/978-3-319-59379-1%0Ahttp://dx.doi.org/10.1016/B978-0-12-420070-8.00002-7%0Ahttp://dx.doi.org/10.1016/j.ab.2015.03.024%0Ahttps://doi.org/10.1080/07352689.2018.1441103%0Ahttp://www.chile.bmw-motorrad.cl/sync/showroom/lam/es/

[12]   Hayati, A. R., Afriani, Z. L., & Akbarjono, A. (2021). Teacher's Teaching Strategies in EFL Class. *Jadila: Journal of Development and Innovation in Language and Literature Education*, *1*(3), 330–341. https://doi.org/10.52690/jadila.v1i3.126

[13]   Jihan, J., Karim, S. A., Royana, R., Jumiyasrini, J., & Clarita, N. A. (2023). EFL Teachers' Strategy in Teaching English Narrative Writing During Covid-19 Outbreak. *Journey: Journal of English Language and Pedagogy*, *6*(1), 71–81. https://doi.org/10.33503/journey.v6i1.2587

[14]   Karim, S. A., Rachmajanti, S., Suryati, N., & Astuti, U. P. (2020). Uncovering student teachers' perceptions regarding the characteristics of effective EFL teacher educators. *International Journal of Innovation, Creativity and Change*, *13*(4), 162–180.

[15]   Karim, S. A., Sulistyo, G. H., Sri Rachmajanti, & Suryati, N. (2020). Exploring EFL teachers' beliefs about English language learning and teaching: Evidence from Indonesia context. *Asian EFL Journal*, *27*(2), 227–246.

[16]   Krumsvik, R. J., Jones, L. Ø., Øfstegaard, M., & Eikeland, O. J. (2016). Upper secondary school teachers' digital competence: Analysed by demographic, personal and professional characteristics. *Nordic Journal of Digital Literacy*, *2016*(3), 143–164. https://doi.org/10.18261/issn.1891-943x-2016-03-02

[17]   Lent, R. W., & Brown, S. D. (1996). Social Cognitive Approach to Career Development: An Overview. *Career Development Quarterly*, *44*(4), 310–321. https://doi.org/10.1002/j.2161-0045.1996.tb00448.x

[18]   Mishra, P., Koehler, M. J., & Henriksen, D. (2011). The Seven Trans-Disciplinary Habits of Mind: Extending the TPACK Framework Towards 21 st Century learning. *Educational Technology*, *11*(2), 22–28. http://punya.educ.msu.edu/publications/mishra-koehler-henriksen2011.pdf

[19]   Mulyanti, S., Nadrun, & Waris, A. (2021). Teachers' strategies in teaching speaking at high school. *Journal of Foreign Language and Educational Research*, *4*(2), 1–11. https://www.jurnal.unismuhpalu.ac.id/index.php/JOFLER/article/view/1673

[20]   Pegalajar Palomino, M. del C. (2018). Information and Communication Technologies and Inclusive Teaching: Perceptions and Attitudes of Future Early Childhood and Primary Education Teachers. *Problems of Education in the 21st Century*, *76*(3), 380–392. https://doi.org/10.33225/pec/18.76.380

[21]   Podolsky, A., Kini, T., & Darling-Hammond, L. (2019). Does teaching experience increase teacher effectiveness? A review of US research. *Journal of Professional Capital and Community*, *4*(4), 286–308. https://doi.org/10.1108/JPCC-12-2018-0032

[22]   Prenger, R., Poortman, C. L., & Handelzalts, A. (2017). Factors influencing teachers' professional development in networked professional learning communities. *Teaching and Teacher Education*, *68*, 77–90. https://doi.org/10.1016/j.tate.2017.08.014

[23]   Sancar, R., Atal, D., & Deryakulu, D. (2021). A new framework for teachers' professional development. *Teaching and Teacher Education*, *101*, 103305. https://doi.org/10.1016/j.tate.2021.103305

[24]   Summers, M., Childs, A., & Corney, G. (2005). Education for sustainable development in initial teacher training: issues for interdisciplinary collaboration. *Environmental Education Research*, *11*(5), 623–647. https://doi.org/10.1080/13504620500169841

[25]   Syafryadin, S. (2020). Students' Strategies in Learning Speaking: Experience of Two Indonesian Schools. *Vision: Journal for Language and Foreign Language Learning*, *9*(1), 34–47. https://doi.org/10.21580/vjv9i14791

[26]   Zeichner, K. M. (2003). Teacher research as professional development for P–12 educators in the USA. *Educational Action Research*, *11*(2), 301–326. https://doi.org/10.1080/09650790300200211

Implementation of a Project to Strengthen the Profile of Pancasila Students through the Production of Eco Enzymes

Nabilla Namira Permata Putri[1*], Bambang Saptono[2]

[1] Department of Basic Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] Department of Basic Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: nabillanamira.2023@student.uny.ac.id

Abstract. This research aims to determine the production of eco enzymes from organic waste from 4th grade students at SD Nurul Fikri Sidoarjo. The research method used is descriptive qualitative with data collection techniques in the form of interviews, observation and documentation. The results of the research show that through eco enzymes which can be used as floor cleaning fluid, students can be introduced to the use of organic waste as an effort to care for the environment regarding the waste problem around them. This activity is part of a project to strengthen the profile of Pancasila students which includes the implementation of sustainable lifestyle aspects. So that students are able to make alternative products as substitutes for chemicals that are friendlier to the environment.

1. Introduction

The project to strengthen the profile of Pancasila students is one of the activities that must be carried out in schools that have implemented the independent curriculum. This project is an interdisciplinary learning that aims to find solutions to environmental problems around students. In line with this, project-based learning exists to provide student-centered learning experiences in carrying out practices to apply their knowledge and skills to find solutions to problems [1]. Project-based learning exists because it begins with the discovery of several problems that must be considered [2]. There are many real problems found around students both at home and at school, one of which is the problem of waste. Garbage is waste that humans produce every day. Waste is divided into 2 types, namely organic waste and inorganic waste. For this reason, steps need to be taken to reduce the amount of existing waste. Through project-based learning, it will provide opportunities for students to be more active in thinking, asking questions, and exploring new things offered by the teacher in learning. [3].

New learning is needed in order to optimize the emergence of knowledge and the transfer of knowledge that is different from what they already know [4]. Teachers must be able to design learning that focuses on the environment around students so that students can get deeper learning [5]. The innovation offered by the teacher in learning for this project is processing organic waste into eco enzyme. Eco enzyme is the result of fermentation of organic waste such as fruit and rinds with a mixture of other organic ingredients and become a product that can provide benefits to humans. However, research on eco enzymes fermented from fruit or rinds is still very rare [6]. In fact, every day humans always produce waste and over time this can cause problems for the environment. For this reason, this learning is present to develop a project based on the real life situation right now [7]. Basically, waste that has been produced by humans can still be reprocessed in certain ways. So it is felt that it is very necessary to explore the opportunities offered by organic waste [8]. Beside for solving problems in the surrounding environment, this project will make students aware of the importance of protecting the environment. One of the challenges for the young generation today is the crisis of national identity and citizenship [9]. Therefore, this project will increase students' knowledge regarding the processing of

organic waste which can be turned into useful new products. The aim of this research is to explore waste processing through eco enzymes which are applied in the project to strengthen the profile of Pancasila students.

2. Methods

This research is descriptive qualitative research with data collection techniques in the form of observation, interviews, and documentation. Through these three data collection techniques, researchers are involved in ongoing experiences with participants [10]. After the data is obtained, the data is then filtered or condensed, after that presented and conclusions drawn [11]. An overview of the research method is as follows in Figure 1. The research was conducted in Sidoarjo involving 81 students in grade 4 at Nurul Fikri Elementary School.
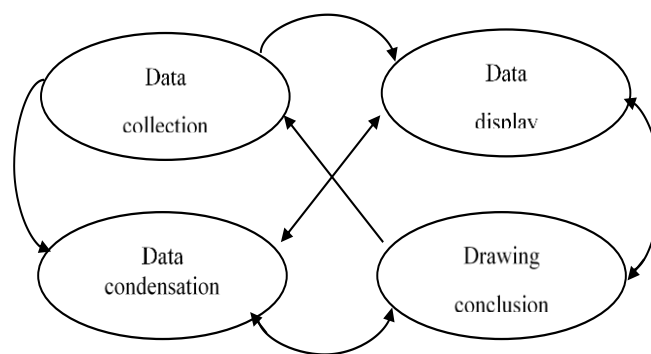
Figure 1. Research design

3. Findings

The project to strengthen the profile of Pancasila students or commonly known as P5 at SD Nurul Fikri Sidoarjo is part of a sustainable series of activities Every day, grade 4 students who have implemented the independent curriculum are asked to sort organic and inorganic waste at home and at school. The aim is to make a habit of sorting waste to make recycling easier. Beside for the processes they carry out every day, these 4th grade students also use organic waste produce eco enzyme. Based on the results of interviews with class teachers, the reason for choosing waste processing into eco enzymes as the implementation of a project to strengthen the profile of Pancasila students is because through the activity of making eco enzymes it can be an effective means of teaching students about the importance of protecting the environment through correct waste management. Students will also gain direct experience in carrying out waste processing activities so that they can complete the process more realistically and it is hoped that students will have a higher awareness of the importance of maintaining environmental cleanliness and reducing waste. Eco enzyme itself is a type of enzyme that is made naturally from organic materials and then fermented. Later, the eco enzyme produced can be used as a floor cleaning fluid as a substitute for household chemicals. The activity of processing waste into eco enzyme at SD Nurul Fikri Sidoarjo is carried out in groups to make it easier to share the tools and materials needed. The ingredients prepared by students in each group were rinds, pandan leaves, starfruit, lemongrass, lime leaves and brown sugar. Each group was also asked to bring a knife, scissors, cutting board and also a container. The following is a detailed explanation of the implementation of the eco enzyme project program in Table 1

Table 1. Eco enzyme project activities flow

Activity stages	Time	Description of activities
Preparation	08.00-08.30	Students gather in the hall while preparing tools and materials
Socialization	08.30-09.00	Socialization was carried out by an environmental activist regarding eco enzyme and how to make it
Implementation of activities	09.00-11.00	Students begin to cut the materials they have brought and then place them into containers. The ingredients that have been cut are then put together in a 5 liter plastic jar that has been prepared by the teacher. After that, the jar is closed tightly and given identity with the date of production and harvest, after that keep the jar in a place away from sunlight.
Evaluation	11.00-11.30	After making the eco enzyme, the teacher appreciated and reflected on the contributions the students had made today

The students involved in making this eco enzyme were 26 students from class 4A , 28 students from class 4B, and 27 students from class 4C, with a total of 81 students who were very enthusiastic about making eco enzyme. The activity begins with socialization. This socialization was explain and introduce about what eco enzyme is. Most of the students were also hearing about eco enzyme for the first time. In the socialization activity also explain about the tools and materials that needed to make eco enzyme, the benefits of eco enzyme, and an explanation of the duration of eco enzyme fermentation. The next stage is carrying out the activity, where students will cut the materials they have brought first and then put them into containers. These ingredients include various kinds of fruits rinds such as apple rind, orange rind, pear rind, melon rind, and so on. And other natural ingredients are needed that provide freshness such as orange leaves, lemongrass, starfruit, pandan leaves and brown sugar. The teacher helps students to direct them to work together well in their groups. Seating between groups is also spaced apart so that they are not crowded together. After that, the pieces of the ingredients will be mixed together into a 5 liter jar and add some water to the jar, then close it tightly and keep it for 90 days in a place that is not exposed to sunlight. The next stage is evaluation. The teacher provides an evaluation of student performance in the project, students are asked to self-reflect by writing a review about their experience in making eco enzymes including the obstacles during the project. The following are the stages of eco enzyme activity which are presented in Figure 2 and Figure 3.

Figure 2. Socialization about eco enzymes

Figure 3. Production of eco enzymes

4. Discuccions

Waste prevention and management is an important issue today [12]. The problem of waste which is increasing every day can affect the environment and students' health. Without realizing it, every day humans always produce waste, both organic and inorganic waste. So efforts are needed to reduce the level of waste production [13]. One effort that can be made is to process waste wisely. Waste processing or waste recycling is often seen in society. People use inorganic waste to make new items such as bags or crafts, while organic waste is more often used as compost. In fact, beside can being used as compost, organic waste can be used as floor cleaning fluid through eco enzymes. However, recyling waste through eco enzyme is very rarely seen. Even the term eco enzyme is unfamiliar. Introducing eco enzymes and how to make them to elementary school students is a step that is expected to increase their level of awareness of the environment.

Schools can be places that provide education about the environment regarding. To keeping the environment clean and the negative impact of waste that is left for a long time to accumulate and rot are very important. This is in line with research conducted by Owojori which states that through education one can develop citizens who care about the condition of their environment and the problems that are occurring. [14]. Moreover, the school environment can carry out programs or campaigns to introduce students to waste processing from an early age so that they can involve students' active participation in the future. A similar opinion was also expressed by Yang that education can have a positive influence to support students' active participation in waste sorting [15]. In groups, students will actively share in the practice of this eco enzyme. Moreover, in the modern era, a collaborative and cooperative group-based approach is increasingly needed so that the goals to be achieved can run more effectively [16]. Even though the tools and materials needed are easy to find around students, from practice in produce eco enzyme as something new for them will provide meaningful learning for students.

Waste processing activities can be started from small steps, like sorting organic and inorganic waste. If they can sorting the waste every day, it can make the waste recycling process easier. Project activities are sustainable that can be important for students to develop [17]. One of the aspects developed in the project to strengthen the profile of Pancasila students is a sustainable lifestyle through processing organic waste into eco enzymes. This project provides students with direct experience regarding the sorting of organic and inorganic waste and its use. Making alternative eco enzymes into environmentally friendly materials that can be used as floor cleaning fluid. This floor cleaning fluid effectively cleans floors from dirt and grease without leaving dangerous chemical residues. Apart from that, using this cleaning fluid also helps reduce waste and supports the principle of waste recycling.

Based on the explanation above, the aspect of a sustainable lifestyle is an important aspect to instill in students from an early age, where elementary school is one of the best times to introduce students to the importance of protecting the environment around them. No matter how small the effort made, it will definitely provide big benefits for the environment. At this age, they have extraordinary potential in the future to protect the environment as the nation's next generation. They are expected to have a soul that cares about the environment. Even though fermentation needed to be carried out for 90 days, when the eco enzyme was ready to be harvested the students were very excited to try the results. They were asked to clean the classroom using eco enzymes that had been harvested. Meanwhile, the remainder of the eco enzyme will be given to school cleaning services to teach students the meaning of sharing with others. This project also makes them proud because they can produce and use natural, environmentally friendly materials rather than having to use chemical products that can pollute the environment.

5. Conclusions

The activity of making eco enzymes has the benefit for students of instilling a sense of care for the environment. This project provides direct experience for students so that they increase their knowledge about how to recycle organic waste. The values in the sustainable lifestyle aspect of the project to

strengthen the profile of Pancasila students appear in characters who are able to make alternative products as substitutes for chemicals that are friendlier to the environment. Suggestions for schools for this activity do not only stop at grade 4, but also implement similar projects in other grades. Meanwhile, grade 4 students as the initial movers of this eco enzyme activity can be chosen to become school environmental ambassadors in order to increase their and the school community's sense of responsibility regarding waste management.

References

[1] X. Du, Y. Chaaban, and Y. A. L. Mabrd, "Exploring the concepts of fidelity and adaptation in the implementation of project based learning in the elementary classroom: Case studies from Qatar," *Int. J. Learn. Teach. Educ. Res.*, vol. 18, no. 9, pp. 1–22, 2019, doi: 10.26803/ijlter.18.9.1.

[2] P. S. Venugopala, B. Ashwini, P. P. Shrinivasa, and C. V. Aravinda, "Issues and Challenges of Implementing Project Based Learning in Engineering Courses: Student and Faculty Perspective," *J. Eng. Educ. Transform.*, vol. 37, no. 3, pp. 86–98, 2024, doi: 10.16920/jeet/2024/v37i3/24006.

[3] B. D. Lazić, J. B. Knežević, and S. M. Maričić, "The influence of project-based learning on student achievement in elementary mathematics education," *South African J. Educ.*, vol. 41, no. 3, pp. 1–10, 2021, doi: 10.15700/saje.v41n3a1909.

[4] T. Köpeczi-Bócz, "The Impact of a Combination of Flipped Classroom and Project-Based Learning on the Learning Motivation of University Students," *Educ. Sci.*, vol. 14, no. 3, 2024, doi: 10.3390/educsci14030240.

[5] I. Paleenud, K. Tanprasert, and S. Waleeittipat, "Lecture-Based and Project-Based Approaches to Instruction, Classroom Learning Environment, and Deep Learning," *Eur. J. Educ. Res.*, vol. volume-13-, no. volume-13-issue-2-april-2024, pp. 531–539, 2024, doi: 10.12973/eu-jer.13.2.531.

[6] H. A. K. Mavani *et al.*, "Antimicrobial efficacy of fruit peels eco-enzyme against Enterococcus faecalis: An in vitro study," *Int. J. Environ. Res. Public Health*, vol. 17, no. 14, pp. 1–12, 2020, doi: 10.3390/ijerph17145107.

[7] M. A. Bes-Piá, J. A. Mendoza-Roca, E. Ferrer-Polonio, A. Iborra-Clar, E. Zuriaga-Agustí, and M. J. Luján-Facundo, "Integration of Project-Based Learning (PjBL) Methodology in the Course 'Bioprocesses Applied to the Environment,'" *Educ. Sci.*, vol. 13, no. 6, 2023, doi: 10.3390/educsci13060570.

[8] L. J. M. Thuriès *et al.*, "Cash for trash: an agro-economic value assessment of urban organic materials used as fertilizers in Cameroon," *Agron. Sustain. Dev.*, vol. 39, no. 6, 2019, doi: 10.1007/s13593-019-0598-7.

[9] K. Komalasari, A. Abdulkarim, and P. Sopianingsih, "Digital-Based Living Values Project Activities Learning Model for Strengthening Students' Pancasila Character," *New Educ. Rev.*, vol. 75, pp. 127–139, 2024, doi: 10.15804/tner.2024.75.1.10.

[10] J. W. Creswell and J. D. Creswell, *Research Design*, Fifth Edit. Sage Publications, 2018.

[11] M. Huberman, M. Miles, and J. Saldana, *Qualitative Data Analysis*. America: Sage Publications, 2014.

[12] L. Y. Lim, C. T. Lee, C. P. C. Bong, J. S. Lim, and J. J. Klemeš, "Environmental and economic feasibility of an integrated community composting plant and organic farm in Malaysia," *J. Environ. Manage.*, vol. 244, no. September 2018, pp. 431–439, 2019, doi: 10.1016/j.jenvman.2019.05.050.

[13] F. Karaca and A. Tleuken, "Reforming Construction Waste Management for Circular Economy in Kazakhstan: A Cost–Benefit Analysis of Upgrading Construction and Demolition Waste Recycling Centres," *Recycling*, vol. 9, no. 1, 2024, doi: 10.3390/recycling9010002.

[14] O. M. Owojori, R. Mulaudzi, and J. N. Edokpayi, "Student's Knowledge, Attitude, and Perception (KAP) to Solid Waste Management: A Survey towards a More Circular Economy from a Rural-Based Tertiary Institution in South Africa," *Sustainability*, 2022, doi: https:// doi.org/10.3390/su14031310.

[15] X. Yang, X. Chen, X. Xiao, H. Xi, and S. Liu, "College students' willingness to separate municipal waste and its influencing factors: A case study in chongqing, china," *Sustain.*, vol. 13, no. 22, 2021, doi: 10.3390/su132212914.

[16] A. K. Jeppu, K. A. Kumar, and A. Sethi, "'We work together as a group': implications of jigsaw cooperative learning," *BMC Med. Educ.*, vol. 23, no. 1, pp. 1–8, 2023, doi: 10.1186/s12909-023-04734-y.

[17] J. Phrophayak *et al.*, "Enhancing Green University Practices through Effective Waste Management Strategies," *Sustain.*, vol. 16, no. 8, 2024, doi: 10.3390/su16083346.

Peer Tutor Learning Process to Improve Students' Numeracy Literacy Skills at SMPIT Abu Bakar Fullday School Yogyakarta Class IX in the 2023/2024 Academic Year

Nurika Miftahuljannah[1]*, Sugiman[2]

[1] Math Education, SMPIT Abu Bakar Fullday School, Yogyakarta, Indonesia
[2] Postgraduate, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: nurika.anna@gmail.com

Abstract. Every learner is a person who has the right to education. This is regulated in Law No 20 of 2003 on the National Education System Chapter 2 Article 3. Numeracy literacy is one of the sciences that is considered to be the foundation in solving social, economic, chemical, biological, physical and other science problems. However, numeracy literacy in Indonesia from the results of PISA (Program for International Student Assessment) has decreased 13 points from 2018. Thus, efforts need to be made with learning methods that are expected to be effective in improving numeracy literacy skills. The method is the peer tutor method. This research uses a type of classroom action research (PTK), that aims to describe the results of numeracy literacy with the peer tutor method as an effort to improve the numeracy literacy skills of class IX students. This research was conducted in the second semester of the 2023/2024 school year for 2 cycles. The steps of the peer tutor method carried out are: (1) planning, (2) action, (3) observation, and (4) reflection. The results showed that there was an increase in the average from cycle 1, namely 52.63 to 56.78 in cycle 2. In addition, the frequency of students who reached the KKM score of 80 also increased from 6 in cycle 1 to 8 in cycle 2. Although there was an increase in the number of students who completed the KKM and increased the average score, however, when viewed from the number of students who completed the KKM and the average score was still very low. Thus the learning process of the peer tutor method cannot improve the numeracy literacy skills of students at the junior high school level.

Keywords: numeracy literacy, peer tutor

1. Introduction

Every learner is a person who has the right to education. Education is a very important component to support the survival of humans who have a greater chance of making their lives more qualified. A creative and innovative educational process will make learners gain more meaningful knowledge so that they can use it to solve problems.

This is in line with Law No 20 of 2003 on the National Education System Chapter 2 Article 3 which states that:

National Education functions to develop the ability and shape the character and civilization of a dignified nation in order to educate the nation's life, aims to develop the potential of students to become

human beings who are faithful and devoted to God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens.

Numeracy literacy or more commonly known as mathematics, is one of the branches of science that is the basis for learning other sciences. Without numeracy literacy, a person will experience problems in solving problems. Numeracy literacy is an element that is considered accurate for solving social, economic, chemical, biological, physical and other science problems (Suprijadi, 2010: 127). Thus, numeracy literacy is an important science to be mastered by students throughout Indonesia.

Based on the results of the PISA (Programme for International Student Assessment) held by the OECD (Organization for Economic Cooperation and Development) in 2022, Indonesia's numeracy literacy score decreased by 13 points from the previous year's PISA results in 2018, although its ranking increased by 5 positions. The increase in Indonesia's ranking from the PISA results is because the global PISA score has decreased. The decline occurred because it was triggered by the Covid-19 pandemic (Kemendikbud, 2023).

This statement is supported by Iwan Pranoto, a professor at the Bandung Institute of Technology, who stated that for the last 20 years Indonesia's PISA score has been below the average of OECD countries. Pranoto said that the country's score globally fell due to the Covid-19 pandemic. "So far, Indonesia has been at the bottom, during the pandemic, of course the decline is not so severe. Because, we cannot go even lower." (Napitupulu, 2023). Thus, even though the rankings have increased, the decline in numeracy literacy scores must still be watched out for.

Indonesia through the Ministry of Education and Culture organized the National Assessment (AN) which focuses on familiarizing students to learn, discuss, and read literacy-based questions, one of which is numeracy literacy (Destiana, 2023). At the junior high school level in Indonesia, AN is carried out by grade 8 students and not entirely. In other words, only a few students in one school represent their participation in AN.

To maintain efforts to improve the numeracy literacy skills of students in grade 9, the DIY regional government organized the ASPD (Regional Education Standardization Assessment). ASPD is an initiative due to the elimination of the National Examination (UN) in 2020 and officially abolished in 2021. The purpose of ASPD is to measure the achievements of students at the final level which can be used as an additional assessment for students to the next level of education. However, ASPD is not used to determine graduation like the UN (Ramadini, 2024).

One of the fields of science tested in the ASPD in 2024 is numeracy literacy. Many efforts have been made by various junior high schools in Yogyakarta to improve numeracy literacy skills. One of the efforts made by researchers in improving numeracy literacy skills is by applying peer tutor learning techniques. The peer tutor method was chosen because it is one of the learning methods that uses language and communication equality (Djamarah & Zain, 2010).

Based on the background of the problem, the researcher wants to conduct research on the effect of peer tutors on the results of the Preparation and Strengthening of Regional Education Standardization Assessment (PP-ASPD) in 2024 at SMPIT Abu Bakar Fullday School Yogyakarta. The school was chosen because it is where the researcher teaches, making it easier for researchers to access data and observe the learning process accurately and thoroughly.

2. Theory Review

2.1 Numeracy Literacy

Literacy is an individual's ability to read, write, speak and calculate (UNESCO, 2008). Meanwhile, the National Literacy Movement Team (2017) states that:

Numeracy is the skill of applying mathematical concepts and rules in real daily situations. Therefore, numeracy literacy can be defined as the knowledge and skills to use various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of daily life; the ability to analyze information displayed in various forms of graphs, tables, charts, etc.; and the ability to use the interpretation of the results of the analysis to predict and make decisions.

In line with Susetyawati and Kintono (2022) who argue that numeracy literacy is the ability to analyze information in problems displayed in various forms (graphs, diagrams, tables, etc.); the ability to use mathematical symbols needed when solving problems; and the ability to use concepts to determine decisions from the results of analyzing information in the problem.

According to Mahmud & Pratiwi (2019) numeracy literacy is the ability to obtain, interpret, use, and communicate various kinds of numbers and mathematical symbols in solving context problems in everyday life. Numeracy literacy skills possessed by students can direct students in solving math problems and applying these concepts in everyday life (Maghfiroh, et al., 2021). Thus, numeracy literacy is a very important ability for every learner to have.

The importance of numeracy literacy is proven to be one of the skills tested by the Organization for Economic Cooperation and Development (OECD) in the Programme for International Student Assessment (PISA). The decline in Indonesia's numeracy literacy score at the world level requires education observers to be more creative and innovative in improving numeracy literacy skills. One method that is considered to be able to improve numeracy literacy skills is the peer tutor method.

2.2 Peer Tutor

The peer tutor method is a learning method that is carried out by empowering the ability of students who have high absorption. These learners teach material/exercises to their friends who do not understand (Sartika, 2022). This learning method provides an opportunity for all students to be active in learning. Thus, it will greatly reduce the tendency of students to be sleepy during class hours, because they do a lot of discussion activities. This method is also in line with the paradigm shift that makes students the center of learning (student center), which initially was the teacher who became the center of learning (teacher center).

Sometimes students have difficulty understanding explanations from teachers, but it is easier to understand explanations made by their own friends because of the use of language that is equal and easy for students to understand. This is in line with Saudah (2022) who states that peer tutors from friends can be used as an alternative learning for students who have difficulty when guided by the teacher. Learners usually do not have fear, awkwardness, or inferiority if they ask or ask for help/give help by their own friends because they are more familiar. Unlike with the teacher, sometimes students feel shy, afraid, or awkward (Izzati, 2015). So that the teacher's explanation may not actually be understood, but students have conveyed understanding.

In the peer tutor learning method, students learn to work together with their group mates, be independent because they do not depend entirely on the teacher, share knowledge that has been understood to convey to their friends. Indirectly, their social skills will also be honed because there are many discussions and questions and answers. Another good effect is that learners will grow to care about each other and also love each other because of frequent interactions that help each other.

Basically, the peer tutor method is a learning process that involves a person to provide learning assistance and guidance to others in learning activities (Anas, 2014). Munthe & Naibaho (2019) argue that peer tutors can provide learning facilities together to students and be guided by peers in sharing knowledge, helping each other, and creating a comfortable situation in the learning process both in expressing opinions and asking questions when getting difficulties.

The steps of sabaya tutor learning according to Sani (2013: 201) are:

1) The teacher forms heterogeneous groups. Each group consists of 3 to 4 people and there must be at least 1 person who has a higher ability who will then be used as a tutor. 2) the teacher should explain how to complete each task in the group with the guidance of peer tutors. 3) the teacher explains the learning material to all learners before the discussion in the group and the teacher provides an opportunity for questions and answers if there is still material that has not been understood. 4) the teacher gives assignments to learners with a special note, that learners who have difficulty in doing the task, can ask for guidance from friends who are appointed as tutors, but still with the teacher's monitoring. 5) the teacher observes the learning activity and gives an assessment. 6) the teacher, tutor and learners evaluate the learning process to determine the next round of follow-up.

The researcher adopted Sani's peer tutor learning steps with some adjustments tailored to the needs and conditions of the class. The purpose of peer tutor learning in this study is to improve students' numeracy literacy scores to prepare for ASPD. Therefore, the materials used in peer tutoring are numeracy literacy exercises.

The steps of the peer tutor learning method in this study are: 1) the teacher forms a heterogeneous group based on the value of the previous PP-ASPD results. The teacher directs 1 learner who becomes a tutor, but all members in the group can become tutors. Who understands, even though he is not a tutor, then he is tasked with explaining to friends in his members. In other words, every member of the group can be a tutor. The diverse abilities of learners allow each learner to also master certain materials that may not have been mastered by the appointed tutor. 2) the teacher prepares the material, in this case numeracy literacy-based practice questions which are then distributed to each learner. 3) the teacher explains what tasks must be done in each group. That is, working on problem exercises with discussions with their group members. 4) Learners work on the tasks given with their group members. If no one in a group can do it, then the representative of the group can ask the teacher who then conveys it back to his group members. 5) The teacher goes around observing the learning activities carried out by learners. If there are learners or groups who have difficulties, the teacher is ready to become a facilitator to help explain. 6) The teacher asks each group to make a report related to the understanding of each group member. So that even though working on it in groups, the teacher can monitor which students still do not understand certain questions. 7) the teacher and students evaluate the peer tutor learning process both in the learning activities and in the scores. The purpose of this evaluation is to find out the obstacles experienced during the learning process and determine what should be improved in the next learning.

3. Research Methods

This research is a classroom action research (PTK) consisting of the stages of planning, action, observation, and reflection taken from Kemmis & Taggart (1998). The stages of the classroom action research process in this study are to implement learning with the peer tutor method in improving numeracy literacy skills to prepare for the ASPD (Regional Education Standardization Assessment) in 2024.

The research was conducted at SMPIT Abu Bakar Fullday School Yogyakarta in the academic year 2023/2024. The subjects of this study were all ninth grade students at the school. The selection of grade IX is in accordance with the need to prepare for the implementation of ASPD which will later become one of the considerations for continuing public schools at the SMA/K level in Yogyakarta.

The research procedure of this group uses the PTK flow, namely: 1) planning, compiling research tools consisting of teaching module learning tools, student worksheets in the form of numeracy literacy exercises, and additional materials. 2) action, implementing peer tutor learning. 3) observation, observing the learning process using the peer tutor method. 4) reflection, identifying the advantages and disadvantages of implementing learning with the peer tutor method. From the end of each stage of the

learning process, it ends with PP-ASPD tests from both the city and province of Yogyakarta to determine the achievement of the numeracy literacy skills of students.

Data were obtained from observations, interviews with several students, and PP-ASPD test results. The data obtained was then analyzed using descriptive quantitative analysis by referring to the increase in the average score from one cycle to the next cycle and the increase in students who got a score equal to or more than the KKM score of 80.

4. Results and Discussion

The learning process with the peer tutor method in class IX SMPIT Abu Bakar Fullday School Yogyakarta even semester of the 2023/2024 academic year was carried out in 2 cycles. The results of each cycle are described as follows.

4.1 Cycle I
The learning process in cycle I was carried out in 2 learning meetings and 1 meeting for PP-ASPD evaluation. The materials used are all junior high school mathematics materials that have been determined by the DIY Dikpora as a measuring tool for students' numeracy literacy skills.

4.1.1 Planning
Learning planning with the peer tutor method in cycle I is by compiling teaching modules and preparing worksheets for students in the form of practice questions. In addition, it also makes heterogeneous groups based on the ability of students consisting of 3-4 people. The teacher said that each group was required to make a report on the understanding of each group member as material for evaluation.

4.1.2 Action
The teacher presents the groups that have been created. Then learners group according to their respective group members who have been designed with heterogeneous abilities. Each learner is then given a worksheet in the form of numeracy literacy-based problem exercises. The group begins to discuss to solve the problems in the problem.

The teacher appoints 1 tutor in each group, but anyone in the group who can solve the problems in the problem, then he is obliged to explain to all members of his group. The purpose of this peer tutor is that each group must understand how to solve each problem that is being worked on which is then proven by the checklist report of each group.

In this action process, the peer tutor method learning process occurs which can make all students play an active role in learning. In addition, it can also reduce drowsiness when learning takes place because students do a lot of discussion which can be in the form of explaining or listening to explanations. Familiarity between learners is also getting closer because of the greater duration of interaction in the learning process. Learners can use references from package books, notebooks, or access the internet in the process of solving numeracy literacy-based problems. However, the teacher limits that each group is only allowed to use 1 laptop to access the internet.

In this process, the teacher is a facilitator who must be ready to explain if the group has difficulty in solving the problem. In addition, the teacher also provides clarification or fixes the problem solving process that is less precise. So that the mistakes that occur are expected not to be repeated.

4.1.3 Observation
Observation activities were carried out when the peer tutor learning process was taking place. The observation was conducted by the researcher herself who was also the math teacher in the class. Some notes during observation in cycle I were that the peer tutor process had gone well. All students want to join their group members. There are already peer tutor activities in each group. It's just that the teacher

must remind more often if there are some learners who look less enthusiastic in the discussion or pay less attention to the explanation of the tutor.

Table 1. PP-ASPD Result Data of DIY Province

No.	Aspect	Descriptiom
1	Many students participate in PP-ASPD	59 students
2	Many students who meet the KKM	6 students (10,17%)
3	Many students do not meet the KKM	53 students (89,83%)
4	Total score	3105
5	Highest score	97,50
6	Lowest score	17,50
7	Average	52,63

4.1.4 Reflection

Based on the observation results of the actions in cycle I, several reflection results were obtained, including: the teacher needs to provide intensive assistance to groups that have more low abilities than other groups; before joining group members, the teacher should provide stronger motivation first so that they are enthusiastic in discussions that apply the peer tutor method; it is better for the teacher to convey material that has not been understood by students in general so that there is no need to repeat in explaining if other groups ask the same question; and students must be more able to condition themselves in learning, for example when drowsiness comes, immediately ask permission to wash their face or ablution first so that their drowsiness can be reduced so that they can be more concentrated in following the learning process.

4.1.5 Numeracy Literacy Results Cycle I

Cycle I was attended by 28 male students and 31 female students. So that the total subjects in this study were 59 people. The evaluation used from the results of cycle I is a numeracy literacy question made by the DIY provincial education office, namely the provincial level PP-ASPD (Preparation and Strengthening of Regional Standardization Assessment) question which was held on March 25-27, 2024. The following results of PP-ASPD DIY Province are shown in table 1.

Based on table 1. the number of students who meet the KKM and do not meet the KKM can be depicted in a pie chart, an image is obtained as shown in figure 1 below.

4.2 Cycle II

The learning process in cycle II was carried out in 2 learning meetings and 1 meeting for evaluation, namely PP-ASPD Yogyakarta City stage 3. The material used is all junior high school mathematics

material that has been determined by the Yogyakarta city office as a measuring tool for students' numeracy literacy skills.

4.2.1 Planning

Learning planning with the peer tutor method in cycle II is by compiling teaching modules that are adjusted to the results of observation, reflection, and the results of the DIY Province PP-ASPD. Furthermore, it also prepares worksheets for students in the form of numeracy literacy-based problem exercises. In addition, it also makes heterogeneous groups based on the ability of students from the results of the DIY Province PP-ASPD in cycle I which consists of 3-4 people. In making groups, teachers also consider the learning style of each learner. Teachers get the results of learning styles based on the results of psychological tests conducted by one of the psychological testing institutions that have collaborated with schools. As in cycle I, the teacher also said that each group was required to make a report on the understanding of each group member as material for evaluation.

4.2.2 Action

The teacher conveys the groups that have been made based on the results of the DIY Province PP-ASPD. Then learners group according to their respective group members who have been designed with heterogeneous abilities. Each learner is then given a worksheet in the form of numeracy literacy-based problem exercises. The group begins to discuss to solve the problems in the problem.

The teacher appoints 1 tutor in each group, but anyone in the group who can solve the problems in the problem, then he is obliged to explain to all members of his group. The purpose of this peer tutor is that each group must understand how to solve each problem that is being worked on which is then proven by the checklist report of each group.

In this action process, the learning process of the peer tutor method occurs which can make all students play an active role in learning. Learners can use references from package books, notebooks, or access the internet in the process of solving numeracy literacy-based problems. However, the teacher limits that each group is only allowed to use 1 laptop to access the internet.

In cycle II action, the teacher was more intensive in assisting the peer tutor learning process. Before starting to group, the teacher asked students about material that had not been understood. The teacher then briefly explained the material that was still not understood. The teacher also more often reminds learners who are starting to get lethargic because they feel sleepy to wash their faces or perform ablution first. In addition, the teacher also remained a facilitator as in cycle I.
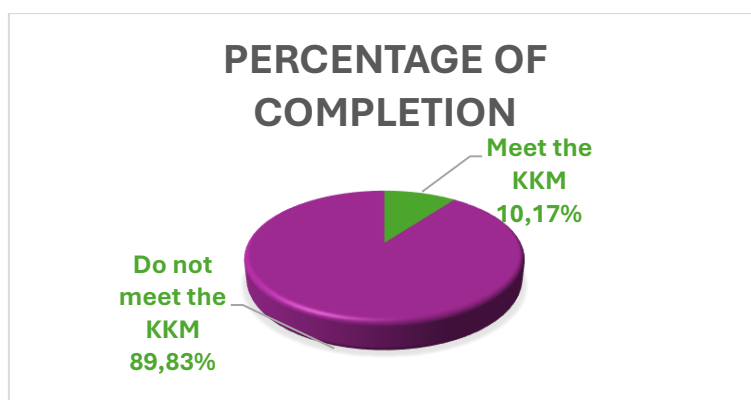
Figure 1. Diagram of Percentage of Numeracy Literacy Completion Based on PP-ASPD Results of DIY Province

4.2.3 Observation

Observation activities were carried out when the peer tutor learning process was taking place. The observation was conducted by the researcher herself who was also the math teacher in the class. Some notes when observing in cycle II are that the peer tutor process has gone well. Fewer students who lack concentration in the peer tutor learning process. In the group, there were more numeracy literacy problems that could be solved. In other words, when in cycle I learners could not solve numeracy literacy problems, in cycle II learners were able to solve them on their own without the help of tutors in their groups or asking the teacher.

4.2.4 Reflection

Based on the observation results of the actions in cycle II, some reflection results were obtained, including: the teacher was more intensive in accompanying the learning process of students using the peer tutor method; fewer students were sleepy or lacking concentration; and other tutors appeared in one group so that tutors in each group could be more than 1. However, there were still a small number of students who did not pay attention and some fell asleep when the discussion process in peer tutors took place.

4.2.5 Cycle II Numeracy Literacy Results

Cycle II was the same as cycle I, which was attended by 28 male students and 31 female students. So that the total subjects in this study were 59 people. The evaluation used from the results of cycle II is a numeracy literacy question made by the Yogyakarta city education office, namely the PP-ASPD (Preparation and Strengthening of Regional Standardization Assessment) question at the city level stage 3 on 24-26 April 2024. The following results of PP-ASPD Yogyakarta City stage 3 are shown in table 2.

Table 2. PP-ASPD Result Data of Yogyakarta City Phase 3

No.	Aspect	Descriptiom
1	Many students participate in PP-ASPD	59 students
2	Many students who meet the KKM	8 students (13,56%)
3	Many students do not meet the KKM	51 students (86,44%)
4	Total score	3350
5	Highest score	97,50
6	Lowest score	17,50
7	Average	56,78

Based on table 2. the number of students who meet the KKM and do not meet the KKM can be depicted in a pie chart, an image is obtained as shown in figure 2 below.
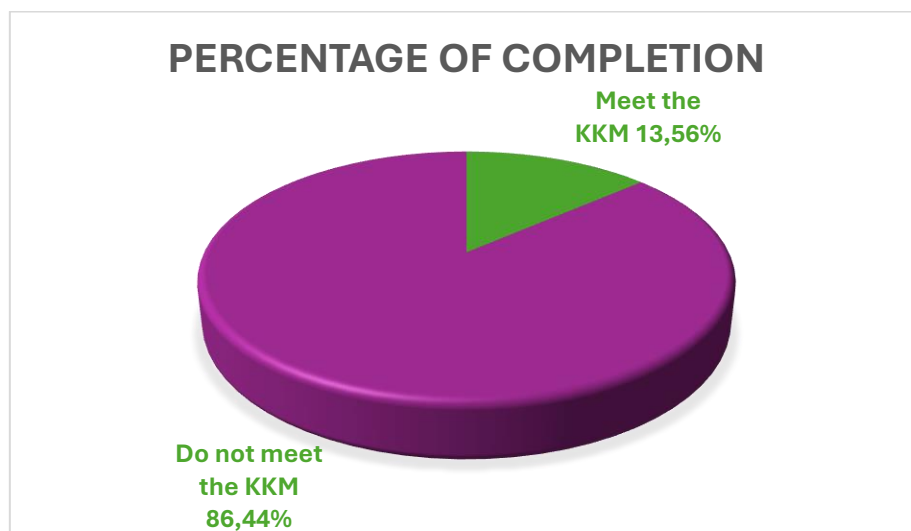
Figure 2. Diagram of Percentage of Numeracy Literacy Completion Based on Results of PP-ASPD Yogyakarta City Phase 3

5. Results and Discussion

Based on the research results above, the research series has been carried out very well starting from the planning, action, observation, and reflection stages, as well as evaluation with numeracy literacy questions made from the DIY provincial education office and the Yogyakarta city education office itself. So that all questions have been validated very well. The recapitulation of the results of students' numeracy literacy skills can be summarized in table 3. The following table is a recapitulation of numeracy literacy skills.

Table 3. Recapitulation of Numeracy Literacy Skills

Description	Meet the KKM		Do not meet the KKM		Average	Total
	Frequency	%	Frequency	%		
Cycle I	6	10,17	53	89,83	52,63	3105
Cycle II	8	13,56	51	86,44	56,78	3350

Based on the table 3 above, there was an increase in the number of participants who met the KKM, namely from cycle I as many as 6 people or 10.17% up to 8 people or 13.56%. In addition, the average and total scores from cycle I to cycle II also increased, namely 4.15 and 245 respectively. Because the increase in students who completed the KKM only increased by 2 people and the percentage who reached the KKM score was still very low at 13.56%, peer tutor learning could not improve numeracy literacy skills. Especially if the time is very short.

6. Conclusion

The results of the research and discussion can provide a conclusion that the learning process using peer tutors implemented at SMPIT Abu Bakar Fullday School Yogyakarta cannot improve students' numeracy literacy skills. This can be seen from the insignificant increase in the number of students' scores from cycle I to cycle II. Although there was an increase in the number of students who completed

the KKM and increased the average score, when viewed from the number of students who completed the KKM and the average score was still very low. Thus the learning process of the peer tutor method cannot improve the numeracy literacy skills of students at the junior high school level.

References

[1] Anas, M.— Mengenal Metode Pembelajaran. Pasuruan, CV. Pustaka Hulwa, 2014.

[2] Destiana.— Sambut Asesmen Nasional 2023 untuk Tingkatkan Kualitas Pembelajaran. https://www.kemdikbud.go.id/main/blog/2023/08/sambut-asesmen-nasional-2023-untuk-tingkatkan-kualitas-pembelajaran, 2023. — accessed on May, 24, 2024

[3] Djamarah, S. B., Zain, A.— Strategi Belajar Mengajar. Jakarta, PT. Rineka Cipta, 2010.

[4] Izzati, N.— Pengaruh Peneraoan Program Remidial dan Pengawaan Melalui Pembelajaran Tutor Sebaya Terhadap Hasil Belajar Matematika Siswa. Matehamatics Education Learning and Teaching, Vol. 4 (1), 2015.

[5] Kemmis, S. & Taggart, M. R.— The Action Reasearcg Planner. Deakin, Australia, The Action Reasearch Planner, 1998.

[6] Maghfiroh, Fadhilah Lailatul, dkk.— Keefektifan Pendekatan Pendidikan Matematika Realistik Indonesia terhadap Kemampuan Literasi Numerasi Siswa di Sekolah Dasar. Jurnal Basicedu, Vol 5 (5): 3342-3351, 2021.

[7] Mahmud, M. R. & Pratiwi, I. M.— Literasi Numerasi Siswa dalam Pemecahan Masalah Tidak Terstruktur. Kalamatika Jurnal Pendidikan Matematika, Vol 4 (1): 69-88, 2019.

[8] Munthe, Ashiong Parhehean & Henny Pradiastuti Naibaho.— Manfaat dan Kendala Penerapan Tutor Sebaya untuk Siswa Kelas IV Sekolah Dasar Lentera Harapan Mamit. Jurnal Pendidikan dan Kebudayaan, Vol 9 (2): 138-147, 2019.

[9] Napitupulu, Ester Lince.— Skor PISA 2022 Indonesia Turun, Peringkat Naik. https://www.kompas.id/baca/humaniora/2023/12/05/skor-pisa-2022-indonesia-turun-peringakt-naik, 2023. — accessed on May, 24, 2024

[10] Pengelola Siaran Pers.— Peringkat Indonesia pada PISA 2022 Naik 5-6 Posisi Dibanding 2018. https://www.kemdikbud.go.id/main/blog/2023/12/peringkat-indonesia-pada-pisa-2022-naik-56-posisi-dibanding-2018, 2023. — accessed on May, 24, 2024

[11] Ramadini, Sri Rumpun Angguning Puan.— Implementasi Kebijakan Asesmen Standardisasi Pendidikan Daerah pada Sekolah Dasar Favorit di Kota Yogyakarta. Jurnal Spektrum Analisis Kebijakan Pendidikan, Vol. 13(1): 1-16, 2024.

[12] Sartika, Dewi.— Pengaruh Penggunaan Metode Tutor Sebaya terhadap Kemampuan Pemahaman Matematis Siswa Kelas VIII. Jurnal Penalaran dan Riset Matematika (PRISMA), Vol. 1 (1): 1-7, 2022.

[13] Saudah.— Meningkatkan Hasil Belajar Matematika Materi Bangun Ruang Menggunakan Model Pembelajaran Tutor Sebaya pada Siswa Kelas 9-I SMP N 10 Malang. Jurnal Inovasi Pendidikan Matematika dan IPA, Vol. 2 (1): 42-52, 2022.

[14] Suprijadi, Didi.— Pengaruh Tutor Sebaya terhadap Hasil Belajar Matematika Siswa Kelas VII SMP Daarussalaam Jakarta. Jurnal Ilmiah Faktor Exacta, Vol. 3 (2): 127-135, 2010.

[15] Susetyawati, M.M. Endang & Kontono.— Pengembangan Butir Soal Kemampuan Literasi Numerasi Matematika Materi Bangun Ruang Kelas VIII SMP di Yogyakarta. Indonesian Journal Of Education And Humanity, Vol. 2 (2): 52-61, 2022.

[16] Undang-undang Republik Indonesia Tahun 20 Tahun 2003 tentang Sistem Pendidikan Nasional.

[17] UNESCO Institute for Statistics.— International Literacy Statistics: A Review of Concepts, Methodology, and Current Data. Montreal. Canada, UNESCO Institute for Statistics, 2008.

[18] Tim Gerakan Literasi Nasional.— Materi Pendukung Literasi Numerasi. Jakarta, Kementrian Pendidikan dan Kebudayaan, 2017.

Best Practices Special Instructional Class Activities with Homeroom Teacher to Build Students' Characters

Oktina Utami

SMAN 1 Sentolo, Kulon Progo, Daerah Istimewa Yogyakarta, Indonesia

oktinautami60@guru.sma.belajar.id

Abstract. The homeroom teacher is a subject teacher who is given the additional task of being responsible for the dynamics of learning in a particular class. They have a role like the head of the family in the class, creating conducive conditions and environment so that the teaching and learning process runs well. The homeroom teacher also has the responsibility to manage, guide and supervise students in one class at school, as well as ensuring students' good academic and personal development. In relation to building student character, the homeroom teacher plays a very important and varied role, including being a role model, guide, motivator, leader, designer, counselor and parent for students. However, in practice, homeroom teachers often lack time and opportunities. His position as a subject teacher requires the homeroom teacher to prioritize achieving the learning objectives of his major subject, rather than carrying out his role as homeroom teacher in the class he teaches. In fact, a lack of time with the homeroom teacher can have several negative implications for students, such as students' lack of awareness of the importance of the homeroom teacher's role in developing their character. Seeing this phenomenon, the author attempted to develop an activity program packaged in a specifically scheduled classroom learning activity, to facilitate the guidance of the class teacher for the class she taught. At SMAN 1 Sentolo, this activity has been carried out for the past year. For this reason, the problems formulated are: 1) What special activities are carried out by the homeroom teacher at SMAN 1 Sentolo in their coaching class sessions? ; 2) Can the special activities carried out by the homeroom teacher of SMAN 1 Sentolo improve the student character development process? The aim is to determine the variations in the types of special activities carried out by the homeroom teacher in his coaching class sessions and the effectiveness of these special activities in improving the student character development process. From the results of implementing best practices and open interviews with several students, whether or not they were involved in these special activities, it was concluded that: 1) Special class activities with the class teacher that were effectively carried out at SMAN 1 Sentolo included making Heart Expression Videos, Gamification of Character Development , Creating content that is trending on social media, exchanging letters, and creating self-resolution boards. 2) Special class activities carried out by the homeroom teacher in the class he teaches have effectively improved the student character development process. This is also known from student testimonials which state that the fun activities they have carried out with the homeroom teacher increase their closeness with the homeroom teacher which in turn can change them towards a better personal character, who is more motivated to carry out a positive culture at school.

Key words: homeroom teacher, personal counselling, character building, personal character

1. Introduction

The homeroom teacher is a subject teacher who is given the additional task of being responsible for the dynamics of learning in a particular class. They have a role like the head of the family in the class,

creating conducive conditions and environments so that the teaching and learning process runs well. The homeroom teacher also has the responsibility to manage, guide and supervise students in one class at school, as well as ensuring students' good academic and personal development.

In relation to building student character, the homeroom teacher plays a very important and varied role, including being a role model, guide, motivator, leader, designer, counselor and parent for students. The homeroom teacher, as a role model for students, must demonstrate good and ethical behavior, so that students can imitate and follow him. Meanwhile, when carrying out the role as a mentor, the homeroom teacher must be able to help students develop religious and moral character. They act as companions and motivators in the learning process. The homeroom teacher must also be a motivator who inspires and encourages students in various activities. As a leader, the homeroom teacher must also be able to manage the class and help students develop social and communicative skills. They must have the ability to organize and direct students in various situations. The homeroom teacher is also a designer who designs and develops learning that suits students' needs. They must have the ability to integrate character education in the subjects they teach. Under certain conditions, the homeroom teacher must also become a counselor who helps students overcome problems and develop emotional abilities. They must have the ability to listen and help students in various situations. And finally, in terms of developing student character, the homeroom teacher as a parent for students while at school, must have the ability to be a role model and provide good guidance to students.

However, in practice, homeroom teachers often lack time and opportunities. Their position as subject teachers requires the homeroom teacher to prioritize achieving the learning objectives of their major subject, rather than carrying out their role as homeroom teacher in the class they teach. In fact, a lack of time with the homeroom teacher can have several negative implications for students, such as students' lack of awareness of the importance of the homeroom teacher's role in developing their character. Homeroom teachers act as role models, mentors, motivators, and leaders, so students should have the opportunity to interact with them more intensively. Lack of time with the homeroom teacher can reduce opportunities for students to develop closeness with the homeroom teacher. Closeness between students and homeroom teachers is very important in helping students develop good religious and moral character. In addition, lack of time with the homeroom teacher can reduce students' motivation to learn and improve their achievement. The homeroom teacher must have time to provide more intensive motivation and support to students. Lastly, lack of time with the homeroom teacher can reduce the opportunity for the homeroom teacher to monitor student dynamics in class. The homeroom teacher must have time to monitor student attendance, supervise student behavior, and provide more intensive guidance.

Seeing this phenomenon, the author attempted to develop an activity program packaged in a specifically scheduled classroom learning activity, to facilitate the guidance of the class teacher for the class she taught. At SMAN 1 Sentolo, this activity has been carried out for the past year, scheduled on the last Monday of every month, during the first lesson as a substitute for the routine flag ceremony. With this activity, the homeroom teacher can have more freedom to carry out their duties not as a subject teacher, but as a homeroom teacher who provides guidance and coaching to improve the character development process for students in the class they teaches.

Based on the background above, the problems formulated in this best practice include: 1) What special activities are carried out by the homeroom teacher at SMAN 1 Sentolo in their coaching class sessions?; 2) Can the special activities carried out by the homeroom teacher of SMAN 1 Sentolo improve the student character development process?

So the objectives of these best practices are: 1) Knowing the variations in the types of special activities carried out by homeroom teachers in their coaching class sessions; 2) Knowing the effectiveness of these special activities in improving the student character development process.

The results of these best practices are expected to provide significant benefits, including: 1) For students: Regain their right to have a homeroom teacher who carries out their role as role models, mentors, motivators, leaders, designers, counselors and their parents while at school, who participate actively to support their character development process. 2) For teachers: Get the opportunity to allocate their time specifically and freely in carrying out their role as homeroom teacher without having to disturb and reduce their effective lesson hours as a subject teacher. 3) For schools: The results of these best practices will make a big contribution to schools, especially in terms of improving and improving the management of their human resources, especially class teachers, which in turn will increase community trust in schools, especially parents who entrust them homeroom teacher as their representative at school for their children.

2. Research Method

This research method is best practices which refers to methods or techniques that have been widely accepted and are considered superior because they tend to provide better results. Best practices are often used to achieve quality and efficiency in various fields, one of which is education. This can be based on self-assessment, benchmarking, or research and evaluation.

These best practices are implemented at SMA Negeri 1 Sentolo which is located at Jl. Sentolo-Muntilan KM 1, Banguncipto, Sentolo, Kulon Progo, Special Region of Yogyakarta, in the 2023/2024 academic year for five times, precisely on 31 July 2023, 16 October 2023, 6 November 2023, 29 January 2024, and 5 March 2024.

The procedures for these best practices include: 1) Developing an activity program and conducting testing in one of the classes by one of the homeroom teachers to determine student enthusiasm and the effectiveness of activities during one class hour. 2) Conduct socialization regarding the importance of this activity and alternative types of activities to fellow homeroom teachers and ask for input on other types of activities that might be carried out. 3) The homeroom teachers implement several types of activities that are suitable for the character of the students in the class they teach with objectives that suit the problems in each class. 4) Conduct follow-up discussions to evaluate the implementation of the activities programmed in each class. 5) Conduct open interviews with students to obtain testimonials regarding the effectiveness of special class activity programs with the homeroom teacher.

3. Discussion

3.1. Initial Condition

The unavailability of special time allocation for homeroom teachers to carry out joint activities with their target classes, causes homeroom teachers who are also subject teachers, to carry out guidance or supervision in between hours of intracurricular teaching and learning activities for their subjects. This was complained about by many homeroom teachers who felt they could not optimally carry out their duties as homeroom teachers. So that many student problems, both individual and classical, are not solved properly. Students who still have problems will of course find it difficult to build intrinsic motivation to learn, let alone think about the process of character development.

In fact, the role of the homeroom teacher has a significant correlation with the development of student character, including supervision and guidance. Homeroom teachers are responsible for supervising and guiding students in various aspects of school life, including academics and behavior. Insufficient supervision or ineffective guidance from the homeroom teacher can cause obstacles in students' character development. However, what has happened so far is that many homeroom teachers at SMAN 1 Sentolo are not active in providing guidance so that students do not receive the direction needed to develop positive characters, such as responsibility, honesty and discipline.

Apart from that, the homeroom teacher should also have a close and positive relationship with students so that they can help in understanding students' personal needs and problems. Minimal interaction or poor relationships between homeroom teachers and students can hinder character development. However, in practice, many homeroom teachers are not personally involved with students, so students do not feel supported or understood, which can hinder character development such as self-confidence and social skills.

Support in conflict resolution by the homeroom teacher is also very much needed. The homeroom teacher plays a role in helping students overcome conflicts both with classmates and with personal problems. If the homeroom teacher is ineffective in handling conflict, this can hinder the development of students' ability to solve problems and empathize. Meanwhile, most homeroom teachers at SMAN 1 Sentolo previously did not have sufficient time and opportunity for this, which resulted in students having difficulty developing the ability to communicate well and resolve problems peacefully.

Some of the conditions above are certainly quite crucial challenges to be solved, especially in maintaining public trust in schools. So in the eyes of the community, especially parents, the homeroom teacher is only a messenger of announcements from the school to students or their parents.

3.2. The Process

From the initial conditions above, the author attempts to develop an activity program that can be carried out regularly and on a schedule to facilitate the class teacher at SMAN 1 Sentolo to be able to carry out his role optimally as class teacher in the class he teaches. This activity is entitled guardianship which contains special activities according to the needs of the target class. This activity is carried out every first hour of class every last Monday of every month. However, because many school activities conflict with this schedule, during the 2023/2024 school year, these activities can only be carried out five times.

In the first stage, the author (who is also the homeroom teacher) prepares an activity program along with alternative activities that may be carried out in specially scheduled classes, such as class discussions, individual counseling, introduction to careers and further education, games or gamification, and providing feedback or reflection. The author then tested one of these activities in the class taught by the author, to determine student enthusiasm and the effectiveness of the activity during one class hour. At this stage, the activities carried out by the author and students are to create open discussions regarding class developments, issues that arise, and celebrate achievements over a certain period of time.

However, at this stage, the author found that students showed less enthusiasm, as seen from the minimal student responses during discussions and only a few students continuously expressed their opinions. From these findings, the author tried to re-arrange activity programs that are more interactive and encourage all students to express opinions and communicate optimally. After adapting to the character of students in the current era and their interest in technology, especially social media, as well as class problems that often arise, most of which originate from gaps between friends due to lack of communication, the author finally compiled several activities, including: Making Videos of Expressions of the Heart, Gamification Character Development, Creating Trending Content on Social Media, Exchanging Letters, and Creating a Self-Resolution Board. Each type of activity can be carried out more than once with different variations, resulting in many activities that can be implemented during one semester or even one academic year.

Next, the author conducted socialization regarding the importance of this activity and alternative types of activities to fellow homeroom teachers and asked for input on other types of activities that might be carried out. The author provides examples of the implementation of activities and their impact

by showing several videos of good practices that have also been carried out by other teachers in other schools via social media or other platforms.

In the third stage, the homeroom teachers, including the author, implement several types of activities that have been agreed upon in the classes they teach with objectives that are appropriate to the problems in each class. The author, as the class teacher, decided to invite students to make a video expressing their hearts as the first activity to be carried out on July 31 2023. This activity was carried out in the school's multimedia studio where students were asked to make an expression of their hearts addressed to their respective parents or guardians. These heartfelt expressions were recorded using a camera and microphone from the school studio and then saved by the homeroom teacher and shown in front of the students' parents when receiving odd semester report cards. In the video recording process, each student was accompanied by the homeroom teacher individually in the studio room and received feedback after they finished recording themselves. So this activity becomes a kind of personal counseling between the homeroom teacher and students. Apart from students being able to express their feelings to their parents, the homeroom teacher also gets the opportunity to make a personal approach to each student by getting to know their point of view towards their respective parents. Some students expressed their gratitude to their parents, apologized for the mistakes they had made, and some students even expressed their anger towards their parents.

The second activity carried out by the author took place on October 16 2023 where the author invited students to create social media content that was trending at that time, namely in the form of movements carried out together and accompanied by music and then uploaded on social media with special captions. . Even though it doesn't really have concrete educational content, if this kind of activity is carried out occasionally it can show students that the teacher or homeroom teacher has made an effort to enter the world of students who are interested in these things. During the content creation process, students talk personally to the homeroom teacher about feelings that they might not be able to express in a formal classroom or discussion setting.

The third activity was carried out on November 6 2023 where the author invited students to carry out gamification activities that could improve their character development, especially in terms of communication between students in the class. This activity is based on problems that often arise, especially in terms of differences in views and opinions which then cause internal conflicts in the class. Not all of the class members, totaling 36 students, know each of their friends' characters personally. Most of them only know a few friends who are their closest circle. This causes many communication problems, especially when it concerns classical class interests, group discussions with random group members, and other problems. Therefore, the author tries to design an activity that aims to make students get to know each other's friends' characters in the class.

The author asks students to write their own names on a large piece of paper. After that, the paper will be given to the student next to him by sliding it. Students who receive paper with that name written on it must write a sentence that describes the character of the owner of that name, based on their point of view, without writing down the identity of the writer. The papers with names on them will continue to be shifted until all names have received a total of 36 character descriptions from 36 class members. These names will be returned to their owners to read their descriptions. Students really enjoyed describing their characters from the perspectives of all their classmates, both positive and negative. This method is quite effective in forcing students to get to know each of their classmates in more detail, even friends with whom they rarely interact. Apart from that, for those who get a positive description, this will be a valuable motivation because it comes from an anonymous friend, so the assessment given tends to be objective. Finally, their self-confidence will increase in front of their classmates. For those who receive negative feedback, of course this becomes points for improvement that can be immediately

followed up because they feel uncomfortable with themselves when they find out that they are rated less well by their classmates.

In the fourth activity which was held on January 29 2024, the author gave letters written by the author himself to all students. The letter is an elaboration of the class teacher's description which was briefly included on the report card page that the student had just received at the end of the odd semester. The author describes in detail his perspective on each student, appreciation for the achievements they have made, and suggestions and input for individual student progress. Students are then asked to read the letters directly and write replies to the letters on the paper provided. The contents of their reply letters varied, ranging from expressions of their views on the author, expressions of thanks, suggestions and input, as well as expressions of their hearts about the personal problems they were facing.

The fifth activity will be held on March 5 2024, facing the end of the school year when students will move up to the next grade. The author asks students to make self-resolutions by arranging them in one corner of the class, so that they can be used as a reference for self-development during the changes of the school year to the next level. Students write not only their hopes but also their appreciation for their own achievements that have been made over the past year. They also wrote a lot of motivation for themselves to be able to overcome all obstacles and challenges they might face in the future. Then they ended with hopes and practical resolutions that they will carry out at the next level after they finish this school year.

After carrying out the five guardianship activities, the author then carried out an evaluation stage which was carried out by discussing with fellow homeroom teachers about the implementation of the program in each class. However, it was discovered that other homeroom teachers only carried out these activities using discussion and lecture methods at every opportunity. Although it was revealed that this had been adjusted to the character of the students in each class.

3.3. Final Result

From the findings above, the author tried to make open interviews with students as the final stage of this best practice, to find out the effectiveness of special class activity programs with the homeroom teacher. The author conducted open interviews or unstructured interviews with students in the class taught by the author himself as homeroom teacher, and students from other classes who did not receive similar activities as the author did with the class he taught.

Of the five students interviewed from the author's own class, they said that the special activities carried out during the guardianship session allowed them to involve themselves maximally and made them feel free to express their opinions. Saras, one of the respondents from the class taught by the author, revealed that the activity of making a video expressing his heart to his parents had succeeded in improving his relationship with his parents, who had previously seemed cold because his parents were busy working and paid little attention to Saras' development. Rakha also revealed that she really liked the letter writing session because she could freely write anything about the author or other teachers at school, which she had not dared to reveal to anyone. The content creation session was also popular with other students such as Anggi, Aisyah, and Devina because their hobby of playing social media was positively affirmed. Other students, namely Naufal and Fafa, also revealed that they enjoyed the gamification activity of describing the characters of their classmates that had been carried out, because they as class president and deputy class president felt the difference in communication patterns between their classmates who previously often had conflicts. After the session, many students who can blend in better not only with their closest circle but with all the students in the class. The self-resolution board was also revealed by students to have been able to remind them of the purpose of all the processes they underwent, because the resolution was clearly posted in one corner of the classroom which they could always read at any time. However, all five agreed in unison that the activities carried out by the

homeroom teacher had been able to increase their closeness to the teacher, especially the homeroom teacher personally, which indirectly had been able to change their personal character to become better students, especially in terms of discipline. and implementing a positive culture in schools.

Next, the author conducted interviews with four students from four different classes who did not receive similar activities. Rafael, one of the students, stated that he felt that the discussion activities carried out during the guardianship session were not much different from usual teaching and learning activities because in the end only one or two students spoke and expressed their opinions. Gea, a student from another class also said that many students were sleepy during the guardianship session because the lectures given by the homeroom teacher were mostly centered on the homeroom teacher. Nabila, a student from another class also revealed that the guardianship session activities carried out by her homeroom teacher ultimately only ended with discussions about the subjects taught by the homeroom teacher, and did not lead to character development or mentoring by the homeroom teacher. Safa from another class also mentioned that in the end the homeroom teacher only delivered important announcements regarding the school activity agenda and the guardianship session was only limited to technical discussions and coordinating the implementation of the activity agenda.

4. Conclusion

Based on the results of the implementation of best practices and discussions, it can be concluded that: 1) Special class activities with the class teacher that are effectively carried out at SMAN 1 Sentolo include Making Videos of Expressions of the Heart, Gamification of Character Development, Creating Content that is becoming a trend on Social Media, Exchanging Letters, and Making a Self-Resolution Board. This is known from the results of open interviews with several students from classes who received these activities. Students feel more able to involve themselves maximally in the interactive activities carried out by the homeroom teacher during the guardianship session. 2) Special class activities carried out by the homeroom teacher in the class he teaches have effectively improved the student character development process. This is also known from student testimonials which state that the fun activities they have carried out with the homeroom teacher increase their closeness with the homeroom teacher which in turn can change them towards a better personal character, who is more motivated to carry out a positive culture at school.

Based on the results of implementing best practices and discussions, suggestions that can be given include: 1) To be able to motivate other fellow teachers who are also homeroom teachers to be able to implement a variety of similar activities that suit the students' character, which are more interactive, so as to improve student involvement in activities, and ultimately leads to increasing students' intrinsic motivation to improve their own character. Teachers, especially homeroom teachers, must be able to increase creativity in creating activities that have a positive impact on students. 2) To hold more frequent discussions between homeroom teachers to create activities that are effective in improving student character development and easy to apply according to student character.

References

[1] Anonym, 2018. *Peran Wali Kelas dalam Membangun Karakter*. Kuanta Indonesia. Accessed on 3 June 2024. https://kuanta.id/peran-wali-kelas-dalam-membangun-karakter/

[2] Anonym, 2020. *Memaksimalkan Peran Wali Kelas dalam Pendidikan Karakter.* Kuanta Indonesia. Accessed on 3 June 2024. https://kuanta.id/memaksimalkan-peran-wali-kelas-dalam-pendidikan-karakter/

[3] Djunaidi, Nanda. 2023. *Pentingkah Peran Wali Kelas di Sekolah?* MTs Miftahul Ulum. Accessed on 3 June 2024. https://mtsmiftahululumlumajang.sch.id/pentingkah-peran-wali-kelas-di-sekolah/

[4] Rizkiandani, W. (2022) Peran Wali Kelas dalam Meningkatkan Minat. *Jurnal Pendidikan Agama.* V2i2.450.

[5] Soeharto, Dyna. 2022. *Kolaborasi Wali Kelas dan Guru Pendamping dalam Proses Pembentukan Karakter Siswa di SDIT Al Uswah B.* Guru Inovatif. Accessed on 3 June 2024.

https://guruinovatif.id/%40dynarukmiharjantisoeharto,amd/kolaborasi-wali-kelas-dan-guru-pendamping-dalam-proses-pembentukan-karakter-siswa-di-sdit-al-uswah-banyuwangi

[6] Wright, Gavin. 2022. *Best Practice.* Tech Target. Accessed on 3 June 2024. https://www.techtarget.com/searchsoftwarequality/definition/best-practice

Humanistic Approach to Early Childhood Education at TK N 2 Yogyakarta

Rahmawati Nur Alim¹*, Nelva Rolina²

¹ Department of Early Childhood Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
² Department of Early Childhood Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: nuralimrahmawaty@gmail.com

Abstract. The first development cycle, which deals with a child's early schooling, serves as the basis for all subsequent development. This makes the teachers, have to make the best use of this period to support children's development in various aspects based on the student's needs and interests which differ from one to another. In that respect, teaching early childhood education have a specific approach in order to attract the student's attention that have different characteristic in learning. Teachers should adapt as much as possible to the needs of each student to keep children motivated in learning. This paper aims to provide the insight of humanistic approach that used by preschool teacher during learning process in TK N 2 Yogyakarta. The researcher used qualitative methods and all the data were collected from observation, documentation, and interview. The result of this present study shows that the teacher in TK N 2 Yogyakarta have applied humanistic approach in learning process to support a child's interests and generate their needs without any coercion from the teacher.
Keywords: Humanistic approach, early childhood education

1. Introduction

Early childhood has a variety of learning methods that different with one to another. The students have their own needs, and their interest. In early childhood learning process, the role of the teacher is very determining in their learning activities, due to the teacher who is being a facilitator and motivator to the children. The teacher is expected can make the children learn easily and happily. The teacher also should know the potential in every students. It is obligation for the teacher to know the child's potential to make the learning process easier. Therefore, a humanistic approach is really needed in the learning process, especially in early childhood. Humanistic theory views the purpose of learning as humanizing humans. The learning process is considered successful if students understand their environment and themselves. Humanistic approach refers to the strategy of the teacher to make the students learn actively, not only acting as recipients, but also being directly involved in learning (Sarnoto & Nugroho, 2015). It believes that the successful learning of prescholers will be achieved if they have right attitudes, interest and motivation during the learning process. In addition, the main goal of the teacher is to help students in developin themselves. It is start from helping each individual to know themselves as unique human being and helping them to realize the potential within themselves (Rohmana & Rinda, 2019). Therefore, a humanistic approach in early childhood education emphasizes the holistic well-being of children and the value of early interventions to prepare children's futures based on their readability. By incorporating diverse perspectives, promoting positive relationships, and fostering a supportive learning

environment, preschool teachers can contribute significantly to the overall development and success of young children.

Another connotation associated with humanistic side, education is focused on the development of rationality, autonomy, empowerment, creativity, care and concern for humankind (Veugelers, 2011), the educational value is diminished if the learning process is not taken into account and the conditions in which learning takes place (Arifi, 2017). It means that learning activity not only in the clasroom, however it can be in everywhere as long as the students get new knowledge and growth in their own potential. Classrooms and teaching are not just a place where teachers can apply their ideas; they also represent a framework for interpreting what teachers know: when and how they should react, what information to present and how to explain them, when to correct students, how to evaluate what they have taught. Using this humanistic approach absolutely make the preschool teacher easy to make the students understand with the material because they have known the characteristic and the needs of the students. By focusing on each child's strengths and potential, this humanistic approach helps build confidence and self-worth. Consequently, a kindergarten teacher plays a crucial role in the development of young children, serving as both an educator and a guide. Their responsibilities and practices are deeply influenced by the principles of early childhood education, especially those aligned with the humanistic approach.

However, in fact, not all of the preshcool teacher realize the important of humanistic approach to the students. There are some of preschool teachers who still use teacher centre that absolutely make the students feel bored in the class. Most of the teacher particularly in kindergarten still make children as adult who are ready to study. It is because not all preschool teachers may fully realize or consciously implement the humanistic approach in their classrooms. Furthermore, this study examines the implementation of the teacher by using humanistic approach at TK N 2 Yogyakarta. Based on the researcher's hypothesis from the first observation at TK N 2 Yogyakarta, it appears that the school have begun to implement a humanistic approach due to extracurriculars program that can be chosen directly by the student. In addition, the researcher also can see that the teacher are really welcoming the students before they are going to the class. The study is focused to see how the way children study in the class. It is important to emphasise that the students in the class have their own style to study without any force. This study aims to understand how preschools children develop their own potential that different from one to another. The following questions will be addressed:

- How do the teacher implement the humanistic approach?

2. Methodology

This research was conducted using a qualitative descriptive method. Qualitative descriptive research is a problem formulation that guides research to explore or photograph the social situation that will be studied thoroughly, broadly and in depth. Bogdan and Taylor stated tha a qualitative approach is a research procedure that produces descriptive data in the form of written or spoken words from people and observed behavior (Moleong, 2009). Qualitative research methods are used to gain a deep understanding of human behavior, experiences, and the reasons that govern such behaviors. Therefore, related to this, the data collection techniques was used observation, interviews and documentations to obtain complete information about the humanistic approach at TK N 2 Yogyakarta. The data will be present in the form of words based on the person being studied (Biklen, 2003).

3. Finding and Discussion

The present study found that the teacher in TK N 2 Yogyakarta have applied the humanistic approach to the students in learning process by using several methods and also from the school's program. There are some basic humanist values developed in the school to support children's learning. These values are the value of freedom, creativity, cooperation, and self-actualization. The activities carried out in TK N 2 Yogyakarta are not all related to academic, but also through habitation and repetition practiced daily. In accordance to the previous statement, children are given the opportunity to develop their creativity and encourage their willingness to study without any coercion from teachers. In addition, children are also involved in imaginative activities such as drawing, dancing, playing musical instruments, swimming which are integrated into extracurricular programs. All of these activities are expected to make the students become happier, healthier, more knowledgeable and competence (Johnson, 2011).

a. The value of freedom

The value of this freedom is clearly seen from the way the children play and learn as well during the class. At this time, the children are able to choose what material they want to study based on their interest. Based on the observation that conduct in TK N 2 Yogyakarta, the researcher can see that the teacher used loose part media. The teacher give the freedom to the students to explore all the toys inside the class. The teacher give the freedom to the students to channel their abilities through play. Through play, children develop creativity, imagination, self-will, self-confidence, physical motor, socialemotional, and cognitive development (Casey, T., & Robertson, 2016). The teachers have provided by arranging the best environment as well as providing media made from loose parts of various kinds to attract children. As stated before children love to play and learn as desired, therefore, learning independence for children will be realized (Rianti et al., 2022). The use of loose part media can also make children think critically (Premaswari et al, 2020) find solutions of their problem, develop children's language ability (Istim et al., 2022), and activate their imagination. Theoretically, it can be conclude that the use of loose parts media is considered to provide opportunities for children to make direct contact with their environment. Direct contact that occurs between early childhood and their environment through the use of loose parts media in the learning process is believed to bring various benefits.

Based on the brief explanation above, it is in line with the data that found by the researcher during the observation. The researcher found that the freedom that give by the teacher is just to make the students stay in the class. It is also found that the students will automatically following the instruction of the teacher after they get bored to play. After playing and exploring all of the media, the students will come to the teacher and ask the task to do something. In addition, the researcher also found that during exploring time the students keep asking question to the teacher that make them even more critically. Therefore, this value of freedom makes children feel happy when they are at school and feel unburdened. It can be conclude that the goal of teaching is to encourage "selfdom" to be recognized by the teacher (Javadi & Tahmasbi, 2020)

b. The value of creativity

Creativity seems to be intuitive in young children, something they are born with (Beaty, 2016). Children is a world of creativity because they live with their imagination. The key of the creativity of preschoolers is to give a freedom. Children must be free to explore, experiment, manipulate, and pretend spontaneously. Based on the the study result, the researcher can see that the teacher give a freedom to the students in drawing and do any worksheet from the teacher. The teacher give the students the picture and ask them to colour it, however, the teacher did not give too many direction such as the instruction of its colour, the way they start to colour, etc. It is because the teacher realize that the students need the

opportunity to work out of the box on their own without any direction or interference (Beaty, 2016). The teacher just let them colour it, and give compliment to those who finish it perfectly. On the oher hand, for those who have not finish the worksheet, still trying to finish it without any coercion. The students are motivated to finish their task as they also want to get a compliment from the teacher. Therefore, the researcher can conclude that the teacher did not force the students, yet give the students compliment and keep support the students. This is make the students can increase their creativity based on their desire. Creativity is believe developed by giving children the opportunity to express thought patterns, skills and abilities that can develop optimally (Addini & Widyasari, 2022). She is also stated that with creative activities the students can develop all their skills which can explore more objects related to what children see and also through their experiences. Therefore, the humanistic approach has been fully used in TK N 2 Yogyakarta by paying attention to their freedom as individuals.

c. The value of cooperation
The value of cooperation also is one of the result finding in this study. By using humanistic approach, the teacher can teach the students basik life skill. It can be seen from the activities in the school program which is extracurricular. In this extracurricular, the students can choose what activity they want to join. There are several activities such as music instrument drumband, angklung, dancing, swimming, painting, and singing. The students can choose one of this activity based on their passion and interest. Those activities is basically train the studens to work together in a group not individually. In this approach, the teacher behaves as a facilitator while the student is in govern of their education (Bentham, 2002) the teacher just guide and following them. Through this learning approach, the learners achieve academic, personal and life experiences through sympathetic and watching the world in a holistic way. *"Anak-anak kalau lagi latihan menari atau bernyanyi sering terlihat kerja sama mereka yang kuat, seperti kalau mereka ingin cepa pulang maka mereka harus kompak agar tidak ada lagi gerakan yang salah. Kalau lagi berenang, kekompakkan anak-anak juga terlihat kalau mereka saling berbagi makanan satu sama lain"* (Guru wali kelas TK A).

Based on the interview above, it is shown that by applying this extracurricular program can increase the students sympathy and empathy that can make them more sensitive in the way of cooperation. Based on the observation, it is also demonstrate that during in a learning process using loose part media, the students tend to more cooperate and share the toys together with the friends. When the students start to share what they have, meas that the children immediately build information through their collaboration with others and through straight experience (Devries et al, 2002). Working with peers is another important part of healthy development and learning that implement by the teachers TK N 2 Yogyakarta. The teachers provide many opportunities for children to play and work together.

d. The value of self-actualization
As what stated by Abraham Maslow regarding to the hierarchy of needs, the need for self-actualization is the highest need that must be fulfilled by every individual. Self-actualization is a state in which a person can develop their skills, actualize themselves, and hone their abilities. In early childhood, the need for self-actualization can be iplemented by developing the children's talents and interests (Wiresti & Na'imah, 2020). It is also stated that a child fulfills his needs hierarchically, starting from the most basic to the highest needs (Kasmiati & Indriyani, 2021). Based on both observation and interview that conducted by the researche at TK N 2 Yogyakarta found that the teacher have stimulated the students to have self-actualization. It can be seen from the way the teacher give the activity to the students through learning by doing. Besides providing extracurricular activities to the students, the teacher also teach them to get use in learning by doing. Learning by doing is a concept of learning while doing, where children are actively involved in various activities carried out by the teacher. As what have been

explained in the previous part, the teacher at TK N 2 Yogyakarta give the freedom to the students. Therefore, they can explore as many as they want. By exploring with themselves, the students also find problem which they cannot solve, however it demands them to solve it even with repeated failed attempts. In this case, the teacher's role is to ensure that there are many opportunities for children to do something throughout the day. Children learn through experiential activities, through rhythm, routine, gratitude and beauty.

"setiap anak beda-beda, tidak semua mau melakukan kegiatan learning by doing. Ada beberapa anak yang ketika menghadapi masalah tapi menyuruh saya untuk mengatasinya dan jika mereka disuruh untuk menyelesaikannya malah pergi saja. Contohnya anak yang bermain lego. Jika bentuk lego tidak seperti yang dia mau, dia akan menyuruh saya untuk membuatkannya. Namun ada juga anak yang terus berusaha untuk bisa mencoba berbagai acam cara supaya dia bisa bikin bentuk lego yang dia mau" (Teacher).

Based on the interview with one of the teacher at TK N 2 Yogyakarta shows that not all the students have same capability for doing something. A student who does not want to learn or solve a problem in one activity, means that he has another interest that can make him think chritically. This is in line with self-actualization where the students will develop in their own way. Furthermore, basically humans are good, and have the potential to be good. Therefore, the tendency or need to actualize oneself is a selective, directed and constructive tendency (Rogers, 2012). The humanistic value of this learning while working activity is providing real experience and experience to children. So that children's knowledge and experience also develop, not only limited to knowledge but also clear understanding. Learning by doing activities basically aim to provide stimulation and real experience to children.

4. Conclusion

Based on the research finding and discussion, TK N 2 Yogyakarta in humanistic approach gives the freedom to children in exploring and developing their potential so that learning objectives can be achieved. The learning activity at TK N 2 Yogyakarta is in line with humanistic learning theory where in the learning process it prioritizes the safety and comfort of students as to develop the potential possessed by the students called humanizing humans. The learning process of children in humanistic learning theory must pay attention to students' learning styles, methods, and their interest. In the learning process at TK N 2 Yogyakarta, the teachers using four values in order to achieve the successful of humanistic approach. The value of freedom, creativity, cooperation, and selff-actualization become the main method of the teacher to use this humanistic approach in early childhood. The humanistic approach in early childhood education is centered around the belief that each child is unique and has the potential for growth and self-actualization. This approach emphasizes the importance of nurturing the whole child, including their emotional, social, cognitive, and physical development.

TK N 2 Yogyakarta have a good plan to support the holistic of the students by addressing all aspects of a child's development, including emotional, social, physical, and intellectual growth. It can be seen from the way teacher give the freedom to the students as may as they want. The teacher never force them to study, however following their desire but still give them direction. The extracurricular program also give big impact to child's development where the students can expand their potential. In addition, the school and the teacher also provide opportunities for creative expression, problem-solving, and decision-making to the children.

References

[1] Addini, S. N., & Widyasari, C. (2022). Effect of Experimental Methods on Early Children's Creativity. *Early Childhood Research Journal (ECRJ)*, *4*(1), 31–57. https://doi.org/10.23917/ecrj.v4i1.11828

[2]   Arifi, Q. (2017). Humanistic Approach in Teaching Foreign Language (from the Teacher Perspective). *European Scientific Journal, ESJ*, *13*(35), 194. https://doi.org/10.19044/esj.2017.v13n35p194

[3]   Bentham,S.   (2002).Psychology   and   Education   East   Sussex: Routledge. https://www.taylorfrancis.com/books/9781134587483.

[4]   Biklen, R. C. B. and S. K. (2003). Qualitative research for education: an introduction to theory and methods. Ally and Bacon.

[5]   Casey, T., & Robertson, J. (2016). Loose Parts Play. Inspiring Scotland.

[6]   DeVries, R., Edmiaston, R., Zan, B., & Hildebrandt, C. (2002). What is constructivist education? Education 63(5), 84-92

[7]   Istim, N., Hendratno, H., & Setyowati, S. (2022). Pengaruh Penggunaan Media Pembelajaran Loose Part Bahan Plastik terhadap Perkembangan Bahasa dan Fisik Motorik pada Anak Usia 5-6 Tahun. *Jurnal Basicedu*, *6*(5), 8572–8584. https://doi.org/10.31004/basicedu.v6i5.3793

[8]   Javadi, Y., & Tahmasbi, M. (2020). Linguistic politeness in the chinese language and culture. *Theory and Practice in Language Studies*, *10*(1), 1–9. https://doi.org/10.17507/tpls.1001.01

[9]   Johnson, J. L. R. dan J. E. (2011). Pendidikan Anak Usia Dini dalam Berbagai Pendekatan (ed 5). Prenada Media.

[10] Kasmiati, & Indriyani. (2021). Pola Kebutuhan Aktualisasi Diri pada Siswa Pendidikan Anak Usia Dini. *Jurnal Pendidikan Anak Usia Dini*, *5*(1), 97–111. https://doi.org/10.31849/paud-lectura.v4i02.8016

[11] Moleong, Lexy J. 2009. Metode Penelitian Kualitatif. Bandung: Remaja Rosdakarya

[12] Prameswari, Titana Widya, dll. (2020). STEAM Based Learning Strategies by Playing Loose Parts for the Achievement of 4C Skills in Children 4-5 Years. Efektor, 7(1), 24–34. http://ojs.unpkediri.ac.id/index.php/efektor-e

[13] Rianti, R., Nurjanah, I., Latifah, D., Alifah, N., & Asyiah, A. (2022). Freedom Learning on Early Childhood Education: Implementation of STEAM Method with Loose Parts Media. *Golden Age: Jurnal Ilmiah Tumbuh Kembang Anak Usia Dini*, *7*(2), 99–108. https://doi.org/10.14421/jga.2022.72-05

[14] Rogers, C.   (2012). On   becoming   a person. Yogyakarta: Pustaka.

[15] Rohmana, W. I. M., & Rinda, R. K. (2019). Humanism Approach in Children Education: A Look Into Humane Perspective Of Teaching English To Children. *Preschool*, *1*(1), 1–10. https://doi.org/10.18860/preschool.v1i1.8171

[16] Sarnoto, A. Z., & Nugroho, T. (2015). Dimensi Mutu Dalam Pendidikan Sekolah. *Ulumuddin*, *5*(1), 48–57. https://www.researchgate.net/publication/329914912_DIMENSI_MUTU_DALAM_PENDIDIKAN_SEKOLAH

[17] Veugelers, Wiel. (Ed.) Education and humanism: Linking autonomy and humanity. Dordrecht: Sense Publishers, 2011.

[18] Wiresti, R. D., & Na'imah, N. (2020). Aspek Perkembangan Anak : Urgensitas Ditinjau dalam Paradigma Psikologi Perkembangan Anak. *Aulad : Journal on Early Childhood*, *3*(1), 36–44. https://doi.org/10.31004/aulad.v3i1.53

Improving Numeracy Literacy Skills through the Campus Teaching Program at Clumprit Public Elementary School: Preparing the Critical Thinking Character of Citizens

Suyato*, Akmal Firmansyah2 and Muhamad Yudha3

1,2,3 Department of Civic and Legal Education, Universitas Negeri Yogyakarta, Sleman, Indonesia

*E-mail: suyato@uny.ac.id

Abstract. This article aims to analyze the impact of the Teaching Campus Program in preparing the critical thinking character of citizens starting early at the elementary school level through literacy and numeracy activities. The research was conducted at Clumprit State Elementary School. The method used was a qualitative approach using observation, interview, and documentation instruments. The results showed that the Teaching Campus Program made a significant contribution to improving the numeracy literacy skills of elementary school students to prepare citizens to have critical thinking characteristics. Teaching Campus students help students understand complex mathematical concepts and increases students' knowledge through literacy accompanied by using interactive and interesting learning methods. In addition to improving numeracy literacy skills, the Teaching Campus Program also has a positive impact on preparing citizens' skills from an early age through the cultivation of the Pancasila student profile character, one element of which is the character of critical thinking.

Keywords: Campus Teaching, Critical Thinking Character, Numeracy Literacy, Citizenship Skills, Primary School.

1. Introduction

Education has an important role in shaping a smart, skilled, and competent young generation (Usmi, & Puspitaningrum. 2022; 12-17). One important aspect of education is improving students' critical thinking skills, especially at the elementary school level. Numeracy literacy is a way to shape students' critical thinking character so that it becomes a strong foundation in mastering concepts from mathematics, natural knowledge, and social, and state insights to gain a good understanding and apply them in everyday life.

Numeracy literacy is one of the basic skills that is very important in modern life. This ability not only helps individuals in managing financial and professional aspects but also plays an important role in making better everyday decisions. In Indonesia, the challenges in teaching numeracy literacy are still significant, as seen from the results of various international surveys that show that Indonesian students' numeracy skills are still below the global average. This low level of numeracy literacy not only hinders individual progress but also has the potential to hinder the economic and social development of the nation.

Indonesia obtained the results of the Program for International Student Assessment (PISA) in Mahdi. (2022) resulting in several components of value, namely, first reading, getting a score of 371 in 2018 which is the lowest score since 2003 and puts Indonesia in 64th position out of 74 countries.

Second, the numeracy or mathematical calculation score was recorded at 379. This figure decreased compared to 2015 which amounted to 386 and was in position number 73. Third, Indonesia's science score was 396. This figure also decreased from 2015 which was ranked 403 and was in position number 71. For your information, the PISA survey is conducted every three years with a sample of 600,000 fifteen-year-old children from seventy-nine countries.

At the same time, civic education is also an important aspect of shaping student character. Citizenship skills involve an understanding of social values, the ability to actively participate in social and political life, and encourage attitudes of tolerance, justice, and cooperation in society, as well as critical thinking (Aisy. D.R., Abdillah., Amalia., & Santoso, G. 2022: 164-172). In addition, the skills that are prepared for citizens from an early age are 4C skills (communication, collaboration, critical thinking, problem-solving, and creativity) (Hambali, M., Wahyuni, L., & Rizal, M.S. 2024: 50-63), so that students can be prepared to become citizens who can compete in the 21st-century era (Suyato., Firmansyah, A., Yudha, M., & Sunarso. 2024; 453-458).

In this context, the Kampus Mengajar program, an initiative of the Indonesian Ministry of Education, Culture, Research, and Technology, comes as one of the solutions to this problem. The program sends university students to schools across Indonesia to help improve the quality of education, including numeracy literacy. With an innovative approach and direct involvement of students in the teaching process, the Teaching Campus Program is expected to make a real contribution to improving students' numeracy skills.

The Teaching Campus Program has been a proven initiative in improving critical thinking skills through numeracy literacy of elementary school students (Dwihantoro, P., Sukmasetya, P., & Anggraeni, L. D. 2023:2001-2007). The program involves university students being placed in remote schools to assist students in understanding complex mathematical concepts, improving critical thinking skills through numeracy literacy, and fostering the character of the Pancasila Student Profile through innovative and interactive learning methods.

However, it is also important to prepare students with strong citizenship skills so that they can act as active, contributing, critical thinking and responsible citizens (Dewi, D.A., & Ulfiah, Z. 2021; 499-508). Therefore, this study aims to analyze the impact of the Teaching Campus Program in improving the critical thinking skills of elementary school students through literacy and numeracy in the teaching campus program.

In this article, the results of research conducted at Clumprit State Elementary School will be discussed. The research method used is a qualitative approach using observation and interview instruments. The results of this study are expected to provide a better understanding of the contribution of the Teaching Campus Program in improving the critical thinking skills of elementary school students, as an effort to prepare citizenship skills from an early age.

With a more holistic understanding, strong numeracy literacy is the foundation for the development of critical thinking skills. Critical thinking skills are essential in forming citizens who can face various challenges and problems in daily life rationally and effectively. Thus, strengthening numeracy literacy through the Teaching Campus Program will not only improve students' numeracy skills but will also prepare them to become critical-thinking citizens.

Based on the problems that occur, there are several issues to be studied, namely: first, how can the Teaching Campus program improve literacy and numeracy for elementary school students? Second, how can the Teaching Campus program contribute to shaping the character of critical thinking in elementary school students?

This study aims to identify the effectiveness of the Teaching Campus Program in improving students' numeracy literacy and explain the contribution of the program in preparing the critical thinking character of citizens. By understanding the impact of this program, it is expected to provide deeper insights into effective educational strategies in the Indonesian context and provide recommendations for future program improvements.

This research is important because it offers a new perspective on the role of university students in improving the quality of basic education through the Teaching Campus Program. In addition, this study

also contributes to the literature on education and critical thinking skills development in Indonesia. The results of this study are expected to serve as a reference for policy makers, educators, and researchers to improve numeracy literacy and critical thinking skills among students. It is hoped that this article can provide new insights for teachers or educators, education policy makers, parents, and researchers interested in the development of character education at the primary level.

2. Methods

This research uses qualitative methods. Qualitative methods will assist researchers in explaining complex phenomena (Sugiyono. 2020:15). In this case phenomena under investigation are students' experiences, perceptions, and understandings related to the development of literacy and numeracy skills to prepare citizenship skills through the Teaching Campus Program. The subjects of this research are students of Clumprit State Elementary School. The research participants will be selected by purposive sampling based on certain criteria, such as the level of initial numeracy literacy skills and socio-economic background. Data ware collected to this study uses observation, interview, and documentation techniques.

The data obtained be analyzed using qualitative analysis methods, such as thematic analysis. Thematic analysis will involve coding and categorizing the data, as well as identifying the main themes that emerged from the interviews, observations, and document analysis. These themes will be used to answer the research questions and understand the influence of the Teaching Campus Experience on critical thinking skills through numeracy literacy activities in preparing citizens' critical thinking skills from primary school age. To ensure data validity and trustworthiness, measures such as data triangulation (use of multiple data sources), member-checking (verifying findings with participants), and independent analysis (other researchers analyzing the same data). This research useed to the privacy and confidentiality rights of participants are protected. Written consent will be obtained from the parents of the students before involving them in the study. Participation in this study is voluntary.

3. Results and Discussion

Before this program was implemented, we collected some data from our findings at school. First, the results of observations, before the implementation of the Teaching Campus program at Clumprit State Elementary School, the condition of students' numeracy literacy skills was still very minimal, this was evident from the fact that there were still some students who still had difficulty reading, and still had difficulty understanding mathematical concepts, then when the Teaching Campus program was implemented, there were changes in the condition of students' skills, who initially had difficulty reading, had begun to read fluently, so that the number of students who were still not fluent in reading had decreased. In addition, there are also changes in numeracy skills, students can easily understand math concepts with interactive and fun learning methods from the Teaching Campus activities, so that these skills can support the development of potential citizenship skills from students.

Second, the results of interviews with the Principal, class teachers, students, and representatives of students' parents produced the following data, namely: (1). Information from the Principal of SD Negeri Clumprit, namely Mrs. Sri Wartini, S.Pd., SD. She stated that the condition of students is very diverse in terms of character and potential. There are students who are active and accomplished, and there are also students who have difficulty following learning, so that these students experience problems in reading and counting mathematics, this has been assisted by teachers through intensive tutoring programs, but there is still no change.

In line with the information we got from the class teacher, Mrs. Rahayu Mulyaning Sari, S.Pd., M.Pd. as a fifth grade teacher, she stated that students who are still constrained in reading and have difficulty understanding mathematics have been given special attention from the school, because in addition to being stuck in learning, these students also have emotional character differences that are very different from others, so that they often fight with their fellow friends while learning, therefore we want to ask for help from the Teaching Campus students so that they can collaborate to help solve the problems that exist in our students.

Data verification we get from interviews with students, namely with the initials D.M.I. provides information that, in his class there are friends who still have difficulty reading, have difficulty understanding mathematics because they have not memorized multiplication, and are emotionally different from others. Then we tried to find more background information on why these students were still experiencing problems in learning, we tried to interview several representatives of parents whose children still had difficulty reading, still had difficulty understanding learning math, and students with emotional differences. It was found that some parents recognized the lack of learning assistance and guidance at home due to economic factors and family education, so students were only left to teachers at school in the learning process.

Third, the third stage we tried to see the school's education report card documentation data, obtained data that there was still a lack of literacy and numeracy skills, then there was still bullying behavior by students, a lack of learning media facilities, and a lack of reading material sources for students. From the three stages of the data collection process, we try to provide innovation and assistance to find solutions to problems that exist in schools by providing assistance, training, and teaching in the Teaching Campus program which has several programs, one of which is a program to improve literacy skills, numeracy skills, instill Pancasila Profile characters that aim to prepare students' critical thinking skills.

After the Teaching Campus program was completed, we collected data again to find the progress and success rate of this program. There are several data that we found. First, in learning activities after the implementation of the Teaching Campus program, there are significant differences, namely students who were originally still difficult to read and understand mathematics began to be able to read smoothly, and have begun to understand basic mathematical concepts well. In addition, there are changes in the character of students, starting to apply the character of the Pancasila Student Profile which is the foundation of the character of Indonesian citizenship.

Second, we interviewed the Principal, class teachers, student representatives, and parent representatives, there were testimonies of good responses from the results of the Teaching Campus activities that had an impact on improving students' literacy and numeracy skills, as well as the character of SD Negeri Clumprit students.

Third, the results of the Mid-Semester Assessment (PTS) and End of Semester Assessment (PAS) have a very satisfactory score graph. This is an indicator that students have improved literacy and numeracy skills. Then during the Minimum Competency Assessment (AKM) trial on the theme of character survey, there was a better development of student character, and the cultivation of the Pancasila Student Profile character.

The findings of the research can be explained in several main themes that emerged from the data analysis. First, students' perceptions of the Teaching Campus Program. In interviews with students, it was found that they generally have a positive perception of the Teaching Campus Program. They reported that the program gave them the opportunity to learn from more experienced students. They also felt that the program helped them increase their confidence and motivation in learning numeracy literacy.

Second, the development of critical thinking skills through literacy and numeracy activities. The data from this study revealed that through the Teaching Campus Program, they had experienced improvements in critical thinking skills through numeracy literacy activities. They reported that they can better understand mathematical concepts, apply mathematical knowledge in daily life, and have better problem-solving skills. Some students also reported improvements in their ability to memorize and use mathematical formulas.

The Teaching Campus program has the potential to improve critical thinking skills through numeracy literacy activities and the cultivation of other citizenship skills for primary school students. Through an approach that uses university students as teachers, the program succeeds in creating an interesting learning environment for students, so that they are more motivated in learning mathematics and eager to find out knowledge through literacy resources provided by the school and from other sources.

The results of improving students' critical thinking skills through numeracy literacy activities also showed that the intervention in this program was effective in improving students' understanding of mathematics concepts and literacy knowledge. In interviews, students reported that the student teachers were able to explain in a way that was easy to understand and provide relevant real-life examples to help students' understanding. Here are figure of the literacy and numeracy activities.

Figure 1: Literacy and Numeracy learning activities

Third, the development of citizenship skills. In addition to improving numeracy literacy skills, the Teaching Campus Program also has a positive impact on the development of students' citizenship skills. Research participants revealed that they felt more concerned about the surrounding environment, better understood their rights and obligations as citizens, and were more active in community participation, such as social activities and mutual cooperation.

Through this program, students are taught civic values, such as not committing acts of bullying, respecting fellow friends, playing an active role in learning, and increasing interest in participating in competitions as a form of fighting for and defending school achievements, a reflection of the basic concept of state defense. This is important in shaping the character of students as responsible and superior citizens. Here are photos of students who won the science olympiad, drawing, and pantomime competitions:

Figure 2. Students winning the competition

Fourth, the supporting factors of the Teaching Campus program. In this study, several supporting factors were identified as playing a role in the success of the Teaching Campus program. These factors include the quality of training received by students, good cooperation between students and teaching students, and support from schools and students' families.

In addition, good cooperation between teaching students and students also plays a role in creating a positive learning environment. Support from schools and students' families is also important in maintaining the continuity of the program and expanding its benefits.

Overall, the results of this study show that the Teaching Campus Program can be an effective intervention in improving the numeracy and civic literacy skills of primary school students. These results can be used as a basis to recommend the development of similar programs at the primary school level and strengthen the role of education in shaping students into active and numerically skilled citizens.

4. Conclusions

The Teaching Campus Program has great potential in improving the numeracy literacy skills of elementary school students, as well as preparing them with citizenship skills that are useful for students in social life. In this study, the author explains that the Teaching Campus Program is a program in which students from higher education teach as volunteer teachers in schools in rural or remote areas. The program aims to improve the quality of education in the area and provide opportunities for students to develop their teaching skills.

In the study, data were collected from a number of elementary school students who participated in the Teaching Campus Program. The results of the data analysis showed that after participating in this program, there was a significant improvement in students' numeracy literacy skills. They showed better ability in understanding mathematical concepts, using appropriate arithmetic operations, and solving mathematical problems critically.

In addition, this study also shows that through the Teaching Campus Program, students are also equipped with important citizenship skills. They form a better understanding of civic values, such as mutual respect, cooperation, and appreciation of diversity. They are also more aware of their rights and obligations as responsible citizens.

In conclusion, the Teaching Campus Program has a significant impact on improving the numeracy literacy skills of primary school students. Through this program, students not only gain better mathematical knowledge but also important citizenship skills. This suggests that teaching approaches involving student volunteers can be an effective and innovative solution to improving education in rural or remote areas.

It is hoped that the results of this study can serve as a basis for further developing the Teaching Campus Program and implementing it in other areas. Thus, more primary school students can benefit from this program and improve their numeracy and literacy skills, as well as prepare them with important citizenship skills for their future and nation-building.

References

[1] Aisy. D.R., Abdillah., Amalia., & Santoso, G. 2022. *Pentingnya Pendidikan Kewarganegaraan dalam membangun jiwa kebangsaan bagi generasi muda milenial. JPT: Jurnal Pendidikan Transformatif. Vol*. 01. No. 03. Halaman 164-172. DOI: https://doi.org/10.9000/jpt.v1i3.421

[2] Dewi, D.A., & Ulfiah, Z. 2021. *Peranan Pendidikan Kewarganegaraan terhadap Pembangunan karakter bangsa. Jurnal Pendidikan Kewarganegaraan Undiksha. Vol*. 09. No. 02. Halaman 409-506. DOI: https://doi.org/10.23887/jpku.v9i2.34152

[3] Dwihantoro, P., Sukmasetya, P., & Anggraeni, L. D. 2023. *Membangun Pondasi Pendidikan: Upaya Meningkatkan Literasi dan Numerasi di SD Negeri Purborejo,Temanggung. Madaniya*, *Vol*. 04. No. 04. Halaman 2001-2007. DOI: https://doi.org/10.53696/27214834.681

[4] Hambali, M., Wahyuni, L., & Rizal, M.S. (2024). *Students' critical thinking process in competition scientific works. Waskita: Jurnal Pendidikan Nilai dan Pembangunan Karakter. Vol*. 08. No. 01. 50-63. DOI: https://doi.org/10.21776/ub.waskita.2024.008.01.4

[5] Mahdi, M.I. 2022. *Kompetensi siswa di Indonesia masih rendah*. Dapat diakses melalui link https://dataindonesia.id/pendidikan/detail/kompetensi-siswa-di-indonesia-masih-rendah. Diakses pada tanggal 10 Mei 2024, pukul 20.00 WIB.

[6] Sugiyono. 2020. *Metode penelitian kualitatif untuk penelitian yang bersifat: eksploratif, enterpretif, interaktif, dan konstruktif*. Bandung: Alfabeta.

[7] Suyato., Firmansyah, A., Yudha, M., & Sunarso. (2024). *Preparing global citizenship: curriculum analysis of Olifant Primary School International Yogyakarta Spesial Region*. In The 11ᵗʰ International Conference on Education Research and Innovation. 453-458. https://iceri.uny.ac.id/download

[8] Usmi, R., & Puspitaningrum, A. 2022. *Kajian pendidikan kewarganegaraan abad ke-21 untuk membentuk kecerdasan kewarganegaraan yang berkeadaban publik. Jurnal Citizenship: Media Publikasi Pendidikan Pancasila dan Kewarganegaraan. Vol*. 05. No. 01. Tahun 2022. Halaman 12-17. DOI: http://dx.doi.org/10.12928/citizenship.v5i2.23345

Peace Education in Montessori Preschool

Syefriani Darnis*

[1] Department of Early Childhood, Trilogi University, Jakarta, Indonesia

E-mail: ipung@trilogi.ac.id

Abstract. Peace education needs to be introduced to students, because of the increasing number of bullying in educational institutions. It is hoped that peace education given from an early age can prevent the amount of bullying violence that occurs. The researcher used a field research and a qualitative approach because the research question was related to the potential implications of Montessori education on subjective conditions of peace. Researchers conducted semi-structured interviews with teachers at Kalyca Azzahra Islamic Montessori Preschool Depok, West java. The results of this research conclude that there are four key aspects identified as contributing to the creation of subjective conditions for peace, namely, the Montessori curriculum, the role of the school environment, teacher-student relationships, and experiences in nature, discussed in the context of relevant literature on peace and Montessori education. Montessori Peace Education in Early Childhood Education Institutions has tremendous potential to contribute to preventing violence that occurs as a result of bullying.
        Keywords : Montessori, Peace Education, Early Childhood

1. Introduction

The Indonesian Child Protection Commission revealed that around 3,800 cases of bullying in Indonesia throughout 2023(KPAI, 2023). Almost half occurred in educational institutions including Islamic boarding schools. Bullying involves repeated hurtful actions between peers where an imbalance of power exists(Hallgren, 2021). Bullying itself is a hostile act carried out by one person or a group of people with the aim of frightening or hurting other people(O.Brien, 2019). It was found that children who were victims of bullying had lower self-esteem, and seeing themselves in a negative light became a number of problems, being more anxious, popular, and less happy than children who were never bullied. In the guidelines issued by UNICEF in *Emerging Practices in Design, Monitoring, and Evaluation for Education for Peace building* regarding peace education, it is proposed that education can be used to promote tolerance and understanding of 'others', or people who are considered inherently different from oneself. Strong peace education programs address these issues of beliefs, attitudes, and values and teach older students conflict management skills and theories. This research will present an alternative Montessori approach to peace education. Maria Montessori believed that preventing conflict was a political task. Building peace is the work of education (Maria Montessori, 2012). According to Montessori, there are two goals of education. It should support the child's growth and development as an individual and contribute to the creation of global societal peace (London Montessori Center, 1996). Montessori saw society as consisting of individuals working together for a common goal. Therefore, the only possible basis for peace lies within each individual. The only way to create positive peace is to restructure society, starting with children.

2. Peace Education in Montessori Classroom

The Montessori education system reflects a vision of a peaceful global society and consists of pedagogical methods with curriculum guidelines, environmental materials, and student-teacher relationships. He observed how children interacted with each other and their environment and took his observations systematically and methodically, and then developed an educational system based on his findings. The system contains not only pedagogical methods, but also a truly global vision aimed at creating a peace-loving society.

2.1 Cosmic Education

Cosmic Education is the philosophical foundation of Montessori (Fresco, 2019). At its core, cosmic education tells the story of the interconnectedness of all things. It describes the role of education as comprehensive, holistic and purposeful; encompasses the full development of humanity in the context of the universe(Schonleber, 2021). It also introduces the possibility that humanity may have a "cosmic duty", to make the world better for future generations. Montessori believed that Cosmic Education was essential to early education because it provided children with a framework for understanding their world and their place in it(Branch, 2017). Children learn to appreciate the lessons of the past, develop an understanding of ethics, and appreciate the contributions of others. In this way, Cosmic Education teaches children to realize the interdependence of all things, in the sense of the word that something happens because it has a purpose and develops a sense of gratitude that arises from that awareness.

Montessori believed that children who received a Cosmic Education in childhood were better prepared to enter adolescence as independent, socially responsible, and emotionally intelligent individuals(Maria Montessori, 1992). This is because Cosmic Education brings children into the world with a practiced understanding of who they are as individuals, as members of humanity, and as citizens of the universe. It also gives children a deep understanding of their moral responsibility to address global issues affecting humanity and the environment. That the world is a place with a purpose; and that war, poverty and injustice, are a deviation from that goal. It was here that Montessori believed that Cosmic Education was a way to restore harmony and order, and thereby enable humanity to realize their true potential. Giving children a cosmic education means offering children a choice, giving them the opportunity to pursue what interests them. Montessori empowers students with the knowledge to change the world. As he stated, Children are the hope and promise for humanity(Maria Montessori, 2012).

2.2 Normalization Process

The ultimate goal of Montessori education is for children to experience "normalization", namely when children can live in harmony and balance with their surrounding environment, becoming world citizens who create peace (peace maker) (Hunter et al., 2020). The term normalization is characteristic of Montessori and in many ways is synonymous with the modern term meaning "socialization" (M Montessori et al., 2017). This can be described as a process that a child goes through successively on his way to maturity. In the first stage from birth to three years, children need experiences that will satisfy their biological, emotional and intellectual needs (Mahan, 2018). Good experiences in these early years will ensure that the child is able to form, through his experiences of attachment to his mother, a good relationship later in life and will be ready for the widening of his environment that school brings.

2.3 Environment

The process of normalization is continued by the teacher at school, in the structured and prepared environment. Montessori classified children into two types "the strong" and "the weak". Strong children are defined as those who have developed the ability to 'resist and overcome the obstacles they encounter' and weak children are those 'who succumb to adverse conditions'. Montessori makes strong remedial suggestions under the heading 'normalization through work'. First, children must be

given freedom in a structured environment. This freedom is important because natural developmental tasks will proceed according to the behavioral patterns that should occur at certain ages of the child. Second, Once the child has completed the task, he will learn to understand and learn the importance of the power of concentration. The more tasks he completes, the more his intelligence develops and he becomes more disciplined and accustomed to the conditions. Third, the teacher is given a set of criteria by which he can judge the extent to which the child has successfully passed this initial formative period. These characteristics, which are manifested in children's behavior such as non-possessiveness, obedience, the power to act from real choice, attachment in reality, love of silence and working alone, love of work, love of order, independence and initiative, self- discipline, joy, and cooperation with peers(Mestanza et al., 2021).

3. Research Methodology

This research investigates the potential of the Montessori system of education to create subjective conditions for peace that must exist within the individual before objective conditions for peace can exist in society. Before discussing the methodology and presenting the findings, we will provide context for the data with a brief description of Montessori education. The researcher used a field research and a qualitative approach because the research question was related to the potential implications of Montessori education on subjective conditions of peace.

The main research includes ten semi-structured interviews conducted with five Montessori teachers at Kalyca Azzahra Islamic Montessori Preschool located in Depok, West Java, from January to March 2024. The five Montessori teachers have received training on philosophy and use of Montessori apparatus. in the Montessori method. A Qualitative Approach is the best way to answer research questions about teachers' understanding of the Montessori system as a way to educate for peace, and the way these teachers interpret Maria Montessori's ideas about education as a foundation for peace and embody them in their classrooms. From the results of the interviews, researchers identified four key aspects of the Montessori system: the Montessori curriculum, the school environment, teacher-student relationships, and experiences in nature, to lay the foundation for a peaceful society in a child as an individual.

4. Main Discussion

Researchers analyzed each of the four key aspects of the Montessori system: Montessori curriculum, school environment, teacher-student relationships, and experiences in nature, to lay the foundation for a peaceful society in a child as an individual. Montessori education has the potential to help create positive conditions for peace. Montessori education contributes to this goal by developing attitudes and worldviews in children that include both a loving imagination and an understanding of how to build peace and loving institutions.

4.1 The Montessori Curriculum

The Montessori curriculum is an innovative learning framework that combines specific learning outcomes and knowledge skills that are aligned with children's developmental needs and interests, where cosmic education is the philosophical basis (Raimondo, 2018). Montessori believed that Cosmic Education was essential to early education because it provided children with a framework for understanding their world and their place in it. Children learn to appreciate the lessons of the past, develop an understanding of ethics, and appreciate the contributions of others(Signorello, 2017). Montessori provides a learning environment supported by real learning media. Montessori designed its basic curriculum so that it could be used appropriately and effectively, in a structured environment. In the Montessori classroom, Cosmic Education forms a platform for teaching children to understand and adapt to their environment. In the early six years of development, Cosmic Education introduces children to nature through experiences with nature and sensory learning materials. These experiences teach children to refine their senses, and thus the way they process and understand their world. These skills help children develop, and become confident with themselves, their surroundings, and their world as a

whole. Montessori believed that children who received a Cosmic Education in childhood were better prepared to enter adolescence as independent, socially responsible, and emotionally intelligent individuals (Holland, 2016). This is because Cosmic Education brings children into the world with a practiced understanding of who they are as individuals, as members of humanity, and as citizens of the universe. It also gives children a deep understanding of their moral responsibility to address global issues affecting humanity and the environment. That the world is a place with a purpose; and that war, poverty and injustice, are a deviation from that goal. It was here that Montessori believed that Cosmic Education was a way to restore harmony and order, and thereby enable humanity to realize their true potential.

4.2 The Environment

One of the factors that contributes to the success of Montessori education is the availability of a learning environment that has been prepared carefully, in detail and adapted to the child's size (Murphy-Ryan, 2017). Montessori stated that children absorb everything through their senses. A well-prepared, child-centered environment is a sensory environment that reflects beauty, simplicity, and order. This prepared environment provides a calm, neutral, serene backdrop that encourages and supports learning. The goal of the environment prepared in a Montessori classroom is to make children feel comfortable and safe. It also teaches them that a prepared and organized environment saves time and helps them learn. A prepared environment also frees children to focus during the learning period by keeping the environment free of chaos and distractions(Hands et al., 2016). In organizing a Montessori learning environment, there are four things that need to be considered, namely; Arrangement of the visible physical environment, Arrangement of an aesthetic environment or fulfilling elements of beauty, Arrangement of the intellectual environment, Arrangement of the environment for children's social and emotional development. Montessori classes combine all age groups from 3 to 6 years in one class(Mavric, 2020). This is known as vertical grouping (Cossentino, 2017). Another most basic thing about this grouping is that Montessori sees that children's abilities are not seen from their age group but from their individual abilities. In this wider age range, children have many opportunities to learn to care for others and have the experience of being cared for in the sense of the word. Older children are given the opportunity to look after and guide younger children and younger children learn to adapt. and respect older children (Lide, 2018).

4.3 Teacher – Student Relationship

Montessori teachers are not the center of attention in the classroom(Saylor et al., 2018). Their role centers on preparing and organizing learning materials to meet the needs and interests of Montessori children(Gutek & Gutek, 2020). The focus is on children's learning, not on teachers' teaching(Jeong, 2020). A Montessori teacher is a child advocate in the deepest sense who respects the child's entire being. Because Montessori education is based on the child's inner motivation, the teacher's role is to work with this motivation in a way that will enhance the child's self-creation process(Scott & Myers, 2021). Montessori teachers do this through the power of carefully trained observation and through knowledge of what the child really needs. Teachers in Montessori classes try to "follow the child" which is one of the principles in the learning process (Ahlquist & Gynther, 2020). However, with careful observation and planning, Montessori teachers remain ever aware of the direction each student is headed and actively work to help them succeed.

4.4 Experiences in nature

One of the principles of structuring the physical environment in Montessori is access to gardens or open air (Kovačić, 2017). Montessori believed in children having a lot of goal-directed physical activity. This requires the child to have ready access to open air. Nature is the greatest source of learning in children's world (Bertolino & Filippa, 2021). Montessori strongly supports these physical activities directed at plants and animals. Not only is access to open air important for physical development, but also for psychological development. Montessori saw children's joy in exploring and handling things in nature.

Man has created great joy in social life, but nevertheless he still belongs to nature which is necessary for him both for the development of his body and his soul(Davies, 2019).

5. Conclusion

This research has explored the potential of the Montessori education system for peace. Analysis of primary data collected during fieldwork, as well as the writings of Maria Montessori and those who continued her work shows that the Montessori system has the potential to contribute to peace by creating the subjectivity necessary in today's conditions. Reviewing the literature on peace education shows that there is a lack of attention to peace education, which creates a school environment for children that is less safe and comfortable, which can lead to bullying violence against them. Peace education in Montessori makes children individuals who are full of compassion, empathy, and tolerance as the basis needed to build a sense of security and peace. The Cosmic Education Curriculum, combined with individual methods for demonstrating and cultivating students' respect for life and a sense of connectedness to others, is an important part of the system and contributes to the subjective condition of peace that makes Montessori effective not only as a schooling method but also prepares children for higher education and employment later in life. Children are prepared to contribute to the improvement of a global society that is increasingly torn by violence. The Montessori system creates an environment that nurtures and utilizes these qualities in individuals, so that they can become creators of sustainable institutions of peace in their communities, countries, and the world.

References

[1]   Ahlquist, E. M. T., & Gynther, P. (2020). Teaching in the Montessori Classroom: Investigating Variation Theory and Embodiment as a Foundation of Teachers' Development. *Journal of Montessori Research*. https://eric.ed.gov/?id=EJ1254028

[2]   Bertolino, F., & Filippa, M. (2021). The Pedagogy of Nature according to Maria Montessori. *Ricerche Di Pedagogia e Didattica. Journal of …*. https://rpd.unibo.it/article/view/12192

[3]   Branch, J. A. (2017). *Uncovering meaning in Montessori teachers' lived experiences of cosmic education as a tool for social justice*. scholarworks.sfasu.edu. https://scholarworks.sfasu.edu/etds/70/

[4]   Cossentino, J. (2017). Montessori ideology and practice in teacher education. *An Arena for Educational Ideologies: Current …*. https://books.google.com/books?hl=en%5C&lr=%5C&id=_0glDwAAQBAJ%5C&oi=fnd%5C&pg=PA45%5C&dq=research+of+montessori%5C&ots=Q-FOS8v4EX%5C&sig=EFTjk5xl5loINr2HYcK7YShjbXU

[5]   Davies, S. (2019). *The Montessori Toddler: A Parent's Guide to Raising a Curious and Responsible Human Being*. Workman Publishing.

[6]   Fresco, G. H. (2019). The "Cosmic" Task of the Youngest Children - Direct, Anticipate or Respect. *Montessori Research and Education : University of Stokholm*, *2*(1), 1–12. https://doi.org/DOI: http://doi.org/10.16993/jmre.10

[7]   Gutek, G. L., & Gutek, P. A. (2020). A Quartet of American Montessori Directresses. *America's Early Montessorians*. https://doi.org/10.1007/978-3-030-54835-3_1

[8]   Hallgren, H. K. & M. (2021). Bullying at school and mental health problems among adolescents: a repeated cross-sectional study. *Child and Adolescent Psychiatry and Mental Health*, *15*(74).

[9]   Hands, P. S., Sethi, R., & Engram, R. (2016). Montessori in a Soka-Inspired Early Education Environment. *12th Annual Soka Education …*. https://ikedalibrary.soka.edu/Soka_Edu_Conf_2016.pdf#page=248

[10]   Holland, W. (2016). Maria Montessori (1870–1952): Scientific pedagogy. *Early Years Pioneers in Context*. https://doi.org/10.4324/9781315747026-8/maria-montessori-1870%E2%80%931952-wendy-holland

[11]   Hunter, P. V, Thorpe, L., Hounjet, C., & ... (2020). Using Normalization Process Theory to evaluate the implementation of Montessori-based volunteer visits within a Canadian long-term care home. *The …*. https://doi.org/10.1093/geront/gny103/31958834/gny103

[12]   Jeong, J. (2020). *An Exploration of the Experience of Teachers in Facilitating Meta-Learning Among Students in Christian Montessori Schools*. search.proquest.com. https://search.proquest.com/openview/aa958644cb025116632999af7670609c/1?pq-origsite=gscholar%5C&cbl=51922%5C&diss=y

[13]   Kovačić, M. (2017). *Maria Montessori*. repozitorij.ufzg.unizg.hr. https://repozitorij.ufzg.unizg.hr/islandora/object/ufzg:365

[14]   KPAI. (2023). *https://www.kpai.go.id/publikasi/rakornas-dan-ekspose-kpai-2023-membangun-indonesia-bebas-kekerasan-terhadap-anak*.

[15]   Lide, A. (2018). Montessori Education: What Is Its Relationship with the Emerging Worldview? *Journal of Conscious*

Evolution. https://digitalcommons.ciis.edu/cejournal/vol8/iss8/5/

[16] London Montessori Center. (1996). *Montessori Philosophy* (No. 1; Module).

[17] Mahan, K. A. (2018). *The Impact of Grace and Courtesy Instruction and Modeling on the Normalization of a Montessori Primary Classroom*. sophia.stkate.edu. https://sophia.stkate.edu/maed/282/

[18] Mavric, M. (2020). The Montessori Approach as a Model of Personalized Instruction. *Journal of Montessori Research*, *6*(2), 3.

[19] Mestanza, J. E. G., Soto, E. E. O., & Navas, C. D. H. (2021). Aplicación del método Montessori: caso de una escuela de Educación General Básica. *Opuntia Brava*. https://opuntiabrava.ult.edu.cu/index.php/opuntiabrava/article/view/1279

[20] Montessori, M, Hunt, J. M. V, & Valsiner, J. (2017). *The montessori method*. taylorfrancis.com. https://doi.org/10.4324/9781315133225

[21] Montessori, Maria. (1992). *Education and Peace* (English Ed). ABC-Clio Inc.

[22] Montessori, Maria. (2012). *The Absorbent Mind* (Paperback). www.bnpublishing.com.

[23] Murphy-Ryan, M. (2017). Helping Children with Attentional Challenges in a Montessori Classroom: The Role of the Physician. *NAMTA Journal*. https://eric.ed.gov/?id=EJ1144543

[24] O.Brien, N. (2019). Understanding Alternative Bullying Perspectives Through Research Engagement With Young People. *Frontier Psychology*, *10*(August). https://doi.org/https://doi.org/10.3389/fpsyg.2019.01984

[25] Raimondo, R. (2018). Cosmic Education in Maria Montessori: Arts and Sciences as resources for human development. *Studi Sulla Formazione*. https://www.torrossa.com/gs/resourceProxy?an=4461415%5C&publisher=FF3888#page=231

[26] Saylor, L. L., McKenzine, G. K., & Sacco, C. C. (2018). Teacher-Centered Mentorship as Meaningful Professional Montessori Development. *Journal of Montessori Research*. https://eric.ed.gov/?id=EJ1197440

[27] Schonleber, N. (2021). Using the Cosmic Curriculum of Dr . Montessori Toward the Development of a Place-Based Indigenous Science Program. *Journal of Montessori Research*, *7*(2), 1–12.

[28] Scott, C. M., & Myers, B. M. (2021). Montessori Education: Teacher Perceptions of Challenges in Transitioning to Virtual Instruction. *Journal of Montessori Research*. https://eric.ed.gov/?id=EJ1325412

[29] Signorello, A. V. (2017). *The Montessori system as education for peace*. t.library2.smu.ca. https://t.library2.smu.ca/handle/01/26941

Teacher Strategies to Improve Literacy in High School Chemistry Learning Based on Scientific Issues Using the MERDEKA Flow

Yuni Hartati Eliya Rosa[1*], Resty Utami[2], Yuninda Adumiranti[3]

[1,2,3] Magister of Chemistry Education, Yogyakarta University State, Yogyakarta, Indonesia

*E-mail: yunihartati.2023@student.uny.ac.id

Abstract. Schools have a major role to help students improve their literacy abilities and skills so that they are able to compete and face in a global life. The purpose of this study is to find out how teachers' strategies in improving literacy in chemistry learning and also provide 21st century (6C) skills (*Character*, *citizenship*, *critical thinking*, *creativity*, *collaboration*, and *communication* (communication) to students. Types of Research Used in Literature Studies. The data source used in the study is in the form of secondary data with a literature review data collection method. The data analysis technique is qualitatively descriptive. The results of the research showed that students' chemical literacy skills were still low and teachers had not presented problem-based learning using SSI. So that the Independent Flow is a way that teachers can use to improve students' chemical literacy and provide 6 skills in the 21st century by applying the steps that the Independent Learning Flow is used, including: 1) starting from oneself, 2) concept exploration, 3) collaboration space, 4) contextual demonstration, 5) elaboration of understanding, 6) connection between materials, and 7) real action.
Keywords: Chemical literacy; SSI; MERDEKA.

1. Introduction

Literacy is the most important part and also the foundation of a person's breadth of insight and knowledge. Along with the development of time, the progress of science and technology has developed very rapidly. With such rapid changes, this is the basis for the change in the quality of life of a person in society. According to Montoya (2018) literacy is an ability that a person has to identify, understand, interpret, create, communicate and calculate, using printed and written materials that are associated with various contexts. This leads individuals to recognize themselves well in making decisions needed by the population in a constructive, reflective manner [1]

Schools have a major role to help students improve their literacy abilities and skills so that they are able to compete and face in a global life. Scientifically literate citizens recognize the nature of knowledge, the limitations of scientific inquiry, the need for sufficient evidence and knowledge to increase proportionality and also its impact on social, political, environmental, economic and technological [2].

Chemistry is included in one of the most important branches of science in life. Chemistry makes a great contribution and relevance in life [3]. Chemistry includes macroscopic, submicroscopic, and symbolic learning [4]. Students who already have literacy skills and understand chemical concepts in their lives can provide good relationships in dealing with various fields. For example, in the field of Health and the environment, if students have good science literacy skills in buying food, the students

will consider the quality of nutrition, its impact and the price. Not only that, with students who have good liturgy skills, they also have creative and innovative thinking, which is the goal of skills that students must have in the 21st century [5]

In terms of science literacy skills, students in Indonesia are ranked 71 out of 79 participating countries [6]. Based on the results of the study [7], the chemical literacy ability of State High School students in Yogyakarta on chemical bonding materials is still very low. Research (Primaastuti & Atun, 2018) states that the average science literacy of students is in the low category on the topic of equilibrium chemistry [8]. This shows that science literacy skills in Indonesia are still low, while in 2045 Indonesia will reach a golden Indonesia. One of them is Indonesia's vision 2045 is human development and mastery of science and technology so that it can improve the quality of a nation's progress [9]. So that Indonesia needs a quality next generation of the nation. Therefore, to be able to improve student literacy, a teacher strategy is needed in learning, which is based on socio-scientific issues (SSI).

Socio-scientific issues (SSI) are problems that are still under debate, dialogue and discussion, but on the other hand have an additional meaning that requires moral reasoning or evaluation of the problem with ethics in making a decision to solve the problem [10]. SSI in learning cannot be solved by cause-and-effect reasoning alone. However, it requires reasoning to think critically because SSI is multidegenerative in decision-making such as environmental, social, and scientific perspectives and connects with life in the present, and the future [11]. SSI provides a challenge to students in critical thinking and self-efficacy as well as achievements. So that if included in learning, it can increase the attraction and interest of students in learning because the material made is more relevant to life and is often found in life.

One of the learning flows that can be used to face problems in improving literacy in student learning is using the MERDEKA flow which consists of M (self-starting), E (concept exploration), R (collaboration space), D (Conceptual Demonstration), E (Elaboration of Understanding), K (Connection Between Materials), A (Real Action). The use of the Merdeka flow in learning makes students more independent in acquiring knowledge and solving problems [11]. Thus, the purpose of this research is to find out teachers' strategies in improving literacy in chemistry learning through the MERDEKA learning flow that can provide 21st century (6C) skills: (*Character* , *citizenship* , *critical thinking* , *creativity* , *collaboration* , and *communication* (communication) to students.

2. Methode

2.1 Type of Research

The type of research used in the research is a literature study. According to Sugiyono (2017), literature research is research that uses theoretical studies, references and scientific literature related to culture, values [12] and norms that develop in the social situation being studied. In literature research, the researcher collects literature data that has been selected, selected, searched, presented and analyzed [13]. So it can be concluded that literature research is research by collecting information and data through various sources of literature or reading such as books, scientific articles, scientific reports, small notes, or various other curnums. In the process of activities carried out, they are organized systematically and sequentially, starting from collecting, processing, and then summarizing data to obtain solutions or answers to the problems presented [14].

2.2 Data Source

The data source used in the research is in the form of secondary data where data is obtained from previous or previous researchers. So that the researcher did not obtain data by direct observation. Research data is sourced from scientific articles or scientific reports. The data in this study was also

obtained through data collection from literature reviews. The data collection method is used by searching for literature data related to the researcher's objectives.

2.3 Research Procedure

The data collection procedure for teacher strategy research to improve literacy in high school chemistry learning based on *socio-scientific issues* uses the MERDEKA flow, followed by analyzing data using descriptive qualitative analysis through literature studies [15]. The data collection steps used are as follows:
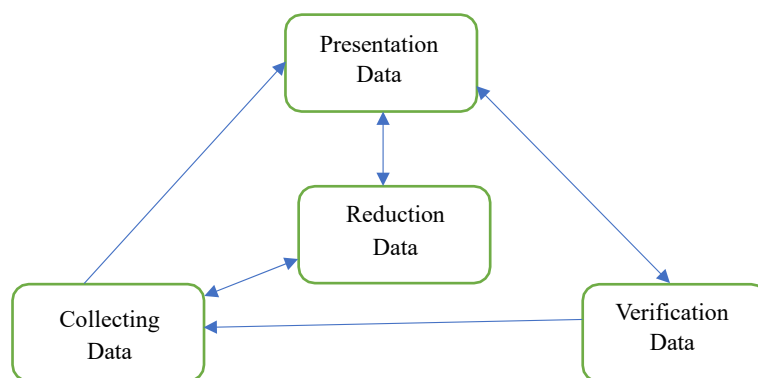
Figure 1: Research Flow Diagram.Literature Study

Based on the current research flow of literature studies according to (Pringgar & Sujatmiko, 2020), namely: (1) data collection is the process by which the researcher reviews articles. (2) Data reduction is a data analysis technique by exploring, calibrating, directing, separating data, and organizing data until a conclusion is obtained. (3) Presentation of data by providing conclusions and taking actions from possible data. Secondary data recording (in the form of articles) is then drawn. (4) Drawing conclusions is finding the results of new findings. In the analysis, conclusions were drawn from general to special.

3. Result and Discussion

Literacy is a very important aspect of the learning process. According to PISA *(Programe for International Student Assessment)* states that science learning has not been successful including aspects of content, context, science application, science process and also attitudes [16]. There are many factors that can affect low literacy such as: gender, school location, socio-economic quality of teachers who teach, type of school, parental education level, and Munger inner school facilities [17]. Until now, literacy has always been a concern in the world of education.

Chemistry is a branch of science that studies matter, structure, composition, bonds, changes in matter and also changes in energy [18]. Chemistry has a very broad scope not only on bombs, poisons, and drugs but also in daily life such as food, clothing, housing, and vehicles, and others [19]. Life in this very modern era is very dependent and inseparable from life with chemistry, and can also affect the quality of a person's life. However, it is very unfortunate that most students consider chemistry to be a difficult and unpleasant learning.

A person with good chemical literacy can make a great contribution to himself and the surrounding environment both in the fields (environment, medicine, and nanotechnology). When learning in the classroom, there are still many teachers who only emphasize the concept of learning, this is what makes learning in the classroom abstract and results in students being lazy to explore knowledge by reading. It is also often felt that over time there are many negative impacts such as air pollution, global depletion,

environmental damage and also energy crisis due to a lack of understanding of scientific facts related to science and technology.

Teacher must be be precise in choosing learning strategies anad learning models used in the classroom. Mistakes that occur in the learning used by teachers have not presented problem-based teaching and have not involved students to be active, critical and creative. However, it is not enough for a person to teach facts by giving students the opportunity to use the practicum guide module only and the chemistry teacher does not make the student understand like a scientist thinks, acts, develops and communicates his understanding to other students [20].

One of the strategies used by teachers that can be applied to involve students to think critically is to use SSI-based learning problems. Learning using SSI involves a spirit of concern for the environment and responsibility [21]. Based on research (Sirmayeni, 2023), the application of the SSI approach in chemistry learning can improve students' critical thinking skills [22]. Productive SSI learning can result from a synergistic combination of various factors in the learning environment.

MERDEKA learning is a learning flow that can involve students to actively seek knowledge freely and decisions in learning that affect students' literacy skills. In addition, the application of the MERDEKA flow can provide 21st century skills, namely (6 C's) to students (*Character* , *citizenship* , *critical thinking* , *creativity* , *collaboration* , and *communication* (communication)[23] .This is in line with the research of Wulandari et al., (2023) The implementation of the independent flow improves creative thinking skills in implementing their knowledge, collaboration shows how students use their various personalities, talents, talents to work together and produce something new, think critically when students are able to interpret information or projects into ideas, communication when students are able to convey their findings[24]. In culture, students are able to respect their surroundings, beliefs, values, and customs [25]. Without judging each other differently. Citizenship, students can show themselves to be responsible in a global society.

The following is the learning flow of MERDEKA according to Lisnawati, (2023) :
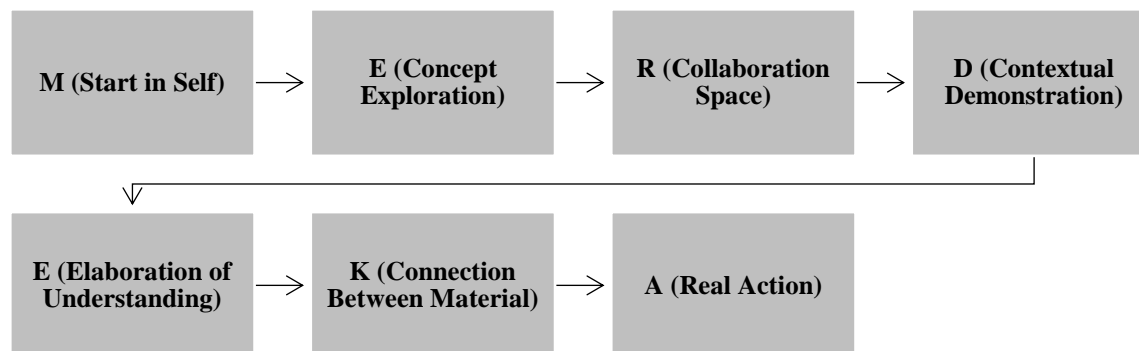
Teachers can apply this MERDEKA flow in the learning process [27] or apply it in LKPD/e-LKPD teaching materials. The SSI context is contained in each learning syntax according to the learning model that will be used by the teacher [28]. Students in learning will start learning with the letter M (start self), starting with self, the teacher can make some light questions that reflect on students before entering learning material that contains SSI-based problems. E (concept exploration) where the teacher can provide triggers which can be in the form of videos or QR codes and then students will explore learning concepts, with the aim of deepening understanding of the material and concepts [26]. R (collaboration space) contains commands to solve problems presented with friends. D (Contextual Demonstration) if students are able to demonstrate the results of discussions with friends. E (Elaboration of Understanding) where students enrich their learning, K (Connections Between Materials) where students can create designs and teachers can present assignments that enable students to systematically

design how to carry out these tasks. A (Real Action) which is the final stage in learning where students can implement the design that has been prepared from connections between materials [29]. By implementing the SSI-based MERDEKA learning strategy, it is likely that students' literacy skills can be improved. In accordance with research (Hidayat & Hidayati, 2024) that the application of the SSI approach in learning media has been proven to be able to improve students' scientific literacy abilities. Apart from that, in the MERDEKA strategy at the contextual demonstration and elaboration stages, students explore information (increasing literacy skills) in groups so as to enable students' understanding and communication skills to increase.

4. Conclusion

The low chemical literacy of students in schools is an unsolved problem and is a big problem in education. It is hoped that the teacher's innovative strategy in increasing literacy in chemistry learning through the MERDEKA pathway can help increase literacy in learning and provide students with skills (creativity), character, citizenship, critical thinking, collaboration. (collaboration), and communication (communication). The steps used in the MERDEKA learning pathway include: 1) self-start, 2) concept exploration, 3) collaboration space, 4) contextual demonstration, 5) elaboration of understanding, 6) connections between materials, and 7) real action.

References

[1] S. Montoya, *Defining Literacy*. Hamburgh: UNESCO Institute for Stastics, 2018.

[2] A. Costa and M. Loureiro, "Scientific Literacy: The Conceptual Framework Prevailing over the First Decade of the Twenty-First Century," *Ferreira, Maria Eduarda* , vol. 1, no. 81, pp. 195–228, Jan. 2021.

[3] O. Sulistina and Samudra Mutiara Hasanah, "Improving Chemical Literacy Skills: Integrated Socio-Scientific Issues Content in Augmented Reality Mobile," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 18, no. 05, pp. 135–147, Mar. 2024, doi: 10.3991/ijim.v18i05.47923.

[4] F. R. Yatim, "Studi Literatur : Penggunaan Model Pembelajaran Untuk Meningkatkan Literasi Kimia Peserta Didik," *Jurnal Pendidikan Tambusai*, vol. 8, no. 1, pp. 9560–9569, 2024.

[5] Y. H. E. Rosa *et al.*, "PABUSI: (Penanaman Budaya Literasi) sebagai Upaya Meningkatkan Kemampuan Berpikir Kritis dan Inovatif untuk Mewujudkan Profil Pelajar Pancasila di SMA Fitra Abdi Palembang," *Dedikasi PKM*, vol. 4, no. 2, pp. 309–319, May 2023.

[6] PISA, *Penilaian dan Kerangka Analisis PISA*. Paris: OECD, 2018.

[7] D. L. Yustin and A. Wiyarsi, "Students' chemical literacy: A study in chemical bonding," in *International Conference on Research, Implementation, and Education of Mathematics and Science*, Yogyakarta: 6th International Conference on Research, Implementation, and Education of Mathematics and Science, 2019, pp. 1–10.

[8] M. Primaastuti and S. Atun, "Analysis of students' science literacy concerning chemical equilibrium," in *International Journal of Instruction*, Malang: AIP Conference Proceedings, Mar. 2018, pp. 1–6.

[9] Khairunnisah and A. L. Fitriyani, *Bonus Demografi dan Visi Indonesia Emas 2024*, 2nd ed., vol. 1. Jakarta: Badan Pusat Statistik, 2023.

[10] S. Rahayu, "Sociosientific Issues : Manfaatnya dalam Meningkatkan Pemahaman Konsep Sains, Nature of Science (NOS) dan Higher Order Thinking Skills (HOTS)," in *Seminar Nasional Pendidikan IPA UNESA*, Malang: Semnas IPA UNESA, Oct. 2019, pp. 1–14.

[11] U. Jamaludin, R. A. Pribadi, and G. Zahara, "Pengembangan Media Pembelajaran Berbasis Alur Merdeka," *Jurnal Ilmiah Wahana Pendidikan*, vol. 9, no. 14, pp. 710–716, Jul. 2023.

[12] Sugiyono, *Metode Penelitian Kualitatif*, 1st ed. Bandung: CV. ALFABETA, 2017.

[13] E. Febrianti, "Studi Kepustkaan Mengenai Strategi dan desain Organisasi dalam Pelayanan Kesehatan," *Jurnal Kesehatan Lentera Acitya*, vol. 11, no. 1, pp. 1–13, Jun. 2024.

[14] H. Mazid, L. Rachmalia, Suyanta, and E. Widjajanti, "Teacher Strategies in Managing Chemistry Learning Time to Improve Student Learning Achievement ," *Jurnal Penelitian Pendidikan IPA*, vol. 9, no. 11, pp. 1129–1136, Sep. 2023.

[15] R. F. Pringgar and B. Sujatmiko, "Penelitian Kepustakaan (Library Research) Modul Pembelajaran Berbasis Augmented Reality pada Pembelajaran Siswa," *Jurnal IT-Edu*, vol. 5, no. 1, pp. 317–329, 2020.

[16] OECD, " PISA 2015 Results in Focus : Snapshot of performance in science, reading and mathematics," OECD Publishing.

[17] C. A. Dewi, S. Rahayu, Muntolib, and Parlan, "Pentingnya Mengoptimalkan Literasi Kimia Melalui Pembelajaran Berbasis Isu-isu Sosiosaintifik di Abad ke-21," in *Proceeding Seminar Nasional IPA XII*, Semarang: Proceeding Seminar Nasional IPA, Aug. 2022, pp. 348–359.

[18] Susanti, Yulina, and D. Azizah, "Analisis Underachiever Terhadap Hasil Belajar Dan IQ Peserta Didik Dalam Mempelajari Materi Kimia Kelas X Di Sekolah Menengah Atas Kabupaten Cirebon," *Jurnal Ilmiah Multi Sciences*, vol. 16, no. 1, Jan. 2024.

[19] A. Sujana, A. Permanasari, W. Sopandi, and A. Mudzakir, "Literasi Kimia Mahasiswa PGSD dan Guru IPA Sekolah Dasar," *Jurnal Pendidikan IPA Indonesia*, vol. 3, no. 1, pp. 5–11, Feb. 2014.

[20] S. Rahayu, "Mengoptimalkan Aspek Literasi dalam Pembelajaran Kimia Abad 21," in *Prosiding Seminar Nasional Kimia UNY*, Yogyakarta: Prosiding Semnas UNY, Oct. 2017, pp. 1–16.

[21] D. Koulougliotis, L. Antonoglou, and Katerina, "Probing Greek secondary school students' awareness of green chemistry principles infused in context-based projects related to socio-scientific issues," *Int J Sci Educ*, vol. 43, no. 2, pp. 298–313, Jan. 2021.

[22] Sirmayeni, "Analisis Kemampuan Berfikir Kritis Peserta Didik dengan E-LKPD Berbasis Socioscientific Issues (SSI) pada Pembelajaran Kimia," *Prosiding Nasional Pendidikan LPPKM IKIG PGRI Bojonegoro*, vol. 5, pp. 174–183, Aug. 2023.

[23] M. Anugerahwati, "Integrating the 6Cs of the 21st century education into the English lesson and the school literacy movement in secondary schools.," in *ternational Seminar on Language, Education, and Culture (ISoLEC)* , International Seminar on Language, Education, and Culture. Kne Social sciences.: ISoLEC:, 2019, pp. 165–171.

[24] A. S. Wulandari, Rachyuni, and A. Widiyatmoko, "Penerapan Alur Merdeka Belajar Dalam meningkatkan Kemampuan Berpikir Kreatif dan Hasil Belajar Peserta Didik," in *Seminar Nasional IPA XIII*, Semarang: Proceeding Unnes, Jul. 2023, pp. 241–251.

[25] V. E. Montessori, T. Murwaningsih, and T. Susilowati, "Implementasi keterampilan abad 21 (6c) dalam pembelajaran daring pada mata kuliah Simulasi Bisnis," *Jurnal Informasi dan Komunikasi Administrasi Perkantoran*, vol. 7, no. 1, pp. 65–68, 2023.

[26] L. Lisnawati, "Implementasi Kurikulum Merdeka Belajar Melalui Muatan Lokal Seni Musik Pada Program Pendidikan Kesetaraan di PKBM Al Kahfi Kota Serang," *Jurnal Pendidikan UNIGA*, vol. 17, no. 1, p. 716, Jun. 2023, doi: 10.52434/jpu.v17i1.2680.

[27] R. Mufliva, S. B. Iriawan, and A. D. Fitriani, "Pengembangan LKPD berbasis Alur 'MERDEKA' sebagai penguatan Literasi Numerasi dalam Implementasi Pembelajaran Berdiferensiasi di Sekolah Dasar," *Jurnal Riset Pedagogik*, vol. 7, no. 3, pp. 1011–1026, 2023.

[28] A. T. Hidayat and S. N. Hidayati, "Peningkatan Literasi Sains Siswa Berbantuan LKPD Berorientasi Socio Scientific Issues (SSI)," *Jurnal Ilmiah Pendidikan IPA*, vol. 6, no. 1, pp. 57–63, 2024.

[29] W. Han, "Alur Pembelajaran Merdeka," 2021.

Systematic Literature Review: Improving HOTS and Students' Communication Ability in Learning Using a Combination of PBL and Brainwriting Learning

Yuninda Adumiranti[1*], Yuni Hartati Eliya Rosa[2]

[1,2] Magister of Chemistry education, Yogyakarta Univercity State, Yogyakarta, Indonesia

[*]E-mail: yunindaadumiranti.2023@student.uny.ac.id

Abstract. Education in schools is more about providing theoretical information without directing it to everyday applications. This resulted in learners only have a theoretical understanding without understanding applicatively. Then it is necessary to choose an effective and applicable model / Method to improve HOTS and communicative abilities. The Model or method used is PBL and Brainwriting. The research method is SLR (Systematic Literature Review). The results of this study are HOTS and communication skills of learners can be improved by a combination of PBL learning models and brainwriting methods.
Keyword: HOTS, communication ability, PBL, *brainwriting*.

1. Introduction

In the era of 4.0 development which will lead to 4.5, students who have high-level skills are needed. This is necessary so that students are able to face rapid and challenging changes in technology and science in the 21st century. The problems faced by the world of education are very diverse and complex. Starting from a weak learning process and evaluation. In the learning process, it is considered weak because students have not been able to develop thinking skills and still rely on the power of memorizing information. Education in schools is more about providing information theoretically without directing to daily applications. This results in students only having a theoretical understanding without any applied understanding. High-level skills are commonly called HOTS (*Higher Order Thingking Skill*). HOTS is a performance that involves several aspects of thinking in learning [1]. This high-level thinking skills include apply, analyze, evaluate, and create. According to Yen & Halili, it specifically consists of critical and creative thinking, problem-solving, decision-making and metacognition [1].

In Indonesia, HOTS is still in development efforts to make it even better. Many previous studies on HOTS have not shown significant changes. If examined further, HOTS has benefits for students. The benefits of having HOTS are reflective and creative thinking, problem solving, critical thinking and metacognition as a result of the application of HOTS to make decisions [2]. Therefore, it is very necessary for Indonesia to increase HOTS for the sustainability of students to face the future.

The improvement of students' skills is also influenced by the learning process of students. If students are interested in the learning process, it will also affect their learning outcomes. There are several efforts to realize fun learning through learning models, learning methods, media and also materials [3]. One of the alternative learning models that are effective to attract students is problem-based learning (*Problem Based Learning*).

PBL is referred to as an interesting learning for many educators because of its teaching framework that advocates active and collaborative learning [4]. PBL directs student involvement in group learning to solve unclear and overt problems [5]. Problem-based learning has the following four basic characteristics: (1) focus on complex, real-world problems that don't have a precise solution, (2) students work in groups, (3) students gain new information through independent learning, and (4) teachers act as facilitators [6]. From this character, it can be seen that PBL focuses on a problem that must be solved. In solving this problem, students are invited to analyze, think critically, and evaluate. In this case, it is very clear that PBL can encourage students' HOTS. In the learning process, there are PBL measures as follows *(Son et al.*, 2020; Suparman *et al*., 2021):

Table 1. Steps to Learn PBL Learning Model

Stages	Learning activities
Problem orientation	1. The teacher conveys and discusses the learning objectives. 2. Teachers present real problems to students. Teachers begin to introduce problems related to daily life 3. Teachers motivate students to engage in problem-solving activities
Learning orientation	1. Teachers guide students in understanding real problems by helping them identify what they already know, what additional information they need, and the steps needed to address the problem effectively. 2. Students share roles/tasks to solve problems
Individual and group investigations	Teachers encourage and guide students in collecting data/information (knowledge, concepts, theories) through various ways to find various alternatives/solutions to solve problems
Solution development and presentation	1. Students are guided to choose the most suitable solution from the various alternatives they have identified. 2. Students compile a report on the results of the problem solving
Analysis and evaluation of the problem-solving process	Teachers facilitate students to reflect and evaluate the problem-solving process carried out

In these steps, students can be active in groups. Students are required to convey ideas related to problems. Learners' ideas can be explored by adding appropriate learning methods. One of the models that can be combined is *Brainwriting*. This model is a combination of thought processes to convey several interesting ideas or concepts. Through *Brainwriting* Students can write their ideas on paper, then other students can also add their ideas [7]. This learning model will train students to come up with many ideas or concepts because it is designed to encourage each student to connect his or her ideas with other ideas [8]. In addition, this learning model helps students to express/communicate their ideas [9]. In PBL Learning, *Brainwriting* Helping Peseta Didik find solutions with his fellow groups. So, when in a group, all students have the opportunity to express their opinions.

The combination of PBL and *brainwriting* has begun to be developed, but it is still few. This is because few apply *the brainwriting* model to learning. It is hoped that the combination of PBL and *brainwriting* can be a new breakthrough for learning. The purpose of this study is to determine the influence of the combination of PBL and *brainwriting* on HOTS and students' communication skills.

2. Method

This study uses the SLR (*Systematic Literature Review*) method. In this method, the process of identifying, reviewing, evaluating, and interpreting all available research is carried out. The SLR

method is a research design to synthesize evidence based on previous or existing research systematically to answer a question. According to M. Newman and D. Gough, SLR has nine stages, namely 1) developing research questions, 2) conceptual framework design, 3) determining criteria, 4) developing research strategies, 5) selecting according to criteria, 6) giving code, 7) assessing selected journals, 8) synthesizing research results, 9) findings.

In the *first* stage, the researcher sorts out the problems to be studied. The researcher chose to discuss the ability of HOTS and student communication. In the second stage, the researcher re-selected a learning model/approach that was able to improve HOTS and communication skills. The researcher chose PBL and *brainwriting* for this study. The problem-focused PBL model can increase students' HOTS, while *brainwriting* is expected to help improve student communication. In addition, the researcher wants to try a combination of the two models. The *third* stage is to determine the criteria. The selected criteria are 1) the selected journal is a journal published in 2020-2024, 2) the selected journal is a journal with *an index of Scopus* quartil 1-4 and sinta 1-4, 3) a journal related to HOTS, communication skills, PBL and *brainwriting*.

Stages *fourth* choose a suitable research strategy. Researchers first collect journals related to problems in *Google Scholar* and *Scopus*. Stages *fifth* stages of selecting and analyzing journals according to the criteria. Non-compliant journals will be deleted. In this study, the researcher initially found 16 journals, after looking at the criteria there were 6 journals that were not included in the second criterion. So in this study there are 10 journals that will be analyzed. Stages *sixth* and *seventh*, the researcher mapped the results of the study in the selected journal and grouped the results. Stages *eighth* and *ninth*, the researcher began to analyze and conclude the results of the study. The analysis used is a descriptive analysis.

3. Results and Discussion

In this study, the researcher collected 10 journals with the division of 3 journals on PBL, 1 journal on *Brainwriting*, 1 journal on PBL and *Brainwriting*, 2 journals on HOTS, 2 journals on PBL and HOTS, 1 journal on *Brainwriting* and communication skills. The following are the results of the collection of these journals.

Table 2. Selected Journals

Title and Researcher	Research Results	Findings
	PBL	
Effects of problem-based learning instructional intervention on critical thinking in higher education: A meta-analysis **Yong Liu a and Attila Pasztor**	The factors that affect the effectiveness of PBL on CT as a whole are student maturity, nationality, type of teaching, sample type, and group size. Problem-Based Learning (PBL) is effective for improving Critical thinking (CT) in higher education.	• PBL can improve students' abilities.
An Analysis Of The Application Of Problem Based Learning (Pbl) Model In Mathematics For Elementary School Students **Sarnoko, Asrowi, Gunarhadi, Budi Usodo**	In this study, it succeeded in providing an overview of the application of the problem-based learning model in elementary schools which still face many obstacles and challenges to achieve optimal results. The recommendation given by the researcher is that intensive training is needed for teachers to understand and implement PBL effectively, in addition to efforts to integrate problem-based learning models with a constructivist social values approach to create a truly authentic learning experience for students.	The implementation of PBL still needs to be reviewed.

Title and Researcher	Research Results	Findings
Thinking Critically About Critical Thinking and Problem-Based Learning in Higher Education: A Scoping Review **Kathrine Liedtke Thorndahl and Diana Stentoft**	This study reveals that some previous studies have not been able to define critical ability. Thus, it is impossible for the reader to judge the results and conclusions, just as it is impossible to evaluate whether the choice of instrument used to measure the extent to which problem-based learning fosters critical thinking is likely to yield valid results.	The implementation of PBL still needs to be reviewed.
	Brainwriting	
The Influence of Project-Based Brain-Writing Learning Model to Increase the Writing Skill toward Indonesian Subject at Elementary School **Dian Permatasari Kusuma Dayu & Haryanto**	The project-based brain-writing *learning model* significantly affects Indonesian writing skills. In the observation results of the learning model based on *brainwriting* learning, students are enthusiastic and active in learning, students are very enthusiastic in developing creative ideas in writing stories in Indonesian learning.	*Brainwriting* can improve students' abilities.
	PBL and *Brainwriting*	
How does PBL Brainwriting Method Supplemented with Concept Mapping Effective to Improve Critical Thinking and Problem-Solving Ability? **Rizki Khairani, Suyitno Aloysius**	Learning the PBL model *brainwriting* method with additional tasks in the form of concept mapping can help improve students' critical thinking and can make learning more effective and efficient.	• The PBL model can be combined with other models/approaches. • *Brainwriting* can improve students' abilities. • PBL can improve students' abilities.
	HOTS	
The Implementation of Higher Order Thinking Skill (HOTS) in Junior High School: Teaching Practice and Problems **Rani Ayu Feronica, Eka Apriani and Sarwo Edy.**	The results show that the implementation of HOTS in schools is in accordance with Anderson's Taxonomy. The teaching problems in the implementation of HOTS are lack of facilities, lack of time, lack of training, lack of knowledge, lack of connections, and lack of motivation.	HOTS can be increased by supporting factors
Improving student higher order thinking skills using Synectic HOTS-oriented learning model **Eko Setyadi Kurniawan, Mundilarto, Edi Istiyono**	Based on the results obtained, the application of the Synectic-HOTS model can improve all aspects of HOTS, although in some aspects, especially the ability to evaluate and create, needs to be further improved. The Synectic-HOTS learning model is effectively used to train students' HOTS, including the ability to analyze, evaluate, and create. In this case, the ability to analogize, explore, and come up with new ideas needs to be continuously trained so that students have a critical and creative attitude.	HOTS can be increased by supporting factors
	PBL and HOTS	
The Effect of Problem-Based Learning Integrated Local Wisdom on Student HOTS and Scientific Attitude **Hikmawati, I Wayan Suastra, Ketut Suma, A.A. Wife Agung Rai Sudiatmika, Rohani**	The application of a problem-based learning model integrated with local wisdom has an influence on students' high-level thinking skills (HOTS) and students' scientific attitudes. This is evidenced by the tests carried out. When tested in ANOVA, there was a difference in HOTS due to differences in learning models. Meanwhile, in the variable of scientific attitudes, there are differences in scientific attitudes due to differences in learning models.	• PBL can improve students' abilities. • HOTS can be increased by supporting factors • PBL can increase students' HOTS.

Title and Researcher	Research Results	Findings
The Effect of Problem-Based Learning with Character Emphasis toward Students' Higher-Order Thinking Skills and Characters **Yusuf Suherman, Agus Muliadi, Saiful Prayogi**	From the data results, the average posttest value and the difference between posttest and pretest were higher in the PBL-CE group than in the PBL and RL groups. This fact shows that the HOTS of students taught with PBL-CE is better compared to those taught with PBL and RL. In the results of student character, the PBL-CE group score was higher than the PBL and RL group scores. This shows that the character of students taught with PBL-CE is better than that taught with PBL and RL. The HOTS scores of students taught with PBL-CE were higher and significantly different when compared to students taught with RL, but did not differ significantly from PBL, and the character scores of students taught with PBL-CE were better and significantly different from PBL and RL. The conclusion of the overall analysis above is that there is a significant influence of PBL-CE on HOTS and student character.	• The PBL model can be combined with other models/approaches. • PBL can improve students' abilities. • HOTS can be increased by supporting factors • PBL can increase students' HOTS.
The Effectiveness of Problem-based Learning with Brainwriting based on Food Diversification Problems on Students' Critical Thinking and Communication Skills **Iis Aprilia Arsanti , Agung Wijaya Subiantoro**	*Brainwriting* and Communication Skills Based on the data from the research and discussion, it was revealed that the Problem-based Learning learning model with the food diversification problem-based brainwriting method was significantly more effective in developing the critical thinking and communication skills of class X students compared to the Guided Inquiry learning model. This is evidenced by the comparison of the average score of critical thinking ability in the experimental class (79.55) which is superior to the average of the control class (62.72). The results of the inferential analysis showing p=0.000 indicate that the average of the two classes has a significant difference.	• The PBL model can be combined with other models/approaches. • *Brainwriting* can improve students' abilities. • PBL can improve students' abilities. • Communication skills can be improved by supporting factors

In the findings in the journal on PBL, it turns out that there are still some that must be reviewed. There are several schools that have not implemented this learning model even though teachers are aware of the model. In a journal entitled "*An Analysis Of The Application Of Problem Based Learning (PBL) Model In Mathematics For Elementary School Students"* There are 40% of teachers who understand the concept of PBL, 30% of teachers who apply the PBL model according to its syntax, and 20% of teachers who evaluate the implementation of learning. This percentage is relatively low. In another journal, the journal entitled "*Thinking Critically About Critical Thinking and Problem-Based Learning in Higher Education: A Scoping Review*", it is mentioned that there is a possibility of invalidity of PBL which can increase critical thinking. The journal above, it can be seen that actually PBL still needs to be reviewed. In fact, if re-examined in the PBL steps, it can help students to analyze critical thinking, solve problems, and form a concept of thinking [4]. Learning that involves students can increase the activeness of independence and improve students' thinking. Moreover, PBL which prioritizes cooperation between students and also students can do it independently which can add concepts to students' thinking. In the findings of the journal entitled "*Effects of problem-based learning instructional intervention on critical thinking in higher education: A meta-analysis*", found that there is still a possibility that PBL can help improve students' abilities. This is supported by a journal entitled "*The Effect of Problem-Based Learning Integrated Local Wisdom on Student HOTS and Scientific Attitude*" and "*The Effect of Problem-Based Learning with Character Emphasis toward Students' Higher-Order Thinking Skills and Characters*" which the journal is carried out by directly testing PBL. And the results prove that PBL can help improve students' abilities.

In other journals, PBL is able to improve students' abilities by combining the PBL with other methods or approaches. So, if you want the results of PBL learning to be more effective, the learning should be combined with other learning methods or approaches. In the PBL Investigation step, students are required to seek information independently with their groups. At this time, other methods or approaches must be applied to help students to channel their ideas or thoughts. One of the methods that teachers can use to help students conduct research is *Brainwriting*. *Brainwriting* is a method used to exchange ideas between students by writing down their ideas and then giving them to other students in one group to be given responses and to draw conclusions, so that all students can channel their respective heights [7]. So if combined between PBL and *Brainwriting* can increase the cohesiveness of students and make it easier to obtain more information so that the group can generate solutions to problems. In addition, it can even out tasks for each group member so that there are no tasks that rest on only one student but work together to obtain a solution.

HOTS is very beneficial for students to deal with unusual problems in their daily lives [10]. In a journal entitled "*The Implementation of Higher Order Thinking Skill (HOTS) in Junior High School: Teaching Practice and Problems*" and "*Improving student higher order thinking skills using Synectic HOTS-oriented learning model*" can show that HOTS can be developed through supporting factors. The supporting factors discussed here are learning models/methods, facilities, teaching materials, etc. In this study, more focus is on the model/method used. In both journals mentioned above, the researchers found that HOTS can be improved by using PBL. In previous studies, The PBL model affects students' learning outcomes, concept understanding, science literacy, environmental literacy, problem-solving skills, critical thinking skills and scientific attitudes [11]. From this statement, it can be seen that PBL can increase HOTS.

In addition to HOTS, students' communication skills must also be considered. Nowadays, many students are not so able to express their opinions about something. Therefore, researchers are determined to find out suitable models/methods to improve communication. Students' communication skills can be said to increase if the aspects of communication skills are fulfilled, which according to Martin (2009) has 4 aspects: 1) Identifying and describing objects precisely, 2) Explaining with logical reasons and making conclusions, 3) Conveying information accurately with writing, and 4) Verbalization of thoughts [9]. One of the methods that can be applied is the *Brainwriting*. As explained above, this method is a written exchange of thoughts. From this, *Brainwriting* can help fulfill aspects of communication skills, especially the 3rd and 4th aspects. From the description above, it can be seen that HOTS and students' communication skills can be improved by a combination of PBL learning models and methods *brainwriting*.

4. Conclusion

From the above discussion, it can be concluded that the combination of PBL and *Brainwriting* affect HOTS and students' communication skills. This is reviewed from previous research and also the steps of the PBL model and the connection between aspects of communication skills with the *Brainwriting*. In this literature review, it is proven that the combination between PBL and *Brainwriting* can improve HOTS and students' communication skills. The limitations of this study, namely the *Brainwriting* are still few and difficult to find. It is hoped that in the future, this research can be developed more widely.

References

[1] Y. Suhirman, A. Muliadi, and S. Prayogi, "The effect of problem-based learning with character emphasis toward students' higher-order thinking skills and characters," *Int. J. Emerg. Technol. Learn.*, vol. 15, no. 6, pp. 183–191, 2020, doi: 10.3991/IJET.V15I06.12061.

[2]   N. Sepriyanti, S. Nelwati, M. Kustati, and J. Afriadi, "the Effect of 21St-Century Learning on Higher-Order Thinking Skills (Hots) and Numerical Literacy of Science Students in Indonesia Based on Gender," *J. Pendidik. IPA Indones.*, vol. 11, no. 2, pp. 314–321, 2022, doi: 10.15294/jpii.v11i2.36384.

[3]   E. S. Kurniawan, Mundilarto, and E. Istiyono, "Improving student higher order thinking skills using Synectic-HOTS-oriented learning model," *Int. J. Eval. Res. Educ.* , vol. 13, no. 2, pp. 1132–1140, 2024, doi: 10.11591/ijere.v13i2.25002.

[4]   Sarnoko, Asrowi, Gunarhadi, and B. Usodo, "an Analysis of the Application of Problem Based Learning (Pbl) Model in Mathematics for Elementary School Students," *J. Ilm. Ilmu Terap. Univ. Jambi*, vol. 8, no. 1, pp. 188–202, 2024.

[5]   Y. Liu and A. Pásztor, "Effects of problem-based learning instructional intervention on critical thinking in higher education: A meta-analysis," *Think. Ski. Creat.*, vol. 45, no. June, 2022, doi: 10.1016/j.tsc.2022.101069.

[6]   K. L. Thorndahl and D. Stentoft, "Thinking critically about critical thinking and prob-lem-based learning in higher education: A scoping review," *Interdiscip. J. Probl. Learn.*, vol. 14, no. 1, pp. 1–21, 2020, doi: 10.14434/ijpbl.v14i1.28773.

[7]   R. Khairani and S. Aloysius, "How does PBL Brainwriting Method Supplemented with Concept Mapping Effective to Improve Critical Thinking and Problem-Solving Ability?," *J. Penelit. Pendidik. IPA*, vol. 9, no. 3, pp. 1030–1038, 2023, doi: 10.29303/jppipa.v9i3.3212.

[8]   H. Dian Permatasari Kusuma Dayu, "The Influence of Project-Based Brain-Writing Learning Model to Increase the Writing Skill toward Indonesian Subject at Elementary School Article Info," *Innov. J. Curric. Educ. Technol.*, vol. 9, no. 1, pp. 25–30, 2020, [Online]. Available: https://journal.unnes.ac.id/sju/index.php/ujet/article/view/24785

[9]   I. A. Arsanti and A. W. Subiantoro, "Efektifitas Problem-based Learning dengan Brainwriting berbasis Masalah Diversifikasi Pangan terhadap Kemampuan Berpikir Kritis dan Berkomunikasi Siswa," *J. Pendidik. Biol.*, vol. 9, no. 2, p. 10, 2020, doi: 10.24114/jpb.v9i2.17371.

[10]   R. A. Feronica, E. Apriani, and S. Edy, "The Implementation of Higher Order Thinking Skill (HOTS) in Junior High School: Teaching Practice and Problems," *ENGLISH Fr. Acad. J. English Lang. Educ.*, vol. 5, no. 2, p. 185, 2021, doi: 10.29240/ef.v5i2.2589.

[11]   H. Hikmawati, I. W. Suastra, K. Suma, A. A. I. A. R. Sudiatmika, and R. Rohani, "Effect of Problem-Based Learning Integrated Local Wisdom on Student Hots and Scientific Attitude," *J. Penelit. Pendidik. IPA*, vol. 7, no. SpecialIssue, pp. 233–239, 2021, doi: 10.29303/jppipa.v7ispecialissue.1118.

Knowledge and Understanding of the Healthy Association of Adolescents among Vocational High School Students in Yogyakarta

Ali Muthahhari Rahim[1], Ahmad Nasrulloh[2]

[1] Faculty of Health and Sport Science, University state of Yogyakarta, Yogyakarta, Indonesia
[2] Faculty of Health and Sport Science, University state of Yogyakarta, Yogyakarta, Indonesia

*E-mail: alimuthahhari.2020@student.uny.ac.id

Abstract. In 2023, the National Population and Family Planning Agency (BKKBN) released that around 60% of children under 17 years old have had premarital relations. Through these conditions, the urgency of the level of knowledge and understanding of healthy social behavior needs to be carried out, especially in children under 17 years of age, or at the level of high school students. The purpose of this study was to determine the level of knowledge and understanding of vocational high school students of the Healthy Association of Adolescents in Yogyakarta City. The research design is descriptive quantitative, with multiple regression analysis techniques. Data was obtained from the results of distributing questionnaires from 59 students of class X SMK X Yogyakarta. The results of the analysis showed that there was a significant relationship between the level of knowledge of students of SMK X Yogyakarta with students' knowledge of drug regulations and healthy association of adolescents. The hypothesis proposed, that both factors individually and simultaneously affect the level of knowledge of students, is accepted. The results of the analysis also show that approximately 68.9% of the variability in students' level of knowledge can be explained by students' knowledge of the healthy association of adolescents. This indicates that students' understanding of drug regulations and the healthy association of adolescents has an important role in determining students' level of knowledge.

Keys word: knowledge, understanding, the healthy association, adolescents vocational school, Yogyakarta

1. Introduction

In 2023, the National Population and Family Planning Agency (BKKBN) released that around 60% of children under 17 years old have had premarital relations. Establishing healthy relationships is a crucial aspect of adolescents' development, influencing their overall well-being and future outcomes. Positive peer interactions can foster self-confidence, emotional support, and healthy decision-making, while negative interactions may lead to risky behaviors. Establishing healthy relationships during adolescent development is crucial for overall well-being and future outcomes. Positive peer interactions play a significant role in fostering self-confidence, emotional support, and healthy decision-making among adolescents. Research has shown that peers influence adolescents' decision-making processes, both positively and negatively (Fleming et al., 2020). Adolescents' cognitive development during this stage is marked by a shift towards more mature thinking, which impacts their attitudes and behaviors (Hastuti et al., 2021).

Negative peer interactions can lead to risky behaviors among adolescents, such as engaging in substance abuse, risky sexual behaviors, and unhealthy habits. It is essential to address these negative influences by strengthening the distribution of information and implementing educational programs at the school level (Wadolowska et al., 2018). adolescents' knowledge and attitudes toward various health topics, such as reproductive health, nutrition, and substance abuse, are crucial in shaping their behaviors. Peer influence also plays a role in behaviors like smoking, alcohol consumption, and engagement in sexual activities (Palomino González et al., 2019).

Understanding the factors associated with risky behaviors among adolescents, such as lack of knowledge, peer pressure, and environmental influences, is vital for designing effective intervention programs (Kanda & Mash, 2018). Educational interventions have shown promise in improving outcomes related to health behaviors, such as sex education acceptance and reducing risky behaviors (Reiter et al., 2022). The point is positive peer interactions are essential for adolescent development, promoting healthy behaviors and decision-making. Addressing negative peer influences through education, intervention programs, and promoting positive social norms can significantly impact adolescents' well-being and future outcomes.

Healthy adolescent interactions among peers play a crucial role in fostering positive social and emotional development. These interactions are characterized by mutual respect, effective communication, trust, and support. Peers significantly influence adolescents' decision-making processes, both positively and negatively. To enhance healthy adolescent development, school-based programs, mentoring, and outdoor activities have shown empirical support (Hartati et al., 2020). Additionally, interventions focusing on reproductive health education have been found to positively impact adolescents' knowledge and attitudes toward premarital sex (Ayu et al., 2020).

Healthy adolescent interactions among peers are influenced by various factors such as education, awareness, and social relationships. Education and awareness play a crucial role in helping adolescent comprehend the significance of respect, communication, and support in their relationships. Positive social relationships contribute to emotional well-being and promote healthy decision-making among adolescents (Chao & Cheng, 2021). Social norms play a significant role in shaping young women's reproductive decision-making and agency, highlighting the importance of considering societal expectations and beliefs in influencing behavior (Fahrni et al., 2022). Additionally, creating awareness and engaging the target population are crucial steps in promoting better preventive practices, such as vaccination and screening for diseases like human papillomavirus and cervical cancer (Ayu et al., 2019). Addressing risky behaviors like smoking among adolescents requires denormalization strategies and systemic interventions to control such behaviors effectively. So, fostering healthy adolescent interactions among peers requires a multifaceted approach that includes education, awareness, positive social relationships, and interventions tailored to address specific risk behaviors. By understanding the impact of peers, cognitive development, social norms, and preventive practices, stakeholders can create environments that support adolescents in making informed decisions and maintaining their well-being.

The cultural values and social norms prevalent in Yogyakarta, Indonesia, significantly influence the interactions among adolescent peers in the region. Yogyakarta's rich cultural heritage, deeply rooted in Javanese traditions, emphasizes maintaining harmonious social relationships, respecting elders, and adhering to societal expectations. Within this cultural context, adolescents in Yogyakarta are influenced by the need to uphold social status, family honor, and community perception, shaping their interactions with peers (Willan et al., 2020). Social norms act as informal rules that guide behavior, informing individuals about societal expectations and influencing their actions based on perceived norms. The perception of the learning environment is crucial in shaping individuals' behaviors and attitudes (Tentama & Jayanti, 2019).

In Yogyakarta, where cultural values play a significant role, the learning environment can further reinforce the importance of traditional norms and values in shaping adolescents' interactions with peers. Adolescents' cognitive development towards maturity is also a critical aspect to consider, as it affects their attitudes and behaviors, especially in culturally influenced settings like Yogyakarta (Wadolowska et al., 2018). Understanding the impact of social norms and cultural values on adolescent behavior is essential for promoting healthy interactions among adolescent peers in Yogyakarta (Willan et al., 2020). By recognizing the influence of societal expectations, respect for traditions, and the importance of maintaining social harmony, stakeholders can create interventions and programs that align with the cultural context of Yogyakarta to support positive peer interactions among adolescents.

The existing literature provides valuable insights into the factors influencing adolescent behaviors and interactions in Yogyakarta, Indonesia. However, there are several gaps in the current understanding of healthy interactions among peers in vocational high school students in the region. For example, there is limited Firstly, there is a limited need for further research on the specific knowledge and understanding of the healthy association of adolescents among vocational high school students in Yogyakarta that focuses on the specific factors that contribute to healthy interactions among peers in this context. Moreover, there is a need to explore the role of family and parental influence in shaping adolescents' understanding of healthy relationships. Additionally, the role of teachers and the school environment in promoting healthy relationships among students should be examined. Lastly, the potential impact of media and social media on adolescent relationships in Yogyakarta needs to be investigated, as these platforms can significantly influence adolescent attitudes and behaviors.

2. Methods

The research design is descriptive quantitative, with multiple regression analysis techniques. Data was obtained from the results of distributing questionnaires from 59 students of class X SMK X Yogyakarta. The questionnaires were designed to assess the student's knowledge and understanding of the healthy association of adolescents. The questionnaire included items that measured factors such as communication skills, conflict resolution strategies, respect for boundaries, and awareness of consent in relationships. The data collected from the questionnaires was analyzed using multiple regression analysis to identify the factors that significantly contribute to adolescents'

3. Result

Table 1. Number of Samples

Gender	Sum
Male	38
Female	21
Total	59

The population in this study was all students at SMK X Yogyakarta City. The sample was taken purposively, which was only done on grade X students. The reason for choosing class X was because these students had just started their education at the Vocational High School (SMK) level and researchers wanted to understand the level of knowledge and understanding of students towards healthy association of adolescents at the beginning of the education period. The sample size was 59 students from 4 classes, with details of 38 male students and 21 female students. This selection is expected to

provide deeper insight into how new students understand the concept of healthy association of adolescents in a new school environment.

Validity Test Results

It is known that the results of the validity test are that the number of values in the variables Knowledge Level (X1) and Student Understanding (X2) is $1 > R_{table}$ (0.252). Then it can be concluded that both variables are valid. This validity measurement shows that the measurement instrument used is feasible to measure what should be measured well on both variables.

Reliability Test Results

Table 2. Reliability Test Results Variable	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Knowledge level (X1)	.866	.867	10
Student Understanding (X2)	.919	.921	10
Healthy Association of Adolescents (Y)	.859	.863	10

Based on the table of reliability test results, we can analyze as follows: The variable "Knowledge Level (X1)" has a Cronbach's Alpha value of 0.866 for 10 items. This value indicates a good level of internal consistency or reliability for measuring the construct since Cronbach's Alpha values above 0.70 are considered acceptable as the minimum limit for adequate reliability. The variable "Student Understanding (X2)" has a Cronbach's Alpha value of 0.919 based on 10 standard items. This value is very good and indicates that the items used to measure this variable are very consistent and reliable, far exceeding the minimum value of 0.70. Meanwhile, the variable " Healthy Association Adolescent (Y)" has a Cronbach's Alpha value of 0.859 for 10 items. This value is also good enough and acceptable to measure the construct reliably, according to the minimum limit of 0.70. Overall, all three variables in this study have good to excellent Cronbach's Alpha values, which indicates that the measurement instruments used to measure these variables have sufficient internal consistency and reliability because all values exceed the generally accepted minimum limit of 0.70 (Ghozali, 2019).

Multiple Linear Regression Analysis Test

1. H1 = There is an influence between Knowledge Level (X1) of the Healthy Association Adolescent (Y)
2. H2 = There is an influence between Student Understanding (X2) of the Healthy Association Adolescent (Y)
3. H3 = There is a slim relationship between the Level of Knowledge (X1) and Student Understanding (X2) of the Healthy Association Adolescent

Coefficientsᵃ

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.035	2.214		3.629	.001
	Knowledge Level (X1)	.451	.102	.491	4.406	.000
	Student understanding (X2)	.325	.092	.393	3.530	.001

a. Dependent Variable: Healthy Association of Adolescents (Y)

Trust Level 95%, a= 0,05

Hypothesis Testing 1

It is known that the Sig value for the relationship between X1 to Y is .000 < 0.05 and the calculated value of 4.406 > T_{table} 2.003, it can be concluded that H1 which reads "There is an influence between the Level of Knowledge (X1) of the Healthy Association Adolescent (Y)" is accepted. So, the results of this analysis show that the level of student knowledge of healthy associations of adolescents is under the hypothesis proposed.

Hypothesis Testing 2

It is known that the Sig value for the relationship between X2 to Y is .001 < 0.05 and the calculated value of 3.530 > T_{table} 2.003, it can be concluded that H2 which reads "There is an influence between Student Understanding (X2) of the Healthy Association Adolescent (Y)" is accepted. So, the results of this analysis also show that students' understanding of the Healthy association of adolescents under the hypothesis proposed.

Hypothesis Testing 3

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	726.480	2	363.240	59.461	.000[b]
	Residual	342.096	56	6.109		
	Total	1068.576	58			

a. Dependent Variable: Healthy Association of Adolescents (Y)
b. Predictors: (Constant), Student Understanding (X2), Level of Knowledge (X1)

It is known that the Sig value for the relationship between X1 and X2 to Y is .000 < 0.05 and the Fcalculate value of 59.461 > T_{table} 3.159, it can be concluded that H3 which reads "There is a slim relationship between the Level of Knowledge (X1) and Student Understanding (X2) of the Healthy Association Adolescent (Y)" is **accepted**. So, the results of this analysis show the level of knowledge and understanding of students towards healthy associations of adolescents under the hypothesis proposed.

Coefficient of Determination

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825[a]	.680	.668	2.47161

a. Predictors: (Constant), Student Understanding (X2), Knowledge Level (X1)

Based on the data above, it is known that the RSquare value of .689, which results from the results of multiple regression analysis shows that about 68.9% of the variability in the level of knowledge and understanding of vocational students towards the Healthy Association Adolescent can be explained by the factors investigated in this study. This confirms that students' knowledge and understanding of the concept of adolescent health association has a significant contribution to explaining variations in students' knowledge levels.

4. Discussion

In the context of this study, it is important to consider that students' level of knowledge and understanding of adolescent healthy promiscuity has a significant impact on shaping students' social behavior. Adolescence is a critical period characterized by increased exploration and development of social, emotional, and cognitive skills to prepare for adulthood (Ren & Lotfipour, 2019). Understanding

the factors that influence adolescent behavior is very important because risky behavior is often influenced by various factors from within adolescents, families, and associations (Wibowo et al., 2019).

The results of research that show the influence between the level of knowledge and understanding of students on the healthy association of adolescents also provide a strong basis for the development of educational programs that are more focused on this aspect. By strengthening students' knowledge and understanding from an early age, it is hoped that healthier and positive social patterns will be formed among adolescents. It can also help in preventing negative behavior such as drug abuse, teen violence, and other risky behavior (Lutasingwa et al., 2024). The importance of educational programs that focus on increasing students' knowledge and understanding of Healthy adolescent relationships must be supported by an educational curriculum that contains reproductive health, the dangers of illegal drug use, and others. Such interventions are essential in shaping adolescent behavior and attitudes toward various health-related aspects (Brown et al., 2021).

In addition, it is also important that equality in the level of knowledge and understanding between male and female students towards of the Healthy association of adolescents shows that education and socialization efforts related to healthy associations need to be carried out evenly without gender discrimination. This reflects the importance of an inclusive and holistic approach in increasing students' awareness and understanding of positive values in adolescent associations. Thus, the results of this study provide a strong foundation for the development of educational policies and programs that are more effective in improving the healthy association of adolescents in the school environment. Educational interventions play an important role in shaping adolescent attitudes and behaviors towards various aspects of health, including reproductive health and healthy lifestyle choices (Satriyono et al., 2022). For example, implementing specialized programs such as the "Sailing through Adolescence" program that combines interactions between affect, behavior, and cognition has shown positive effects in improving students' attitudes toward adolescence (Chao & Cheng, 2021). Then the provision of comprehensive education on reproductive health has been highlighted as important in improving students' knowledge and attitudes toward premarital sex and reproductive health (Panda et al., 2023).

In addition, research emphasizes the importance of school-based programs, mentoring, and outdoor activities in promoting healthy adolescent development and addressing various health-risk behaviors among adolescents (Yamin et al., 2022). It is very important to consider the cognitive maturity of adolescents when designing educational programs, as cognitive development affects students' understanding and decision-making processes (Reiter et al., 2022). In addition, peer influence on adolescent behavior and decision-making underscores the importance of social interaction and peer relationships in shaping adolescent attitudes and behaviors (Wibowo et al., 2019). In conclusion, promoting equity in knowledge and understanding between male and female students about healthy adolescent relationships requires comprehensive, gender-sensitive educational interventions. By taking into account cognitive development, peer influence, and gender-specific considerations in health education programs, efforts can be made to ensure that education and socialization related to healthy relationships are conducted fairly without gender discrimination.

References

[1] Ayu, S. M., Lindawati, S., & Halimatusa'diyah, T. (2020). Knowledge and attitude about risky pregnancy among student. *International Journal of Evaluation and Research in Education*, *9*(2), 326–334. https://doi.org/10.11591/ijere.v9i2.20413

[2] Ayu, S. M., Wibowo, M., & Sofiana, L. (2019). Risky teenager behavior in a vocational high school. *International Journal of Evaluation and Research in Education*, *8*(3), 470–475. https://doi.org/10.11591/ijere.v8i3.20241

[3] Brown, R., Seabrook, J. A., Stranges, S., Clark, A. F., Haines, J., O'connor, C., Doherty, S., & Gilliland, J. A. (2021). Examining the correlates of adolescent food and nutrition knowledge. *Nutrients*, *13*(6). https://doi.org/10.3390/nu13062044

[4] Chao, K. Y., & Cheng, W. (2021). An Effective Life–Sex–Emotions Course for Taiwanese Adolescents on Health Perceptions: A Cohort Study. *Frontiers in Public Health*, *9*. https://doi.org/10.3389/fpubh.2021.660229

[5] Fahrni, M. L., Azni, M. Z., Rusdi, N. S. M., Choo, C. Y., Isa, K. A. M., & Babar, Z. U. D. (2022). Impact of university students' awareness and attitudes on vaccination practices for human papillomavirus, and perception on self-sampling for cervical cancer screening. *Journal of Pharmaceutical Policy and Practice*, *15*(1). https://doi.org/10.1186/s40545-022-00471-7

[6] Fleming, C., Drennan, V. M., Kerry-Barnard, S., Reid, F., Adams, E. J., Sadiq, S. T., Phillips, R., Majewska, W., Harding-Esch, E. M., Cousins, E. C., Yoward, F., & Oakeshott, P. (2020). Understanding the acceptability, barriers and facilitators for chlamydia and gonorrhoea screening in technical colleges: Qualitative process evaluation of the "test n Treat" trial. *BMC Public Health*, *20*(1). https://doi.org/10.1186/s12889-020-09285-1

[7] Ghozali, I. (2019). *Desain Penelitian Kualitatif dan Kuantitatif*. Universitas Diponegoro.

[8] Hartati, M. S., Suryadarma, I. G. P., & Hanum, F. (2020). Implementation of the parenting model to improve understanding of reproduction health of vocational high school students. *International Journal of Instruction*, *13*(1), 215–224. https://doi.org/10.29333/IJI.2020.13114A

[9] Hastuti, P., Prahesti, Y., & Yunitasari, E. (2021). The Effect of Reproductive Health Education on Knowledge and Attitudes of Adolescent About Premarital Sex in Private Vocational School Surabaya. *Pediomaternal Nursing Journal*, *7*(2), 101. https://doi.org/10.20473/pmnj.v7i2.27498

[10] Kanda, L., & Mash, R. (2018). Reasons for inconsistent condom use by young adults in Mahalapye, Botswana. *African Journal of Primary Health Care and Family Medicine*, *10*(1). https://doi.org/10.4102/phcfm.v10i1.1492

[11] Lutasingwa, D., Favina, A., Ochora, M., Rukanikigitero, J. M. V., Gutabarwa, L. T., Kagaba, A., & Kaggwa, M. M. (2024). Level of Knowledge on Sexual and Reproductive Health Rights Among the Teenage Mothers and Their Parents in Rwanda: A Comparative Cross-Sectional Study. *Risk Management and Healthcare Policy*, *17*, 159–169. https://doi.org/10.2147/RMHP.S437217

[12] Palomino González, R., Kadengye, D. T., & Mayega, R. W. (2019). The knowledge-risk-behaviour continuum among young Ugandans: What it tells us about SRH/HIV integration. *BMC Public Health*, *19*. https://doi.org/10.1186/s12889-019-6809-y

[13] Panda, A., Parida, J., Jena, S., Pradhan, A., Pati, S., Kaur, H., & Acharya, S. K. (2023). Perception, practices, and understanding related to teenage pregnancy among the adolescent girls in India: a scoping review. In *Reproductive Health* (Vol. 20, Issue 1). BioMed Central Ltd. https://doi.org/10.1186/s12978-023-01634-8

[14] Reiter, P. L., Gower, A. L., Kiss, D. E., Shoben, A. B., Katz, M. L., Bauermeister, J. A., Paskett, E. D., & McRee, A. L. (2022). Effects of a web-based HPV vaccination intervention on cognitive outcomes among young gay, bisexual, and other men who have sex with men. *Human Vaccines and Immunotherapeutics*, *18*(6). https://doi.org/10.1080/21645515.2022.2114261

[15] Ren, M., & Lotfipour, S. (2019). Nicotine gateway effects on adolescent substance use. In *Western Journal of Emergency Medicine* (Vol. 20, Issue 5, pp. 696–709). eScholarship. https://doi.org/10.5811/westjem.2019.7.41661

[16] Satriyono, A. Y., Sulistyoningsih, H., & Hidayani, W. R. (2022). Knowledge, Attitudes and Behaviors of the Adolescent Reproductive Health Triad. *Buletin Ilmu Kebidanan Dan Keperawatan*, *1*(01), 20–31. https://doi.org/10.56741/bikk.v1i01.36

[17] Tentama, F., & Jayanti, H. D. (2019). Self-concept, perception of the learning environment and employability: A study of vocational high school students in Prambanan Yogyakarta, Indonesia. *Humanities and Social Sciences Reviews*, *7*(1), 433–440. https://doi.org/10.18510/hssr.2019.7149

[18] Wadolowska, L., Hamulka, J., Kowalkowska, J., Kostecka, M., Wadolowska, K., Biezanowska-Kopec, R., Czarniecka-Skubina, E., Kozirok, W., & Piotrowska, A. (2018). Prudent-active and fast-food-sedentary dietary-lifestyle patterns: The association with adiposity, nutrition knowledge and sociodemographic factors in Polish teenagers—The ABC of healthy eating project. *Nutrients*, *10*(12). https://doi.org/10.3390/nu10121988

[19] Wibowo, M., Sofiana, L., Ayu, S. M., Gustina, E., & Khoeriyah, I. (2019). Adolescent smoking behaviour determinants in the city of Yogyakarta, Indonesia. *International Journal Of Community Medicine And Public Health*, *6*(12), 5064. https://doi.org/10.18203/2394-6040.ijcmph20195445

[20] Willan, S., Gibbs, A., Petersen, I., & Jewkes, R. (2020). Exploring young women's reproductive decision-making, agency and social norms in South African informal settlements. *PLoS ONE*, *15*(4). https://doi.org/10.1371/journal.pone.0231181

Learning Motivation in Calculus among Civil Engineering Students at UNPAR: A Qualitative Study in the Mathematics 2 Course

Arfin[1]* and Oriza Stepanus[2]

[1] Department of Mathematics, Universitas Katolik Parahyangan, Bandung, Indonesia
[2] Department of Mathematics, Universitas Katolik Parahyangan, Bandung, Indonesia

*E-mail: yong.arfin@unpar.ac.id

Abstract. This qualitative study explores the motivation of Civil Engineering students at Universitas Katolik Parahyangan (UNPAR) in Bandung, Indonesia, regarding their learning of calculus within the Mathematics 2 course. Data were gathered through a survey using online questionnaire via Google Form of 55 students and in-depth interviews with 6 selected students representing high, moderate, and low levels of motivation. Results indicate that learning motivation is influenced by factors such as course relevance, teaching quality, academic support, and personal experiences. Students who perceive practical applications of calculus in Civil Engineering and receive quality instruction exhibit higher motivation. Additionally, effective study methods, including group discussions and online resources, help students overcome challenges. The study suggests emphasizing practical applications of calculus and providing adequate academic support to enhance students' motivation and learning outcomes, offering insights for future teaching strategies.
Keywords: Motivation, Learning, Calculus

1. Introduction

Learning motivation encompasses all internal drives within students that trigger learning activities, ensure the continuity of the learning process, and provide direction to these activities, allowing the desired goals of the learner to be achieved. Learning motivation is a key factor influencing the academic success of students [1, 2]. In the context of higher education, learning motivation is influenced not only by interest in the subject matter but also by students' perceptions of the relevance and practical application of the material being studied. Calculus, although often considered difficult, has been crucial to developing many scientific advancements, particularly in physics and engineering [3, 4]. Therefore, it is important to understand how students' motivation towards learning calculus is formed and what factors influence it.

The researchers are lecturers at Universitas Katolik Parahyangan (UNPAR) assigned to the Civil Engineering Study Program to teach the Mathematics 2 course. The topics covered in the Mathematics 2 course include: derivatives of transcendental functions, techniques of integration, improper integrals, partial derivatives, double integrals, and first and second-order differential equations. The researchers have firsthand experience with the challenges and dynamics faced by students in learning calculus, particularly in the Mathematics 2 course. The researchers' observations indicate that although calculus holds a crucial position in forming the mathematical foundation required for more advanced engineering courses, many students experience learning difficulties and lack motivation. This is evident from the high number of students who frequently miss classes without a valid reason, low participation in class discussions, frequent delays in submitting assignments, and low scores on assignments/quizzes [5].

Learning motivation plays a vital role in higher education as it drives and directs students' learning behaviors [6, 7]. Students with high level of learning motivation tend to be more enthusiastic, persistent, and resilient in facing academic challenges. They are more likely to take the initiative in seeking additional help, actively participate in class discussions, and use various learning resources to deepen their understanding. In contrast, students with low learning motivation appear lethargic, unenthusiastic, and unfocused during lectures. They also show less initiative for independent study and minimal involvement in academic activities [8, 9, 10].

In general, learning motivation can be divided into two main categories: intrinsic motivation and extrinsic motivation [11]. Intrinsic motivation comes from within the individual, such as interest and curiosity about a subject, while extrinsic motivation is influenced by external factors, such as grades, rewards, or social pressure [12, 13]. When students are intrinsically motivated, they exhibit a natural inclination to explore, understand, and master subjects out of sheer passion and intellectual curiosity. In the context of learning calculus, students driven by intrinsic motivation are often fascinated by the intricacies of mathematical concepts, finding joy in deciphering complex equations and discovering their real-world applications. Conversely, extrinsically motivated students may be spurred by the desire to attain high grades, secure academic achievements, or meet external expectations imposed by peers, parents, or educators.

Based on the discussion above, this research is conducted to comprehend the dynamics of student learning motivation in learning calculus. By understanding student learning motivation, this study aims to provide insights into formulating more effective teaching strategies to enhance student learning outcomes, particularly in learning calculus. Furthermore, this research offers deeper insights into student learning motivation to provide practical implications for improving overall academic performance.

2. Methodology

This research employs a qualitative approach using survey and in-depth interview methods. The survey was conducted in February 2024 by distributing an online questionnaire via Google Form to Civil Engineering students at UNPAR who have completed or are currently enrolled in the Mathematics 2 course, with a minimum target of 50 respondents. The questionnaire utilized in the survey consists of 30 statements covering key factors such as the relevance of the course to the background of the study program, academic support, teaching quality of lecturers, and personal perspectives on the Mathematics 2 course. Additionally, in-depth interviews were conducted with several students to gain deeper insights into their experiences and challenges in learning calculus.

In the initial stage, data collection was conducted through the distribution of an online questionnaire to Civil Engineering students at UNPAR. This questionnaire was designed to gather basic demographic information, such as age, gender, and academic year, as well as more specific statements regarding their experiences in learning calculus. For each statement, students selected one of five options that best represented their agreement, namely: strongly agree (SA), agree (A), neutral (N), disagree (D), or strongly disagree (SD). The questionnaire data were then converted into motivation scores using a Likert scale [14] as shown in Table 1.

Table 1. Likert Scale Scoring Guidelines

Response	Score
Strongly Agree (SA)	5

Response	Score
Agree (A)	4
Neutral (N)	3
Disagree (D)	2
Strongly Disagree (SD)	1

From the learning motivation score data, the mean (μ) and standard deviation (σ) were calculated to classify students into categories of high, moderate, and low learning motivation. This classification was based on the criteria outlined in Table 2.

Table 2. Categorization of Learning Motivation

Category	Criteria
High motivation	$X \geq \mu + \sigma$
Moderate motivation	$\mu - \sigma \leq X < \mu + \sigma$
Low motivation	$X < \mu - \sigma$

Note:
X : student's learning motivation questionnaire score

In-depth interviews were conducted with 6 students (2 from each category) selected randomly based on the survey results to gain deeper insights into their experiences with learning calculus. These interviews were semi-structured, allowing researchers to delve deeper into relevant topics and obtain richer insights into their learning motivation. The interview findings were then thematically analyzed to identify the main themes related to learning motivation. This thematic analysis helped uncover dominant factors influencing student motivation and provided insights into how they tackled challenges in learning calculus within the Mathematics 2 course.

3. Results and Discussion

3.1 Learning Motivation Questionnaire Data

A total of 55 respondents (38 males and 17 females) have completed the online questionnaire distributed via Google Form in February 2024. The questionnaire was administered to Civil Engineering students from various academic years, namely 2021, 2022, and 2023. Based on the analysis of learning motivation scores, the mean score obtained was 120.4 with a standard deviation of 11.34. Using these values, students were classified based on high, moderate, and low motivation categories as shown in Table 3.

Table 3. Student Groups Based on Learning Motivation

Category	Number of Students
High motivation	12

Category	Number of Students
Moderate motivation	33
Low motivation	10

3.2 In-Depth Interview Results Data

Based on the student groups in Table 3, two students were randomly selected from each category: high motivation (H1 and H2), moderate motivation (M1 and M2), and low motivation (L1 and L2) for in-depth interviews.

a) High Motivation Category (H1 and H2)

Student T1 exhibits a strong interest in calculus due to recognizing its importance in civil engineering. T1 actively seeks additional materials outside of class and frequently engages in group discussions. Since high school, T1 has had a strong mathematical foundation, further fueling interest in this course. Additionally, T1 utilizes online learning resources such as video tutorials and online discussion forums. T1 believes that by maximizing various learning sources, they can deepen their understanding of calculus and overcome challenges effectively.

Student T2 possesses high intrinsic motivation as T2 aspires to become a proficient civil engineer. A strong desire for success in civil engineering drives T2's focus on calculus learning. T2 consistently completes assignments on time and is not hesitant to ask the lecturer for clarification on any unclear material. With this proactive learning approach, T2 feels more prepared to face exams and assigned tasks.

b) Moderate Motivation Category (M1 and M2)

Student M1 exhibits a moderate level of interest in calculus but often struggles to comprehend abstract concepts. Despite having a sufficient mathematical background, M1 frequently doubts their own abilities, especially when facing complex topics. This uncertainty sometimes hinders M1's learning motivation. M1 tends to study only when there are assignments or exams and is less active in seeking additional sources outside of class. M1 rarely engages in group discussions or seeks additional materials independently. Nevertheless, M1 still strives to complete assignments on time and attends classes regularly.

Student M2 demonstrates fluctuating interest in calculus, depending on the topic being studied. M2's interest tends to increase when the topics discussed are more applicable and directly related to civil engineering. Conversely, their interest decreases when topics are perceived as too theoretical or difficult to understand. M2 is sometimes active in class discussions but does not always seek additional help when encountering difficulties. M2 feels more comfortable studying alone or with close friends who have a similar understanding. However, the lack of initiative to seek additional support often makes it challenging for M2 to master the material comprehensively.

c) Low Motivation Category (L1 and L2)

Student L1 demonstrates low motivation as calculus is perceived as too difficult and not directly related to their interest in civil engineering. This lack of understanding makes L1 feel stressed and less interested in delving deeper into calculus. Since high school, L1 has had negative experiences with mathematics, further worsening their motivation at the college level. This student tends to procrastinate on assignments and often fails to complete them on time. They rarely engage in class discussions and prefer to avoid tasks considered difficult. L1 feels that more interactive and directly supportive teaching methods could be beneficial.

Student L2 also exhibits low motivation and lacks confidence in their mathematical abilities since high school. Negative past experiences with mathematics make L2 feel that calculus is a subject they cannot master. This leads to feelings of anxiety and lack of motivation to learn. This student seldom

participates in class discussions and prefers to copy answers from peers when completing assignments. L2 believes that emotional support and more intensive guidance from professors or tutors are crucial.

4. Conclusion

The research provides significant insights into the complexities of learning motivation among Civil Engineering students at Universitas Katolik Parahyangan (UNPAR) in the Mathematics 2 course, particularly concerning calculus. Through a qualitative examination involving both survey data and in-depth interviews, several critical factors influencing student motivation have been elucidated. Survey results underscore the pivotal role of course relevance, teaching quality, academic support, and personal experiences in shaping students' motivation levels. Notably, students exhibit higher motivation when they perceive the practical implications of calculus in Civil Engineering and receive quality instruction, complemented by additional academic assistance.

In-depth interviews offer deeper insights into individual student experiences and challenges, highlighting distinct patterns among those with varying levels of motivation. Students with high motivation demonstrate proactive learning behaviors and engagement, whereas those with moderate motivation grapple with abstract concepts but maintain a diligent approach. Conversely, students with low motivation face considerable hurdles, often stemming from negative past experiences and feelings of inadequacy. Overall, the findings underscore the importance of understanding and addressing student motivation to foster a conducive learning environment and enhance student success in calculus education.

Acknowledgement

References

[1] V. Gopalan, J. A. A. Bakar, A. Nasir, Zulkifli, A. Alwi and R. C. Mat, "A Review of The Motivation Theories in Learning," 2017.
https://doi.org/10.1063/1.5005376

[2] M. F. Mahasa and N. S. B. Jamaluddin, "The Influence of Motivational Factors on Student Academic Achievement," *International Journal of Advanced Education and Development,* vol. 4, no. 2, pp. 1-12, 2023.
http://www.amcs-press.com/index.php/ijaed/article/view/335

[3] C. S. Domondon, C. Pardo and E. T. Rin, "Analysis of Difficulties of Students in Learning Calculus," *Science International (Lahore),* vol. 34, no. 6, pp. 1-4, 2022.
https://www.researchgate.net/publication/368810478_ANALYSIS_OF_DIFFICULTIES_OF_STUDENTS_IN_LEARNING_CALCULUS

[4] A. Perdigones, E. Gallego, N. Garcia, P. Fernandez, E. Perez-Martin and J. D. Corro, "Physics and Mathematics in the Engineering Curriculum: Correlation with Applied Subjects," *International Journal of Engineering Education,* vol. 30, no. 6, pp. 1509-1521, January 2014.
https://oa.upm.es/33336/1/INVE_MEM_2014_182314.pdf

[5] J. D. Willms, "Student Engagement at School; A Sense of Belonging and Participation: Results from PISA 2000," OECD: Organisation for Economic Co-Operation and Development, 2003.
http://dx.doi.org/10.1787/9789264018938-en

[6] J. Filgona, J. Sakiyo, D. M. Gwany and A. U. Okoronka, "Motivation in Learning," *Asian Journal of Education and Social Studies,* vol. 10, no. 4, pp. 16-37, 2020.
https://doi.org/10.9734/AJESS/2020/v10i430273

[7]   A. D. Wardani, I. Gunawan, D. E. Kusumaningrum and D. D. N. Betty, "Student Learning Motivation: A Conceptual Paper," in *2nd Early Childhood and Primary Childhood Education (ECPE) 2020*, 2020. http://dx.doi.org/10.2991/assehr.k.201112.049

[8]   C. Liu, Y. Shi and Y. Wang, "Self-Determination Theory in Education: The Relationship between Motivation and Academic Performance of Primary School, High School, and College Students," in *3rd International Conference on Mental Health, Education, and Human Development (MHEHD) 2022*. http://creativecommons.org/licenses/by-nc/4.0/

[9]   K. A. B. Abdulrahman, A. S. Alshehri, K. M. Alkhalifah, A. Alasiri, M. S. Aldayel, F. S. Alahmari, A. M. Alothman and M. A. Alfadhel, "The Realtionship Between Motivation and Academic Performance Among Medical Students in Riyadh," *Cureus,* vol. 15, no. 10, p. e46815, 10 October 2023. https://doi.org/10.7759%2Fcureus.46815

[10] D. B. Moreira-Morales and M. I. García-Loor, "Motivation in Academic Performance," *International Research Journal of Management IT and Social Sciences,* vol. 11, no. 1, pp. 30-38, January 2024. http://dx.doi.org/10.21744/irjmis.v11n1.2403

[11] R. Syamsuddin, "Learning Motivation," in *Effective Learning and Teaching For ESP*, 2021, pp. 1-32. https://www.researchgate.net/publication/353437453_LEARNING_MOTIVATION_MOTIVATION_OF_LEARNING.

[12] K. Cherry, "Intrinsic Motivation vs. Extrinsic Motivation: What's the Difference?," 13 December 2023. [Online]. https://www.verywellmind.com/differences-between-extrinsic-and-intrinsic-motivation-2795384. [Accessed 29 May 2024].

[13] R. M. Ryan and E. L. Deci, "Intrinsic and Extrinsic Motivations: Classic Definitions and New Definitions," *Contemporary Educational Psychology,* vol. 25, no. 1, pp. 54-67, 2000. https://doi.org/10.1006/ceps.1999.1020

[14] L. Cohen, L. Manion and K. Marrison, Research Methods in Education, 8 ed., Routledge, 2018. https://perpus.univpancasila.ac.id/repository/EBUPT170030.pdf

Effectiveness of Fruit and Vegetable Carving Creator Video Content on Students with Learning Barriers

Eka Rachmawati[1*], Titik Sulistyani[2] and Lina Mufidah[3]

[1,2,3] Cullinary Arts, Akademi Kesejahteraan Sosial "AKK", Yogyakarta, Indonesia

*E-mail: eckha.rachma@gmail.com

Abstract. The aims of this research are 1) to describe the effectiveness of fruit and vegetable carving content creator videos on students with learning barriers, 2) to describe changes in the skills of students with learning barriers in receiving fruit and vegetable carving creator content videos. This research is descriptive in nature using a quantitative approach, especially in the fruit and vegetable carving art course. The subjects in this research were 10 students with learning barriers in the fruit and vegetable carving course. Determination of research subjects is based on subject criteria that match the research criteria. The data collection techniques used were interviews and questionnaires. The results of this research are Ease of accessing videos by 85%; 2) clarity of videos from content creators, namely 80.2%; 3) the correlation between the content creator's video and the lecture material is 81%, this percentage is classified as good because the video can be used as a learning tool for students who experience learning obstacles; 4) the level of change in students' skills is 80.6% as evidenced by the results of work performance and; 5) the usefulness of videos in supporting learning is 82.4%, that the video content creator carving fruit and vegetables can be used for a long time and can be repeated according to user needs. The conclusions in this research reveal that the use of fruit and vegetable carving content creator videos in fruit and vegetable carving art courses has a good and positive skill change impact on students' understanding of learning and improves students' skills in practicing learning according to the video directions. This research produces findings in the learning development process.

Keyword : Effectiveness, Creator Video Content, Students With Learning Barriers

1. Introduction

The development of today's era accompanied by the great development of the internet in Indonesia has made many people display their creativity through internet media. Current technological advances which are increasingly rapid in various fields are very helpful in the development of science and technology, one of which is in the advancement of learning [1]. From all walks of life and ages, almost all people in Indonesia and the world have and are social media users. This social media is used as a medium for obtaining and conveying information to the public [2][3] Many people use the internet to fulfill their information needs and search for precise data from various sources in the world. From the existence of the internet, social media emerged whose aim was to act as an intermediary to connect people to interact with each other [4]

From another perspective, social media is media that is connected to the internet with the hope of facilitating the process of interaction or exchanging ideas with each other. Then using social media to

communicate has the advantage of being able to send messages in the form of writing, video, images and sound [4] The average Indonesian spends three hours and fourteen minutes a day accessing social media [5].However, you need to know that continuous use of social media will definitely have positive or negative effects. The effects are not only for adults, but also for teenage children who still need guidance from what they watch. Therefore, social media cannot be underestimated, considering the effects it will have on users[4].

Technological developments create various new things, including professions that developed rapidly during the pandemic and continue to develop until now, namely Content Creator. Content creator refers to creators in various fields. The term content creator also varies, including the term 'youtuber' which means the creator and uploader of videos on YouTube, which is the largest video site in the world [6]. In several countries, the term one-person media creator is equated with the term 'content creator'. content creators who utilize various techniques are increasing in number along with the change in content focus to videos from writing and photos [7][8].Video makers or commonly referred to as content creators are people who have an important role in creating a work in the form of a video.

Content creators are tasked with creating content in the form of writing, images or videos that will be displayed on various popular media such as YouTube, Snapchat, Instagram. A content creator now does not have to be a famous public figure or celebrity. However, those who become famous for their skills and creativity in creating content can already become a content creator. Content creators are tasked with collecting ideas and data, then conducting research to create concepts that will be used as content. After that, they will create appropriate content .

The process of creating content is long and not easy. Starting from ideation, research, drafting the script, making copy, the shooting process, editing, to content promotion. The existence of this content is not only a marketing tool, but has also made a positive contribution to the world of education by presenting digital media-based learning innovations. One form of innovation is the role of content creators in creating interactive learning videos for various subjects.

The presence of multimedia is considered a technological advancement in conveying. Information [9] Learning using video media is considered to increase students' interest in learning because it can help understand the material presented with visualization in the form of video. [10] Video is an electronic media that is able to combine audio and visual technology together to produce a dynamic and interesting show. Video media has a function as a learning medium, namely attention function, affective function, cognitive function and compensatory function [11].

Students with obstacles are vulnerable or are considered less likely to participate in learning due to the gap between normal students and students with needs [1]. Several previous studies stated that media videos can improve learning [12][13] and numerous studies show that video, in particular, can be a highly effective educational tool [14][15]. The video taken for learning is a video that contains how to carve fruit and vegetables simply. One of the videos that can be taken and easily applied in learning is videos from content creators on YouTube and Instagram. The video contains step by step how to carve.

The application used by fruit and vegetable carving content creators on YouTube is @pengukirlegendaris with a total of 52.2 thousand subscribers with 1 thousand carving videos and an account on Instagram @owel.yuwono with 37.5 thousand followers. The content created is carving content ranging from simple garnishes to levels of difficulty intended for people who are skilled at carving. The raw materials used are also ingredients that are easy to find such as cucumber, chayote, papaya, carrots, radishes, beets,

This content creator can be used as a learning resource for students with learning barriers to hone their skills in carving fruit and vegetables. In fact, carving is a difficult subject and requires skill and

interest in carrying it out. With videos from content creators, they can be used as a means of independent learning [16].

2. Method

This research is descriptive in nature using a quantitative approach, especially in the fruit and vegetable carving art course. This research will clearly illustrate the effectiveness of learning videos carried out by fruit carving content creators. There were 10 subjects in this research in the class of 2023. Determination of research subjects was based on subject criteria that were in accordance with the research criteria. Data collection in this research used questionnaires and observation. A questionnaire is a data collection technique that is carried out by distributing questions or written statements to respondents[17]. The main instrument in this research is a closed questionnaire. The data collection technique used is using a questionnaire. The data analysis technique was carried out using descriptive percentage analysis.

The grid in the questionnaire is as follows: ease of accessing the video, clarity of the video, linkage of the video to lecture material, level of student understanding, usefulness of the video. The instrument grid in the interview can be seen in table 1.

Table 1. Interview instrument grid

No	Aspect	Question items
1	Ease of accessing videos	1,2,3,4,5
2	Video clarity	6,7,8,9
3	Linkage of videos with lecture material	10,11,12,13
4	Level of student understanding	14,15,16,17
5	Usefulness of the video	18,19,20

The questionnaire contains 4 aspects with 20 questions using a scale Likert 1-5 consists of (strongly agree, agree, quite agree, somewhat agree and disagree) and using descriptive analysis stages. The following is an interpretation table of the Likert scale presented.

Table 2. Percentage Categories

No	Presentase	Interpretation
1	81 % - 100 %	strongly agree
2	61 % - 80 %	agree
3	41 % - 60 %	quite agree
4	21 % - 40 %	disagree
5	0 % - 20 %	don't agree

3. Results and Discussion

Learning the art of fruit and vegetable carving is a mandatory course that must be taken by all culinary arts students without exception. Fruit and vegetable carving materials include making simple plate garnishes from chilies, carrots, cucumbers, spring onions and tomatoes. Next, carve the garnishes for the tumpeng with cucumber, radish, carrot, pumpkin, bok choy. Fruit carving art materials also include various kinds of leaf folds and large tumpeng decorations for center pieces. Lastly, the most difficult thing is carving large fruit such as papaya, melon and watermelon which are carved in the shape of flowers or animals.

The material for carving fruit and vegetables is not easy because it requires skill and imagination to make it, so video support is needed so that it can be used as a guide for students to practice their skills

and imagination. The fruit and vegetable carving video from content creator @owel.yuwono on Instagram contains short videos that are easy to understand, while on the YouTube channel the fruit carving video contains step by step steps that can be imitated and repeated by all students, especially students with learning disorders.

Students with learning disorders are students who are slow in accepting learning material, especially with carving material which they feel is very difficult to do. With the supporting video tutorial content of fruit carving creator @owel.yuwono for students with learning disorders, it is hoped that they can slowly practice their skills and his imagination in carving. The following is an overview of several video clips shared by fruit carving content creator @owel.yuwono
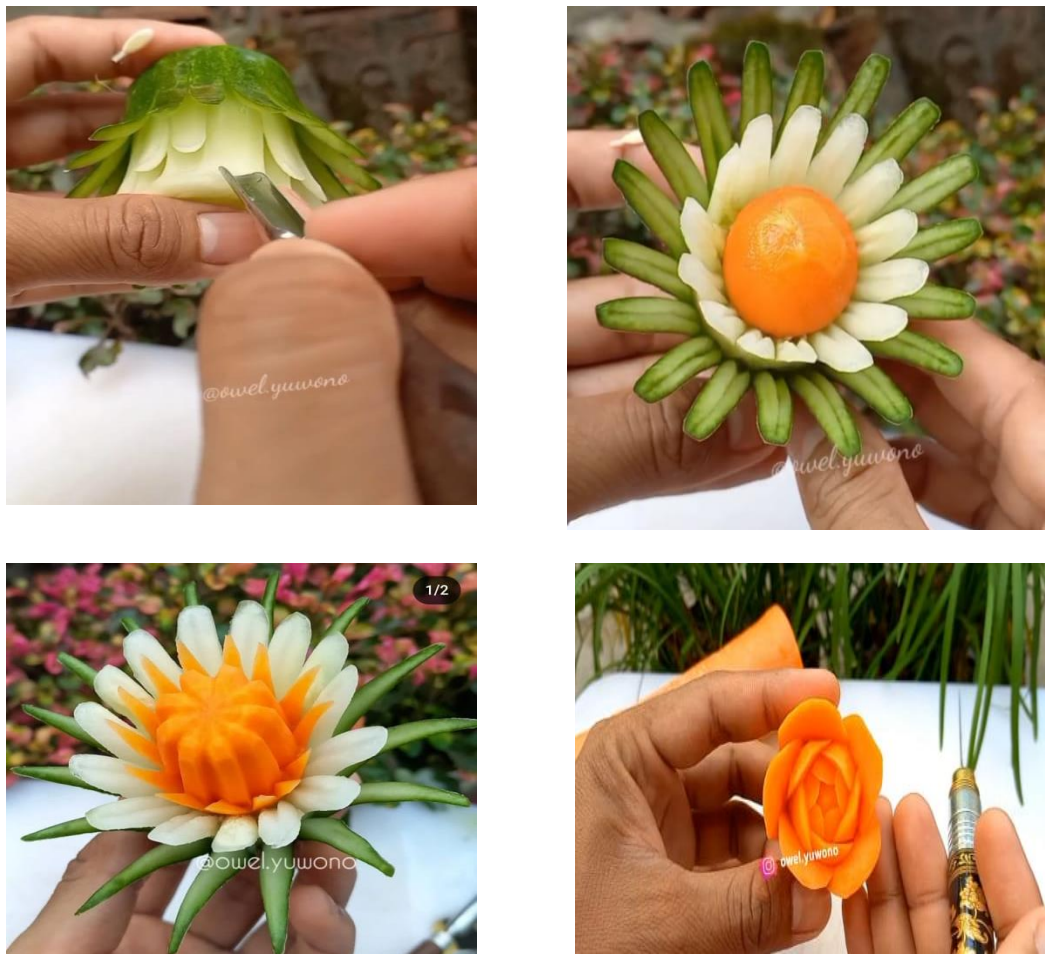
Figure 1. Examples of cavings from creator content

There are several examples of how to carve, which can be used as an illustration for students, especially students with learning disorders. Several experiments carried out by students can be seen in the following figure 2.

Figure 2. Results of student practice before watching the video

After carrying out several experiments using video assistants and lecturers, the results of several students began to improve and can be seen in the following figure 3.

Figure 3. Practice results after watching the creator's video several times

Based on the results obtained in this research, it can be seen in the following figure 4.
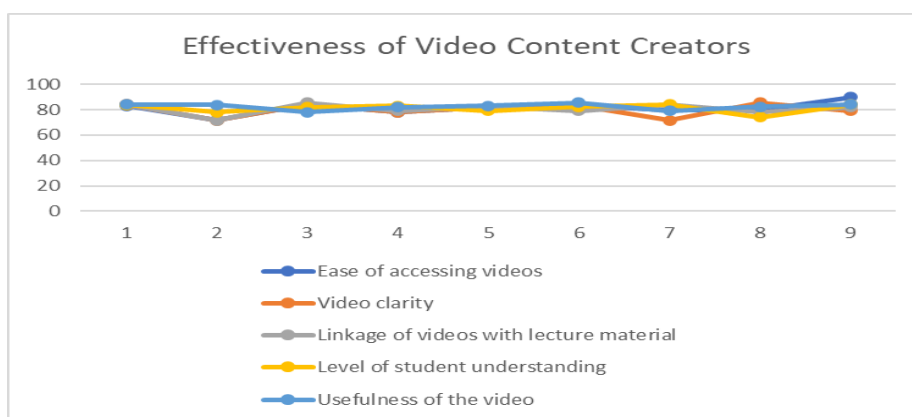
Figure 4. Results of the effectiveness of video content creators in learning fruit carving

In the picture you can see the following results: 1) ease of accessing videos is 85%. This result is classified as very good because the video is very easy to access both via Instagram and YouTube; 2) video clarity from the content creator is 80.2%. The video results from content creators are classified as good because the video contains step by step carvings so that students can do it slowly and can do it

repeatedly; 3) the connection between the video and the lecture material is 81%. In principle, the videos from the content creator @owel.yuwono are closely related to the practice course in the art of fruit and vegetable carving so that there is a connection between the videos made and the learning materials taught on campus; 4) the level of student understanding is 80.6%. The existence of these video content creators means that the skills of students with learning disorders can improve over time. They can repeat the video so that it can be played slowly so that it can be imitated easily; 5) the usefulness of the video is 82.4%. The results of the usefulness of the video are indeed very good because this video can actually help students with learning disorders improve their skills and create better imaginations than before they watched the video.

Images can summarize and present complex material in new and more useful ways for users. In line with Prastowo's opinion and in line with this research, video has the role of 1) Providing unexpected experiences for students; 2) Showing clearly something that was initially impossible to see; 3) Analyze changes over a certain period of time; 4) Providing experience for students to feel a certain situation, and; 5) Show case study presentations about real life that can trigger student discussion[18]

In line with Hamalik, the use of teaching media in the teaching and learning process can arouse new desires and interests, generate motivation and stimulants learning activities, and even have psychological influences [19]. The learning experience that students gain from using videos can be through the process of doing or experiencing directly what is learned in the videos, so that there is a process of observing and studying the videos. The more realistic students are in studying the video tutorial, the more experience they will gain in the learning they experience.

Delivering material on the art of fruit and vegetable carving by utilizing videos from fruit carving content creators has proven to be effective in developing, improving skills and fostering learning imagination so that students with learning disorders can increase their self-confidence and maximize student potential in performance during practicums.

4. Conclusion

The conclusions in this research reveal that the use of video tutorials by utilizing videos from content creator @owel.yuwono has a direct and positive influence on students' understanding of learning. This effectiveness can betranslated into 1) ease of accessing videos is 85%; 2) the clarity of the video from the content creator is 80.2%; 3) the link between the video and the lecture material is 81%; 4) the level of student understanding is 80.6%; 5) the usefulness of the video is 82.4%.

Students with disabilities are encouraged to participate be active by asking questions, giving opinions, about the fruit and vegetable carving art courses that they get from the creator's video content. Students are also more independent and indirectly have a confidence effect on themselves in focusing on learning. In the end, this research produced findings in the learning development process. This research can be applied to other practical courses by looking for themes that are similar to the material and content of other creators so that it can provide an overview and understanding for students.

The skills of students with learning obstacles can develop with video tutorials from this content creator because they can learn slowly and can be repeated according to user needs, so video tutorials have good usefulness and effectiveness in providing a detailed overview of practical material, especially as accompanying learning media. for students without exception.

References

[1]   E.Rachmawati, T.Sulistyani2 , L.Mufidah. (2023). Efektivitas Vidio Pembelajaran Tutorial Boga Dasar Pada Mahasiswa Dengan Hambatan Pendengaran. Prosiding Pendidikan Teknik Boga Busana Ft Uny. Vol 18, No 1 (2023): Prosiding PTBB 2023.

[2]   A. E. Pratiwi, N. N.Ufairah, &, R. S. Sopiah. (2021). Utilizing TikTok application as media for learning English pronunciation. *International Conference on Education of Suryakancana (IConnects Proceedings)*. https://doi.org/https://doi.org/10.35194/cp.v0i0.1374.

[3]   S.Rijal, &Y. Sukmayadi. (2021). The Use of the TikTok Application as a Music Learning Media for Junior High School Students. *Proceedings of the 3rd International Conference on Arts and Design Education (ICADE 2020)*, 104–108. https://doi.org/10.2991/assehr.k.210203.023

[4]   A.Nisa, S.D.Harya, Y.Adelia. *(2022).* Pengaruh Konten Kreator Tiktok @Sikibor Halilibor Terhadap Sikap Dan Perilaku Generasi Z . Jurnal Ilmu Komunikasi Dan Media Sosial (JKOMDIS) .Vol. 2 No. 3 November 2022 Hal. 338-345. DOI : https://doi.org/10.47233/jkomdis.v2i3.382

[5]   N.Aziz, I., & R.H. Sabella. (2021). TikTok as Media of Learning English. *JEET, Journal of English Education and Technology*, *2*(02), 408–419. http://jeet.fkdp.or.id/index.php/jeet/article/view/51

[6]   A.Ryvo., A. N.Julianto, A.Abdurrachim, A. A.Amien., D. S.Prakoso, D.Affian, E. R. P.Wulandari, F. V. A.Maulana, F. P.Sungkono, & F. H.Ardipraditiya. (2020). *Peradaban Media Sosial di Era Industri 4.0* (Vol. 9).

[7]   G.Liu, P.Gao, Y.Li, & Z.Zhang. (2019). Research on the Influence of Social Media Short Video Marketing on Consumer Brand Attitude. *Proceedings of the 2019 5th International Conference on Social Science and Higher Education (ICSSHE 2019)*, *336*, 784–789. https://doi.org/10.2991/icsshe-19.2019.192

[8]   A.Malimbe, F.Waani, & E. A. A. Suwu. (2021). Dampak Penggunaan Aplikasi Online Tiktok (Douyin) Terhadap Minat Belajar di Kalangan Mahasiswa Sosiologi Fakultas Ilmu Sosial Dan Politik Universitas Sam Ratulangi Manado. *JURNAL ILMIAH SOCIETY*, *1*(1).https://ejournal.unsrat.ac.id/index.php/jurnalilmiahsociety/article/view/35815

[9]   S. Miriri et al. (2016). " Food and gastronomic heritage: Telling a story of eyes and hands" Symposium on Computers and Communication (ISCC) (IEEE) 6–9. 2016

[10]   A.Yudianto. (2017). Penerapan Video sebagai media pembelajaran. ISBN.978- 602-50088-0-1.P.

[11]   A. Arsyad. (2013). Media Pembelajaran. Jakarta: Rajawali Press.

[12]   B, Means., Y, Toyama., R,Murphy., M, Bakia., & K,Jones,. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies.

[13]   S.F. Richard., et al. "The effects of technology use in postsecondary education: A meta-analysis of classroom applications." *Computers & Education* 72 (2014): 271-291.

[14]   W.A,Allen., and A. R. Smith. "Effects of video podcasting on psychomotor and cognitive performance, attitudes and study behavior of student physical therapists." *Innovations in Education and Teaching International* 49.4 (2012): 401-414.

[15]   B.R Stockwell, M.S Stockwell, M Cennamo, E Jiang. "Blended learning improves science education." *Cell* 162.5 (2015): 933-936.

[16]   D.L Schacter, K.K Szpunar. "Enhancing attention and memory during video-recorded lectures." *Scholarship of Teaching and Learning in Psychology* 1.1 (2015): 60.

[17]   Sugiyono. (2012). Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta.

[18]   A.Prastowo. (2012). Panduan Kreatif Membuat Bahan Ajar Inovatif. Yogyakarta: Diva Press

[19]   Azhar. 2003, Media Pembelajaran. Jakarta: Raja Grafindo Persada.

Enhancing Learning Outcomes through Multimedia Learning Materials for Students with Intellectual Disabilities

Nuryansyah Adijaya[1], Yumna Rasyid[2], Ifan Iskandar[3]

[1,2]Program Studi Linguistik Terapan, Program Pascasarjana, UNJ
[3]Program Magister Pendidikan Bahasa Inggris, UNJ
[1]nuryansyahadijaya_9906921038@mhs.unj.ac.id
[2]yumna.rasyid@unj.ac.id
[3]ifaniskandar@unj.ac.id
*) [1]**Nuryansyah Adijaya**

Abstract. This study investigates the efficacy of multimedia learning materials in enhancing educational outcomes for students with intellectual disabilities, a group traditionally undeserved by conventional educational methodologies. Intellectual disabilities vary widely, impacting cognitive functions such as memory, problem-solving, attention, and language skills, thereby necessitating more adaptive educational approaches. The research is grounded in Mayer's Cognitive Theory of Multimedia Learning and the Universal Design for Learning framework, which advocate for integrating multiple sensory inputs to reduce cognitive overload and enhance learning accessibility. Through a qualitative research design, the study analyzed various multimedia tools including interactive games, augmented reality, and tailored educational modules, and assessed their impact on learning engagement, comprehension, and retention. Data were collected from previous research and supplemented with interviews from teachers who have implemented these tools in their classrooms. Findings indicate that multimedia materials significantly improve educational outcomes by providing multi sensory, engaging, and differentiated learning experiences that are more aligned with the cognitive needs of students with intellectual disabilities. These materials not only foster better academic performance but also improve life skills and facilitate the integration of these individuals into the broader community. The study emphasizes the necessity of ongoing development and integration of multimedia resources in special education to ensure inclusive educational practices that can accommodate diverse learning needs.
Keywords: learning outcomes: multimedia learning material; students with intellectual disability

1. Introduction

Intellectual disabilities encompass a diverse range of cognitive impairments that profoundly affect an individual's ability to learn, communicate, and navigate daily activities. These impairments can vary widely in their severity and impact, influencing key cognitive functions such as memory, problem-solving, attention, and language skills. As a result, students with intellectual disabilities often encounter significant barriers within traditional educational settings, which are predominantly structured for intellectual development and learning styles. These traditional teaching methods, heavily reliant on direct instruction and rote memorization, may not only fail to meet the diverse needs of these students but also hinder their academic and social development. Studies have consistently shown that such one-

size-fits-all approaches are ill-suited for students whose learning processes require more flexibility and support, often leading to lower engagement and educational outcomes [1].

Given these challenges, educators and researchers have increasingly turned towards more inclusive and adaptive educational tools, such as multimedia learning materials, which hold promise for bridging the learning gaps experienced by students with intellectual disabilities. Multimedia learning materials uniquely combine various modes of information presentation—text, audio, visuals, and interactive elements creating richer, more engaging learning experiences, A.Pavithra, dkk (2018). These resources are designed to leverage the multisensory processing capabilities of the human brain, thereby enhancing understanding and retention of information. For example, visual representations can help clarify abstract concepts, while simultaneous audio explanations can reinforce the material, making learning more accessible and effective for students with varied cognitive abilities [3].

The potential benefits of multimedia learning materials are supported by several educational theories, including Moreno and Mayer's theory about Multimedia Learning, which posits that people learn better from words and pictures than from words alone. This theory suggests that multimedia can reduce cognitive overload by distributing cognitive effort more evenly across different modalities [4]. Furthermore, the Universal Design for Learning (UDL) framework advocates for the provision of multiple means of engagement, representation, action, and expression to cater to diverse learners, emphasizing that educational environments should adapt to the learner rather than expecting the learner to adapt to the environment, [5].

This study seeks to explore and evaluate the effectiveness of multimedia learning materials in improving educational outcomes for students with intellectual disabilities. By examining how these tools enhance engagement, comprehension, and retention, the research aims to provide empirical evidence that can inform and guide educational strategies tailored to the needs of these students. Moreover, the significance of this research extends beyond academic contexts, addressing broader societal implications such as promoting greater independence, improving life skills, and facilitating better integration of individuals with intellectual disabilities into the community. This contribution is crucial for fostering a more inclusive society where all individuals have the opportunity to learn and succeed.

2. Literature Review

Overview of Educational Strategies for Students with Intellectual Disabilities
Educational strategies for students with intellectual disabilities have evolved significantly over the past few decades, focusing on the development of customized teaching methods to address specific learning deficits. Historically, the pedagogical approach was largely based on direct instruction and behaviorist methods which emphasize repetition and reinforcement. However, contemporary educational models advocate for inclusive and adaptive learning environments that encourage interaction and participation, which are critical for this demographic. Sarkar, (2022) pay attention to the importance of the students' condition and that cater to the unique needs of each student, emphasizing the role of adaptive technologies and modified curricula that enhance accessibility and learning.

Learning Outcomes with Multimedia
Multimedia Learning Materials is a concept of designing learning materials integrate various forms of content such as text, audio, visuals, and interactive elements to create a rich, engaging learning environment. The use of multimedia is expected to support individuals learn better when information is presented through both verbal and visual means [7]. This integrating media approach is believed to reduce cognitive load and facilitate the integration of new information into existing knowledge structures, thus enhancing learning efficiency and retention.

Universal Design for Learning (UDL): UDL is a framework that emphasizes the need to design educational environments that accommodate the varying needs of all learners. It proposes providing multiple means of engagement, representation, action, and expression to ensure that all students have equal opportunities to learn and participate in educational activities, [8]. This approach is particularly beneficial for students with disabilities, as it promotes the adoption of flexible teaching strategies and materials that can be adjusted to meet diverse learning needs.

Empirical Evidence: Research has consistently shown that when educational materials are designed with these principles in mind, learning outcomes for students with intellectual disabilities can significantly improve. For instance, studies have found that multimedia tools can enhance the motivation and academic performance of these students in various subjects, from basic sciences to language arts [9]. Moreover, the incorporation of interactive elements and real-world applications has been shown to increase engagement and facilitate deeper learning understanding that help the students to get better learning outcome [10].

Practical Implementations: In practice, teachers who implement multimedia resources often notice improvements in student comprehension and retention. Interviews with educators, as well as case studies in special education settings, reveal that multimedia-based teaching strategies not only support the students achieve better result of the study but also help in developing critical life skills among students with intellectual disabilities.

In conclusion, enhancing learning outcomes through multimedia learning materials and UDL represents a progressive step towards more inclusive and effective educational practices. These approaches are not only essential for supporting students with intellectual disabilities but also beneficial for all learners, promoting a more accommodating and interactive educational environment.

Multimedia Learning Material

The concept of multimedia-based teaching materials is considered a solution for learning, including English, which can enhance learning motivation, especially for students with intellectual disabilities who have a high level of boredom due to their intellectual level. The multimedia concept in English teaching materials involves integrating various contents into the teaching material; text, illustrations, activities, sound, video, and so on into a digital system using computer design, making the presentation of the teaching materials more interactive,[11]. This explanation suggests that multimedia teaching materials are one way to help increase the motivation of students with intellectual disabilities in learning English.

Multimedia teaching materials play an important role in improving English language skills for students with intellectual disabilities due to the enjoyable concept they present, thus being able to enhance motivation,[12]. In line with the characteristics and benefits of multimedia teaching materials for students with intellectual disabilities, the design and use of such materials for these students can no longer be overlooked. Thus, these students can be assisted in learning English.

Students with Intellectual Disability

Intellectual disability is a condition in students who have below-average intellectual levels, affecting all aspects of their lives, including their learning process. [13] explains that intellectual disability is a state where students have abnormalities in intellectual levels that occur since the developmental stages of children, thus affecting their learning process, including language learning. Therefore, in the learning process, including learning English, these students require special handling starting from teachers, methods, to teaching materials.

It is clear from this that in helping students with intellectual disabilities, one needs special skills and instruments to facilitate their learning. Additionally, in teaching English to students with intellectual disabilities, we need special English teaching materials tailored to their conditions and characteristics.

Intellectual disability itself has classifications, so handling also varies between groups. There are several levels of intellectual disability indicated by intellectual levels (IQ), [14].

3. Methodology

This study employs a qualitative research design to explore the impact of multimedia learning materials in enhancing educational outcomes for students with intellectual disabilities. The qualitative approach allows for in-depth analysis of some researches that discuss the use of multimedia learning materials in learning process of students with intellectual disability. The data of the research is derived from some previous researches that explored about multimedia learning materials and students with intellectual disability. To support the data, researchers also make interview with two teachers that teach intellectual disability students. The data will be analyzed by reading the researches carefully to find out the effect of multimedia learning materials to learning teaching process whether the materials give positive impact or not to the result the learning activities. Meanwhile, the result of the interview will be used to give confirmation to what have been claimed in the researches.

4. Finding and discussion

A review of the literature has examined several studies to assess the efficacy of English language teaching materials in enhancing the educational experience of students with intellectual disabilities. These investigations provide significant insights into the adaptation and effectiveness of diverse educational strategies tailored for this demographic:

a. [15] employed a mixed-methods approach in their study, "Interactive Educational Animal Identification Game for Primary Schoolchildren with Intellectual Disability." The findings indicated that interactive, game-based educational applications could significantly bolster motivation and improve learning outcomes for students with intellectual disabilities.

b. Similarly, Khamparia et al. (2020) explored the "Effect of microworld game-based approach on neuromuscular disabled students' learning performance in elementary basic science." Utilizing a quasi-experimental design, the study concluded that game-based learning materials could enhance academic performance in basic science among students with intellectual disabilities, including those with Autism, Dyslexia, Dysgraphia, and Alzheimer's, by enabling direct engagement and practice with the material.

c. In the realm of mathematics education, [16] utilized the ADDIE model to develop a mathematics module tailored for students with intellectual disabilities, titled "Design of mathematics module for retardation students in mathematical solving." The research demonstrated that realistic approaches to mathematics education could significantly enhance these students' problem-solving capabilities.

d. [17] in their study, "Automatic Adaptation of Open Education Resources: An approach from a multilevel methodology based on students' preferences, educational special needs, artificial intelligence, and accessibility metadata," provided evidence that integrating open-access educational resources with teaching materials could improve learning outcomes for special needs students, including those with intellectual disabilities.

e. Furthermore, (Ahmad et al., 2019.) focused on augmented reality in their study, "Augmented reality model to aid Al-Quran memorizing for hearing impaired students," employing an Augmented Reality Based Content (ARBC) model. This approach proved effective in aiding hearing-impaired students in memorizing Al-Quran.

f. [19] investigated piano teaching methods for children with autism in her study "Methods of teaching piano to children with autism." The findings suggested that employing varied teaching

techniques could enhance memory and facilitate the learning process, enabling autistic students to perform complex rhythmic patterns.

g. (Zou & Teng, (2023), in their study titled "Effect of Tasks and Multimedia Annotation on Vocabulary Learning," reveal that the use of multimedia annotations has a positive impact on helping students increase their vocabulary. The researchers also recommend that teachers, educational material developers, students, and others use multimedia annotations in their learning processes

h. Edwards et al., (2020), in their research titled "Using Video Prompting to Teach Mathematics to Adolescent Students with LD," integrate mathematics learning by using videos to assist students with learning disabilities. The use of videos in learning is considered effective because it can enhance concentration and eliminate boredom in these students, thus improving their mathematics learning outcomes.

i. Lindner et al.,(2021), in their research titled "An Integrative Study on Learning and Testing with Multimedia: Effects on Students' Performance and Metacognition," reveal that the use of multimedia in learning increases students' confidence in answering given questions. Thus, the use of multimedia has a positive impact on students in facing exams.

j. Bouck et al., (2017), in their research titled "Using Concrete-Representational-Abstract Approach to Support Students with Intellectual Disability to Solve Change-Making Problems," utilized concrete objects in science learning. The study found that using concrete objects in science education can create a fun learning environment for students with intellectual disabilities, thereby helping to enhance their critical thinking abilities and ability to find solutions to existing questions.

Collectively, these studies underscore the importance of developing and utilizing teaching materials that are specifically designed to meet the unique educational needs of students with intellectual disabilities. The research consistently shows that tailored educational resources, particularly those incorporating multimedia elements, can significantly improve educational outcomes across various disciplines, from mathematics and science to music and religious studies. This body of evidence advocates for ongoing research and development of specialized teaching materials to better support the educational advancement of students with intellectual disabilities.

Interviews conducted with teachers at special public schools 4 and 7 in Jakarta further corroborate these findings, revealing that multimedia-based teaching materials positively impact the learning outcomes of students with intellectual disabilities. By incorporating videos, images, and other multimedia elements into their teaching, educators have observed notable improvements in students' comprehension of the material, thereby enhancing overall academic performance.

5. Conclusion

Based on the provided data and analysis within the document, the research aimed to evaluate the effectiveness of multimedia learning materials in enhancing educational outcomes for students with intellectual disabilities. The integration of multimedia tools in educational settings has shown promising potential in addressing the unique challenges faced by these students. The diverse sensory and interactive components inherent to multimedia materials align well with the learning needs of individuals with cognitive impairments, offering more accessible and engaging educational experiences.

The study confirms that multimedia applications, such as interactive games, augmented reality, and digital modules, significantly improve motivation, engagement, and academic performance across various subjects including science, mathematics, and language arts. Specifically, the findings from Yasin et al. (2019) and Khamparia et al. (2020) illustrate that game-based learning environments can

drastically enhance learning outcomes in elementary science and aid in the identification of animals, proving beneficial for students with a range of disabilities including students with intellectual disability.

Furthermore, the development and adaptation of specialized teaching modules, as demonstrated by Susiana & Suparman (2019) and Ingavélez-Guerra et al. (2021), highlight the effectiveness of tailored educational content that respects the individual needs of students, thereby facilitating better problem-solving skills and overall comprehension. This approach is underpinned by educational theories such as Mayer's Cognitive Theory of Multimedia Learning and the Universal Design for Learning, which advocate for the reduction of cognitive load and the provision of multiple means of learning engagement.

The empirical data gathered from interviews with teachers who teach students with intellectual disability in Jakarta's special state schools reinforces the study's findings, illustrating that the practical application of multimedia teaching materials yields improvements in students' understanding and retention of the material taught. These observations are crucial as they provide real-world confirmation of the theoretical benefits of multimedia learning tools.

In conclusion, this research substantiates the claim that multimedia learning materials significantly contribute to the educational advancement of students with intellectual disabilities. It advocates for the continued development and implementation of multimedia-based teaching strategies to foster a more inclusive and effective learning environment. Moving forward, it is recommended that educational practitioners and policymakers continue to support the integration of multimedia resources in special education curricula to ensure that all students have the opportunity to achieve their full educational potential.

References

[1] G. A. Tularam, "Traditional vs Non-traditional Teaching and Learning Strategies - the case of E-learning!," *Int. J. Math. Teach. Learn.*, vol. 19, no. 1, pp. 129–158, 2018, doi: 10.4256/ijmtl.v19i1.21.

[2] S. M. P. A.Pavithra, M.Aathilingam, "Multimedia and Its Applications," *Int. J. Res. Dev. Technol.*, vol. 10, no. 5, pp. 271–276, 2018, [Online]. Available: www.ijrdt.org.

[3] A. V. Oje, N. J. Hunsu, and D. May, "Virtual reality assisted engineering education: A multimedia learning perspective," *Comput. Educ. X Real.*, vol. 3, no. July 2022, p. 100033, 2023, doi: 10.1016/j.cexr.2023.100033.

[4] R. Moreno and R. E. Mayer, "Cognitive principles of multimedia learning: The role of modality and contiguity," *J. Educ. Psychol.*, vol. 91, no. 2, pp. 358–368, 1999, doi: 10.1037/0022-0663.91.2.358.

[5] K. Rao, "Universal design for learning and multimedia technology: Supporting culturally and linguistically diverse students," *J. Educ. Multimed. Hypermedia*, vol. 24, no. 2, pp. 121–137, 2015.

[6] K. Sarkar, "Effective Teaching Skills and Instructional Strategies for learners with Intellectual Disabilities ONLINE NATIONAL SEMINAR on Inclusive Education in India Organized by Department of Education , Mizoram University (A Central University), Aizawl , Mizoram," no. December, 2022.

[7] M. D. Abdulrahaman *et al.*, "Multimedia tools in the teaching and learning processes: A systematic review," *Heliyon*, vol. 6, no. 11, p. e05312, 2020, doi: 10.1016/j.heliyon.2020.e05312.

[8] C. A. Dell, T. F. Dell, and T. L. Blackwell, "Applying universal design for learning in online courses: Pedagogical and practical considerations," *J. Educ. Online*, vol. 13, no. 2, pp. 166–192, 2015, doi: 10.9743/jeo.2015.2.1.

[9] N. Zeqiri and A. Luma, "Multimedia learning systems and its implementation for the subject advanced it skills," *MIPRO 2007 - 30th Jubil. Int. Conv. Proc. Comput. Educ.*, vol. 4, no. May, pp. 265–268, 2007.

[10] A. Khamparia, B. Pandey, and B. P. Mishra, "Effects of microworld game-based approach on neuromuscular disabled students learning performance in elementary basic science courses," *Educ. Inf. Technol.*, 2020, doi: 10.1007/s10639-020-10142-2.

[11] F. P. Hardiyanti and N. Azizah, "Multimedia of Educational Game for Disability Intellectual Learning Process: A Systematic Review," vol. 296, no. Icsie 2018, pp. 360–368, 2019, doi: 10.2991/icsie-18.2019.66.

[12] Munir, W. Setiawan, E. P. Nugroho, J. Kusnendar, and A. P. Wibawa, "The effectiveness of Multimedia in Education for Special Education (MESE) to improve reading ability and memorizing for children with intellectual disability," *Int. J. Emerg. Technol. Learn.*, vol. 13, no. 8, pp. 254–263, 2018, doi: 10.3991/ijet.v13i08.8291.

[13] K. Klefbeck, "Lesson study for students with intellectual disability," *Int. J. Lesson Learn. Stud.*, vol. 9, no. 3, pp. 245–259, 2020, doi: 10.1108/IJLLS-12-2019-0082.

[14] A. Shree and P. C. Shukla, "Intellectual Disability: Definition, classification, causes and characteristics," *Learn. Community-An Int. J. Educ. Soc. Dev.*, vol. 7, no. 1, p. 9, 2016, doi: 10.5958/2231-458x.2016.00002.6.

[15] F. Yasin, A. Irsyadi, I. Journal, F. Communication, and U. M. Surakarta, "International Journal of Advanced Trends in Computer Science and Engineering Available Online at http://www.warse.org/IJATCSE/static/pdf/file/ijatcse64862019.pdf Interactive Educational Animal Identification Game for Primary," 2019.

[16] Susiana and Suparman, "Design of mathematics module for mental retardation students in mathematical problem-solving," *Int. J. Sci. Technol. Res.*, vol. 8, no. 11, pp. 3900–3905, 2019.

[17] P. Ingavélez-guerra, V. Robles-bykbaev, A. Pérez-muñoz, J. R. Hilera, and S. Otón-tortosa, "Automatic adaptation of open educational resources : an approach from a multilevel methodology based on accessibility metadata," vol. 4, pp. 1–15, 2021, doi: 10.1109/ACCESS.2021.3139537.

[18] H. Ahmad *et al.*, *Augmented Reality Model to Aid Al-Quran Memorization for Hearing Impaired Students*. Springer Singapore.

[19] V. Dimitrova, "Methods of Teaching Piano to Children with Autism," 2022, [Online]. Available: http://hdl.handle.net/1880/114640.

[20] D. Zou and M. F. Teng, "Effects of tasks and multimedia annotations on vocabulary learning," *System*, vol. 115, no. February 2022, p. 103050, 2023, doi: 10.1016/j.system.2023.103050.

[21] S. E. Edwards, R. O. Kellems, G. S. Gibb, B. Y. Ashbaker, K. Osborne, and A. W. Wheatley, "Using video prompting to teach mathematics to adolescent students with LD rre ct pr oo un f v er si un co rre ct ed pr oo," vol. 1, pp. 1–13, 2020, doi: 10.3233/TAD-200298.

[22] M. A. Lindner, A. Eitel, J. Barenthien, and O. Köller, "An integrative study on learning and testing with multimedia: Effects on students' performance and metacognition," *Learn. Instr.*, vol. 71, no. July 2017, p. 101100, 2021, doi: 10.1016/j.learninstruc.2018.01.002.

[23] E. Bouck, J. Park, and B. Nickell, "Research in Developmental Disabilities Using the concrete-representational-abstract approach to support students with intellectual disability to solve change-making problems," *Res. Dev. Disabil.*, vol. 60, pp. 24–36, 2017, doi: 10.1016/j.ridd.2016.11.006.

The Effect of Reward and Punishment Strategy on Learning Outcomes of Social Learning of Elementary School Students

Silfi Melindawati[1*], Itsna Oktaviyanti[2*], E. Kus Eddy Sartono[3], Wuri Wuryandani[4]

[1] Pendidikan Guru Sekolah Dasar, Universitas Adzkia, Padang, Indonesia
[2] Pendidikan Guru Sekolah Dasar, Universitas Mataram, Nusa tenggara Barat, Indonesia
[3] Universitas Negeri Yogyakarta, Indonesia

[*]E-mail: silfi.m@adzkia.ac.id, itsna@unram.ac.id

Abstract. This study was motivated by the social studies learning outcomes of fifth grade students of SD IT ADZKIA I still below KKM with several problems, namely: The purpose of this study was to determine the significant effect of the use of reward and punishment strategies on the learning outcomes of social studies subjects of grade V students. This type of research is experimental research using Quasi Experimental Design with research design Nonequivalent Control Group Design. The population here is all fifth grade students, with random sampling techniques where class VA is the experiment and VB is the control class.

1. Introduction

Education according to (Hamalik, 2009) is a process in order to influence students to be able to adapt themselves as well as possible to their environment, and thus will cause changes in themselves that allow them to function in community life. Based on the above opinions, it can be concluded that a learning strategy is a plan or learning activity carried out by teachers and students with certain procedures to achieve learning objectives effectively and efficiently. Education in Indonesia is closely related to reward and punishment in relation to learning and discipline teachers apply strategies to motivate students to be more obedient and orderly to all the rules in school (Martins, 2021). One of the needs that students have is the need for appreciation contained in intellectual needs. Activities that can be carried out by teachers to fulfill the need for appreciation in learning are by providing rewards and punishments (Shabel, 2019). Therefore, the authors try to use reward and punishment strategies to improve student learning outcomes and discipline. According to (Mukherjee, 2020) reward is a way done by someone to give an award to someone for doing a task and being more motivated in doing something. Punishment is an educational tool to correct offenses committed by students not for revenge.

Reward and punishment are used by teachers as a form of reinforcement, stimulus in educating students (Awaga, 2020). Rewards are given by teachers to students by giving gifts for positive things done by students (Byrd, 2018). Reward is intended to make children more active in their efforts to work and do better. Punishment is given by the teacher to students because students make violations or mistakes. Punishment will make students regret their wrong actions (Zhao, 2020). Thus education must be directed to improve quality human beings who are able to compete, have good character. Education is also closely related to the learning process, in learning now teachers are required to prioritize creative learning and communication between students and teachers, students and students and teachers and

parents.Learning strategy is a plan, action, or behavior that includes the use of methods and utilization of various resources or strengths in a learning. This means that in the preparation of a new strategy until the process of preparing a work plan has not yet reached action(Watson, 2019). Based on the background of the problem above, several problems can be identified that occur in class V SD IT ADZKIA as follows: 1) The teacher still uses conventional methods, 2) Lack of student enthusiasm in participating in the learning process, 3). Lack of student confidence in expressing opinions in discussions.4) Low student social studies learning outcomes. Based on the above problems, the purpose of this study is to determine the effect of reward and punishment strategies on social studies learning outcomes of grade V SD IT ADZKIA I. Based on the results of interviews in VA , VB and VC class teacher. The author found a problem in class V SD IT ADZKIA , obtaining problems related to the low daily assessment of students below the KKM (Minimum Completeness Criteria). This can be seen from the daily assessment of grade V students of SD IT ADZKIA.

Table 1. Percentage. Source: PH scores from class V teachers A, B & C SD IT ADZKIA I KKM: 75

CLASS	KKM	Completeness		Numbe of Students	Percentage (%)	
		Completed	Not Yet Completed		Completed	Not Yet Completed
Class VA	75	9	11	20	45%	55%
Class VB	75	8	10	17	44%	66%
Class VC	75	10	7	17	58%	42%

2. Methods

Based on the problems and objectives to be achieved in the study, the type of research conducted is classified as experimental research. In experimental research there is treatment (treatment) which is used to look for the effect of certain treatments on others under controlled conditions. (Sugiono, 2017: 110) explains, experimental research methods are one of the quantitative methods, used primarily when researchers want to conduct experiments to find the effect of independent variables / treatment / certain treatments on dependent variables / results / outputs under controlled conditions.

The experimental research design used is a type of Quasi Experimental Design or also called a pseudo-experiment that tests the independent variable with the dependent variable carried out on a sample of the experimental group or control group (Sugiono, 2017): 120). The design form used is Nonequivalent Control Group Design, in this research design there are two groups, the first group is given treatment (X) and the other group is not given treatment (X). The treated group is called the experimental group and the untreated group is called the control group. Then, both groups were given a posttest (O). The following is a table of research design:

$$O_1 \quad X \quad O_2$$

$$\cdots\cdots\cdots\cdots\cdots\cdots$$

$$O_3 \qquad\qquad O_4$$
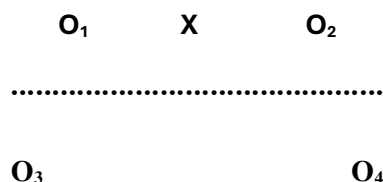
Table 2. Research Design Nonequivalent Control Group Design Source**: (Sugiono, 2017): 79)**

The population in the research to be carried out is all fifth grade students of SD IT ADZKIA I, consisting of classes VA, VB, and VC. Details of the population can be seen in the following table:

Table 2. Number of Students in Class V. Source: Class Teachers IVA, IVB, & IVC

Class	Number of Student
VA	20
VB	18
VC	17
Total	55

Table 3. Normality test of class VA, VB and VC

Tests of Normality

	Kelas	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
Hasil Belajar IPS	Kelas A	.131	20	.200[*]	.942	20	.263
	Kelas B	.232	18	.011	.926	18	.164
	Kelas C	.173	17	.188	.961	17	.653

Based on the normality test above, it can be seen that the significant value obtained is in the Shapiro-Wilk column 0.164 in the control class and 0.263 in the experimental class and in class VC 0.653>0.05 (level of error / rejection), so with this it can be stated that the social studies learning outcomes test data is normally distributed.

Test of Homogeneity of Variances			
Hasil Belajar IPS			
Levene Statistic	df1	df2	Sig.
1.827	2	52	.171

Based on the table above, it can be seen that the significance of the Levene test is 0.171> 0.05 (the level of error / rejection level), it can be seen that the social studies learning outcomes test data is homogeneously distributed.

The sample of this study were VA class students consisting of 20 people, VB class students consisting of 18 people. The technique used as sampling is the Sample Random Sampling technique said to be a sample (simple) because taking sample members from the population is done randomly without regard to the strata in the population. This is done when members of the population are considered homogeneous. The sample class consists of two classes, namely the experimental class treated with the reward and punishment strategy and the control class with the conventional model for VA or VB grade students at SD IT ADZKIA I.

Question Validity Test

To find out whether an item or item is valid or not, it can be seen from the correlation price. According to Sugiyono (2009) "if the correlation price is below 0.30, it can be concluded that the item

instrument is invalid, so it must be corrected or discarded". In this study to test the validity of the research instrument questions, researchers used the help of Microsoft Excell applications. Of the 30 items, there are 18 valid items and 12 invalid items, including: valid questions are numbers 1, 2, 3, 4, 7, 11, 12, 13, 16, 17, 20, 21, 24, 25, 26, 27, 29, 30. And invalid questions are numbers 5, 6, 8, 9, 10, 14, 15, 18, 19, 22, 23, 28.

Problem Reliability Test

An instrument is said to be reliable if it is reliable enough to be used as a data collection tool because the instrument is good, does not tend to direct respondents to choose certain answers (Arikunto, 2010). In this study, the K-20 formula was used to calculate the reliability, namely as follows:

$$r\ 11= \left(\frac{n}{n-1}\right)\left(\frac{S^2 - \sum pq}{S^2}\right)$$

$$S^2 = \frac{\sum Y^2 \frac{(\sum Y)^2}{N}}{N}$$

Notes:

r11 = Instrument Reliability
p = Proportion of subjects who answered the question correctly
q = Proportion of subjects who answered the question incorrectly (q 1-p)
∑pq = The sum of the multiplication results between p and q n
N = Number of questions
$S2$ = Standard deviation of the test

To interpret the test reliability numbers, the criteria found in the following table are used:
Reliability Coefficient Criteria

Koefisien Reliabilitas	Kriteria
0,81 ≤ r₁₁ 1,00	Very High
0,61 ≤ r₁₁ 0,80	High
0,41 ≤ r₁₁ 0,60	Fair
0,21 ≤ r₁₁ 0,40	Low
0,00 ≤ r₁₁ 0,20	Very Low

Test Reliability Criteria (Arikunto, 2012) .

Data Analysis Technique

Data analysis techniques useful for student learning outcomes in control and experimental classes used descriptive statistics in the form of averages and standard deviations (the average value obtained is compared with the completeness value). Comparing control class and experimental class using t-test. Before conducting the t-test, a prerequisite test was first carried out, namely the normality test and homogeneity test as a condition for research to be carried out.

a. Normality Test

The normality test aims to determine whether the research data is normally distributed or not. In this study, the data normality testing technique was carried out using the Liliefors test by looking at the significance value on Shapiro-Wil. The hypotheses proposed are:

H0 : Data is normally distributed
H1 : Data is not normally distributed

In this calculation the researcher used SPSS 22, in conducting a normality test to further accuracy the data, with the following steps: Fill in the SPSS dataset like the example that has been downloaded, after the data is filled in the variable, on the Menu, Click Analyze, Descriptive Statistics, Explore.

b.   Homogeneity Test

The homogeneity test aims to determine whether the sample class has a homogeneous variance or not. The data homogeneity test in this study was carried out with the Levene test using the help of the SPSS 22 program.

For the homogeneity test, researchers used the SPSS version 22 program using the levene test. With the criteria if the significance value (Sig) Levene > 0.05 then the data is homogeneous and vice versa. The homogeneity test steps using the Levene test are as follows:

Take the data that has been tested for normality
Click Analyze, take Compare means
Click Oneway ANOVA, click option
In the option column select homogeney of variance text
Click Continue then OK.

The criteria for determining the equality of variance are as follows:

Determine the test significance level $\alpha = 0.05$
Compare the Sig. value with the significance level
If Sig. > 0.05 then both variants are homogeneous
If Sig. < 0.05 then both variants are not homogeneous

c.   Hypothesis Test

Hypothesis testing is used to determine the effect of reward and punishment learning strategies on student learning outcomes that have been given treatment to experimental groups and control groups. The hypothesis aims to test the truth of the theory under study, to contribute new discovery theories and add extensive knowledge to something under study. The t-test for hypothesis:

After conducting normality and homogeneity tests, hypothesis testing is then carried out. The hypothesis put forward:

$H_0 : \mu_1 = \mu_2$ There is no effect of using reward and punishment strategies on social studies learning outcomes in Class V SD IT ADZKIA I.

$H_1 : \mu_1 > \mu_2$ There is a significant influence on the use of reward and punishment strategies on social studies learning outcomes in Class V SD IT ADZKIA I.

3.   Results And Discussion

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Kelas Eksperimen	20	50	100	83.50	14.244
Kelas Kontrol	18	50	90	66.67	12. 834
Valid N (listwise)	18				

Results of descriptive statistics of experimental and control classes

The data from the descriptive statistics show that the average value of the learning outcomes of 5th grade students of SD IT ADZKIA I, after the application of the reward and punishment strategy in the experimental class is 83.50 out of an ideal score of 100. And the control class did not use the reward

and punishment strategy and got an average score of 66.67 out of an ideal score of 100. Categories in the learning outcomes completeness guidelines (Siti, et al, 2020: 314).

Table 4. Level of Post-Test Learning Outcomes of Experimental Classes

Skor	Interpresentasi	Frekuensi	Persentase (%)
80 – 100	Very good	14	70%
66 – 79	good	2	10 %
56 – 65	fair	1	5%
40 – 55	less	3	15%
30 – 39	fail		%
Jumlah		20	100

Source: Statistical data on frequency and percentage of learning outcomes scores of class V SD IT ADZKIA I

Diagram 1. Bar Diagram of Experimental VA Class Post-test Results

Table 5. Level of Learning Achievement of Control Class Post-test

Interpresentation score Frequency Percentage (%)

Skor	interpresentasi	Frekuensi	Presentase (%)
80 – 100	Baik sekali	4	23 %
66 – 79	Baik	7	33 %
56 – 65	Cukup	4	22 %
40 – 55	Kurang	4	22%
30 – 39	Gagal	0	0
Jumlah		18	100

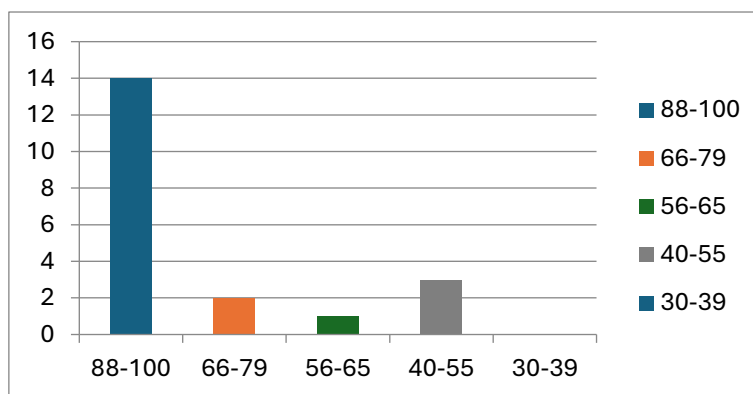Source: Statistical data on frequency and percentage of learning outcomes scores of class V SD IT ADZKIA I
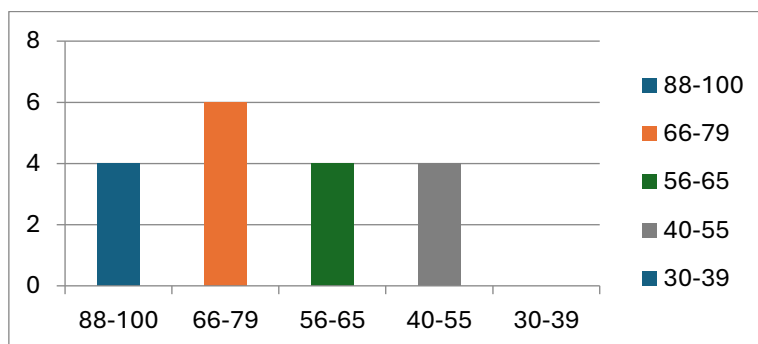
Diagram 2. Bar Diagram of Control Class VB Posttest Results

Based on the data obtained from the table above, it can be seen that the learning outcomes of students in the experimental class at the pottest stage using test instruments are categorized as 70% Very Good, 10% Good, 5% Fair and 15% Poor. Based on the percentage results obtained, it can be seen the effect on changes in the level of student learning outcomes after applying the reward and punishnent strategy during the learning process. Whereas in the control class the percentage results of the pottest scores were obtained in the Excellent category 23%, Good 33%, Fair 22% and less 22%. This data has an effect with the application of the reward and punishnent strategy on student learning outcomes where the pots-test value in the experimental class is higher than the control class, meaning that students more easily understand the material after the application of the reward and punishnent strategy in the learning process so that it affects the final value of the pots-test is very high.

Table 6. Description of Social Studies Learning Outcomes

Skor	Category	Score Frequency of experimental class	Percentage (%)	class Frequency Control	Percentage (%)
0 ≤ x < 75	Incomplete	6	30%	14	78%
75 ≤ x ≤ 100	Completed	14	70%	4	22%

Based on the table above, it can be seen that the learning outcomes of grade V SD IT ADZKIA I in social studies subjects after the posttest in the experimental class and the control class were much different where more were completed in the experimental class as many as 70% of students after applying the reward and punishment strategy compared to the control class which did not use the reward and punishment strategy, many students' posttest scores were low. This means that the completeness of learning outcomes in the experimental class is more satisfying than in the control class because from the average experimental class of 83.50 to the percentage of experimental class student learning outcomes 70% complete this is what makes the experimental class superior to the control class, so it means that there is an effect of reward and punishment strategies on the learning outcomes of social studies class V SD IT ADZKIA I.

Table 7. Post-test Normality Test Results

		Tests of Normality					
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Kelas	Statistic	Df	Sig.	Statistic	Df	Sig.
Social Studies	Experiment	.225	20	.009	.911	20	.067
Learning	Control	.175	18	.149	.908	18	.078

Based on the normality test above, it can be seen that the significant value in the Shampiro-Wilk column is 0.67 in the experimental class and 0.78 in the control class > 0.05 (error rate / rejection). This data on social studies learning outcomes through the post test is declared normally distributed.

Table 8. Homogeneity Test Results of the Final Test

Test of Homogeneity of Variances			
social studies learning outcomes			
Levene Statistic	df1	df2	Sig.
.080	1	35	.778

Based on the table above, it can be seen that the significance of the Lavene test is 0.778>0.05 (the level of error / rejection level) which means that the social studies learning outcomes test data are homogeneously distributed.

Discussion

The research is included in experimental research because this study has the aim of examining the effect of reward and punishment strategies on student learning outcomes in social studies class V SD IT ADZKIA I. The influence contained in the title can be seen that the dependent variable is the reward and punishment strategy and the independent variable is the learning outcomes of fifth grade students of SD IT ADZKIA I. The design of the research design applied is Quasi.

The research design applied is Quasi Experimental Design with the type, namely Nonequivalent Control Group Design. This study used 2 classes with 1 class as an experimental class and 1 as a control class to test the effect between the two variables contained in the title. Testing the reward and punishment strategy on student learning outcomes, researchers used a post-test design where in this design researchers tested student learning outcomes with questions at the end of learning after applying the reward and punishment strategy to the experimental class in the learning process 3 consecutive meetings and in the control class using conventional methods.

Based on the description of the analysis of student test data with descriptive and inferential statistics, it can be seen that the test results in the experimental class are higher than the control class. This is because the reward and punishment strategy has all the advantages with the following characteristics:

1. The learning process using the reward and punishment strategy can make children actively learn. The learning process is more students than teachers, where students can conceptualize their own learning so that learning will be more meaningful. This is because the reward and punishment strategy has an interesting learning phase and makes students eager to learn.
2. Learning with the reward and punishment strategy encourages students to learn more, makes students more independent, creates an attitude of responsibility, and increases student creativity.
3. This strategy aims to always involve students where students are given certain tasks during learning hours that can be completed in class, where the task can be accounted for by students to the teacher when the learning is complete. The task can be memorization, testing or evaluation(Watson, 2019).

Student learning outcomes using the reward and punishment strategy are higher, this is because the reward and punishment strategy can make students active and include all students in learning, so that students better understand the learning material. So learning with reward and punishment strategies is very influential on student learning outcomes so that student learning outcomes increase. Based on the description above, it means that H0 is rejected and H1 is accepted, which means "There is a significant effect of using the reward and punishment strategy on social studies learning outcomes in class V SD

IT ADZKIA I" is accepted. The reward and punishment strategy applied can make students active and improve student learning outcomes in elementary schools.

4. Conclusions

Based on descriptive statistical analysis of the results of research that has been done by researchers, it is obtained that the value of the post-test results of the experimental class gets an average (mean) of 83.50 so the social studies learning outcomes of students after applying the reward and punishment strategy has better learning outcomes compared to the control class of only 66.7 without using the reward and punishment strategy. Based on the results of descriptive statistical analysis on the average value of learning outcomes on the post-test, the learning outcomes of experimental class students are in the category of excellent 70%, good 10%, sufficient 5% and less 15%. The control class is in the excellent criteria 23%, good 33%, sufficient 22% and less 22%. The percentage of student learning outcomes in the post-test, the percentage of the experimental class is high. Therefore, the test results prove that the use of reward and punishment strategies has a significant effect on social studies learning outcomes in class V SD IT ADZKIA I. Based on the results of inferential statistical analysis that researchers obtained, it can be concluded that tcount = 3.451 and ttable = 1.688 where tcount is greater than ttable. These results prove that the use of reward and punishment strategies has a significant effect on social studies learning outcomes in class V SD IT ADZKIA I.

References

[1] Arikunto, S. (2012). *Prosedur Penelitian: Suatu Pendekatan Praktik*. Rineka Cipta.
[2] Awaga, A. L. (2020). Evolutionary game of green manufacturing mode of enterprises under the influence of government reward and punishment. *Advances in Production Engineering And Management*, *15*(4), 416–430. https://doi.org/10.14743/APEM2020.4.375
[3] Byrd, A. L. (2018). Boys with conduct problems and callous-unemotional traits: Neural response to reward and punishment and associations with treatment response. *Developmental Cognitive Neuroscience*, *30*, 51–59. https://doi.org/10.1016/j.dcn.2017.12.004
[4] Hamalik, O. (2009). *Proses Belajar Mengajar*. PT. Bumi Aksara.
[5] Martins, D. (2021). Mapping social reward and punishment processing in the human brain: A voxel-based meta-analysis of neuroimaging findings using the social incentive delay task. *Neuroscience and Biobehavioral Reviews*, *122*, 1–17. https://doi.org/10.1016/j.neubiorev.2020.12.034
[6] Mukherjee, D. (2020). Reward and punishment reversal-learning in major depressive disorder. *Journal of Abnormal Psychology*, *129*(8), 810–823. https://doi.org/10.1037/abn0000641
[7] Shabel, S. J. (2019). Stress transforms lateral habenula reward responses into punishment signals. *Proceedings of the National Academy of Sciences of the United States of America*, *116*(25), 12488–12493. https://doi.org/10.1073/pnas.1903334116
[8] Sugiono. (2017). *Statistika untuk Penelitian*. Alfabeta.
[9] Watson, P. (2019). Prioritizing pleasure and pain: attentional capture by reward-related and punishment-related stimuli. *Current Opinion in Behavioral Sciences*, *26*, 107–113. https://doi.org/10.1016/j.cobeha.2018.12.002
[10] Zhao, Y. (2020). EPR system based on a reward and punishment mechanism: Producer-led product recycling channels. *Waste Management*, *103*, 198–207. https://doi.org/10.1016/j.wasman.2019.12.034
[11] Arikunto, S. (2012). *Prosedur Penelitian: Suatu Pendekatan Praktik*. Rineka Cipta.
[12] Awaga, A. L. (2020). Evolutionary game of green manufacturing mode of enterprises under the influence of government reward and punishment. *Advances in Production Engineering And Management*, *15*(4), 416–430. https://doi.org/10.14743/APEM2020.4.375
[13] Byrd, A. L. (2018). Boys with conduct problems and callous-unemotional traits: Neural response to reward and punishment and associations with treatment response. *Developmental Cognitive Neuroscience*, *30*, 51–59. https://doi.org/10.1016/j.dcn.2017.12.004
[14] Hamalik, O. (2009). *Proses Belajar Mengajar*. PT. Bumi Aksara.
[15] Martins, D. (2021). Mapping social reward and punishment processing in the human brain: A voxel-based meta-analysis of neuroimaging findings using the social incentive delay task. *Neuroscience and Biobehavioral Reviews*, *122*, 1–17. https://doi.org/10.1016/j.neubiorev.2020.12.034
[16] Mukherjee, D. (2020). Reward and punishment reversal-learning in major depressive disorder. *Journal of Abnormal Psychology*, *129*(8), 810–823. https://doi.org/10.1037/abn0000641

[17] Shabel, S. J. (2019). Stress transforms lateral habenula reward responses into punishment signals. *Proceedings of the National Academy of Sciences of the United States of America*, *116*(25), 12488–12493. https://doi.org/10.1073/pnas.1903334116

[18] Sugiono. (2017). *Statistika untuk Penelitian*. Alfabeta.

[19] Watson, P. (2019). Prioritizing pleasure and pain: attentional capture by reward-related and punishment-related stimuli. *Current Opinion in Behavioral Sciences*, *26*, 107–113. https://doi.org/10.1016/j.cobeha.2018.12.002

[20] Zhao, Y. (2020). EPR system based on a reward and punishment mechanism: Producer-led product recycling channels. *Waste Management*, *103*, 198–207. https://doi.org/10.1016/j.wasman.2019.12.034

Challenges to Inclusive Leadership in Developing School Climate in Indonesia

Siti Nurjannah[1*], Fahrur Rosi[2] and Hermanto[3]

[1] Special Education, Universitas Negeri Yogyakarta, Indonesia
[2] English Language Education, Universitas Negeri Malang, Indonesia
[3] Special Education, Universitas Negeri Yogyakarta, Indonesia

[*]E-mail: sitinurjannah.2022@student.uny.ac.id

Abstract. Inclusive leadership in schools is necessary to support a positive school climate. This study aims to examine the challenges and barriers in implementing inclusive leadership in Yogyakarta, Indonesia. This study used descriptive research involving 78 principals and teachers, consisting of 59 principals and 19 teachers, divided into 5 districts. Data were collected through questionnaires filled out by all participants, and FGDs were conducted to gather deeper data represented by 10 participants. The findings indicated that schools in Yogyakarta have demonstrated commendable implementation of inclusive leadership practices to foster a positive school climate. However, there are still some aspects that are a challenge in the practice of inclusive leadership, so schools can improve inclusive leadership in aspects that have not been maximized. Future research can conduct similar research in other provinces in order to provide input to schools in implementing inclusive leadership and creating a positive school environment.

1. Introduction

The development of inclusive leadership has been under scrutiny since its introduction in literature during the early 1990s [1]. This form of inclusive leadership appears as a psychological construct designed to yield advantages through the inclusive behaviors and skills exhibited by a leader within an organization or institution [2]. In various domains, particularly education, inclusive leadership practices serve as the foundational elements for shaping inclusive behaviors and attitudes [3]. Implementing inclusive leadership practices is instrumental in optimizing group or institutional performance, fostering inclusive attitudes among all members, and achieving collective goals [4]. Institutions, including educational establishments like schools, witness an enhancement in both institutional performance and a positive climate through the adoption of inclusive leadership practices.

The application of the concept of inclusive leadership in educational institutions will have an effect on increasing a positive school climate [5]–[7]. Inclusive leadership practices will strive to create an inclusive school climate and increase school safety (Bradshaw et al., 2021) . Through inclusive leadership, it will also improve students' academic achievement results and the welfare of the entire school community due to a positive school climate [7], [9], [10]. Inclusive leadership always tries to see and understand from many different points of view, so that it will accommodate the diversity of students in schools [11]. The spirit of inclusive leadership must not only be possessed by a school principal, but all teachers, education staff and the entire community involved in the school must have a spirit of inclusive leadership.

Previous research has demonstrated a connection between inclusive leadership and the establishment of an inclusive school climate. The school climate plays a pivotal role in determining the overall success of students, encompassing both academic and non-academic accomplishments. A positive school climate, capable of accommodating diverse achievements, has been highlighted as crucial [9]. Beyond academic proficiency, a positive school climate extends its influence to the psychological and social well-being of students, with factors like classroom environments, overall school atmosphere, and cultural diversity significantly shaping this climate [12]. Establishing a positive school climate necessitates the collective engagement of all stakeholders, acknowledging that the realization of this goal requires substantial support [13]. In this pursuit, inclusive leadership emerges as a vital strategy among the various approaches essential for cultivating a positive school climate [14].

In the absence of inclusive leadership within a school, the occurrence of unfavorable incidents such as bullying is not uncommon. Instances of bullying or oppression can result in students feeling insecure and uneasy within the school environment [15]. The active engagement of all stakeholders is imperative to cultivate a positive school climate, considering the interdependent relationship between a positive school environment and positive student behavior [16]. However, the establishment of a positive school climate is not a straightforward process, as acknowledged by Brown (2019), who underscores the challenges and impediments associated with implementing inclusive leadership in schools. Ainscow and Sandill (2010) [17] identified several challenges experienced in the implementation of inclusive leadership practices, encompassing difficulties related to culture, leadership style, and the role of networks.

An additional challenge encountered during the implementation of inclusive leadership is the persistence of traditional leadership practices in educational institutions, which do not align with the principles of inclusive leadership. This misalignment results in a hesitancy to embrace inclusive leadership practices [18]. Enhancing the execution of inclusive leadership practices requires a comprehensive understanding of the challenges inherent in their implementation to effectively contribute to fostering a positive school climate. Building on these considerations, the objective of this research is to identify the challenges associated with implementing inclusive leadership to establish a positive school climate for students in Yogyakarta Province. In light of this, the research problem is formulated as follows: 1) What are the biggest aspects of challenges in implementing inclusive leadership in each region in Yogyakarta Province? 2) What are the most challenging aspects in implementing inclusive leadership in Yogyakarta Province?

2. Method

This research is descriptive research used to explore the inclusive leadership of school principals in Yogyakarta Province. Participants in this study were 78 school principals and teachers, involving 59 school principals and 19 teachers in Yogyakarta province with a target of 5 districts, namely Bantul Regency, Gunung Kidul Regency, Sleman Regency, Kulon Progo Regency, and Yogyakarta City. Participants in this study consisted of 30 male and 48 female respondents and on average had taught in an educational environment for 26 years.

The data collection process is through distributing online questionnaires and conducting Focus Group Discussions (FGD) representing ten school principals and/or representatives. Ten school principals were selected based on predetermined criteria, namely: 1) Inclusive schools located in Yogyakarta City, because Yogyakarta City has been implementing schools providing inclusive education for longer than the other 4 districts. 2) Be under the auspices of the Disability Services Unit. Based on these criteria, 10 inclusive schools in Yogyakarta were selected. The resulting data is in the form of quantitative data and qualitative data. Quantitative data was generated from questionnaires distributed online, while qualitative data was generated from FGD. This qualitative data aims to explore

problems from quantitative data. The FGD was carried out for approximately 2.5 hours, starting with relevant questions and each school principal and/or representative answered and provided views in turn. The information conveyed by the resource person during the FGD is recorded and also recorded for further processing in the results of the discussion.

This research is descriptive research. Descriptive research has a design to provide authentic insight and understanding of a phenomenon [19]. This descriptive research provides an understanding of the challenges in implementing inclusive leadership practices to support a positive school climate. The questionnaire used is an adaptation of the instrument from the Inclusive Leadership Survey Item Development research developed by Nathaniel J. Ratcliff et al. in 2018 which has been validated [20]. The questionnaire consists of 5 aspects, namely fair treatment, openness to differences, integration into the unit, leveraging unique perspectives and expertise, and shared understanding in communications and 39 questions in total, apart from participant information. The questions in the questionnaire use a Likert scale ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree. Data analysis uses descriptive analysis. The questions in the instrument items are positive questions, so the greater the percentage obtained, the better the implementation of inclusive leadership.

3. Result

Inclusive leadership is very important to implement in an educational institution, to accommodate a positive school environment. Even though it is said to be important, not all educational institutions implement inclusive leadership well [3]. It is important to explore and map the challenges and obstacles that accompany efforts to implement inclusive leadership, this is one form of effort to improve and shape a positive educational environment. The following presents data on the distribution of challenges and obstacles in developing inclusive leadership in Yogyakarta Province:
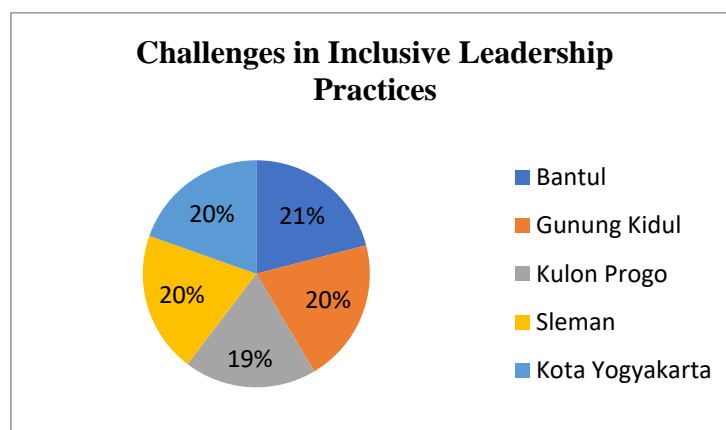
Figure 1: Distribution of questionnaire

The percentage scale illustrates the challenges and obstacles faced in implementing school leadership in Yogyakarta Province. Among the districts, Kulon Progo experiences the highest level of challenges at 19%, signifying that various aspects of inclusive leadership remain unfulfilled in this region. Following closely are Sleman district, Yogyakarta city, and Gunung Kidul, all with a 20% challenge percentage. Notably, Bantul district records the lowest percentage level at 21%, suggesting that this area encounters more challenges than the other districts.

Analyzing the data, Kulon Progo Regency emerges as the district facing the most challenges in implementing inclusive leadership across its schools within Yogyakarta Province. Conversely, Bantul

Regency stands out as the district with fewer challenges and obstacles compared to the other four regencies. This data sheds light on the varying degrees of challenges experienced by each district, emphasizing the need for tailored approaches to address specific hurdles in promoting inclusive leadership.

Beyond the overall challenge percentages, a detailed examination of the data reveals insights into the specific aspects posing the most challenges and obstacles in each region. This nuanced perspective allows for a more targeted understanding of the areas where improvement and strategic interventions may be particularly beneficial in fostering inclusive leadership within Yogyakarta Province.
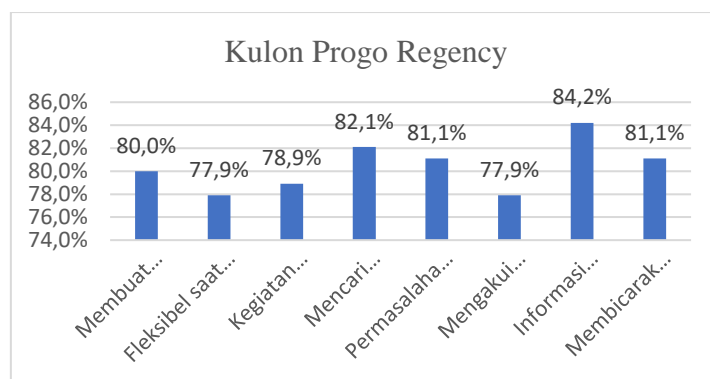
Figure 2: Challenge in Kulon Progo Regencey

Out of the total 78 respondents, a notable 23.1% expressed encountering obstacles in implementing inclusive leadership within Kulon Progo Regency. The challenges were specifically identified in two key aspects: 'flexible behavior of school members in accepting the diversity of students at school' and 'recognizing limited knowledge and skills.' This indicates a substantial need for targeted interventions and strategies in these specific areas to enhance the implementation of inclusive leadership practices in Kulon Progo Regency.

Conversely, among the same group of 78 respondents, a relatively lower percentage, 16.8%, highlighted the aspect 'all important information can reach all work members' as the least challenging and obstacle-laden. This suggests a positive trend in this particular aspect, indicating a relatively smoother implementation and a higher level of satisfaction among respondents in ensuring the dissemination of crucial information to all members within the school environment.
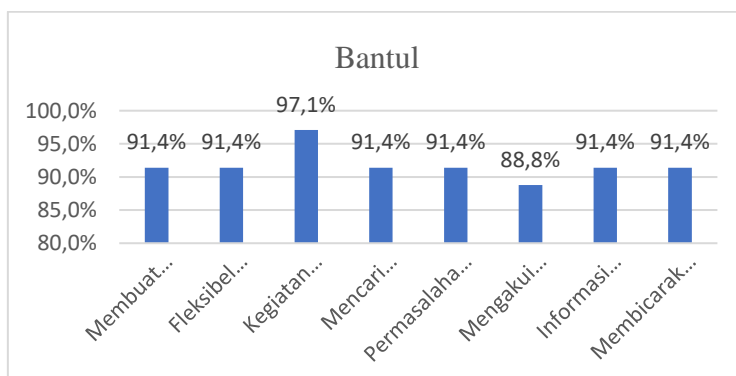
Figure 3: Challenge in Bantul Regency

Additionally, within Bantul Regency, a segment of the 78 respondents, specifically 12.2%, reported encountering obstacles in implementing inclusive leadership. These challenges were specifically identified in the aspect of 'recognizing limited knowledge and skills.' This signifies a need for targeted interventions and support mechanisms in this particular area to bolster the successful implementation of inclusive leadership practices in Bantul Regency.

Conversely, among the same group of 78 respondents, a lower percentage, specifically 3.9%, pinpointed the aspect 'organizing activities to increase students' self-confidence' as the least challenging and obstacle-laden. This data suggests a relatively smoother implementation and a higher level of satisfaction among respondents in terms of organizing activities aimed at enhancing students' self-confidence within the educational setting in Bantul Regency.
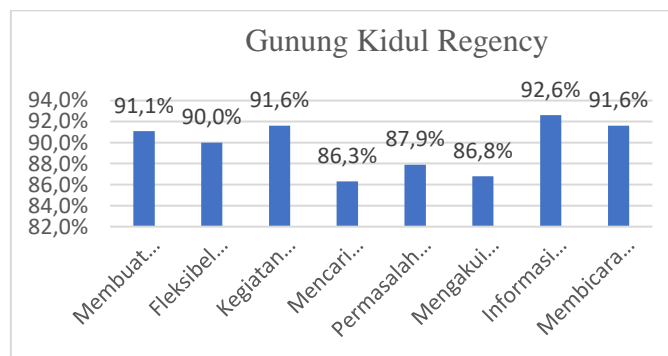
Figure 4: Challenge in Gunung Kidul Regency

Moving on to Gunung Kidul Regency, among the 78 respondents, a significant 14.7% indicated encountering obstacles in implementing inclusive leadership. Specifically, challenges were reported in the aspect of 'seeking input through school members in running the school unit by applying inclusive principles.' This underscores the need for targeted strategies and interventions in this particular domain to ensure the effective implementation of inclusive leadership practices within Gunung Kidul Regency.

Conversely, within the same pool of 78 respondents, a relatively lower percentage, 7.4%, identified the aspect 'information can be accessed by all working members at the school' as the least challenging and obstacle-laden. This data suggests a relatively smoother implementation and a higher level of satisfaction among respondents regarding the accessibility of information to all working members within the educational context in Gunung Kidul Regency.
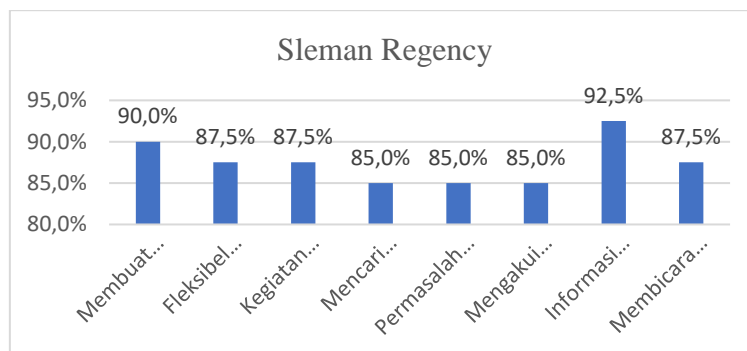
Figure 5: Challenge in Sleman Regency

Within Sleman Regency, the most significant challenges and obstacles, as reported by 15% of the 78 respondents, are concentrated in several key aspects. These include 'seeking input from school members in running school units by applying inclusive principles,' 'ensuring that all problems in efforts to accommodate the diversity of students have been heard,' and 'limitations of school knowledge and skills in accommodating the diversity of students.' This data emphasizes the critical need for targeted interventions and support mechanisms to address challenges in these specific domains and enhance the implementation of inclusive leadership practices in Sleman Regency.

In contrast, within the same group of 78 respondents in Sleman Regency, a comparatively lower percentage, specifically 7.5%, identified the aspect 'information can be accessed by all work members at the school' as the least challenging and obstacle-laden. This insight suggests a relatively smoother implementation and a higher level of satisfaction among respondents regarding the accessibility of information to all working members within the educational context in Sleman Regency.

Figure 6: Challenge in Yogyakarta City

Lastly, the city of Yogyakarta. Among the 78 respondents, a specific aspect stood out as the least challenging and obstacle-laden, a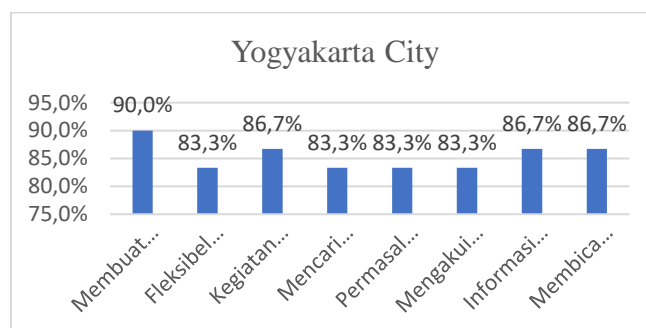ccounting for 10%. This aspect pertains to the ability to make various policies related to the continuity of school activities by paying attention to the diversity of students.' This insight provides valuable information on the areas where challenges are perceived to be comparatively lower, indicating a positive trend in the implementation of inclusive leadership practices in the City of Yogyakarta.

Concurrently, when examining the distribution of data across various aspects in the City of Yogyakarta, it is noteworthy that other challenges and obstacles exhibit a consistent pattern. This indicates a uniform distribution of challenges across different aspects, suggesting a relatively similar landscape of challenges and obstacles in various domains within the City of Yogyakarta. This nuanced understanding is crucial for developing targeted strategies to address challenges and promote inclusive leadership practices effectively.

When examined comprehensively, the most substantial challenge and obstacle for Yogyakarta Province, derived from the collective data, lies in the aspect of 'schools recognizing the limitations of knowledge and skills in accommodating the diversity of students.' This aspect is marked by a significant percentage of 85%, representing 15% of the 78 respondents who participated. This insight emphasizes the critical need for focused efforts and interventions to address challenges related to knowledge and skill limitations and enhance the overall implementation of inclusive leadership practices in the province.
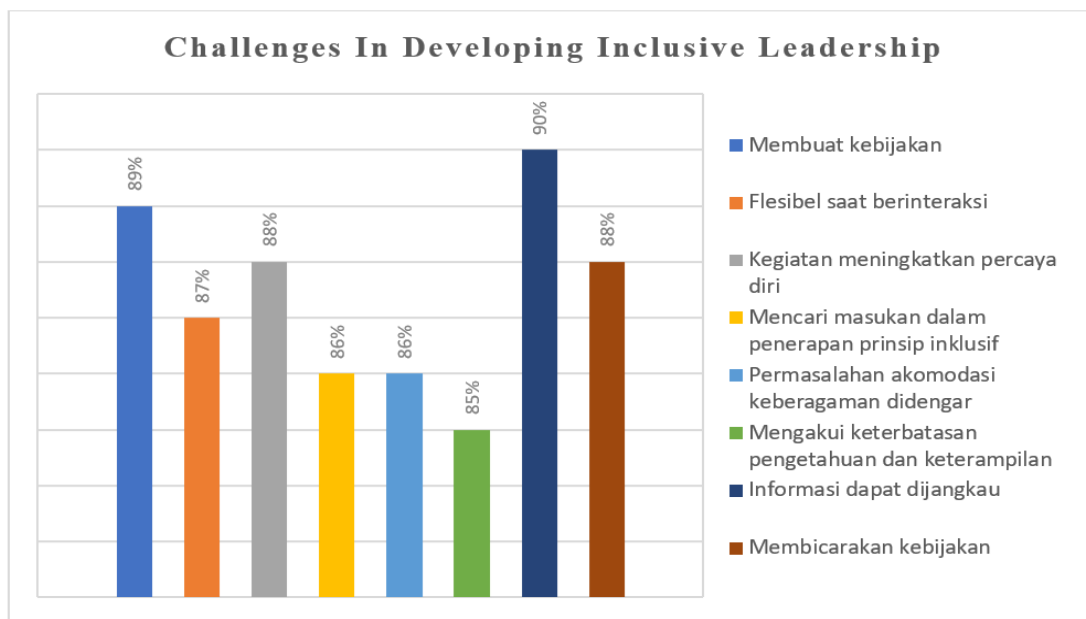
Figure 6: Challenge in developing inclusive leadership

4. Discussion

When examining the percentage scores in individual regions and the overall presentation across Yogyakarta Province, it becomes apparent that the average challenges and impediments to implementing inclusive leadership are consistently no less than 50%. It indicates that the execution of inclusive leadership in Yogyakarta Province is commendable. The most significant perceived challenges and obstacles in implementing inclusive leadership, particularly in embracing school diversity to foster a positive climate, are concentrated in Kulon Progo Regency, with a rate of 77.9%. However, despite the overall positive performance, schools in the region still grapple with several challenges and obstacles in their endeavors to implement inclusive leadership, as evidenced by the average score that remains at 85% and has not yet reached 100% in each aspect.

During the focus group discussions (FGDs) involving school principals or their representatives, some school leaders openly acknowledged their restricted knowledge and competencies in effectively accommodating student diversity. This deficiency in knowledge adversely influences the attitudes exhibited by school principals towards students. Moreover, the limited knowledge and skills of school principals are likely to extend their impact on teachers' understanding of how to address student diversity. The level of teacher knowledge is intricately linked to the actions of the principal in organizing diverse training sessions and facilitating ongoing learning opportunities for teachers [21].Inadequate knowledge among teachers is bound to influence their inclusive leadership behavior within the school context. Consequently, it becomes imperative to undertake initiatives aimed at enhancing teacher competency in inclusive education [22]–[24].

In a different aspect, specifically regarding adaptability during interactions, various school principals highlighted the necessity of adjusting communication styles when engaging with diverse students. According to the principal of SD K, teachers are encouraged to observe and understand how students behave during communication, emphasizing the need for flexibility. The diverse nature of students in the school environment poses a challenge, requiring principals to be adaptable in their interactions. However, some schools, such as SDN B, face challenges in adopting a flexible

communication role. It is crucial to assess whether schools have initiated discussions with parents or guardians, as well as with colleagues, including teachers and education staff. These discussions aim to listen and address the diverse issues raised and solicit input for the improved implementation of inclusive principles. Consequently, these efforts contribute to enhancing the implementation of inclusive leadership by school principals. Despite the significance of these endeavors, it is acknowledged that in certain schools, grappling with issues related to accommodating diversity and soliciting input for inclusive principles poses a distinct challenge for school leaders.

Another challenge involves initiatives aimed at enhancing teacher confidence in instructing diverse students. Several school principals or their representatives acknowledged the implementation of such activities, which not only serves as a manifestation of inclusive leadership but also addresses teachers' needs [25]. An illustrative example of such an activity involves schools fostering the development of teachers' expertise, accomplished through both training sessions and tasks aligned with the teacher's mastered areas. However, not all schools within each district undertake these initiatives, leading to teachers experiencing diminished confidence when instructing students with diverse abilities. Consequently, school leaders must promptly address this challenge within their institutions to foster greater teacher confidence when dealing with diverse student populations.

Additionally, concerning the least challenging aspect in implementing inclusive leadership—the accessibility of information to all staff members—several schools have endeavored to standardize perceptions and information reception to embrace the existing diversity within their institutions. This concerted effort aims to eliminate discriminatory treatment of students and empower teachers to disseminate information regarding positive attitudes and behavior to all students, fostering a sense of camaraderie. Furthermore, through this shared understanding, the occurrence of violence in the school environment can be minimized, and every member of the school community can feel valued. School principals can enhance the accessibility of information to all staff members by incorporating the presence of Special Education Teachers within the school setting [26].

Schools encounter various challenges and impediments in their endeavors to instate inclusive leadership within their educational settings. This research serves as a tool for schools to delineate specific aspects requiring further enhancement. The primary goal is to implement inclusive leadership, fostering an environment that embraces diversity and cultivates a positive school climate. Successful implementation of inclusive leadership is anticipated to exert a far-reaching influence on students' academic achievements while concurrently establishing a positive school milieu for all members, particularly the students. Additionally, it holds the potential to mitigate instances of verbal and non-verbal violence within the school environment.

5. Conclusion

Several dimensions pose challenges and hurdles in the endeavor to instill inclusive leadership within the educational landscape of Yogyakarta Province. The most pivotal factor influencing the implementation of inclusive leadership is the acknowledgment by schools of their limitations in understanding and accommodating the diversity of students. Despite the overall positive outcomes, as evidenced by an average success rate of 85% (15% challenge), and individual regional achievements, such as 77.9% success in Kulon Progo Regency (with a 23.1% challenge), the research findings underscore the need for continual improvement by schools and policymakers. This ongoing effort aims to refine aspects, fostering better implementation of inclusive leadership, thereby nurturing a positive school environment and diminishing instances of violence. Further research can explore similar themes in diverse provinces, offering valuable insights for schools seeking to implement inclusive leadership and foster positive educational environments.

References

[1] H. Thompson and G. Matkin, "The Evolution of Inclusive Leadership Studies: A literature review," *J. Leadersh. Educ.*, vol. 19, no. 3, Jul. 2019, doi: 10.12806/V19/I3/R2.

[2] L. Booysen, *Diversity at Work: The Practice of Inclusion*. Wiley, 2013. doi: 10.1002/9781118764282.

[3] M. K. Bhowmik, A. Walker, and D. Bryant, "Reconceptualizing inclusive leadership to address diversity in schools," *Multicult. Educ. Rev.*, vol. 15, no. 2, pp. 139–156, Apr. 2023, doi: 10.1080/2005615X.2023.2250713.

[4] C. Anam, T. Hastuti, and D. M. Rosyanti, "Komponen – Komponen Inclusive Leadership Pada Sektor Pendidikan Dan Organisasi in Society 5.0," *Equilib. J. Ilm. Ekon. Manaj. dan Akunt.*, vol. 10, no. 2, pp. 146–150, 2021, doi: 10.35906/je001.v10i2.822.

[5] K. Bosworth, R. Garcia, M. Judkins, and M. Saliba, "The impact of leadership involvement in enhancing high school climate and reducing bullying: An exploratory study," *J. Sch. Violence*, vol. 17, no. 3, pp. 354–366, Jul. 2018, doi: 10.1080/15388220.2017.1376208.

[6] E. Crisol Moya, T. Molonia, and M. J. Caurcel Cara, "Inclusive Leadership and Education Quality: Adaptation and Validation of the Questionnaire 'Inclusive Leadership in Schools' (LEI-Q) to the Italian Context," *Sustainability*, vol. 12, no. 13, p. 5375, Jul. 2020, doi: 10.3390/su12135375.

[7] T. V. T. Nguyen, H. T. Nguyen, T. X. Nong, and T. T. T. Nguyen, "Inclusive Leadership and Creative Teaching: The Mediating Role of Knowledge Sharing and Innovative Climate," *Creat. Res. J.*, pp. 1–12, Oct. 2022, doi: 10.1080/10400419.2022.2134543.

[8] C. P. Bradshaw, J. Cohen, D. L. Espelage, and M. Nation, "Addressing School Safety Through Comprehensive School Climate Approaches," *School Psych. Rev.*, vol. 50, no. 2–3, pp. 221–236, Jul. 2021, doi: 10.1080/2372966X.2021.1926321.

[9] T. A. Chirkina and T. E. Khavenson, "School Climate," *Russ. Educ. Soc.*, vol. 60, no. 2, pp. 133–160, Feb. 2018, doi: 10.1080/10609393.2018.1451189.

[10] C. Konishi, T. K. Y. Wong, R. J. Persram, L. F. Vargas-Madriz, and X. Liu, "Reconstructing the concept of school climate," *Educ. Res.*, vol. 64, no. 2, pp. 159–175, Apr. 2022, doi: 10.1080/00131881.2022.2056495.

[11] A. E. Randel *et al.*, "Inclusive leadership: Realizing positive outcomes through belongingness and being valued for uniqueness," *Hum. Resour. Manag. Rev.*, vol. 28, no. 2, pp. 190–203, Jun. 2018, doi: 10.1016/j.hrmr.2017.07.002.

[12] T. P. La Salle, J. Meyers, K. Varjas, and A. Roach, "A Cultural-Ecological Model of School Climate," *Int. J. Sch. Educ. Psychol.*, vol. 3, no. 3, pp. 157–166, Jul. 2015, doi: 10.1080/21683603.2015.1047550.

[13] C. S. Brown, "The Importance, and the Challenges, to Ensuring an Inclusive School Climate," *Educ. Psychol.*, vol. 54, no. 4, pp. 322–330, Oct. 2019, doi: 10.1080/00461520.2019.1655646.

[14] E. Crisol-Moya, M. A. Romero-López, A. Burgos García, and Y. Sánchez-Hernández, "Inclusive Leadership From the Family Perspective in Compulsory Education," *J. New Approaches Educ. Res.*, vol. 11, no. 2, p. 226, Jul. 2022, doi: 10.7821/naer.2022.7.937.

[15] H. Cowie and O. Oztug, "Pupils' perceptions of safety at school," *Pastor. Care Educ.*, vol. 26, no. 2, pp. 59–67, Jun. 2008, doi: 10.1080/02643940802062501.

[16] H.-F. Hsieh, B. A. Scott, S. A. Stoddard, M. A. Zimmerman, M. J. Kleinsasser, and J. Heinze, "Exposure to Violence at School and School-Related Promotive Factors Among Adolescents in Urban Settings," *J. Sch. Violence*, vol. 22, no. 3, pp. 367–382, Jul. 2023, doi: 10.1080/15388220.2023.2186419.

[17] M. Ainscow and A. Sandill, "The Big Challenge: Leadership for Inclusion," in *International Encyclopedia of Education*, Elsevier, 2010, pp. 846–851. doi: 10.1016/B978-0-08-044894-7.00453-X.

[18] J. Ryan, "Inclusive Leadership and Social Justice for Schools," *Leadersh. Policy Sch.*, vol. 5, no. 1, pp. 3–17, Mar. 2006, doi: 10.1080/15700760500483995.

[19] D. Silverman, *Qualitative Research Theory. Method and Practice.* London: SAGE Publications, Inc, 1997.

[20] N. J. Ratcliff, M. Key-roberts, M. J. Simmons, and M. Jiménez-rodríguez, "Inclusive Leadership Survey Item Development Consortium of Universities of the Washington for the Behavioral and Social Sciences Department of the Army," no. May, 2018.

[21] D. Kriswanto, Suyatno, and Sukirman, "Penyelenggaraan Pendidikan Inklusif di Sekolah Dasar: Analisis Faktor-Faktor dan Solusi yang Ditawarkan," *J. Basicedu*, vol. 07, no. 5, 2023, doi: https://doi.org/10.31004/basicedu.v7i5.6167.

[22] Ediyanto and N. Kawai, "The measurement of teachers' attitudes toward inclusive education: An empirical study in East Java, Indonesia," *Cogent Educ.*, vol. 10, no. 2, Dec. 2023, doi: 10.1080/2331186X.2023.2229014.

[23] N. Priyanti, "An Investigation into Pre-Service Teachers' Disability Governing Frameworks: An Attempt to Theoretically Predict the Implementation of Inclusive Education," *Int. J. Disabil. Dev. Educ.*, vol. 69, no. 1, pp. 1–14, Jan. 2022, doi: 10.1080/1034912X.2021.1998887.

[24] R. Tangen *, "Promoting inclusive education in secondary school in Norway: a national programme for teacher development," *Eur. J. Spec. Needs Educ.*, vol. 20, no. 1, pp. 57–70, Feb. 2005, doi: 10.1080/0885625042000319089.

[25] I. Kusmaryono, "Faktor Berpengaruh, Tantangan, dan Kebutuhan Guru di Sekolah Inklusi di Kota Semarang," *J. Ilm. Pendidik. Dasar*, vol. 10, no. 1, 2023, doi: https://doi.org/http://dx.doi.org/10.30659/pendas.10.1.12-23.

[26] J. Fitzgerald and J. Radford, "Leadership for inclusive special education: a qualitative exploration of SENCOs' and principals' Experiences in secondary schools in Ireland," *Int. J. Incl. Educ.*, vol. 26, no. 10, pp. 992–1007, Aug. 2022, doi: 10.1080/13603116.2020.1760365.

Unlocking Potential: The Impact of Differentiated TEFL Instruction in Indonesia

Sukarno[1*], Megan Jinabe[2] and Maria Vineki Riyadini[3]

[1*] English Language Education, UNY, Yogyakarta, Indonesia
[2,3] English Language Education, UNY, Yogyakarta, Indonesia

[*]E-mail: sukarno@uny.ac.id

Abstract. In English Language Teaching (ELT), differentiated instruction is recognized for its role in fostering student growth and comprehension. However, a notable gap exists between its theoretical importance and practical implementation, particularly within the Indonesian context. This study aims to bridge this gap by scrutinizing the practice of differentiated instruction in TEFL (Teaching English as a Foreign Language) classrooms across Indonesia. Using a library research methodology, this study explores several key areas: the conceptualization of differentiated instruction, its diverse benefits, current educational demands, the implications of the *Kurikulum Merdeka*, efforts to integrate differentiated instruction into classrooms, practical applications in schools, and the challenges faced in these endeavors. The study sheds light on the intricacies of differentiated instruction implementation, including its conceptualization, benefits, challenges, and alignment with the *Kurikulum Merdeka*. It provides insights into the practical applications of differentiated instruction in TEFL classrooms across Indonesia. By enhancing stakeholders', particularly teachers', understanding of differentiated instruction and its practical application within English language classrooms, this study contributes to improving teaching practices and student learning outcomes in the Indonesian ELT context.

Keywords: Differentiated Instruction, ELT, TEFL

1. Introduction

In the landscape of English Language Teaching (ELT), the pursuit of effective pedagogical strategies to cater to diverse learner needs stands as a cornerstone of educational progress (1). Among these strategies, differentiated instruction emerges as a beacon of promise, offering tailored approaches to accommodate the unique learning profiles of students (2–5). While the theoretical underpinnings of differentiated instruction resonate strongly within the academic discourse, its translation into everyday practice presents a complex and often elusive challenge, particularly within the Indonesian context (6–8).

In the Indonesian context, a significant research gap exists in the practical application of differentiated instruction within TEFL classrooms. Despite extensive literature emphasizing its theoretical benefits, more empirical studies must examine how differentiated instruction is implemented and sustained in real-world settings across Indonesia. Therefore, this article sets out to explore the dynamic interplay between the theoretical significance of differentiated instruction and its practical implementation in the realm of Teaching English as a Foreign Language (TEFL) across Indonesia. At the heart of this inquiry lies a fundamental dichotomy: the ideal vision of classrooms brimming with

differentiated instruction, juxtaposed against the stark reality of its limited integration into pedagogical practices (9,10).

Central to this investigation is the endeavor to unravel the multifaceted dimensions of differentiated instruction, ranging from its conceptual essence to its manifold benefits for both learners and educators (11–13). Moreover, this inquiry extends to examine the evolving demands of contemporary education, including the imperatives set forth by the Merdeka Curriculum, and their implications for the integration of differentiated instruction (14). Within this comprehensive exploration, specific attention is directed towards the strategies and initiatives undertaken to infuse differentiated instruction into English language classrooms (15–17). Through a meticulous examination of real-world practices in schools, this study seeks to illuminate the challenges and triumphs encountered in the pursuit of implementing differentiated instruction.

By delving into these intricacies, this article endeavors to offer insights that transcend theoretical discourse, providing stakeholders, particularly teachers, with actionable knowledge to navigate the terrain of differentiated TEFL instruction more effectively. Ultimately, this inquiry aspires to unlock the latent potential of differentiated instruction within Indonesian TEFL contexts, thereby fostering enriched learning experiences and empowering both educators and learners.

This article aims to bridge the gap between theoretical discourse and practical application by exploring the theoretical foundations and practical challenges of implementing differentiated instruction in Indonesian TEFL classrooms. By providing empirical insights to improve the efficacy of English language teaching for diverse learners, it will advance educational practices and student outcomes in Indonesia.

2. Method

This study employs a literature review methodology to examine the implementation of differentiated instruction in TEFL classrooms in Indonesia. A comprehensive search of scholarly articles, books, reports, and educational documents uses electronic databases and manual searches of relevant sources. Selected literature meets specific criteria, including relevance, publication in reputable sources, availability in English, and recent publication dates. Thematic analysis is employed to identify key findings and insights, focusing on conceptualization, benefits, challenges, integration efforts, and real-world practices of differentiated instruction. Ethical guidelines are followed, and limitations such as potential bias and language constraints are addressed. Validity and reliability are ensured through rigorous methodology, transparency, and peer review.

3. Results and Discussion

3.1 The Nature & Benefits of Differentiated Instruction in TEFL Context in Indonesia

Differentiated instruction (DI) is currently seen as an essential aspects instilled in the classrooms. It is a teaching strategy designed to address students' diverse needs by modifying instruction and curriculum to match individual abilities, interests, and prior knowledge (18,19). Tomlinson (20) highlights that through DI, teachers shift from mere dispensers of knowledge to organizers of varied learning opportunities, contrasting the "one size fits all" approach.

Various perspectives related to DI come from some experts. Parmansyah (4) defines DI as an approach where teaching is adapted to match students' abilities using systematic procedures for progress monitoring and data-based decision-making. Hall (21) expands this view by including students' varying background knowledge, readiness, language, learning preferences, and interests. Benjamin (22) further broadens the concept to include various classroom practices that accommodate different learning styles, interests, prior knowledge, socialization needs, and comfort zones.

A more inclusive definition by Tomlinson and friends (23) describes DI as a proactive approach where teachers modify curricula, teaching methods, resources, learning activities, and student products. It is conducted in roder to address the diverse needs of individual students and small groups, aiming to maximize learning opportunities (24). Suprayogi and Valcke (25) integrate various dimensions into their definition, emphasizing strategies like flexible grouping, differentiated homework, peer and collaborative learning methods, and varied assessment methods based on student's abilities and prior knowledge.

Differentiated instruction (DI) in the context of Teaching English as a Foreign Language (TEFL) is designed to cater to the diverse learning needs of students. In Indonesia, this approach is particularly relevant due to the varying levels of English proficiency among students. DI enables teachers to tailor their instructional methods to address the individual learning styles, interests, and abilities of their students. By employing DI, educators can provide a more inclusive and supportive learning environment, which can lead to improved student engagement and academic achievement.

Moreover, the benefits of DI in the Indonesian TEFL context are manifold. Firstly, DI empowers students by allowing them to learn at their own pace, promoting a deeper understanding of language concepts. Secondly, it fosters a more engaging and interactive classroom environment, where students feel valued and understood. Thirdly, DI helps in identifying and nurturing the strengths of each student, thereby boosting their confidence and motivation. In sum, the implementation of DI in TEFL not only enhances language acquisition but also contributes to the overall development of students, instilling a sense of hope and optimism among educators.

3.2 The Demands of the Current Era and Independent Curriculum (Merdeka Curriculum) in Indonesia

In the contemporary educational landscape, there is a growing demand for teaching methods that prepare students for the complexities of the modern world. The *Merdeka Curriculum*, or Independent Curriculum, introduced in Indonesia, reflects this shift towards a more flexible and student-centered approach (16,17). This curriculum emphasizes critical thinking, creativity, and the ability to adapt to various situations—skills that are essential in the 21st century (18).

The *Merdeka Curriculum* aligns seamlessly with the principles of DI, as both advocate for personalized learning experiences that cater to the diverse needs of students. Under this curriculum, teachers are encouraged to develop learning activities that are relevant to the students' contexts and interests (29). This requires educators to be adept at assessing individual student needs and designing instructional strategies that accommodate these differences (16–18). Consequently, the integration of DI within the framework of the *Merdeka Curriculum* can help bridge the gap between educational theory and practice, ensuring that students receive a well-rounded and effective education, providing reassurance to policymakers and administrators about its compatibility.

3.3 Factual Practice of Differentiated Instruction in TEFL Context in Indonesia

Despite the theoretical benefits of DI, its practical application in Indonesian TEFL classrooms presents a mixed picture. Observations and reports from various schools indicate that while some teachers have successfully incorporated DI strategies, many still struggle with its implementation (30,31). In classrooms where DI is effectively practiced, teachers use a variety of methods such as flexible grouping, tiered assignments, and ongoing assessments to meet the diverse needs of their students (32–34).For instance, in some Indonesian schools, teachers have created differentiated lesson plans that allow students to choose from a range of activities based on their interests and skill levels (33). Additionally, the use of technology has facilitated the implementation of DI, with digital tools enabling personalized learning paths and instant feedback (22,35). However, these practices are not yet

widespread, and there is a need for more professional development and resources to support teachers in adopting DI effectively.

There are many ways to incorporate DI into the classrooms. In this case, teachers should be prepare (36). In terms of implementing DI, teachers can follow the "Five Dimensions of Differentiation", a framework for integrating differentiation into teaching practices (18,37). The first dimension focuses on *content*, recognizing that students have varying academic abilities and interests, necessitating tailored curriculum delivery. *Instructional strategies*, the second dimension, acknowledge diverse learning styles, prompting teachers to employ varied methods to accommodate individual or group preferences. The third dimension suggests that the *classroom environment* itself can be differentiated, allowing for flexible groupings, guest speakers, or new technologies to enhance learning experiences. Regarding *products*, the fourth dimension emphasizes offering students options to express their learning in diverse formats, such as written work, technology, or visual presentations. Lastly, differentiation involves *teachers' decisions and choices*, considering students' learning styles, interests, abilities, and expression preferences and implementing flexible approaches to meet diverse needs effectively. Here some of the factual examples on how to implement each dimension in the teaching and learning processes.

3.3.1   *Content*: In a TEFL classroom in Indonesia, teachers can differentiate content by providing reading materials at various proficiency levels to cater to students' diverse language abilities. For instance, they can offer simplified texts for beginners and more complex articles for advanced learners. Additionally, incorporating topics related to Indonesian culture or current events can engage students and make the content more relevant to their interests.

3.3.2   *Instructional Strategies*: Teachers can use various instructional strategies to accommodate different learning styles. For example, they can incorporate group activities for collaborative learning, individual tasks for independent learners, and multimedia resources such as videos or audio recordings to appeal to visual or auditory learners. Furthermore, task-based learning approaches allow students to learn through real-life language use, enhancing engagement and comprehension.

3.3.3   *The Classroom arrangements*: Differentiating the learning environment involves creating opportunities for student interaction and exploration. Teachers can arrange flexible seating arrangements in a TEFL classroom in Indonesia to facilitate group work or individual study. They can also incorporate technology using language learning apps or online resources during lessons. Additionally, organizing language immersion experiences, such as language cafes or cultural outings, can provide authentic language practice outside the classroom.

3.3.4   *Student Products*: Offering diverse options for demonstrating learning allows students to showcase their language proficiency in various ways. In a TEFL classroom in Indonesia, students could create multimedia presentations, write essays, participate in role-plays, or perform skits in English. Providing choices empowers students to express themselves in formats that align with their strengths and interests, fostering creativity and motivation.

3.3.5   *Teacher Decisions*: Teachers in a TEFL classroom in Indonesia make intentional decisions to meet the needs of diverse learners. This may involve conducting pre-assessments to gauge students' language levels, adapting lesson plans based on formative feedback, and providing individualized support during language practice activities. Additionally, incorporating Indonesian culture and language elements into instruction acknowledges students' backgrounds and fosters a sense of inclusivity and cultural appreciation.

3.4 Challenges in the Implementation of Differentiated Instruction in TEFL Context in Indonesia

Implementing DI in Indonesian TEFL classrooms is not without its constant challenges. It is also in line with what other countires experienced (38). One of the primary obstacles is the lack of adequate training and professional development for teachers, a situation exacerbated by the vast geographical spread of the country (39,40). Many educators are not familiar with the principles of DI or how to apply them in their teaching (5,41,42). This gap in knowledge often leads to resistance or improper implementation of DI strategies (15,32,43).

Another significant challenge is the high student-to-teacher ratio in many Indonesian schools, which makes it difficult for teachers to provide individualized attention (44–47). Additionally, limited resources and infrastructure further hinder the effective practice of DI (48). For example, overcrowded classrooms and insufficient teaching materials can impede the creation of a conducive learning environment for DI.

Moreover, cultural factors also play a role in the challenges faced. The traditional teacher-centered approach to education, which is prevalent in many parts of Indonesia, can be at odds with the student-centered philosophy of DI (49,50). Overcoming these challenges requires a concerted effort from all stakeholders, including policymakers, school administrators, teachers, and the community.

4. Conclusion

This study underscores the gap between theory and practice in implementing differentiated instruction in TEFL classrooms across Indonesia. It provides insights into conceptualization, benefits, challenges, and practical applications of differentiation. Key findings emphasize the critical need for teachers to understand and apply differentiated instruction, particularly in light of the *Merdeka* Curriculum. There is untapped potential for improving student learning outcomes, necessitating collaboration among policymakers, curriculum developers, teacher training programs, and educational institutions to promote professional development and resource provision for effective implementation. Prioritizing differentiated instruction can lead to a more inclusive and dynamic learning environment for English language students in Indonesia.

Therefore, to improve students' learning, teachers need more help understanding and using differentiated instruction, especially with the new Merdeka Curriculum. That means policymakers, curriculum developers, and teacher training programs should work together to give teachers better training and resources. By doing this, we can make English classes in Indonesia more inclusive and interesting for all students.

References

[1] Ma'youf NA, Aburezeq IM. The effectiveness of differentiated teaching strategy in developing reading comprehension skills of fourth grade students in the United Arab Emirates. Theory Pract Lang Stud. 2022;12(1):17–27.

[2] Valiandes S, Neophytou L, Hajisoteriou C. Establishing a framework for blending intercultural education with differentiated instruction. Intercult Educ [Internet]. 2018;29(3):379–98. Available from: http://doi.org/10.1080/14675986.2018.1441706

[3] Vijaya L V, Dass P, Srivalli B, Ugandhar T. Enhancing Learning Outcomes in Social Sciences through the Integration of Research-Based Teaching Strategies. Int Res J Adv Eng Manag. 2024;2(03):516–27.

[4] Paramansyah A. Inclusive Education Practices: A Systematic Literature Review on Approaches and Impact Praktik. Educ Stud Teach J. 2024;1(4):49–59.

[5] van Geel M, Keuning T, Frèrejean J, Dolmans D, van Merriënboer J, Visscher AJ. Capturing the complexity of differentiated instruction. Sch Eff Sch Improv. 2019 Jan 2;30(1):51–67.

[6] Porta T, Todd N. Differentiated instruction within senior secondary curriculum frameworks: A small-scale study of teacher views from an independent South Australian school. Curric J. 2022 Nov 1;33(4):570–86.

[7] Gibbs K. Voices in practice: challenges to implementing differentiated instruction by teachers and school leaders in an Australian mainstream secondary school. Aust Educ Res. 2023 Sep 1;50(4):1217–32.

[8] Magableh I, Abdullah A. The Effect of Differentiated Instruction on EFL Learners: Teachers' Perspective. Int J Acad Res

Bus Soc Sci. 2020;10(5).

[9] Al-Shaboul Y, Al-Azaizeh M, Al-Dosari N. Differentiated instruction between application and constraints: Teachers' perspective. Eur J Educ Res. 2021 Jan 1;10(1):127–43.

[10] Ortega DP, Cabrera JM, Benalcázar J V. Differentiating instruction in the language learning classroom: Theoretical considerations and practical applications. J Lang Teach Res. 2018;9(6):1220–8.

[11] Joseph S, Thomas M, Simonette G, Ramsook L. The Impact of Differentiated Instruction in a Teacher Education Setting: Successes and Challenges. Int J High Educ. 2013 Jun 22;2(3).

[12] Kotob MM, Jbaili F. Implementing Differentiation in Early Education: The Impact on Student's Academic Achievement. J Appl Linguist Lang Res [Internet]. 2020;7(2):110–33. Available from: www.jallr.com

[13] Grecu YV. Differentiated instruction: Curriculum and resources provide a roadmap to help English teachers meet students' needs. Teach Teach Educ [Internet]. 2023 Apr;125:104064. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0742051X23000525

[14] Onyishi CN, Sefotho MM. Teachers' perspectives on the use of differentiated instruction in inclusive classrooms: Implication for teacher education. Int J High Educ. 2020;9(6):136–50.

[15] Gaitas S, Alves Martins M. Teacher perceived difficulty in implementing differentiated instructional strategies in primary school. Int J Incl Educ. 2017 May 4;21(5):544–56.

[16] Donche V, De Maeyer S, Coertjens L, Van Daal T, Van Petegem P. Differential use of learning strategies in first-year higher education: The impact of personality, academic motivation, and teaching strategies. Br J Educ Psychol. 2013;83(2):238–51.

[17] Moreno S. Differentiated Instruction: Strategies for English Language Learners Listening Comprehension Development. [Bridgewater, Massachusetts]: Bridgewater State University; 2015.

[18] Reis SM, Renzulli JS. The Five Dimensions of Differentiation. Vol. 6, International Journal for Talent Development and Creativity. 2018.

[19] Tomlinson CA, Moon T. Assessment in a Differentiated Classroom. In 2014.

[20] Tomlinson CA. How to differentiate instruction in mixed-ability classrooms. Alexandria: ASCD; 1995.

[21] Hall G. Explaining English Language Teaching: Learning in Action. London: Routledge; 2011.

[22] Benjamin A. Differentiated instruction using technology: A guide for middle & HS teachers. Routledge; 2014.

[23] Tomlinson B. Developing Materials for Language Teaching. London: Continuum; 2003.

[24] Pozas M, Letzel-Alt V, Schwab S. The effects of differentiated instruction on teachers' stress and job satisfaction. Teach Teach Educ [Internet]. 2023 Feb;122:103962. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0742051X22003377

[25] Suprayogi MN, Valcke M, Godwin R. Teachers and their implementation of differentiated instruction in the classroom. Teach Teach Educ. 2017 Oct;67:291–301.

[26] Malehere DAP, Listiani T. Penerapan Differentiated Instruction Berbasis Kurikulum Merdeka untuk Mendorong Pemahaman Konsep Matematika. EDUKATIF J ILMU Pendidik [Internet]. 2024 Jan 30;6(1):353–67. Available from: https://edukatif.org/index.php/edukatif/article/view/5753

[27] Astuti YF, Syafei M, Suryani FB. English Junior High School Teachers' and Students' Perspectives of Differentiated Instruction Practices in Kurikulum Merdeka. SIMPLE Int J English Educ. 2023;1(1):30–4.

[28] Mairoza D, Roza W, Samanhudi U. An English Teachers' Perspectives on Differentiated Instruction in 'Kurikulum Merdeka': A Case Study in SMA Kabupaten Solok. Lect J Pendidik [Internet]. 2024 Feb 3;15(1):207–21. Available from: https://journal.unilak.ac.id/index.php/lectura/article/view/18276

[29] Aprima D, Sari S. Analisis Penerapan Pembelajaran Berdiferensiasi Dalam Implementasi Kurikulum Merdeka Pada Pelajaran Matematika SD. Cendikia Media J Ilm Pendidik. 2022;13(1):95–101.

[30] Whitley J, Gooderham S, Duquette C, Orders S, Cousins JB. Implementing differentiated instruction: a mixed-methods exploration of teacher beliefs and practices. Teach Teach. 2019 Nov 17;25(8):1043–61.

[31] Ginja TG, Chen X. Teacher Educators' Perspectives and Experiences towards Differentiated Instruction. Int J Instr. 2020 Oct 1;13(4):781–98.

[32] Sougari A-M, Mavroudi A. Differentiated Instruction in the EFL Classroom: Discrepancies between Teachers' Self-Report Questionnaires and Actual Practices. 23th Int Symp Theor Appl Linguist. 2019;23(Di):398–413.

[33] Mirawati IGA, Suwastini NKA, Haryanti ND, Jayantini IGASR. Differentiated Instructions: Relevant Studies on Its Implementation. Prasi. 2022;17(1):11–21.

[34] de Jager T. Perspectives of teachers on differentiated teaching in multi-cultural South African secondary schools. Stud Educ Eval. 2017 Jun 1;53:115–21.

[35] Sahabudin NA, Ali MB. Personalized Learning and Learning Style among Upper Secondary School Students. Procedia - Soc Behav Sci. 2013 Nov;103:710–6.

[36] Langelaan BN, Gaikhorst L, Smets W, Oostdam RJ. Differentiating instruction: Understanding the key elements for successful teacher preparation and development. Teach Teach Educ [Internet]. 2024 Apr;140:104464. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0742051X23004523

[37] Roiha A, Polso J. The 5-Dimensional Model: A Tangible Framework for Differentiation. Pract Assessment, Res Eval. 2021;26(August):1–17.

[38] Maulana R, Smale-Jacobse A, Helms-Lorenz M, Chun S, Lee O. Measuring differentiated instruction in The Netherlands and South Korea: factor structure equivalence, correlates, and complexity level. Eur J Psychol Educ. 2020 Dec

1;35(4):881–909.

[39] Smets W, Struyven K. A teachers' professional development programme to implement differentiated instruction in secondary education: How far do teachers reach? Cogent Educ. 2020 Jan 1;7(1).

[40] Lavania M, Nor FM. Factors influencing the implementation of Differentiated Instruction in English language instruction in rural and urban secondary schools of Johor Bahru. Creat Educ. 2021;12(06):1235–46.

[41] Karimi MN, Nazari M. Growth in language teachers' understanding of differentiated instruction: a sociocultural theory perspective. J Educ Teach. 2021 May 27;47(3):322–36.

[42] Schleicher A. Teaching Excellence through Professional Learning and Policy Reform [Internet]. OECD; 2016. (International Summit on the Teaching Profession). Available from: https://www.oecd-ilibrary.org/education/teaching-excellence-through-professional-learning-and-policy-reform_9789264252059-en

[43] Suryati I, Ratih K, Maryadi M. Teachers' Challenges in Implementing Differentiated Instruction in Teaching English at Junior High School. Eduvest - J Univers Stud. 2023;3(9):1693–708.

[44] Tanjung PA, Ashadi A. Differentiated Instruction in Accommodating Individual Differences of EFL Students. Celt A J Cult English Lang Teaching, Lit Linguist. 2019;6(2):63–72.

[45] Bukhari SSF. The effectiveness of pre-assessment to differentiate the reading tasks for the mixed-abilities EFL learners. English Lang Teach Res Middle East North Africa Mult Perspect. 2019;125–52.

[46] Magableh ISI, Abdullah A. The Impact of Differentiated Instruction on Students' Reading Comprehension Attainment in Mixed-Ability Classrooms. Interchange. 2021;52:255–272.

[47] Tomlinson C. How to differentiate instruction in mixed-ability classrooms. 3rd ed. Alexandria, Virginia: ASCD; 2017.

[48] Sukarno S, Riyadini M V, Jinabe M, Lestari AE. Unveiling pre-service English teachers' perceptions of differentiated instruction. Diksi [Internet]. 2024;32(1):47–60. Available from: https://journal.uny.ac.id/index.php/diksi/article/view/66720

[49] Valiandes S, Neophytou L, Hajisoteriou C. Establishing a framework for blending intercultural education with differentiated instruction. Intercult Educ. 2018;29(3):379–98.

[50] Reza F, Rohmah Z, Abdullah NN. Challenges in Implementing Kurikulum Merdeka for EFL Teachers. JEELS (Journal English Educ Linguist Stud [Internet]. 2023 Nov 22;10(2):439–69. Available from: https://jurnalfaktarbiyah.iainkediri.ac.id/index.php/jeels/article/view/1899

Ki Hadjar Dewantara's *Tri N* "Niteni, Nirokke, Nambahi" as a Writing Teaching Approach

Dinar Martia Azizah[1*]

[1] Graduate Program, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia

*E-mail: dinar.azizah@ustjogja.ac.id

Abstract. The development of writing skills is not as easy as it was imagined. In the reality, some writing teaching approaches are still having some limitations. The aim of this paper is to describe the modification of Ki Hadjar Dewantara's *Tri N* as a writing teaching approach. This paper is a non-research article. The modification of Tri N approach is based on the Tri N approach by accommodating the advantages of the product, process, and genre approaches. The *niteni* stage comprises a series of processes, including (1) understanding the background of the text, (2) studying the language used in the text, (3) identifying the parts and characteristics of the text, (4) revealing values or information in the text, (5) looking for the relation of the text contents to learners' life, and (6) communicating learners' opinions or views of the text. The *nirokke* process involves the process of (1) exploring ideas based on the text already studied, (2) making outlines based on the parts of the text that has been studied, (3) composing the written draft, (4) applying the form of language learned from the text, and (5) getting feedback from others. The *nambahi* process is done through some stages, such as: (1) revising the input and (2) developing the draft into a text developed from learners' perspective. The *nambahi* stage in the modification of Tri N also includes *nebarke*, a process which means 'disseminate'. With a wider scope of readers, students will not only get more input, but also inculcate characters to uphold their honesty in writing. In addition, students will also be more motivated to give more value to their writing. In short, the concept of Tri N which was previously only applied in the learning process in Tamansiswa, actually has the potential to be applied in all schools.
Key words: Ki Hadjar Dewantara, Tri N, writing teaching approach

1. Introduction

Teaching is an activity in which a teacher guides and facilitates learning. It is also enable students to learn and provide a condusive atmosphere for learning [1]. Language teaching is commonly regarded as some activities which the teachers done in the classroom and has some effects to the students. In this activity, there are some interaction of teachers-students and students-students during process of teaching and learning.

The new trends of English language learning enable students to be more active in teaching and learning process that is often called by students centered approach. The role of teacher in learning activity is not dominant. Students are encouraged to interact with their own material directly. Learning materials are also expected to be contextual. The materials should have correlation to students' lives. The language use is target language. Teachers also try to develop cooperation athmosphere rather than competition. The materials also enable students to develop higher order thinking skills. The evaluation should be authentic. It represent whole process of teaching and learning. It is not only evaluate on

cognitive, but also psycomotoric and affective aspects. It has to consider real performances of students [2].

English is the only foreign language that becomes compulsory subject. Mastery of English is considered to be necessary for students so that they can be competitive generations in the era of globalization [3]. Due to that expectation, the students are encouraged to master all English language skills, including writing. Writing skill enables students to express ideas, thoughts, feelings and experiences as a productive prowess. Those ones are expected to be medias in supporting the intellectual, emotional, and social development of learners. In addition, by conducting writing activities, students can get opportunity to develop their creativity and sharpen their skills in language processing.

In fact, the development of writing skills is not as easy as it was imagined. Each language teacher has their own perspective about the ideal writing model which is believed to be able to create effective teaching and learning activities. Nowadays, we are possible to find various teaching writing approach. In other words, there is not yet a writing approach that many practitioners may agree to [4].

A study conducted by Yingjie [5] reveals teachers and students' perceptions on writing skill. They mentions that which one of the major obstacles in developing writing skills is the lack of effective writing approach. Another study conducted by Koross, et al [6] shows that teachers do not have clear understanding about what the effective learning models for developing writing skills are. As a result, students also do not have enough information about what kinds of writing approach that they have to apply. Writing becomes the most difficult English skills that should be mastered by students. The research results imply that teachers' unappropriate choices in selecting learning approach can negatively affect learning outcomes of students.

The problems related to writing activity seemed to be the obstacles which need to be given more attention to. The solutions given towards the obstacles have a fairly essential impact to improve writing skills effectively. Learning activities in writing needs to be designed optimally and suited to the students' learning characteristics so that it can be one of the factors which supports the improvements of students' writing competence. One of the solutions is by applying Tri N as a writing teaching approach.

A research carried out by Wardina and Abdul Rozak [7] entitled *Pengaruh Teknik Tri N (Niteni, Niroake, dan Nambahi) Ki Hajar Dewantara Terhadap Kemampuan Menulis Narasi Siswa* aimed in finding out the influence of Ki Hadjar Dewantara's Tri N technique on the fourth graders' narrative writing skill at SDN 4 Kenanga. The data were then analyzed using descriptive statistical analysis. The result of the research showed that the application of Tri N added variety in learning. Apart from that, the statistical calculation of students' learning result using t test indicated that the result of t calculation in amount of 14.538 is bigger that t table in amount to 2.060. Therefore, the application of Ki Hadjar Dewantara's Tri N has significant influence on improving the fourth graders' narrative writing skill at SDN 4 Kenanga.

Other previous study by Yuli [8] entitled *Pendekatan Saintifik dalam Ajaran Ki Hadjar Dewantara* was aimed in finding out the scientific approach in Ki Hadjar Dewantara's teaching and its relevance to the current learning. The data were gained by conducting interview with people who were once directly taught by Ki Hadjar Dewantara and experts of Taman Siswa's philosophy. The researcher also studied Ki Hadjar Dewantara's writing and articles concerning about him. The result of the research showed that the concept of *Niteni-Nirokke-Nambahi* (observing, imitating and improving) using *among* (education by guidance) system reflected scientific approach. The concept of Tri N represents an approach to gain education. The system of Tut Wuri Handayani places students as the subject of education, and in the new terminology it is called student-centered. The research suggested that Tri N can be implemented in learning and is in line with scientific approach currently applied in Indonesia.

Based on the background, the objective of this paper is to provide possible solutions towards problems related to students' poor writing competence caused by the disadvantages learning approach applied by their teachers by applying Ki Hadjar Dewantara's *Tri N* "Niteni, Nirokke, Nambahi".

2. Discussion

2.1 The Concept of Ki Hadjar Dewantara's Tri N "Niteni, Nirokke, Nambahi"

The implementation of the Tri N approach in English learning does not seem to be contradictory to the scientific approach in Curriculum merdeka. The Tri N concept is considered appropriate and even it was applied by Ki Hadjar Dewantara long before the scientific approach is applied today [8].

Ki Boentarsono, et al. (2012) state that the niteni, nirokke, and nambahi (observing, imitating, and elaborating) or (Tri N) approach is a student-oriented approach [8]. This approach lays the foundation for education on the interests and potentials that need to be developed within the children, not the educators' interests and abilities. The results of interviews with students and experts in *ketamansiswaan* (things concerning *Taman Siswa*) show that the Tri N approach is in harmony with the psycho-cultural process that human beings can experience universally. This process takes place in stages sequentially (systematically) and does not occur separately/randomly. The skills of observing, questioning, reasoning, trying, and creating networks, which are characteristics of the scientific approach in Curriculum merdeka, are included in Tri N [8].

Niteni is not only seeing things at a glance but paying close attention seriously and carefully. It involves all the five senses. In *niteni* there is a deeper process than merely observing, because it includes reasoning and communicating. *Niteni* begins with viewing activities with the five senses and is called *nontoni* (watching) because before anyone can observe, he needs to see various phenomena and problems that guide students' understanding according to their developmental level. Identification activities are included in *nontoni* (watching). The process of analysis and synthesis is also part of *niteni*. In other words, observation includes *niteni* activities that comprise reasoning and information processing [8].

Nirokke is a student activity to repeat what has been obtained before, perhaps with a spoken object that can be used to sharpen the understanding. This understanding is called better understanding. Students try to practice what is understood from the *niteni* process. *Nirokke* involves mind, senses, feeling, and spirit integrally and harmoniously, a harmonious convergence of thinking, sensing, feeling, and believing [8].

Nambahi is elaborating something that students have gained from the previous learning steps so that it can be more perfect according to their mind and conscience. *Nambahi* involves and develops students' creativity. At this stage students show and present what they have learned. All the three are systematic steps as a whole learning process. *Niteni* is derived from the word *titen* which refers to the ability to accurately recognize and grasp meanings (properties, characteristics, procedures, truths) by comparing a variety of things so that they can find out differences and similarities or something right and wrong. In the *nirokke* process there is a creative and innovative process to give new colors to the model that is imitated so that it fixes, adds, subtracts, and changes.

2.2 The Modification of Ki Hadjar Dewantara's Tri N As A Writing Teaching Approach

The Tri N learning can be formulated with an "modification". This is done by considering that every writing approach has advantages and disadvantages. The product-based approach prioritizes grammatical accuracy [9]; the process-based approach emphasizes the stages of finding and connecting students' ideas [10]; the genre-based approach allows students to learn the patterns of different types of writing and to communicate them to the readers' expectations [11]; the Tri N approach involves

students' five senses by starting the process of observing seriously and carefully until they are able to perform the analysis and synthesis, to try to practice what is understood from the previous process by involving the mind, senses, feeling and spirit integrally and harmoniously, and to make it perfect according to their mind and conscience so that it leads to the modification of Tri N approach.

The disadvantage of the genre approach is that it limits students' creative power. This is contrary to the Tri N concept. One of the obstacles that teachers face in implementing the genre approach comes from student factors. Learning problems that are not resolved since the beginning will have a negative impact on the next learning process [12]. This can be solved through Tri N, especially the niteni process which according to Ki Hadjar Dewantara is a deep observing process up to the cognitive level of synthesis. Niteni also involves the process of communicating what students understand so that it helps teachers identify and identify students' problems since the beginning before stepping on to the next stage. The disadvantage of the product approach indicates that grammar learning should be conveyed in a clear context. Ki Hadjar Dewantara used the term "putting the child in the nature", meaning that the delivery of each learning concept is associated with the context of the learner's life, not something that is very abstract beyond the reach of his understanding.

The modification of Tri N approach is based on the Tri N approach by accommodating the advantages of the product, process, and genre approaches. The niteni stage comprises a series of processes, including (1) understanding the background of the text, (2) studying the language used in the text, (3) identifying the parts and characteristics of the text, (4) revealing values or information in the text, (5) looking for the relation of the text contents to learners' life, and (6) communicating learners' opinions or views of the text. The nirokke process involves the process of (1) exploring ideas based on the text already studied, (2) making outlines based on the parts of the text that has been studied, (3) composing the written draft, (4) applying the form of language learned from the text, and (5) getting feedback from others. The nambahi process is done through several stages, such as: (1) revising the input and (2) developing the draft into a text developed from learners' perspective.

The modification of Tri N approach accommodates constructivism learning theory, especially the pragmatic-conceptual nature, and makes children the subjects who construct knowledge through their own experience through an exploratory and elaborative learning stage so as to develop their potentials. The delivery is not only conceptual but also promotes students' action. Learners' characteristics, including their socio-cultural background, are the most fundamental things to consider in learning. The socio-cultural aspect becomes an integral part of learning. The Tri N approach was invented and developed by Ki Hadjar Dewantara, so it is expected to be more suitable for Indonesian students.

The implementation of the Tri N approach in English learning does not seem to be contradictory to the scientific approach in Curriculum merdeka. The Tri N concept is considered appropriate and even it was applied by Ki Hadjar Dewantara long before the scientific approach is applied today [8]. The last step of the scientific approach is building networks. This does not appear in the product, process, and genre approaches. The nambahi stage in the modification of Tri N also includes nebarke, a process which means 'disseminate'. With a wider scope of readers, students will not only get more input, but also inculcate characters to uphold their honesty in writing. In addition, students will also be more motivated to give more value to their writing, such as offering solutions to a problem in the community, publishing the innovations they have created, promoting positive things for the younger generation, etc. This can be done by sending students' writing to newspapers, school bulletins, wall magazines, etc.

On one hand, scientific approach which is the characterizes merdeka curriculum has only been recently implemented, on the other hand Ki Hadjar Dewantara had already applied such an approach, even though it did not stated explicitly in its terminology. The concept of Tri N which was previously only applied in the learning process in Tamansiswa, actually has the potential to be applied in all schools

3. Conclusion

The development of writing skills is not as easy as it was imagined. In the reality, some writing models applied in the classroom are still having some limitations. One of the models sees a writing process as a highly structured activity. Such modelis too rigid in defining writing steps and pays little attention to the content of writing. Writing activityis typically startedby choosing a writing topic, making an outline, determining main ideas of each paragraph, and developing paragraphs. Other writing model aims to tailor students' writing products to the characteristics of a text. The writing activity becomes too rigid because of the complicated steps suggested to be applied. Unfortunately, it is not able to support the development of students creativity in expressing their ideas instead. In other case, there is a writing model that emphasizes on the accuracy of grammar. It puts the students to pressure so that they feeling secured in making mistakes especially in applying the grammar on their writings.

Tri N learning can be formulated with a modification. This is done by considering that every writing approach has advantages and disadvantages. The product-based approach prioritizes grammatical accuracy; the process-based approach emphasizes the stages of finding and connecting students' ideas; the genre-based approach allows students to learn the patterns of different types of writing and to communicate them to the readers' expectations; the Tri N approach involves students' five senses by starting the process of observing seriously and carefully until they are able to perform the analysis and synthesis, to try to practice what is understood from the previous process by involving the mind, senses, feeling and spirit integrally and harmoniously, and to make it perfect according to their mind and conscience so that it leads to the modification of Tri N approach. The concept of Tri N which was previously only applied in the learning process in Tamansiswa, actually has the potential to be applied in all schools.

References

[1] Brown, H. D. (2000). *Principle of Language Learning and Teaching: 4th ed*. New York: Pearson Education Company.

[2] Nunan, D. 1999. *Second Language Teaching & Learning*. New York: Heinle& Heinle Publisher.

[3] Nunan, D. (2003). Practical English Language Teaching. New York: McGraw Hill.

[4] Hedge, T. (2001). *Teaching and learning in the language classroom* . Oxford: Oxford University Press

[5] Yingjie, Y. (2016). An investigation of Chinese junior high school teachers' and students' attitudes towards EFL writing. *International Journal of Research Studies in Education*. Vol. 5 No. 2

[6] Koross, B T, et al. (2013). Perception of Teachers and Students Towards Methods Used in Teaching and Learning of English Writing Skills in Secondary Schools. *International Journal of English Language and Linguistics Research*. Vol.1, No. 1.

[7] Wardina dan Abdul Rozak.(2014). *Pengaruh Teknik Tri N (Niteni, Niroake, dan Nambahi) Ki Hajar Dewantara Terhadap Kemampuan Menulis Narasi Siswa*. ejournal FKIP UNSWAGATI.

[8] Yuli Prihatni. (2014). Pendekatan Saintifik dalam Ajaran Ki Hadjar Dewantara. *Prosiding Seminar Nasional Pendidikan Sains*. Vol. 2. No. 1.

[9] Tangpermpoon, T. (2008). Modification of Approaches to Improve Students Writing Skills for English Major Students. *ABAC Journal.* Vol. 28, No. 2.

[10] Hyland, K. (2003). *Second Language Writing*. New York: Cambridge University Press.

[11] Hammond, J., B, A., Joyce, H., Brosnan, D., Gerot, L., Solomon, N., & Hood, S. (1992). English for social purposes: A handbook for teachers of adult literacy. National Centre for English Language Teaching and Research, Macquarie University, Sydney, Australia.

[12] Nurviyani, V. (2013). The English Teachers' Understanding of Genre Based Approach. *Jurnal JOEPALLT*. Vol. I.

Analysis of Critical Thinking Research Models in Indonesian Language Journals throughout SINTA-based Journals: A Literature Review

Bukran Habibullah[1], Samsul Kamarudin[2], Geby Rahmayani[3], Nino Chairisa[4], Universitas Negeri Yogyakarta[1,2,3,4]

bukranhabibullah.2023@student.ac.id
samsulkamarudin.2023@student.uny.ac.id
gebyrahmayani.2023@student.uny.ac.id
nino0044fbsb.2023@student.uny.ac.id

Abstract. Critical thinking skills are considered an essential foundation for effective learning and complex problem solving. Students who have good critical thinking skills tend to have better academic outcomes and are better prepared for the changing demands of the world of work. This research aims to conduct a comprehensive literature review on critical thinking skills in Indonesian language journals. This research is a library research or literature study. Although there have been many studies conducted on critical thinking skills, no one has provided a complete analysis of the research results in the context of Indonesian Language Education journals. The data for this study were obtained from Indonesian Language Education journals listed in the Science and Technology Index (SINTA) that have been published in the last six years 2018 to 2023. In this study, six primary aspects will be investigated for content analysis. The variables at issue include: (1) the annual number of publications; (2) the type of research; (3) the subjects of the research; (4) the selection of Indonesian themes for research; (5) the equipment used for data collecting; and (6) the methodologies used for data analysis. The findings of this study revealed that only 7 Indonesian language education journals contained articles on critical thinking and only six articles discussed critical thinking. This study revealed that the most designed type of research was experimental research. Furthermore, as a research subject, it refers to the junior and senior high school levels. While in the realm of the material used the majority focuses on writing skills. The questionnaire is the most widely used instrument and the data analysis methods that are often used are ANOVA and t-test.
Keywords: Indonesian educational journals, critical thinking skills, data analysis

1. Introduction

Ideally, learning activities are not only focused on efforts to gain as much knowledge as possible, but also how to use all the knowledge gained to deal with new situations or solve specific problems related to the field of study studied. (Wena, 2010). Learning is an activity that involves cognition. In an age where information is increasingly complex and changing rapidly, students are required to have various skills. One of them is critical thinking skills (Widodo & Istiqamah, 2022). Teaching students to think critically is one of the main goals of education (Syafitri et al., 2015). (Syafitri et al., 2021). To be able to adapt to change, every learner must have critical thinking skills. Critical thinking is about meeting certain standards of accuracy in thinking (Rohman & Kusaeri, 2021).

Critical thinking is reflective rational thinking that is focused on deciding what to do and what to believe, (Hunaepi et al., 2020). Critical thinking as an organized process in solving problems involving mental activities that include the ability to formulate problems, provide arguments or opinions, evaluate, and make decisions (Juliyantika & Batubara, 2022a). Critical thinking as an intelligent disciplined process of active and skillful conceptualization, application, analysis, synthesis, and evaluation gathered from, or generated by, observation, experience, reflection, reasoning, or communication as a guide to belief and action (Syafitri et al., 2021). Critical thinking is the ability to analyze, evaluate, and synthesize information, as well as the ability to make good decisions based on deep understanding critically and logically. Critical thinking skills are closely related to metacognitive skills, which is the ability to understand, control, and regulate our own thinking processes (Suharyani et al., 2023).

In education, critical thinking skills are considered an important foundation for effective learning and complex problem solving. Students who have good critical thinking skills tend to have better academic outcomes and are better prepared for the changing demands of the world of work. Education should focus on developing critical thinking, imagination, and emotional intelligence to develop well-rounded individuals who can contribute to the world (Mulyaningsih et al., 2024). (Taghva et al., 2014) revealed the results of his research that critical thinking skills possessed by students have a positive impact on independence in developing knowledge. (Hunaepi et al., 2020). The implementation of HOTS in learning is influential, positively correlated, efficient, and able to improve students' critical thinking skills (Suciati, 2022). In line with Ngatiyem's research, it is revealed that the application of the Problem Base Learning model can improve students' critical thinking skills (Ngatiyem, 2021). Social networking site use and critical thinking together simultaneously contribute significantly to learning outcomes (Nadeak et al., 2020). However, if grouped and classified in a gradual time, the data based on the *Trends in International Mathematics and Science Study (TIMSS) International quadrennial* study conducted on junior high school students with characteristics of high cognitive level questions that can measure students' critical thinking skills show that Indonesian students consistently fall in the lower ranks (Syafitri et al., 2021).

Some research results that have highlighted critical thinking research that has been published in Science and Technology Index journals (SINTA) for biology education, one of which is Susetyarini and Fauzi. They found that the increasing trend in the number of publications on critical thinking skills indicates the number of researchers that are eager to look into advanced critical thinking abilities has significantly increased (Susetyarini & Fauzi, 2020). Second, research conducted by Juliantika and Batubara on critical thinking in basic education journals showed a very rapid increase in 2020 (Juliyantika & Batubara, 2022). Although there have been many studies conducted on critical thinking skills, no one has provided a complete analysis of the research results in the context of Indonesian Language Education journals. Therefore, this study is crucial because it contributes to understanding the pattern of research related to critical thinking skills in the discipline of Indonesian Language Education. This study aims to answer the following questions: (1) How much research has been done on critical thinking skills year after year? (2) What research designs are used in Indonesian journals to investigate critical thinking skills? (3) What topics are most often researched regarding students' critical thinking skills? (4) What did the researchers' themes choice when conducting the research? (5) What the researchers used for data collecting? (6) how are the techniques applied to analyze data? Thus, this study aims to conduct a comprehensive literature review on critical thinking skills. There are differences in several aspects of the current study compared to previous studies related to critical thinking skills. Firstly, this research focuses on analyzing all articles that have been published in Indonesian language journals accredited by Science and Technology Index (SINTA). Second, the focus of this research is to explore several articles that emphasize critical thinking skills.

2. Methods

This research is a library research or library study, which is research that utilizes library sources to obtain research data (Fatha Pringgar & Sujatmiko, 2020). The data for this study were obtained from the Indonesian Language Education journal listed in the Science and Technology Index (SINTA). The data taken are articles that have been published in the last six years 2018 to 2023. The steps taken to collect journals and articles are through visiting the website: https://sinta.kemdikbud.go.id/, then clicking the "sources" menu then selecting the "journal" menu, then entering the keyword "Indonesian Language" in the "search journal name / ISSN / PISSN" column. After that, search for relevant journal names and click on the journal URL to access its webpage. Next, using the search feature on the journal's website to find articles related to critical thinking skills, using keywords such as "critical thinking", "Thinking", and "Critical Thinking". The search results yielded 12 Indonesian language journals. However, only 7 journals contained articles on critical thinking, with a total of 19 articles found. Furthermore, after checking with the speed-reading method, only 6 articles specifically discussed critical thinking skills.

Research Instruments
The instrument used in this study is a content analysis guideline adapted from research results (Susetyarini & Fauzi, 2020), and further developed. (Table 1.) There are six main variables issue that will be reviewed. The variables at issue include: (1) the annual number of publications; (2) the type of research; (3) the subjects of the research; (4) the selection of Indonesian themes for research; (5) the equipment used for data collecting; and (6) the methodologies used for data analysis. Due to a lack of prior research that could be used as a guide to determine the scope of what should be included in the categories and the potential for creating too general categories when performing content analysis on some articles, it was decided not to take the categories in aspects (1) and (4) at first. Furthermore, the categories found in aspects (2), (3), (5), and (6) were established before any data was gathered. Moreover, aspect (1) was separated into two smaller aspects: the general research type (2a) and the quantitative research design (2b).

Table 1. Research Aspects and Categories for Content Analysis

Aspects	Category	
Type of research (1a)	A.1-R and D A.2-CAR	A.3-Qualitative Research A.4-Quantitative Research A.5-Mixed Research
Quantitative research type (1b)	B.1-Observation Study (OS) B.2-Survey Research (SR)	B.5-Experimental Design (TED) B.6-Quasi-Experimental Design (QED)
Research subject	C.1-BIPA learners C.2- Junior high school students in grade VIII C.3 - Junior high school students in grade VII	C.4-Ninth grade high school students C.5-Ninth grade high school students C.6-Undergraduate Students

Aspects	Category	
Data collection instruments	D.1-sheet questionnaire D.2-observation sheet D.3-test sheet	D.4-interview sheet D.5-not identified
Data analysis method	E.1-percentage E.2-tests E.3-ANOVA	E.4-ANCOVA E.5-Not identified E.6-Other

3. Findings

Table 2: Names of Journals and Titles of Articles Analyzed

No.	Author	Article Title	Publisher	Rangking
1	(Siti Khoirunnisa et al., 2023)	Daya Pikir Kritis Pembelajar BIPA 4 Dalam Penilaian Keterampilan Berbicara Berkonteks Sosiokultural	Jurnal Bahasa Indonesia Bagi Penutur Asing (JBIPA)	S3
2	(Widodo & Istiqamah, 2022)	Pemetaan Tahap Berpikir Hots Siswa Kelas Viii Smp Gibs: Sebuah Asesmen Dengan Pendekatan Anderson Krathwohl Taxonomy	Logat Jurnal Bahasa Indonesia Dan Pembelajaran	S4
3	(Iskandar, 2018)	Pengaruh Strategi Pembelajaran Dan Kemampuan Berpikir Logis Terhadap Keterampilan Menulis Argumentasi	Estetik Jurnal Bahasa Indonesia	S5
4	(Handayani et al., 2018)	Keefektifan Model Berpikir Induktif Dan Model Saintifik Pada Pembelajaran Menulis Fabel	Jurnal Pendidikan Bahasa Indonesia	S5
5	(Yuniarti et al., n.d.)	Project Based Learning Sebagai Model Pembelajaran Teks Anekdot Pada Siswa SMA	Jurnal Pendidikan Bahasa Indonesia	S5
6	(Khotimah & Triana, 2020)	Student Facilitator and Explaining Untuk Pembelajaran Tik Bahasa Indonesia	Jurnal Pendidikan Bahasa Indonesia	S5

Year of article publication
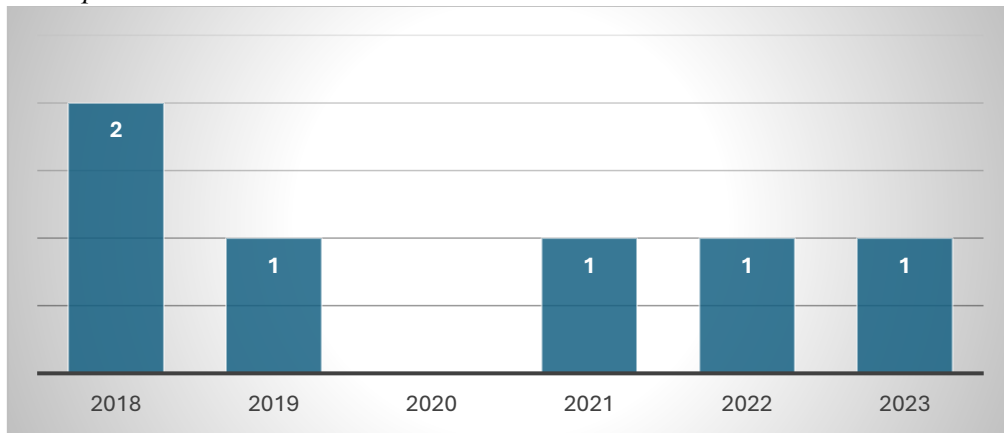
Figure 1. Distribution of research in the last six years

The graph in Figure 1 shows the results of research on critical thinking skills in the last six years, from 2018 to 2023.

Type of Research
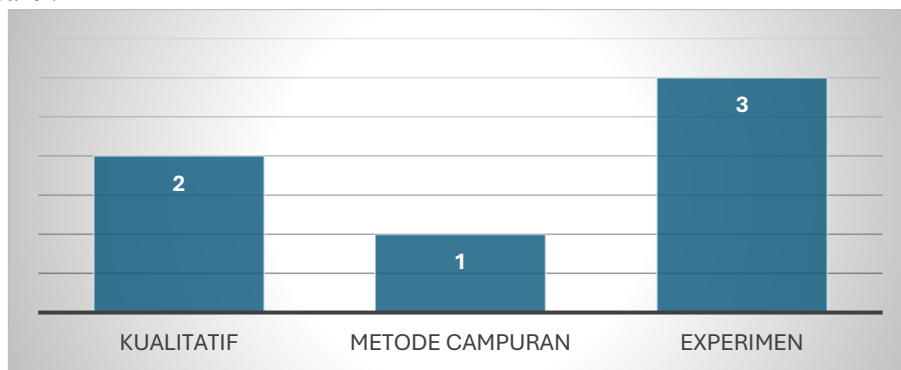
Figure 2. Different types of research

The most common type of research conducted to examine critical thinking skills in Indonesian language journals is experimental research.

Research Subject
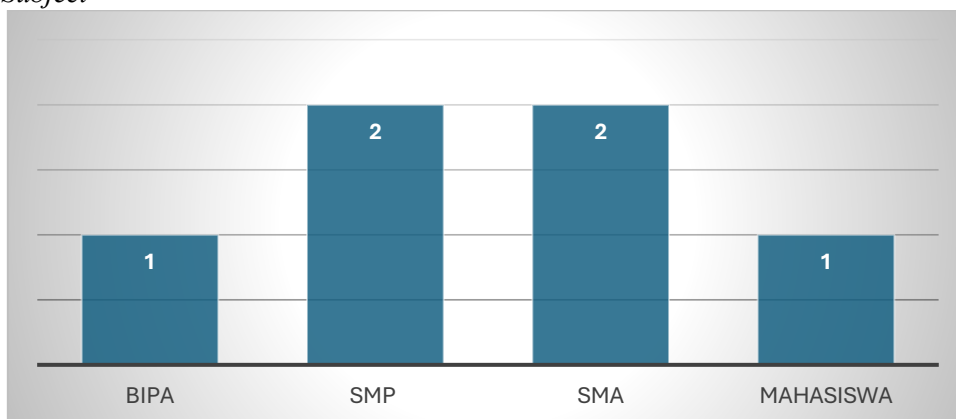
Figure 3. Research subjects

Junior and senior high school students were the most frequently chosen research subjects, followed by college students and international students learning Indonesian (BIPA).

Topics chosen when conducting Research.
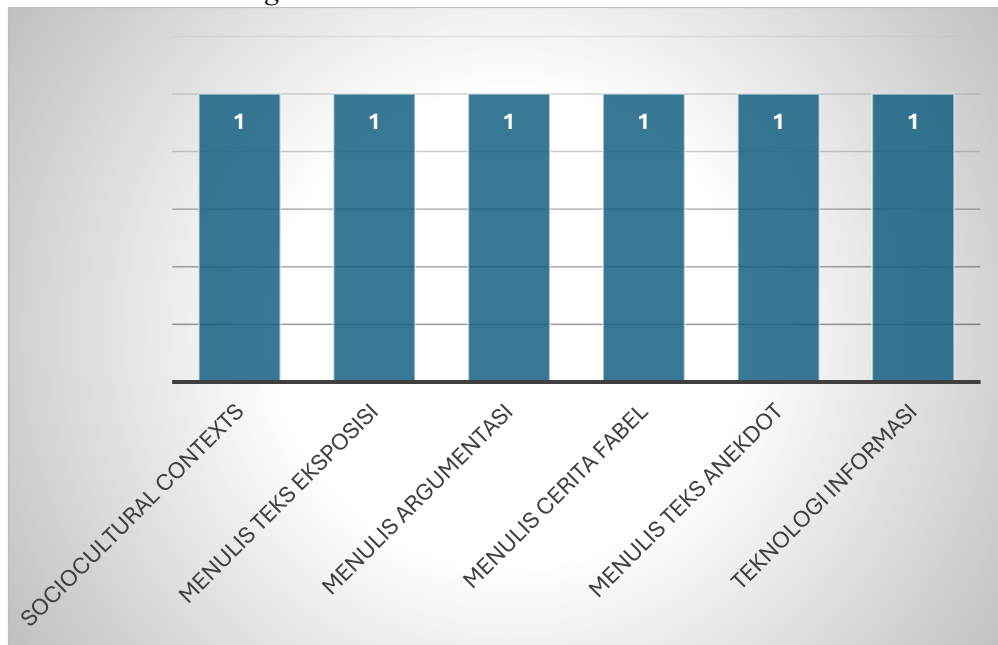
Figure 4. Selected topics when conducting research.

There are several publications that only focus on one specific topic, namely the development of text writing skills, which includes types of writing such as exposition, argument, fable, and anecdote.

Research instruments
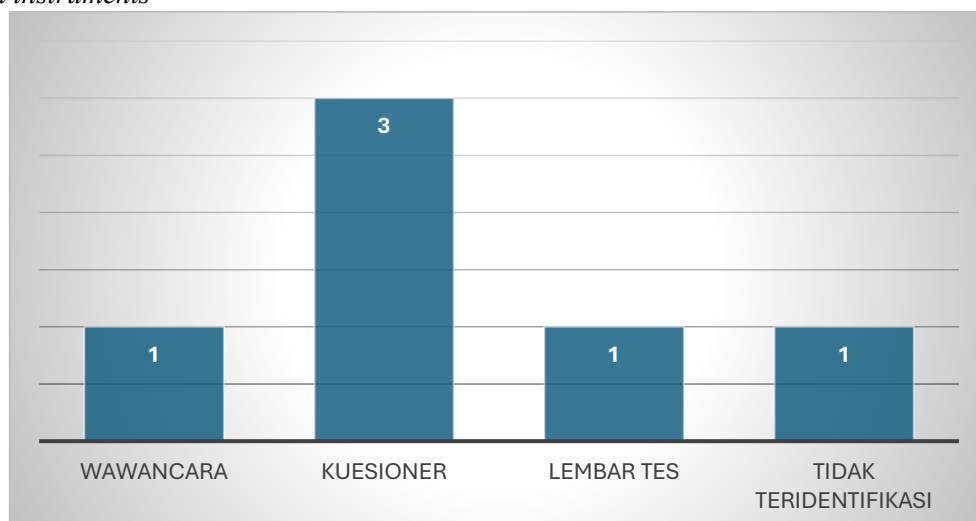
Figure 5. Research Instrument Model

As shown in Figure 4, questionnaires have been the most widely utilized technique for gathering information about critical thinking abilities.

Data Analysis Method
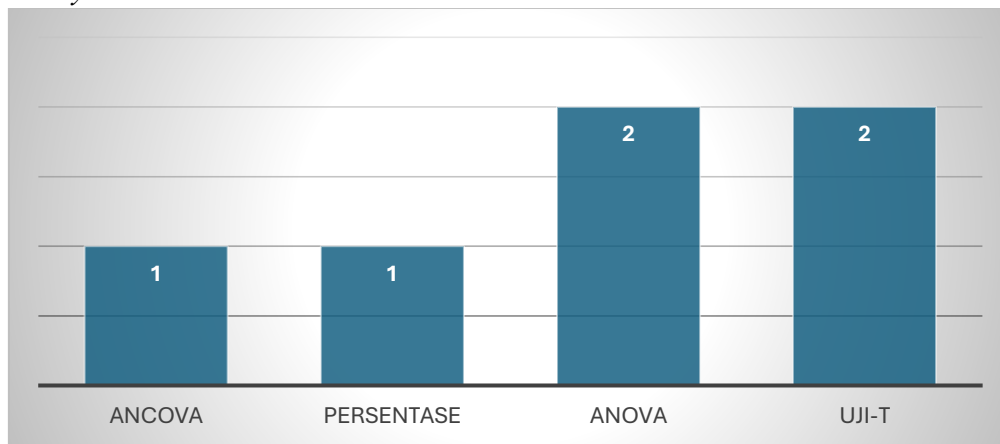
Figure 6. Data Analysis Method in Critical Thinking Research

The data in Figure 6 indicates ANOVA (Analysis of Variance) and t-test are two statistical methods often used to analyze data in research.

4. Discussion

Based on the data presented in the graph in Figure 1, there is no trend or pattern that can be observed regarding fluctuations in the number of scientific articles that discuss the topic of critical thinking during the observation period. This situation can be seen from the fact that only in 2018, the number of articles published reached two, while in other years, the publication of articles with similar themes consistently amounted to only one each year. This condition indicates that the interest and attention from researchers and academics to the issue of critical thinking skills in students is still relatively low. There has not been a significant effort to explore further and in depth about this important aspect in the context of education and learning in the school environment. Studies on critical thinking tendencies in Indonesian language journals are still lacking, in comparison to the findings of (Juliyantika & Batubara, 2011). (Juliyantika & Batubara, 2022) in their research on critical thinking in basic education journals which experienced a very striking increase. This is based on the sensitivity of researchers to common issues that often occur around. The bigger the favorable influence on the advancement of Indonesian education, the greater the quantity of research examining critical thinking abilities. This assertion is predicated on the notion that research's ultimate objective is to enhance instructional methods (Coburn & Penuel, 2016).

Turning our attention to the type of research used the data in Figure 2 reveals an interesting picture. The experimental research approach is considered superior and more widely applied compared to qualitative methods. Specifically, the experimental research design was recorded to be used three times in the various studies analyzed. Meanwhile, there were two studies that applied a qualitative approach in exploring the context of critical thinking, and only one study combined quantitative and qualitative methods or commonly referred to as mixed research. This fact shows that there are variations in the choice of research approaches used by researchers when studying the topic of critical thinking through the publication of articles in scientific journals. Experimental research is the most used choice, followed by qualitative research in the context of critical thinking, while mixed research is the least common type of application. Therefore, the condition of the minimal number of studies using qualitative designs is seen as a favorable opportunity for researchers to further expand the scope of using qualitative-oriented

research methods to explore and gain a deeper understanding of aspects of students' critical thinking abilities.

Based on the information presented regarding the type of research used in Figure 2, it is revealed that experimental design is the most prevalent and favored method to be adopted by researchers in conducting their studies. This fact indicates that in general, researchers tend to attempt to compare the best instructional designs that can be applied to improve critical thinking skills in students. In conducting a study, of course, researchers need the presence of research subjects as targets to test the hypotheses they propose. These findings are in line with the results of research carried out by Fauzi & Pradipta, who thoroughly examined the substance of every study on biology education published in the area in 2017. (Fauzi & Pradipta, 2018). In their research, it was concluded that the experimental method was indeed the most widely used choice by researchers in studying topics related to Biology education in Indonesia during that period. Thus, it can be said that the choice of experimental design as the most popular research method in assessing students' critical thinking skills is a common trend and is quite common in research practices in the field of education, not least in the context of Biology education in Indonesia. This is driven by the desire of researchers to be able to compare and evaluate the effectiveness of various learning approaches to develop students' critical thinking skills.

In addition to presenting comparative data regarding the level of education that is the subject of research in examining critical thinking skills, ranging from the junior high school level to the higher education level, and involving Indonesian language learners for foreign speakers (BIPA), the results of the analysis in Figure 3 show a lack of research on critical thinking at the high school level. In fact, referring to the research of Noorhafizah et al (2022) revealed that increasing teacher activity and student activity will also make critical thinking skills, collaboration and student independence will increase. (Noorhapizah et al., 2022).. Similarly, at the higher education level, critical thinking skills need to be developed and familiarized by everyone. This habit of critical thinking will be carried by students until they enter the world of work (Riyanto et al., 2022). (Riyanto et al., 2024)..

The research results also highlight a surprising fact. From the data, it was revealed that not a single study was conducted involving students at the master's or undergraduate level as research subjects. The absence of research exploring the development of critical thinking skills among master's students opens very interesting opportunities for future researchers to get involved and contribute to filling this void. Master's students, who in fact have been studying higher education for at least five years, certainly have different characteristics and levels of thinking maturity compared to undergraduate students or students at the primary and secondary education levels. Therefore, conducting research that focuses on efforts to develop and improve critical thinking skills among master's students can provide very valuable insights and findings. This will not only enrich the scientific treasure in the field of critical thinking skills development, but also has the potential to produce specific learning strategies, methods, or models that are appropriate for master's level students' demands and characteristics.

It was found that some of the scientific publications reviewed tended to focus attention on only one specific topic, namely efforts to develop writing skills texts with various types, such as expositions, arguments, fable stories, and anecdotes. In addition to discussing writing skills, some publications also involve discussion of speaking skills in relation to the development of critical thinking skills. Based on the data presented in Figure 4, it can be identified that there are four publications that specifically examine the level of critical thinking skills in the context of writing or writing activities. However, what is quite unfortunate is that none of the four publications presents a detailed research background related to the actual conditions that describe the relationship between students' critical thinking skills and the topic or writing activity that is the focus of the research.

The lack of background information can be a drawback, considering the importance of explaining the initial conditions or real conditions behind the research. In the absence of an adequate explanation

of these conditions, it is difficult for readers or other parties to understand the urgency and relevance of the research conducted. Information about the actual conditions related to students' critical thinking skills in relation to writing activities is needed to provide a clear picture of the problems or gaps to be addressed through the research. Therefore, the presence of a comprehensive and detailed research background should be an important component that cannot be ignored in a good scientific publication. This is necessary so that the research conducted has a strong foundation or justification and can convince readers of its significance and relevance empirically and theoretically. Learning with the aim of improving critical thinking skills can be done through several strategies, one of which is finding problems (Lynch, 1994)

To measure and evaluate students' critical thinking skills, researchers have developed a variety of methods and instruments that can be used. As the data in Figure 5 shows, questionnaires are the most common and widely adopted method for collecting data related to students' critical thinking skills. Basically, critical thinking skills can be interpreted as a series of thinking processes that demand high-level cognitive abilities, which can be evaluated or accessed through students' responses to a set of questions presented in a particular instrument or measuring instrument. The use of questionnaires as a data collection method is considered more objective than other methods such as written tests or interviews, considering that in questionnaires, students are freer to provide answers according to their own understanding and opinions without any direct intervention from researchers.

However, it should be noted that in one of the articles examining critical thinking skills, the researcher did not disclose or specify the type of instrument used to collect research data. This means that in that publication, information regarding the instruments used to assess students' critical thinking skills could not be clearly identified. The diversity of methods and instruments used to measure students' critical thinking skills shows that this aspect is a complex and multidimensional construct. Therefore, caution and careful consideration are needed from researchers in choosing and developing the right instrument to capture and evaluate critical thinking skills accurately and comprehensively in accordance with the research objectives to be achieved. When using tests as their primary means of gathering data, some researchers frequently omit to mention whether the instrument has undergone validity and reliability testing. This emphasizes how crucial it is to evaluate an instrument's validity and reliability before using it to gather data, as mentioned by (Bajpai & Bajpai, 2014)

The data in Figure 6 indicates ANOVA (Analysis of Variance) and t-test are two statistical methods often used to analyze data in research. ANOVA is a statistical analysis method utilized to examine differences among three or more groups of population mean values. This method makes it possible to compare the mean values of several groups simultaneously. The main purpose of using ANOVA is to identify whether there is a significant difference between the means of the groups. On the other hand, the t-test is a statistical method applied to test the difference between two population means. The t-test is used to compare the mean values of two groups of data. The purpose is to determine if there is a significant difference between the two means. (Goodman et al., 2019).

In scientific research, there are various data analysis methods that can be selected and applied by researchers according to their needs and data characteristics. However, based on the results of a review of several scientific articles reviewed, it was found that only a small number of researchers utilized data analysis methods such as ANCOVA (Analysis of Covariance) and Percentage in processing and analyzing their research data. More specifically, there was only one article that included the use of the ANCOVA method as a tool for analyzing data in its research. ANCOVA itself is an analytical method that combines elements of analysis of variance (ANOVA) with linear regression to test the effect of one or more independent variables on the dependent variable, considering the influence of covariate or control variables. Meanwhile, the Percentage method, which is one of the simple descriptive data analysis techniques, was also only found to be used in one article out of all the publications reviewed.

In this method, the data obtained is processed and presented in the form of percentages or proportions to provide a more understandable picture of the characteristics or phenomena studied.

Most other scientific articles tend to use data analysis methods that are more popular and commonly applied in research, such as linear regression, ANOVA (Analysis of Variance), t-test, and other analytical techniques that are well established and widely known among researchers and academics. Choosing the appropriate data analysis technique is certainly an important factor that can affect the quality and accuracy of the interpretation of the research results obtained.

5. Summary

In this study, this article highlights how the trend of critical thinking research in Indonesian language education journals published in the SINTA Science and Technology Index since the last six years from 2018 to 2023. The findings in this article show that only in 2018, the number of articles published reached two, while in other years, the publication of articles with similar themes consistently amounted to only one each year. Likewise, related to the nature of the research employed in the analyzed papers, it appears that the experimental research approach is considered superior and more widely applied compared to qualitative methods and mixed research methods. After in-depth analysis, it was found that some of the scientific publications reviewed tended to focus on only one specific topic, namely efforts to develop writing skills. Data found in the realm of research instruments revealed that questionnaires or questionnaires are the most common and widely adopted method for collecting data related to students' critical thinking skills. Finally, in the realm of data analysis methods, it was found that most journals analyzed indicated that ANOVA (Analysis of Variance) and t-test were the two statistical methods often used to analyze data in research. Alluding to the data found in this study, the recommendation given for future researchers is the need to increase the number of studies that examine critical thinking skills in the context of Indonesian language learning.

References

[1] Bajpai, R., & Bajpai, S. (2014). Goodness of Measurement: Reliability and Validity. *International Journal of Medical Science and Public Health*, *3*(2), 112. https://doi.org/10.5455/ijmsph.2013.191120133

[2] Coburn, C. E., & Penuel, W. R. (2016). Research–Practice Partnerships in Education: Outcomes, Dynamics, and Open Questions. In *Educational Researcher* (Vol. 45, Issue 1, pp. 48–54). SAGE Publications Inc. https://doi.org/10.3102/0013189X16631750

[3] Fatha Pringgar, R., & Sujatmiko, B. (2020). PENELITIAN KEPUSTAKAAN (LIBRARY RESEARCH) MODUL PEMBELAJARAN BERBASIS AUGMENTED REALITY PADA PEMBELAJARAN SISWA. *JurnalIT-EDU*, *5*(1), 317–329. https://ejournal.unesa.ac.id/index.php/it-edu/article/view/37489

[4] Fauzi, A., & Pradipta, I. W. (2018). Research methods and data analysis techniques in education articles published by Indonesian biology educational journals. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, *4*(2), 123–134. https://doi.org/10.22219/jpbi.v4i2.5889

[5] Goodman, W. M., Spruill, S. E., & Komaroff, E. (2019). A Proposed Hybrid Effect Size Plus p-Value Criterion: Empirical Evidence Supporting its Use. *American Statistician*, *73*(sup1), 168–185. https://doi.org/10.1080/00031305.2018.1564697

[6] Handayani, L., Chamalah, E., & Setiana, L. N. (2018). KEEFEKTIFAN MODEL BERPIKIR INDUKTIF DAN MODEL SAINTIFIK PADA PEMBELAJARAN MENULIS FABEL. *Jurnal Pendidikan Bahasa Indonesia*, *6*(1), 32–41. DOI: http://dx.doi.org/10.30659/j.6.1.32-41

[7] Hunaepi, Firdaus, L., Samsuri, T., Susantini, E., & raharjo. (2020). *Efektifitas Perangkat Pembelajaran Inkuiri Terintegrasi Kearifan Lokal The Effectiveness of Inquiry Learning Tools with Local Wisdom Integration Towards Students' Critical Thinking Skills*. https://doi.org/10.24246/j.js.2020.v10.i3.p269-281

[8] Iskandar, Z. (2018). Pengaruh Strategi Pembelajaran Dan Kemampuan Berpikir Logis Terhadap Keterampilan Menulis Argumentasi. *ESTETIK Jurnal Bahasa Indonesia*, *1*(1), 58–68. DOI: http://dx.doi.org/10.29240/estetik.v1i1.416

[9] Juliyantika, T., & Batubara, H. H. (2022a). Tren Penelitian Keterampilan Berpikir Kritis pada Jurnal Pendidikan Dasar di Indonesia. *Jurnal Basicedu*, *6*(3), 4731–4744. https://doi.org/10.31004/basicedu.v6i3.2869

[10] Juliyantika, T., & Batubara, H. H. (2022b). Tren Penelitian Keterampilan Berpikir Kritis pada Jurnal Pendidikan Dasar di Indonesia. *Jurnal Basicedu*, *6*(3), 4731–4744. https://doi.org/10.31004/basicedu.v6i3.2869

[11] Khotimah, K., & Triana, L. (2020). STUDENT FACILITATOR AND EXPLAINING UNTUK PEMBELAJARAN TIK BAHASA INDONESIA. *Jurnal Bahasa Indonesia*, 13–20. DOI: http://dx.doi.org/10.30659/jpbi.9.1.13-20

[12] Lynch, B. (1994). *Strategies for Teaching Critical Thinking. - Practical Assessment, Research & Evaluation*. https://www.researchgate.net/publication/293246157 https://doi.org/10.7275/hdhj-fc81

[13] Mulyaningsih, N., Asbari, M., & Rahmawati, R. S. (2024). *Keterampilan Berpikir Kritis dan Pemecahan Masalah Mahasiswa*. https://doi.org/10.4444/jisma.v3i1.496

[14] Nadeak, B., Juwita, C. P., Sormin, E., & Naibaho, L. (2020). Hubungan kemampuan berpikir kritis mahasiswa dengan penggunaan media sosial terhadap capaian pembelajaran pada masa pandemi Covid-19. *Jurnal Konseling Dan Pendidikan*, *8*(2), 98–104. https://doi.org/10.29210/146600

[15] Ngatiyem. (2021). *PENERAPAN PEMBELAJARAN PROBLEM BASED LEARNING UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR KRITIS SISWA*. https://doi.org/10.51878/action.v1i2.637

[16] Noorhapizah, O., Pratiwi, D. A., & Ramadhanty, K. (2022). MENINGKATKAN KETERAMPILAN BERPIKIR KRITIS MENGGUNAKAN SMART MODEL UNTUK SISWA SEKOLAH DASAR. In *JCI Jurnal Cakrawala Ilmiah* (Vol. 2, Issue 2). https://doi.org/10.53625/jcijurnalcakrawalailmiah.v2i2.3773

[17] Riyanto, M., Asbari, M., & Latif, D. (2024). Efektivitas Problem Based Learning terhadap Kemampuan Berpikir Kritis Mahasiswa. *JOURNAL OF INFORMATION SYSTEMS AND MANAGEMENT*, *03*(01). https://jisma.org https://doi.org/10.4444/jisma.v3i1.744

[18] Rohman, F., & Kusaeri. (2021). *Watson-Glaser Critical Thinking Appraisal (WGCTA) CRITICAL THINKING ABILITY ASSESSMENT IN FIKIH LEARNING WITH WATSON-GLASER CRITICAL THINKING APPRAISAL (WGCTA)*. http://creativecommons.org/licenses/by-sa/4.0/

[19] Siti Khoirunnisa, A., Cahyani, I., & Damayanti, V. S. (2023). Daya pikir kritis pemelajar BIPA 4 dalam penilaian keterampilan berbicara berkonteks sosiokultural. *Jurnal Bahasa Indonesia Bagi Penutur Asing (JBIPA)*, *5*(1), 1–11. https://doi.org/10.26499/jbipa.v5i1.6184

[20] Suciati, I. (2022). IMPLEMENTASI HIGHER ORDER THINKING SKILLS TERHADAP KEMAMPUAN BERPIKIR KRITIS PESERTA DIDIK DALAM PEMBELAJARAN. In *Jurnal Pembelajaran Matematika dan Sains* (Vol. 3, Issue 1). **DOI:** https://doi.org/10.24239/koordinat.v3i1.32

[21] Suharyani, L. A., Nugroho, A. S., & Dewi, E. R. S. (2023). Profil keterampilan berpikir kritis siswa SMA pada materi perubahan lingkungan berbasis strategi metakognitif. *Practice of The Science of Teaching Journal: Jurnal Praktisi Pendidikan*, *2*(1), 37–44. https://doi.org/10.58362/hafecspost.v2i1.30

[22] Susetyarini, E., & Fauzi, A. (2020). Trend of critical thinking skill research in biology education journals across Indonesia: From research design to data analysis. *International Journal of Instruction*, *13*(1), 535–550. https://doi.org/10.29333/iji.2020.13135a

[23] Syafitri, E., Armanto, D., & Rahmadani, E. (2021). AKSIOLOGI KEMAMPUAN BERPIKIR KRITIS. In *Journal of Science and Social Research* (Issue 3). http://jurnal.goretanpena.com/index.php/JSSR DOI: https://doi.org/10.54314/jssr.v4i3.682

[24] Taghva, F., Rezaei, N., Ghaderi, J., & Taghva, R. (2014). Studying the Relationship between Critical Thinking Skills and Students' Educational Achievement (Eghlid Universities as Case Study). *International Letters of Social and Humanistic Sciences*, *25*, 18–25. https://doi.org/10.18052/www.scipress.com/ilshs.25.18

[25] Wena, M. (2010). *Strategi Pembelajaran Inovatif Kontemporer Suatu Tinjauan Konseptual Operasional*. Jakarta: Bumi Aksara.

[26] Widodo, A. wahyo, & Istiqamah. (2022). PEMETAAN TAHAP BERPIKIR HOTS SISWA KELAS VIII SMP GIBS: SEBUAH ASESMEN DENGAN PENDEKATAN ANDERSON KRATHWOHL TAXONOMY. *Logat Jurnal Bahasa Indonesia Dan Pembelajaran*, *9*(1), 25–41. **DOI:** https://doi.org/10.36706/logat.v9i1.221

[27] Yuniarti, haryadi, & Haryati, N. (n.d.). PROJECT BASED LEARNING SEBAGAI MODEL PEMBELAJARAN TEKS ANEKDOT PADA SISWA SMA. *Jurnal Pendidikan Bahasa Indonesia*, 73–81. DOI: http://dx.doi.org/10.30659/jpbi.9.2.73-81

Early Childhood's English Vocabulary Acquisition through YouTube Kids's Songs

Dede Surahman¹*, Erna Andriyanti² and Pratomo Widodo³

1,2,3 Department of Language Education Science, Faculty of Languages, Arts and Culture, Universitas Negeri Yogyakarta, Indonesia

*E-mail: dedesurahman.2023@student.uny.ac.id. erna.andriyanti@uny.ac.id pratomo@uny.ac.id.

Abstract. Children have carried LAD since they were born. They can speak any language, based on where they live. This study aims to trace the English language acquisition of an early child, Niscala, from Indonesia. This study focused on the process of English vocabulary acquisition for Niscala, the factors of Niscala's interest in English YouTube channels for kids: Cocomelon-Nursery Rhymes and Meowmi Family Show, the impacts of videos on those YouTube channels, and the parent's apperception of Niscala's English acquisition. The present study used descriptive research where data was collected through a questionnaire and video recorded as secondary data to observe Niscala's interest in English songs. The findings revealed that Niscala enjoyed watching the videos and did it with her intention. The process of English vocabulary acquisition in Niscala began at 25 months. She listened to English songs from this medium for at most 3 hours a day. She can imitate English songs, even though the pronunciation is not clear. She felt happy when she sang the English songs. This media stimulated her brain to absorb the language. So, this media influenced the child and made the subconscious mind pick up vocabulary in the songs.

1. Introduction

In the area of language acquisition, there is a belief that it is easier for children to acquire new vocabulary because of some factors, such as age, gender, social class, social identity, and environment (Anqi, 2023). Language is a very complex system that is constantly changing. Despite many complexities and intricacies, children can learn their mother tongue quickly and efficiently (Genelza, 2022). Additionally, some experts are also interested in the topic related to second language acquisition. Second language acquisition is the process of acquiring a language naturally besides the native language unconsciously (Susan M. Gass, 2020). In other words, children can acquire any language since early childhood from their interactions with parents through a process of stimulus and response to get the natural of language acquisition (Mahdi, Mahmood Shaalan Atiyah Alsalmani, & Ali Abbas Jasim Mohammed, 2022).

When a child knows some English vocabulary, they can speak English. During this period, the children can memorize the vocabulary with easy. The correlation of English vocabulary with second language acquisition is the child acquires the vocabulary naturally. The early language environment has an important role in a child's language development (Wang, Rondeline Williams, Laura Dilley, & Derek M. Houston, 2020). In other words, they can speak any language based on interaction with the people around them. They get English vocabulary naturally from their parents, media, and environment.

Many factors may influence children to acquire new vocabulary. Factors that influence children's behavior are stimuli that often arise from the surrounding environment and are responded to by them

so that they become habits (Peker & Özkaynak, 2020), (Girl, 2022). Stimulating parenting and some aspects of the home language environment are significantly correlated with cognitive and language development in childhood (Ma & et. al, 2023). Based on the behaviorist's theory, this process applies so that they can acquire the language or vocabulary from other human behavior. Hence, the person was able to make the desired behavior become a habit, performed spontaneously. Besides that, learning vocabulary is essential for acquiring any language, as teachers introduce new words to visual stimuli to better engage students in learning (Alghamdi, 2018). In a previous study on the acquisition of English in children at Islamic elementary schools, Nurul Hidayah shows that children have reached the third and fourth stages, namely telegraphic and formulaic speech and productive language (Fahriany & Albiansyah, 2020).

Nevertheless, some children face difficulties in understanding texts that include language formulas (Kan & Murphy, 2020). A parent's choice early on to enroll their child in a reputable pre-kindergarten program that offers a second language and comprehensive environment can at least facilitate a smoother and less stressful transition from the pre-kindergarten stage to a higher level (Wallin & Cheevakumjorn, 2020). However, this study is different from previous studies. The parents introduced the English song vocabulary to their child not from school but through YouTube Kids. Hence, this research study was conducted to focus on Niscala's interest in English songs through YouTube Kids based on her parent's perception. The research objectives of this research involve: 1) to trace the process of English vocabulary acquisition of Niscala; 2) to trace the factors of Niscala's interest in English YouTube channels for kids: Cocomelon-Nursery Rhymes and Meowmi Family Show; 3) to trace the impacts of videos in those YouTube; and 4) to describe the parent's apperception of Niscala's English acquisition.

2. Method

The research used descriptive qualitative research. Descriptive research design is a research method that collect the stories, and report individual experience in detail (Miles, Huberman, & Saldana, , 2014). This study was conducted in one early childhood. Her name is Niscala. She is the second daughter in her family. Her age is more 2 years old. researcher gave some questionnaire to her mother through a link sent via WhatsApp. Then this type questionnaire is in open-ended questions where the respondent is free to anwer the question in her own words (Malik & Hamied, 2014). It was intended to trace the process of English vocabulary acquisition of Niscala, to trace the factor of Niscala's interest for K: Cocomelon-Nursery Rhymes and Meowmi Family Show, to trace the impact of youtube kids: Cocomelon-Nursery Rhymes and Meowmi Family Show for Niscala, and to describe the parent's apperception of Niscala's English acquisition. One of the instruments used was in the form of questionnaire. The questionnaire involved a number of questions given to the parents. It included 9 items of questions, related to early childhood's English song acquisition through YouTube Kids.

Subsequently, the researcher used video recorded as secondary data to observe Niscala's interest in English song Acquisition through YouTube Kids. After that, the data was transcribed into sentences to check the English vocabulary acquisition of Niscala. The data analysis technique for this research used triangulation. It used multiple sources or methods to gather data. This study combines questionnaire data with video recordings to provide a more comprehensive understanding of the data under research.

3. Results and Discussion

YouTube Kids is a video application for families with content that parents can control so it is safe for children. Parents can choose some good video channels according to their child's age. Additionally, parents can block inappropriate videos and channels. There are many great videos for early childhood education, including the Cocomelon & Miawmi Families. Cocomelon's videos contain catchy English children's songs with 3D animation and cover the daily lives of children, adults, and animals interacting with each other. Then Meowmi Family Show is a channel that contains videos of baby cats with their families and friends, holding events that present their daily lives. In this study, several categories came to surface. Here the researcher is going to present each category with some pieces of the participant from Niscala's mother. In this study, the larger categorization for this phase is presented in the form of four more comprehensive concepts or themes, early childhood, English song acquisition, YouTube kids, and parent's apperception. The data obtained in this research is the results of a questionnaire and a video recording of Niscala while continuing an English song. Table 2 displays descriptive questionnaire results regarding parents' responses to their interest in singing English songs.

Table 1. Questionnaire of Early Childhood's English Song Acquisition based on Parent's Apperception

No.	Categories	Questions	Parent's Apperception
1	Early childhood	What language do your children usually use every day?	Indonesian language
2	English Acquisition	When did your child begin to recognize or acquire English vocabulary?	25 months
3	English Acquisition	What are the factors that make your child acquire English vocabulary?	From Nursery Songs such as Cocomelon, Miawmi Family Show
4	Media	Is there any other media or application that makes children happy and interested in listening to vocabulary/ songs/ language phrases? Please mention the media or application.	YouTube Kids
5	Parent's apperception	Why does this media make children happy when they imitate English vocabulary or songs?	Because videos are interesting, then parents can control the YouTube Kids program.
6.	Parent's apperception	How long a day does your child listen to English vocabulary/songs from this media?	The child listens to English song in a day to a maximum of 3 hours.
7	Media	Does media or technology influence children's acquisition of English vocabulary? Why and give examples according to experience and data.	Perhaps because from the children's song subconsciously caught the song.
8	Early childhood	How was your child's initial process of learning English until now? Is there any progress? Please explain!	There is no significant development because the language used daily remains Indonesian. She only used English when singing the song.

No	Categories	Questions	Parent's Apperception
9	Media	Does media or technology currently influence the acquisition of English vocabulary? Give reasons accompanied by existing data.	I cannot answer the effect or no because further research is needed to assess the effect size. And I have no valid data to serv as evidence. But maybe childrer can acquire the language becaus they enjoy the process without being told others words. They g the song because enjoying the process stimulates their brain to absorb the language.
10	English Acquisition	Are there other factors besides media or technology that influence children's acquisition of English vocabularies? Please state and give reasons.	Perhaps there are other factors besides media, for example, video games, because many studies have revealed these results (can be seen on Google Scholar, etc.). However, in-depth and long observation is needed to see whether this factor really exists. But in my child's case, maybe because he enjoyed the process, maybe th was one of the factors why he was able to acquire this language.

Table 1 shows the results of the questionnaire to parents. Based on the parent apperception showed that Niscala enjoyed watching the video: Cocomelon & Miawmi Family without being ordered. The process of English vocabulary acquisition of Niscala began at 25 months. She watched and listened to English songs from this medium for at most 3 hours a day. She was subconsciously capturing the song. This media stimulated her brain to absorb the language. It influenced Niscala's acquisition of English vocabulary. So, this media made the subconscious mind pick up on the songs. It was relevant to the previous study that YouTube children's educational videos are becoming a valuable tool for parents and educators in introducing English language learning to children (Kilag, Heyrosa-Malbas, Arcillo, & Barcena, 2023).

Figure 1. Respect's Niscala watch video on YouTube Kids channel

Figure 1 shows the results that Niscala enjoys while moving his hands and body following the video. On another occasion, Niscala can sing English songs following what her mother sings a song. Such as Cocomelon - Nursery Rhymes, the title is Finger Family. His mother started singing a song: Daddy's Finger, Baby's Finger Where are you? Then, Niscala directly continued the song: mi ayam ayam wat did yu do (Here I am, here I am How do you do?). From the data, Niscala is able to imitate English songs, even though the pronunciation is not clear. She feels happy when she sings a song while holding the ball.

The data analysis carried out, media of YouTube Kids: Cocomelon & Miawmi Family show of early childhood had an influence on acquiring English. It is in line with research which states that the use of media has an influence on children's acquisition of English vocabulary because, from children's songs, the subconscious mind picks up on the songs (Genelza, 2022) (Alam & Mizan , 2019) (Nguyen , 2021) (Viet , 2021). YouTube children's educational videos are becoming a valuable tool for parents and educators in introducing English language learning to children (Kilag, Heyrosa-Malbas, Arcillo, & Barcena, 2023). Thus, it can conclude that YouTube Kids media influences children's acquisition of English vocabulary because their subconscious mind picks up on the songs.

4. Conclusion

YouTube Kids: Cocomelon, Miawmi Family Show is a medium that influences early childhood English vocabulary acquisition because, from children's songs, the subconscious mind captures the song. At an early age, children enjoy the process of acquiring English vocabulary by singing a song. Therefore, parents can provide media or toys that educate their children in mastering English vocabulary. The recommendation, especially for parents, they should be able to choose and use media to support language acquisition. Hence, early childhood enjoys. This field allows researchers to expand, replicate, or modify research to ensure the appropriateness of secondary learning acquisition for young children.

References

[1] T. anqi , "A Literature Review of the Effect of Individual Differences on Second Language Acquisition," International Journal of Linguistics, Literature and Translation, vol. VI, no. 10, pp. 01-06, 2023.

[2] G. G. Genelza, "A case study research on Justin Herald's language development," Journal of Languages, Linguistics and Literary Studies (JLLLS), vol. II, pp. 133-141, 2022.

[3] J. B. a. L. P. Susan M. Gass, Second language acquisition: an introductory course, New York: Routledge, 2020.

[4] G. . S. Mahdi, M. S. A. A. and A. A. J. M. , "Language Acquisition and Learning on Children," European Journal of Research Development and Sustainability, vol. 3, no. 2, pp. 30-37, April 2022.

[5] Y. Wang, R. W. L. D. and D. M. H. , "A meta-analysis of the predictability of LENA™ automated measures for child language development," Developmental Review, vol. 57, 2020.

[6] H. Peker and O. Özkaynak, "A Critical Review on the Equivocal Definition of Comprehensible Input and the Misleading Use of the Term "Acquisition"," Journal of Language Education and Research, vol. VI, no. 1, pp. 238-250, 2020.

[7] N. Girl, "Examining Three Crucial Second Language Acquisition Theories and their Relationship in the Acquisition Process by a Six-Year-Old," MEXTESOL Journal, vol. 46, no. 4, 2022.

[8] Y. Ma and e. a. , "Family-level factors of early childhood development: Evidence from rural China," Infant Behavior and Development, vol. 70, 2023.

[9] Y. Sun, "An Analysis on the Factors Affecting Second Language Acquisition and Its Implications for Teaching and Learning," Journal of Language Teaching and Research, vol. X, no. 5, pp. 1018-1022, 2019.

[10] J. C. Meniado, "Second Language Acquisition: The Case of Filipino Migrant Workers," Advances in Language and Literary Studies, vol. X, no. 1, pp. 47-57, 2019.

[11] B. Ozfidan and L. M. Burlbaw, "A Literature-Based Approach on Age Factors in Second Language cquisition: Children, Adolescents, and Adults," International Education Studies, vol. XII, no. 10, pp. 27-36, 2019.

[12] Y. Chen, N. J. Cabrera and S. M. Reich, "Mother-child and father-child "serve and return" interactions at 9 months: Associations with children's language skills at 18 and 24 months," Infant Behavior and Development, vol. 73, 2023.

[13] K. Rose, S. Armon-Lotem and C. Altman, "Family language policy and vocabulary of bilingual children across different ages," Ampersand, 2023.

[14] H. H. Alghamdi, "Exploring Second Language Vocabulary Learning in ESL Classes," English Language Teaching, vol. XII, no. 1, pp. 78-84, 2018.

[15] Fahriany and Albiansyah, "The Acquisition of English Vocabulary for Children at Grade III in SD Islam Nurul Hidayah," International Journal of Emerging Issues in Early Childhood Education, vol. II, no. 2, pp. 127-132, 2020.

[16] S. Budianto, N. Sayidah, S. and A. Mustofa, "Teachers' and Students' Perception on Acquiring English Vocabulary for Young Learners Using Mobile Apps in EFL Context," World Journal of English Language, vol. XII, no. 8, pp. 402-409, 2022.

[17] M. . Z. Alam and F. . B. Mizan , "The Perceptions about Computer Assisted Language Learning for L2 Vocabulary Acquisition," Journal of Language Teaching and Research, vol. X, no. 5, pp. 926-936, 2019.

[18] Y. Sun , "An Analysis on the Factors Affecting Second Language Acquisition and Its Implications for Teaching and Learning," Journal of Language Teaching and Research, vol. X, no. 5, pp. 1018-1022, 2019.

[19] N. T. T. Nguyen , "A review of the effects of media on foreign language vocabulary acquisition," ijte, vol. 1, no. 1, pp. 30-37, 2021.

[20] . G. Dionisio, L. C. Pascual and . R. Ilustre, "Vocabulary Acquisition and Learning Strategies in Second Language Learning: A Review Paper," International Journal of English Language Studies, vol. IV, no. 3, pp. 58-62, 2022.

[21] G. Jingshu, S. Lee, H. Guo and . J. Yang, "Exploring Deep Learning of English Vocabulary Acquisition from Mobile Learning Environment," Journal of e-learning Research, vol. I, no. 4, pp. 1-16, 2021.

[22] M. Alfadil , "Effectiveness of virtual reality game in foreign language vocabulary acquisition," Computers & Education, vol. 153, 2020.

[23] F. Fellasufah and A. Mustadi, "A Scrapbook of Child Stories as A Media to Improving the Story-telling Skill," Journal of Education and Learning, vol. 15, no. 2, pp. 195-202, 2021.

[24] R. T. Kan and V. A. Murphy, "Effects of frequency and idiomaticity on second language reading comprehension in children with English as an additional language," Studies in Second Language Learning and Teaching, vol. X, no. 3, pp. 579-605, 2020.

[25] J. Wallin and B. Cheevakumjorn, "Learning English as a Second Language: Earlier is Better," JEES, vol. V, no. 1, pp. 1-8, 2020.

[26] M. B. Miles, A. M. Huberman and J. Saldana, , Qualitative data analysis: a methods sourcebook, 3 ed., United States: Sage Publication, Inc., 2014.

[27] R. S. Malik and F. A. Hamied, Research Method: A Guide for First Time Researcher, Bandung: UPI Press, 2014.

[28] O. K. Kilag, M. Heyrosa-Malbas, M. T. Arcillo and M. C. Barcena, "The Role of YouTube Children's Educational Videos in Enhancing Early Childhood English Language Proficiency: An Investigation of Parental Perceptions," Multidimensional Research Journal (MRJ), vol. II, no. 6, pp. 67-78, 2023.

[29] H. . Q. Viet , "The Differences of Individual Learners in Second Language Acquisition," International Journal of TESOL & Education , vol. I, no. 1, pp. 38-46, 2021.

[30] M. E. Hoque, "The Universal Grammar Theory: Noam Chomsky's Contributionto Second Language (SL) Education," The Journal of EFL Education and Research , vol. VI, no. 2, pp. 57-62, 2021.

The Readability Level of *Bahasa Inggris* Textbook with Merdeka Curriculum

Dini Renati

Universitas Tidar

Abstract. In the context of Indonesia's Merdeka curriculum, this study evaluates the readability level of English textbooks for 10th-grade students, recognizing the crucial role of English proficiency in accessing global opportunities.The methodology this research used was descriptive quantitative by looking at the data of 10 grade students' English textbook from Merdeka curriculum. The reading texts in the book were collected as research data, these data was then analyzed with Flesch reading ease formula to test the researchers' hypothesis. The results of this study show that the final average calculation of reading texts is fairly difficult. These findings underscore the need for aligning educational materials with students' reading abilities to enhance learning experiences and promote effective language acquisition within the evolving educational landscape. In conclusion, the Readability level of English textbooks for 10th-grade students has been categorized as 'fairly difficult'. For further knowledge, future research needs to present students' perspectives to adapt the results of this research to students' needs.

Keywords : Readability, Flesch Reading Ease, Merdeka Curriculum

1. Introduction

In the current era of globalization, mastery of English is the key to accessing world resources and opportunities. One way to improve English language skills is through learning through textbooks. However, the quality and readability of English textbooks in Indonesia, especially in the Merdeka curriculum, is a concern. The Merdeka Curriculum, which was first implemented in 2022, aims to develop education that is more inclusive, innovative and relevant to the needs of the times. Amendments to the Decree of the Minister of Education, Culture, Research and Technology Number 56/M/2022 concerning Guidelines for Implementing Curriculum in the Context of Learner Recovery. One important component in this curriculum is the use of English textbooks as a learning tool. Therefore, this study aims to evaluate the readability level of English textbooks used in the Merdeka curriculum in Indonesia. In the context of high school education, reading skills have a crucial role in broadening students' horizons and increasing their understanding of various academic content. Therefore, it is important to pay attention to the development of appropriate and varied teaching materials, such as the latest textbooks, interactive digital materials, as well as other additional resources, to support the development of holistic reading skills and sustainable among high school students

Nuttall (1996) offered three criteria for choosing reading texts for students: suitability of content, exploitability, and readability. Understanding the importance of readability in the process of learning Bahasa Inggris is essential for effective English language education. As Hakim (2021) said that readability is one of the important aspects that should be considered in designing and evaluating a

textbook because most of its contents are in the form of written text. Besides considering the criteria of a good textbook, the teacher must consider the proper content and evaluate the readability level of the reading material (Dzulhijjah, 2021; Azima et al, 2023). As we delve into the readability of Bahasa Inggris textbooks, it becomes crucial to emphasize its pivotal role in facilitating English language acquisition. Previous study from Tilawati and Suendarti (2020) stated that the correlation between readability levels and student engagement, emphasizing the need for comprehensible materials in language education. They said that careful selection of text in textbooks will be effective for teaching and will provide good input to students so that they can produce the desired language.

In this research, we will use a method for assessing the readability of English textbooks that has been developed by experts in the field. The researcher uses the concepts of the Flesch Reading Ease formula (Flesch, 1948) as the guidance to measure the readability level of the reading texts in English language textbooks because many researchers have widely used them. Thus the current research will utilize the Flesch Reading Ease Formula in analyzing the readability of reading texts. Since the object of the research in the previous research mostly came from the non government, for instance Tilawati's research (2020) analyzed the readability of a book entitled Pathway to English. Thus, it is necessary to select a research object from a government source to know the teaching materials that are suitable for students, especially the reading materials contained in them so that they suit the students' abilities. Therefore, this current research decided to analyze the readability level of reading texts in the newest textbook from the Ministry of Education and Culture, namely *Bahasa Inggris for 10th grade.* This textbook is written by Budi Hermawan, Dwi Haryanti, dan Nining Suryaningsih, published in 2022 and designed based on the revised Kurikulum Merdeka. This research is expected to provide insight into the readability level of English textbooks in the Merdeka curriculum and provide recommendations for improving the quality of textbooks

2. Methodology

This research used a descriptive quantitative approach. To measure the readability value of the books we analyzed, we used the theory and formula from Flesch KincaId (1949). The sample from this research is an English textbook for class 10 from the latest educational curriculum, namely the Merdeka curriculum. The instrument of our research is a series of data collection on reading texts in the book. This research procedure follows the readability research steps from Flesch Kincald's book. Thus, the steps carried out in this study begin with the selection of samples by Search for research objects or books to be analyzed. Then the second step is analyzing and grouping all the text in the book to be studied. Furthermore, the analysis of the results and interpretation of data which is then processed using the Flesch Kincald formula.

3. Finding Research

A total of 15 texts are available in the textbook, 2 descriptive texts, 3 procedure texts, 2 recount texts, 5 expository texts, and 3 narrative texts. The texts taken for this study are in terms of monologue. All texts in this book will be analyzed using Flesch Reading Ease. To shorten and simplify the analysis, the first to last texts were sorted and marked using codes, e.g. text 1 became T1, text 2 became T2 and so on. Table 1 shows the texts computed into the Flesch Reading Ease formula.

Table 1. Text Selection

No	Code	Number of Words	Page
1.	T1	287	11-12
2.	T2	90	27
3.	T3	350	35-36
4.	T4	65	50
5.	T5	126	77
6.	T6	517	84-86
7.	T7	90	96
8.	T8	376	109-110
9.	T9	289	110-112
10.	T12	131	116
11.	T13	153	117
12.	T10	82	126-127
13.	T11	279	135-136
14.	T14	805	137-140
15.	T15	117	153

The data inputted will calculated based on the Flesch Reading Ease formula that is presented below:

Flesch Reading Ease Score: 206.835 – (1.105 × Average Sentence) – 84.6 × Average Syllables per Word.

Furthermore, after each text is calculated using the Flesch Reading Ease formula, all results can be seen in table 2 below.

Table 2. The result of the calculation based on Flesch Reading Ease

Code	Flesch Reading Ease Score	Difficulty level
T1	68.785	standard
T2	37.64	difficult
T3	58.595	fairly difficult

Code	Flesch Reading Ease Score	Difficulty level
T4	46.171	difficult
T5	45.051	difficult
T6	71.659	fairly easy
T7	30.024	difficult
T8	68.275	standard
T9	35.515	difficult
T10	59.095	fairly difficult
T11	72.175	fairly easy
T12	30.375	difficult
T13	87.785	easy
T14	88.23	easy
T15	50.845	fairly difficult
Mean	56.68	fairly difficult

Based on table 2, two texts are categorized as 'easy', two texts at 'fairly easy' level, two texts at 'standard' level, three texts at 'fairly difficult' level, and six texts at 'difficult' level. Based on the result, the researcher measures the mean of each formula and found that the overall reading texts are at the 'fairly difficult' level. This score indicates how easy or difficult a text is for readers to understand. Determining the easy or difficult value of a text based on the book from Flesch Kincald Readability is shown on a scale of 0 to 100. Scores above 80 are considered easy to understand for general readers, while scores below 60 indicate more complex and difficult to understand texts.

4. Discussion

According to those classifications, it can be concluded that from 15 texts, there were only two texts (13.33%) that were classified as easy readability; that is the text on page 45-46 (T1). 9 (60%) texts proved to be above the other or more difficult to read. Moreover, 4 (26.66%) texts were relatively easier to read than other texts in the book. On average, the texts on the textbook were at the 'fairly difficult' level. In this study, the results show that the readability analysis of the corresponding texts was done thoroughly and accurately using the Flesch Reading Ease Formula. This theory is not new, having previously been applied by Brown researchers in 1997 in evaluating the readability of some random books in the American Public library for EFL students. This decision is also in line with the research conducted by Hakim et al. (2021), where they used the Flesch Reading Ease Formula Theory to compare the readability level with several other theories, which eventually resulted in a consistent conclusion. In addition, research by Dzulhijjah (2021) and Tilawati (2022) also showed the use of the same formula in evaluating reading books for high school students. They found that the level of readability varied between texts in one book they reviewed. This underlines the importance of using the right readability method in assessing the suitability of reading materials with the level of understanding of the target

readers. Thus, the results of this study provide a strong foundation for using the Flesch Reading Ease Formula as an effective tool in evaluating the readability of texts, especially in educational contexts where comprehension of reading material is crucial.

5. Conclusion

This study was conducted using the Flesch Kincald Reading Ease formula in *Merdeka Curriculum* grade 10 English book. The purpose of this study is to determine the level of readability of textbooks. The series of research began with determining the book, identifying the text, reading the text, and counting the number of sentences, words, and syllables. After that, the data was processed into the Flesch Kincald Reading Ease formula to measure the readability level of each text. From the calculation results, the categorization was summarized into several parts, there were 2 texts categorized as easy, 2 texts as fairly easy, and 6 texts as fairly difficult. On average, the texts are Fairly Difficult. This means that according to the theory of Flesch's Ease of Reading Formula by Rudolf Flesch, the reading material has an average of 15 texts taken that are fairly difficult. The results of this study certainly require further analysis to determine the suitability of the books read with the students' abilities by involving the students directly for future research.

Resources

[1] Azima, F., Ping, M. T., & Amarullah, A. K. (2023). Are these texts readable? An Analysis on the Readability Level of English Textbooks for Indonesian High Schools. *Borneo Educational Journal (Borju)*, 5(1), 28-36. DOI: 10.24903/bej.v5i1.1095

[2] Dzulhijjah, Y. (2021). An Analysis of Readability Level of Reading Material in English Textbook for First Grade of Senior Highschool. *Journal of Education and Teaching*, 2(1), 1-7. DOI: 10.24014/jete.v2i1.8211

[3] Flesch, R. F. (1949). The Art of Readable Writing (A. J. Gould, Ed.). Harper & Row.

[4] Hakim, A. A., Setyaningsih, E., & Cahyaningrum, D. (2021). Examining the Readability Level of Reading Texts in English Textbook for Indonesian Senior High School. *Journal of English Language Studies*, 6(1), 18-35. DOI: http://dx.doi.org/10.30870/jels.v6i1

[5] Nuttall, C. (1996). Teaching reading skills in a foreign language (2nd ed.). Oxford, UK: Heinemann.

[6] Handayani, R., Furaidah, & Ivone, F. M. (2020). The Readability Level of Reading Texts in Erlangga Straight Point Series: English for Eleventh Grade Students. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 5(11), 1579–1587. http://journal.um.ac.id/index.php/jptpp/

[7] Tilawati, T., & Suendarti, M. (2022). The Readability Level of Reading Text in the English Textbook Entitled "Pathway to English" Used the Eleventh Grade Students of States Islamic Senior High School In Tangerang. Inference: *Journal of English Language Teaching*, 5(1), 80-86.

[8] Ganie, R., Deliana., & Rangkuti, R. (2019). Reading Comprehension Problems on English Texts Faced By High School Students in Medan. In *The Second Annual International Conference on Language and Literature* (Vol. 2019, pp. 684–694). KnE Social Sciences. DOI: https://doi.org/10.18502/kss.v3i19.4896

[9] Sakinah, N., & Fudhla, N. (2023). An Analysis of Reading Questions in "English for Senior High School Grade XII" Textbook Published by Masmedia. *Journal of English Language Teaching*, 12(4), 1078-1088. DOI: https://doi.org/10.24036/jelt.v12i4.125631

[10] Junita, T., Mukhrizal, & Elfrida. (2023). Teachers' Strategies in Teaching Reading Comprehension at Senior High Schools. *Jurnal Wacana*, 21(2), 2746-4652. DOI: https://doi.org/10.33369/jwacana.v21i2.29572

[11] Hidayatillah, N., & Zainil, Y. (2020). The Readability of Students' Textbook Used in Semantic and Pragmatic Course in English Language Education Program of UNP. *Journal of English Language Teaching*, 9(1), ISSN 2302-3198. DOI : https://doi.org/10.24036/jelt.v9i1.107848

[12] Putri, C. M., Herawati, A., & Rahmah, M. (2021). Content analysis of English textbook for 11th grade of senior high school on HOTS criteria. Pedagogia: *Jurnal Ilmiah Pendidikan*, 13(2), 90-93. DOI: https://doi.org/10.55215/pedagogia.v13i2.4505

[13] Merkle, A. C., Ferrell, L. K., Ferrell, O. C., & Hair, J. F. Jr. (2021). Evaluating ebook effectiveness and the impact on student engagement. *Journal of Marketing Education*, 1-10. DOI: https://doi.org/10.1177/02734753211035162

[14] Senowarsito, S., Suwandi, S. Siti Musarokah, S. , & Ardini, S. N. (2023). The Analysis of Feasibility in EFL Textbook: A Contribution to Kurikulum Merdeka. *Arab World English Journal (AWEJ) Special Issue on CALL* (9) 305-319. DOI: https://dx.doi.org/10.24093/awej/call9.21

The Power of Literature in Language Education: Techniques for Effective Integration in the Classroom

Evi Kasyulita[1*], Al Malikul Ikhwanda Putra[2] , Sri Harti Widyastuti[3] , and Wiyatmi[4]

[1,2,3,4] Ilmu Pendidikan Bahasa, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: evikasyulita@upp.ac.id [1], almalikul.2023@student.uny.ac.id [2], hartiwidyastuti@yahoo.co.id [3], wiyatmi_fbs@yahoo.co.id [4]

Abstract. The integration of literature in language education has been recognized for its potential to enhance linguistic skills, cultural awareness, and critical thinking. This article explores various techniques for effectively incorporating literature into language classrooms, providing educators with practical strategies to engage students and foster a deeper understanding of language through literary texts. By examining theoretical frameworks and empirical studies, this article aims to offer a comprehensive guide for educators seeking to leverage the power of literature in their teaching practices.

1. Introduction

The use of literature in language teaching has long been advocated for its many benefits. Literature not only exposes students to rich and diverse linguistic expressions but also introduces them to different cultural contexts and human experiences. As such, literary texts provide a unique and invaluable resource for language learners, enabling them to acquire language skills in a context that is both meaningful and engaging. This article aims to explore the theoretical underpinnings of using literature in language education and present effective techniques for its integration in the classroom.

Literature plays a crucial role in language education by offering authentic language input and a rich array of vocabulary, grammatical structures, and stylistic devices (Collie & Slater, 1987). Through exposure to literary texts, students encounter complex language patterns and diverse language use that are often absent in conventional language learning materials. This exposure not only enhances their linguistic proficiency but also prepares them for real-world communication by familiarizing them with the subtleties and nuances of the language.

In addition to language benefits, literature offers insight into many cultures and ideas. It permits pupils to investigate the cultural and social circumstances in which the language is utilized, so increasing cultural awareness and empathy (Lazar, 2020). By engaging with characters and narratives from various cultural backgrounds, students develop a deeper understanding of and appreciation for cultural diversity, which is essential in our increasingly globalized world.

Moreover, the analytical and interpretive nature of literary studies promotes critical thinking. As students analyze plot structures, character development, and thematic elements, they sharpen their analytical skills and learn to evaluate information critically (Khatib, 2011). These skills are transferable to other areas of study and life, making literature a valuable component of a well-rounded education.

This article uses numerous theoretical frameworks to promote the incorporation of literature into language teaching. Reader-response theory stresses the reader's active participation in text interpretation, encouraging pupils to interact directly with literary works (Rosenblatt, 1982). According to constructivist learning theory, learners construct knowledge through experiences and reflections,

hence literature can be an effective instrument for contextual learning. Sociocultural theory emphasizes the relevance of social interaction and cultural context in learning, placing literature as a tool for exploring different perspectives and cultures (Lantolf, 2011).

By examining these theoretical foundations and presenting practical techniques for incorporating literature into the language classroom, this article aims to offer a comprehensive guide for educators. It addresses the benefits and challenges of using literature in language education and provides strategies for selecting appropriate texts, conducting pre-reading and post-reading activities, and integrating literature with other subjects. Additionally, the article reviews case studies and empirical research to illustrate the effectiveness of literature-based instruction in enhancing language skills and cultural competence.

In conclusion, literature is a powerful tool in language education, offering numerous benefits that extend beyond linguistic proficiency. By leveraging the insights and strategies presented in this article, educators can create enriching and engaging learning experiences that harness the transformative power of literature.

2. Theoretical Framework

The integration of literature in language education is grounded in several key theoretical frameworks:

a. **Linguistic Theories**: According to Krashen's Input Hypothesis, comprehensible input is essential for language acquisition (Krashen, 1985). Literary texts, with their varied and rich language, provide this input in a meaningful context. This exposure helps students grasp complex linguistic structures and vocabulary in a natural way.
b. **Cultural Theories**: Byram's Model of Intercultural Communicative Competence emphasizes the importance of cultural understanding in language learning (Byram, 1997). Literature introduces students to different cultures, fostering empathy and intercultural awareness. This is crucial in today's globalized world, where intercultural competence is highly valued.
c. **Critical Pedagogy**: Freire's concept of critical pedagogy encourages learners to question and challenge societal norms (Freire, 1970). Literature, through its exploration of diverse themes and perspectives, serves as a tool for developing critical thinking skills. It encourages students to engage with texts critically and reflect on their own beliefs and assumptions.

3. Research Methodology

The objective of this research is to understand the perspectives and approaches used by English lecturers when teaching literature. The study investigates the benefits and drawbacks of employing literature, as well as effective teaching strategies and potential problems. The research explicitly answers the following questions:
a. How do EFL lecturers use literature to improve and develop their students' language skills?
b. How does exposure to literature impact students' language development, according to EFL lecturers in semester 4?
c. What are the benefits and challenges of using literature, according to EFL lecturers in semester 4?

Research Design
For this study, the researcher used qualitative research designs. Bogdan and Taylor (2014) define qualitative research as a research method that generates qualitative descriptive data in the form of individual written or spoken words and observed behaviours. This study's primary focus is on an

exploratory-qualitative design, which is a technique for learning more about the research object under inquiry. The research was then interpreted qualitatively and descriptively.

Sources of Data
The data were obtained from fourth English semester students at the University of Pasir Pengaraian, with a sample consisting of 22 students and 1 lecturer. Research data were investigated and acquired using a variety of data sources, including documents, sources (informants), events or activities, places, and objects. The outcomes of the observation, interview, and documentation were the sources of the research data.

Data Collection
There are three stages in collecting data:
   a. **Direct Observation**: The researcher conducted direct observations in the classroom to gather data from the actual situation. This helped in understanding the context and methods used in teaching literature.

   b. **Interviews**: Following class observations, the researcher conducted interviews with the lecturer. The interview procedure was aided by the use of an audio recording device to acquire more detailed information. The interviews focused on the lecturer's approaches, perceptions, and experiences with teaching literature.

   c. **Documentation**: The researcher collected documentation to support the data obtained from observations and interviews. This included collecting lesson plans, student assignments, and other relevant materials.

Data Analysis
The researcher applied the following Miles and Huberman hypothesis (quoted in Punch, 2009):
   a. **Data Reduction**: This entails selecting, concentrating, simplifying, abstracting, and changing the data contained in written field notes or transcriptions. Data reduction is a type of analysis in which data is sharpened, sorted, focused, discarded, and organized in order to draw and verify final conclusions.

   b. **Data Display**: This entails organizing and combining data in a way that enables for conclusion drawing. Displays assist in comprehending what is going on and taking action based on that understanding.

   c. **Conclusion Drawing and Verification**: This involves interpreting the displayed data, identifying patterns, themes, and relationships. These conclusions are then verified to check their validity.

4. Results and Discussion

The study's findings shed light on the approaches, impacts, and obstacles of integrating literature in EFL classrooms.

Methods Used by EFL Lecturers
EFL lecturers employ a variety of methods to incorporate literature into their teaching, including:
   a. **Close Reading**: Detailed analysis of texts to understand language use and thematic elements. This method helps students develop critical reading skills and deepens their understanding of linguistic structures.

b. **Literature Circles**: Small group discussions where students share their interpretations and perspectives. This collaborative approach enhances communicative competence and encourages peer learning.

c. **Creative Writing**: Activities that involve students writing their own pieces inspired by the literary texts they read. Creative writing fosters creativity and helps students apply new vocabulary and grammatical structures in meaningful contexts.

d. **Dramatization**: Acting out scenes from literary works to engage with the material in a dynamic manner. This strategy improves pupils' speaking skills and allows them to internalize language patterns.

Effects on Students' Language Development
According to surveyed and interviewed EFL lecturers, exposure to literature has a considerable positive impact on students' language development:

a. **Vocabulary Expansion**: Literary books expose pupils to a diverse set of vocabulary, including colloquial idioms and sophisticated terminology. This exposure allows children to extend their lexicon in a contextually rich setting (Lazar, 1993).

b. **Improved Reading Skills**: Regular engagement with literature improves students' reading comprehension and analytical skills. They learn to identify themes, infer meanings, and appreciate different literary styles.

c. **Enhanced Writing Abilities**: Through creative writing and literary analysis, students develop better writing skills. They learn to express their thoughts more clearly and creatively, using varied sentence structures and stylistic elements.

d. **Cultural Awareness**: Literature provides insights into different cultures and perspectives, fostering intercultural competence and empathy (Byram, 1997).

Benefits and Challenges
The study highlights several benefits and challenges associated with using literature in EFL classrooms.

Benefits

a. **Engagement and Motivation**: The narrative and emotional appeal of literature help kids study more effectively and enjoyably. This enhanced incentive boosts participation and retention rates.

b. **Critical Thinking**: Analyzing literary texts encourages students to think critically about complex issues and develop their analytical skills. This is essential for their overall intellectual development (Freire, 1970).

c. **Language Proficiency**: Literature provides children with extensive linguistic input, which improves their total language competency, including reading, writing, speaking, and listening.

Challenges

a. **Language Complexity**: The complex language used in literary texts can be challenging for EFL students, particularly those at lower proficiency levels. Teachers need to carefully select texts that are appropriate for their students' language abilities.

b. **Resource Availability**: Access to diverse and appropriate literary texts can be limited in some educational contexts. This can hinder the effective integration of literature into the curriculum.

c. **Teacher Preparation**: Effective use of literature in the classroom requires teachers to be well-prepared and knowledgeable about both the texts and the pedagogical approaches. Professional development and training are essential to address this challenge.

5. Conclusion

The integration of literature into language education offers numerous benefits, including enhanced linguistic skills, cultural awareness, and critical thinking. By employing a variety of techniques such as close reading, literature circles, creative writing, and dramatization, educators can effectively incorporate literature into their teaching practices. This study provides a comprehensive guide for educators to harness the power of literature, making language learning a more enriching and engaging experience for students.

The theoretical theories and empirical evidence presented show that literature not only improves language competency, but also educates students to be more empathic and critical global citizens. Future research could investigate the long-term effects of literature integration on language acquisition and intercultural competency, cementing its role in language instruction.

References

[1] Appleman, D. (2015). Critical Encounters in Secondary English: Teaching Literary Theory to Adolescents. Teachers College Press.

[2] Beane, J. A. (1997). Curriculum Integration: Designing the Core of Democratic Education. Teachers College Press.

[3] Beach, R., & Marshall, J. (1991). Teaching Literature in the Secondary School. Harcourt Brace Jovanovich.

[4] Brookfield, S. D., & Preskill, S. (2005). Discussion as a Way of Teaching: Tools and Techniques for Democratic Classrooms. Jossey-Bass.

[5] Carter, R., & Long, M. N. (1991). Teaching Literature. Longman.

[6] Collie, J., & Slater, S. (1987). Literature in the Language Classroom: A Resource Book of Ideas and Activities. Cambridge University Press.

[7] Copeland, M. (2005). Socratic Circles: Fostering Critical and Creative Thinking in Middle and High School. Stenhouse Publishers.

[8] Daniels, H. (2002). Literature Circles: Voice and Choice in Book Clubs and Reading Groups. Stenhouse Publishers.

[9] Dörnyei, Z. (2001). Motivational Strategies in the Language Classroom. Cambridge University Press.

[10] Drake, S. M., & Burns, R. C. (2004). Meeting Standards Through Integrated Curriculum. ASCD.

[11] Eisner, E. W. (2002). The Arts and the Creation of Mind. Yale University Press.

[12] Fountas, I. C., & Pinnell, G. S. (1996). Guided Reading: Good First Teaching for All Children. Heinemann.

[13] Ghosn, I. K. (2002). Four Good Reasons to Use Literature in Primary School ELT. ELT Journal, 56(2), 172-179.

[14] Hess, D. E. (2009). Controversy in the Classroom: The Democratic Power of Discussion. Routledge.

[15] Hrastinski, S. (2008). Asynchronous and Synchronous E-Learning. Educause Quarterly, 31(4), 51-55.

[16] Hughes, J. (2009). Teaching African American Literature in a Diverse High School: A Case Study. Journal of Adolescent & Adult Literacy, 52(7), 594-603.

[17] Kajder, S. (2006). Bringing the Outside In: Visual Ways to Engage Reluctant Readers. Stenhouse Publishers.

[18] Kidd, D. C., & Castano, E. (2013). Reading Literary Fiction Improves Theory of Mind. Science, 342(6156), 377-380.

[19] Kramsch, C. (1993). Context and Culture in Language Teaching. Oxford University Press.

[20] Krashen, S. (1989). Language Acquisition and Language Education: Extensions and Applications. Prentice-Hall International.

[21] Lazar, G. (1993). Literature and Language Teaching: A Guide for Teachers and Trainers. Cambridge University Press.

[22] Mar, R. A., Oatley, K., & Peterson, J. B. (2009). Exploring the Link Between Reading Fiction and Empathy: Ruling Out Individual Differences and Examining Outcomes. Communications, 34(4), 407-428.

[23] Mayer, R. E. (2009). Multimedia Learning. Cambridge University Press.

[24] Nussbaum, M. C. (1997). Cultivating Humanity: A Classical Defense of Reform in Liberal Education. Harvard University Press.

[25] Oatley, K. (2016). Fiction: Simulation of Social Worlds. Trends in Cognitive Sciences, 20(8), 618-628.

[26] Rosenblatt, L. M. (1978). The Reader, the Text, the Poem: The Transactional Theory of the Literary Work. Southern Illinois University Press.

[27] Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. Harvard University Press.

[28] Walsh, M. (2010). Multimodal Literacy: What Does It Mean for Classroom Practice? Australian Journal of Language and Literacy, 33(3), 211-239.

[29] Wagner, B. J. (1998). Educational Drama and Language Arts: What Research Shows. Heinemann.

Improving Students' Reading Comprehension of Analytical Exposition Text by Using Mind Mapping

Gema Galgani Jumi Sayekti

SMA Negeri 1 Kalasan

E-mail: gemayekti@gmail.com

Abstract. The aim of the research was to improve students' reading comprehension on analytical exposition text. This study was a classroom action research using two cycles. This two-cycled action research was conducted to enhance students' reading comprehension by implementing mind mapping. The participants of this study were 35 students of XI MIPA 1 class in SMA N 1 Kalasan. The results show that mind mapping improved students' reading comprehension. It can be seen from the increase of mean scores of the pre test and the post test administered during the action research, i.e. the pre test mean score was 72 and the mean score of the post test was 83. Moreover, the students' attitudes towards reading comprehension also changed from a negative one to a positive one. Thus, the use of mind mapping has a significant effect on students' reading comprehension. It indicated that the technique can be an alternative technique to teach reading comprehension.
Keywords: comprehension, mind mapping reading

1. Introduction

In Indonesia English is taught as a foreign language. It is a compulsory subject in the national curriculum. It is a key for the learners in the global era to communicate easily across nationalities for many years to come (Harmer, 2002: 2). There are four skills in learning English namely speaking, listening, reading and writing. Reading is one of the language skills the students should master to get information from the texts (Haerazi & Irawan, 2020). It is one of the language activities to get information and knowledge. In this process, the readers are engaged with the text as they try to elicit the meaning. Reading is considered as a process of translating alphabetical symbols into a form of language from which the native speaker has already derived the meaning (Bond, 1984: 02).

Teaching reading for Senior High School students is conducted to help them get prepared for the examination to register for higher education such as universities or colleges. Therefore reading skill is needed by the students of Senior High School to enable them to comprehend reading texts which are tested in the admission test in higher education.

In order to help the students to comprehend reading text easily, teachers should use a certain method in teaching reading. In this research the researchers tried to implement mind mapping techniques in teaching reading. Some previous research on mind mapping techniques for teaching reading had been conducted by the other researchers, however this research will focus on the teaching reading of analytical exposition text for the XI grades of Senior High School. Analytical exposition text is a text which is introduced in the XI grade and had never been taught in the previous level. The

analytical exposition text will be easier to comprehend when the reader understands the concept of mind mapping to find the main ideas in each paragraph.

Based on the result of the students reading text which are still in low level, the researchers then decided to implement mind mapping techniques to help the students improve their reading comprehension.

1. 1 Reading Comprehension

Reading comprehension is the process of understanding and interpreting texts in order to get some specific or detailed information. Grabe and Stoller (2002: 9) stated that reading is the ability to draw a meaning from the written text and interpret it appropriately. In addition, Indrayani (2014, p. 9) stated that reading comprehension is the ability to understand the meaning or idea in the written text completely. As the process of understanding and interpreting texts, reading comprehension implies that reading is an interactive process which involves the reader, the texts, and the writer. In reading, the reader attempts to understand and interpret the ideas conveyed by the writer through the texts (Murcia and Olshtain, 2000, p. 119).

There are three things the readers should fulfill in order to make them get the meaning of the text effectively. Those three things are: (1) identifying and understanding the words in the text or words recognition, (2) constructing and understanding the words, and (3) coordinating the words and interpreting them so that there is an accurate understanding. Leipzig (2001). In addition, Grabe (2010, p. 277) stated that understanding main ideas and exploring the organization of a text are important for good comprehension. Considering these, reading comprehension is really a complex activity (Schmitt 2010, p. 216) in which readers should not only master a certain amount of vocabulary and grammar but also master the skills of finding the main ideas.

Heilman et.al (1981:246) identifies four reading comprehension levels: literal, interpretative, critical, and creative. Literal comprehension involves acquiring information that is directly stated. Interpretive reading involves "reading between lines" of making an inference. Critical reading involves evaluating written material. Creative comprehension involves formulating and rethinking ideas. The literal reading is the simplest level because what the reader needs to do is to reproduce what the author is explicitly conveying. Thus, the reader aims only to understand the information explicitly stated in the texts. The evidence of the reader's understanding could be seen from his ability to recognize and recall facts; identify the main idea and supporting details; categorize, outline, and summarize the information. To master literal reading, the reader should also be able to locate information, use context clues to supply meaning, follow specific directions, follow a sequence, identify stated conclusions, and identify explicitly stated relationships and organizational patterns (such as cause-effect and comparison and contrast). Interpretative (or inferential) reading concerns with what the author means by what is said. It requires the reader to go beyond the information given by the writer. Like in literal reading, inferences in interpretative reading are made in the main idea, supporting details, sequence, and cause and effect relationships. However, interpretative reading requires the reader to read between the lines and make inferences about things not directly stated. Interpretative reading could also involve interpreting figurative language, drawing conclusions, predicting outcomes, determining the mood, and judging the author's point of view. Critical reading, which is defined as "an active and purposeful process of comprehending, questioning and evaluating printed material and in order to react intelligently to the writer's ideas (Pardede,2007), deals with why the author says what he or she says. Critical reading is always called the high level of comprehension because it requires the reader to use some external criteria from his/her own experience in order to evaluate and judge the quality of the information, the values of the writer's use of language, and the writer's reasoning, simplifications, and generalizations. To do so,

the reader should note the evidence of the writer's bias, his qualifications, his point of view, intent and truthfulness. In short, the reader should react emotionally and intellectually to the texts.Creative reading requires the reader's involvement with the information presented as he uses it to formulate or rethink ideas of his own. It also includes reading for implied and inferred meanings, appreciative reactions, and critical evaluations. While reading, the reader keeps on asking himself, "What will happen now?", "Why?", "If I were placed in such a condition, what am I going to do?", "How did the character feel?", "Have I ever felt like that?". By getting the answer for these questions, the reader will be able to get the implied and inferred meanings.

1. 2 Mind Mapping

Mind map is a graphical way to represent ideas and concepts, Buzan (2010), who popularized and developed it, claimed that mind mapping is a powerful graphics method which provides a universal key to unlocking the potential of a brain. It is a useful technique that helps the students learn more effectively and improves the way to record information. Buzan (2007, p. 116) accentuated that mind mapping is advantageous to: (1) memorize everything permanently, (2) master the fact, number and the formula easily, (3) increase the concentration and motivation, (4) memorize the names, the events in history, and the drama text, (5) rememorize again the information easily, and (6) decrease a half of the studying time.

Ingemann (2008) supported the claim by stating that by mind mapping one can develop his ability in memorizing, brainstorming, learning, and developing creativity. In addition, Akpodiete (2012, p. 1) stated it is a visual thinking tool that helps to structure information, helping you to better analyze, comprehend, synthesize, recall and generate new ideas. Moreover, it is a method of creative notetaking which makes it easy for students to remember a lot of information (De Porter, 2008, p.175). For Kaufman (2008), "a mind map is a non-linear diagram that makes it easy to capture key thoughts and connections between ideas in a graphical or visual format". To make a mind map, an idea, concept, or question is placed in the center. Then the information is captured by connecting the key concepts and thoughts to the central idea. More detailed information related to these thoughts is then captured in branches that radiate out from the key concepts, away from the central idea.

Kaufman (2008) emphasized that mind mapping is a valuable technique to use while reading and making notes. Its non-linear format permits one to view the whole notes at a glance, then easily place new information in the appropriate branch or make connections between ideas. This is in line with the theory of top-down process which views reading as not only a process of extracting meaning from a text but a process of connecting information in the text with the background knowledge the reader brings to the act of reading (Pardede, 2010). In the context of learning reading comprehension, Bahadori and Gorjian, (2016,p.9) stated that mind maps help develop students' ability to comprehend and understand the meaning of a text.

Cadieux (2011, p.1) supported this by emphasizing that, "mind mapping can be used to improve reading comprehension in both fiction and non-fiction texts and across a variety of genres. Mind maps work because they give the reader another (visual) way to process information." She also argued that, "for non-fiction texts, the mind map should contain the main idea in the center, branching out to supporting ideas and facts if using a mind map, students should be asked to use the center of the mind map for the title of the book or piece of text." In short, mind mapping can be employed in numerous stages in the reading task. This depends on the teacher's ability to manipulate and change the strategy

to suit the type of the reading task. Various studies revealed mind mapping is effective to use to develop students' reading comprehension.

The action research carried out by Rizqiya (2013) in a senior high school in Bandung revealed that mind mapping made the students effectively recall their background knowledge and focus on their reading. The result of Moi and Lian's (2007, p.71) study revealed that incorporating mind mapping into the teaching of comprehension skills enhances students' understanding and memory of comprehension passages. Similarly, Cain (2001, p.5) showed that by means of mind mapping evidence includes improved concentration, staying on task for longer periods of time, improved questioning and answering during class discussions and improved independence. In addition, Toi's (2009, p.8) study showed that mind mapping could help children recall words more effectively than using lists. Based on the usefulness and effectiveness of mind mapping used to develop students' reading comprehension reported above, mind mapping was incorporated as the teaching technique in this study. Specifically, the study addressed the following research questions: (1) Can mind mapping improve the students' reading comprehension? (2) Are the students interested in the use of mind mapping to develop reading comprehension?

2. Research Method

The design of this study is action research. This research study occurs through a dynamic process which is flexible to the changes with the condition of the field. We plan to adopt a model proposed by Kemmis and McTaggart (1988) as cited by Koshy (2010: 5) because the procedure is simpler to be implemented than other action research models. The procedure in the model follows the following steps: planning session, acting, and observing session, and reflecting session, which is depicted as follows:
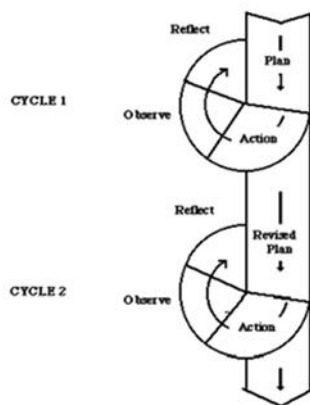
Figure 1. Kemmis and McTaggart (1988) as cited in Koshy (2010: 5)

This study was conducted in two cycles in five weeks, from October 13 to November 3 2022. The participants were 36 students of the XI MIPA 1 class of SMA Negeri 1 Kalasan. The data was collected using test and non-test techniques. The test technique was a pre and a post test used to measure the reading comprehension achievement of the participants. The pre-test was administered before the action, followed with a questionnaire, while the posttest was conducted at the end of cycle 2 followed with a questionnaire again. The non-test is a questionnaire and observation sheet. The questionnaire was used to collect data concerning the response of the students of the use of mind mapping. The

questionnaire was administered twice: before the action research, and at the end of cycle 2. The observation sheet was used by the collaborator to record the activities and all data were analyzed employing the descriptive analysis technique.

3. Findings and Discussion

The research was done during the teaching learning process in Class XI MIPA 1 of SMA Negeri 1 Kalasan. The material of the Basic Competence that the students were discussing then was Analytical Exposition text in which the students are expected to comprehend some reading texts about opinions and arguments. The Analytical Exposition text is a new material which had never been taught in the previous level.

According to the action research process, the qualitative and quantitative data before and after giving action to the students related to the student's reading comprehension of analytical exposition text using mind mapping the finding and discussions are presented in this section.

Students reading comprehension using mind mapping before the implementation.
In order to answer the research question, 35 students were given action in 2 meetings. The data taken from the students in the form of qualitative and quantitative. The researchers use observation and open-ended questionnaires to collect the qualitative data while the quantitative data was taken from pre and post-test.

A student who got 8 answers correct from 20 questions stated that English is difficult.
"For me English is difficult to understand " although she read the text carefully, the pretest score still included a low score compared with others.

Another student got 6 correct answers from 20 questions.
She said " I used to do translation by google translate if i got difficulty during reading" beside that she hadn't known mind mapping yet. She rarely reads English and prefers to use google translate to understand the meaning of a text. It means that for her English is difficult.

There were 5 students who got the highest score , 18 correct answers. They were stating that english is the important language that they have to learn. They realize that understanding English will be important for their future. they used to apply mind mapping because it helped them.

Students reading comprehension using mind mapping after the implementation.
The students were given action for two weeks for development level of reading comprehension using mind mapping. In the implementation the teacher and collaborators change the media of mind mapping using Canva application and additional strategy that is group discussion and presentation in order to increase their reading comprehension scores and development. In this way the students' score shows that there was a significant development of the scores and the attitude.

Table 1. The result of the Pre and Post Reading Test

	N	min	max	mean	std deviation
pretest	35	30	90	72	13.67694
posttest	35	70	95	84	6.31791

The table above showed the significant improvement of the students. The minimum score in the pre test was 30. It increased to 70. The maximum score increased 5 point from 90 to 95. the score increased significantly due to the new strategy given to the students that was discussion and group presentation and using canva as the mind mapping application . this strategy gave a good impact to the students in some aspects. First, as we know that canva had many features, up to date and easy to use, the student was able to explore the features to increase their creativity. not only that but also they might work effectively and not think about the design the whole time. Second, the group discussion and group presentation made them excited to explain that they were happy and the environment was very competitive. They want to give their best. From the observation they were happy, enthusiastic and enjoyed the class.

4. Conclusion

Senior High School students are prepared to go to higher education and when they register to a certain university they will have to do some test like UTBK, in which there are test items based on reading text. So the teacher should make the students get used to reading. In fact, students are often faced with many challenges including reading materials, in which they often find difficulties to get the gist of the text. Therefore, reading needs effort and motivation especially when the texts are long texts. That is why enhancing students' reading skills is important.

Using mind mapping techniques can improve students' reading comprehension. improvement of students' reading comprehension in cycle 1 is not significant. Therefore, some strategies are implemented in cycle 2. Group discussion and group presentation are implemented in the class. These encourage students to collaborate with other students in their group. These improve student motivation. Then, at the end of cycle 2, the score of students reading comprehension is improved.

5. Suggestion

As researchers, we hope this project will give many benefits for the sake of the betterment in English language teaching in senior high school. Based on the discussion and conclusion elaborated previously in this chapter, we would like to address several suggestions addressed to teachers in senior high school, to other researchers and lecturer in this course as follows.

The teacher in senior high school takes into consideration the teaching materials for the students. It is important to provide a fresh method for the students. Towards activity in the classroom, it is recommended for the teacher to provide more various activities conducted in teaching reading comprehension by utilizing the existence of digital such as Canva application and school infrastructure.

For the future use of this project, it is recommended to other researchers to further investigate improving students' reading comprehension using mind mapping with different strategies or methods. In addition, it will be better to have an expert judgments process to evaluate the quality and appropriateness of the developed material design for the betterment of the teaching and learning processes of the vocational high school. While for the lecturers of this course, it is hoped to provide the report preparation checklist given at the beginning of the semester so that students can prepare appropriate and expected reports.

References

[1] Alomari, Akram M. (2019). *Using mind mapping technique to improve reading comprehension ability of fourth-grade Arabic language students in Jordan.* IOSR Journal Of Humanities And Social Science (IOSR-JHSS) Volume 24, Issue 1, Ver. 1 (January. 2019) 53-58

[2] Ary, D., Jacobs, L. C, Sorensen, C., and Razavieh, A. (2010). *Introduction to research in education*. Belmont: Wadsworth Cengage Learning.

[3] Bond, J. (1984). *Teaching Reading Comprehension*. New Jersey: Prentice Hall Inc.

[4] Brandner, R. (2019). *Why mind mapping?*. Retrieved January 8, 2020, from https://www.mindmeister.com/blog/why-mind-mapping/

[5] Buzan, T. (2007). *Mind map untuk anak-anak*. Jakarta: Gramedia Pustaka Utama.

[6] Buzan, T and B. Buzan (2000). *The mind map book*, BBC Books, London.

[7] Creswell, J. W. (2012). *Educational research: planning, conducting, and evaluating quantitative and qualitative research.* (4th ed.). Lincoln: University of Nebraska.

[8] Erdogan, Y. (2008). *Paper-based and computer-based concept mappings: the effects on computer achievement, computer anxiety, and computer attitude*. British Journal of Educational Technology, 40 (5), 821-836.

[9] Haerazi, H., & Irawan, L. (2020). *The effectiveness of ECOLA technique to improve reading comprehension in relation to motivation and self-efficacy*. International Journal of Emerging Technologies in Learning (IJET), 15(01), pp. 61-76. doi: http://dx.doi.org/10.3991/ijet.v15i01.11495

[10] Haerazi, Irawan, Suadiyatno, & Hidayatullah. (2020). *Triggering preservice teachers' writing skills through genre-based instructional model viewed from creativity*. International Journal of Evaluation and Research in Education (IJERE), 9(1), 234-244 DOI: http://doi.org/10.11591/ijere.v9i1.2039

[11] Haerazi, H., Prayati, Z., & Vikasari, R. M. (2019*). Practicing contextual teaching and learning (CTL) approach to improve students' reading comprehension in relation to motivation*. English Review: Journal of English Education, 8(1), 139-146. https://doi.org/10.25134/erjee.v8i1.2011

[12] Haerazi, H., May Vikasari, R., & Prayati, Z. (2019). *The use of scientific-based approach in ELT class to improve students' achievement and classroom interaction*. Register Journal, 12(2), 157-180. https://doi.org/10.18326/rgt.v12i2.157-180

[13] Hall, J. L., (2010). *A guide to doing statistics in second language research using SPSS*. New York & London: Routledge (Taylor and Francis Group).

[14] Harmer, J. (2002). *The practice of English language teaching*. Longman: Pearson Education Limited.

[15] Hsu, C. Y. (2010). *The effect of collaborative strategic reading on EFL students' reading comprehension and learning interest*. Taiwan: Unpublished Thesis.

[16] Imran, F., Firman, E., & Raudhatunnisa, S. (2020). *Applying think-talk-write (TTW) in the teaching of reading comprehension in relation to students' critical thinking skills*. JOLLT Journal of Languages and Language Teaching, 7(1), 57-63. DOI: https://doi.org/10.33394/jollt.v7i1.1439

[17] Khatimah, K. & Rachman, D. (2018). *Mind mapping vs semantic mapping: Which technique gives EFL learners more benefits in reading comprehension?*. JEES (Journal of English Educators Society), 3 (2), 165-176. DOI: https://doi.org/10.21070/jees.v3i2.1498

[18] Lenski, S. and Lewis, G. (2008). *Reading success for struggling adolescent learners*. New York and London: The Guilford Press.

[19] Maxom, M. (2009). *Teaching English as a foreign language for dummies*. Chichester and West Sussex: John Wiley and Sons Ltd.

[20] McNamara, D. S. (2007*). Reading comprehension strategies: Theories, intervention, and technologies.* New York and London: Lawrence Erlbaum Associates Inc.

[21] Nunan, D. (1992). *Research methods in language learning.* New York: Cambridge University Press.

[22] Rachmawati, U. (2018). *Reading interest of senior high school students: A case study.* JOLLT Journal of Languages and Language Teaching, 6(1), 17-26. DOI: https://doi.org/10.33394/jollt.v6i1.809

[23] Rubiyah, Ping M. T., and Samdiyanita (2018). *Implementing Concept Mapping Technique To Improve Students' Descriptive Writing Ability.* Language and Language Teaching Journal Sanata Dharma

[24] University, Yogyakarta, Indonesia.

[25] Setianingsih, T., Rosihan, M., & Pardani, S. (2018). *The use of mind mapping to improve motivation in learning vocabulary of second grade students at MTs NW Mispalah Praya*. JOLLT Journal of Languages and Language Teaching, 6(2), 125-133. DOI: https://doi.org/10.33394/jollt.v6i2.1264

[26] Siriphanic, P., & Laohawiriyano, C. (2010). *Using mind mapping technique to improve reading comprehension ability of Thai EFL university students*. In the 2nd International Conference on Humanities and Social Sciences (pp. 1–13). Prince of Songkla. Retrieved from http://fs.libarts.psu.ac.th/research/conference/proceedings-2/4pdf/001.pdf

[27] Snow, C. (2002). *Reading For Understanding*. Santa Monica, Arlington and Pittsburgh: RAND.

[28] Zahedi, Y., & Abdi, M. (2012). *The semantic mapping strategy on EFL learners' vocabulary learning*. Procedia - Social and Behavioral Sciences, 69, 2273–2280. Retrieved from https://ac.els-cdn.com

Preliminary Study of Indonesian Language Skills Teaching Materials for Primary School Teacher Education Students

Hafizah [1*], Nuruddin [2], Ilza Mayuni [3]

[1] Applied Linguistics Study Program, UNJ; Primary School Teacher Education Study Program, Universitas   Bhayangkara Jakarta Raya, Indonesia
[2] Applied Linguistics Study Program, UNJ, Indonesia
[3] Department of English Education, UNJ, Indonesia

[*]E-mail: hafizah_9906921030@mhs.unj.ac.id ; hafizah@ubharajaya.ac.id ,

Abstract. This study represents an exploratory investigation into the deficiencies observed within the Indonesian Language Skills teaching materials employed by both educators and students in the Primary School Teacher Education Study Program. The objective of this research is to assess the current state of Language Skills teaching materials utilized across universities. The methodology adopted was qualitative, involving observations and interviews with lecturers responsible for Indonesian language skills courses within the Primary School Teacher Education Study Program, complemented by the distribution of questionnaires to students enrolled in these courses. The instruments utilized in this research were an interview guide and a questionnaire. The findings indicate that the teaching materials currently in use primarily consist of slides, handouts, and textbooks that are not tailor-made for Elementary School Teacher Education students. Furthermore, the content of these materials does not align with competency standards outlined in the independent curriculum, lacks certain pedagogical approaches, and fails to incorporate digital technology that includes multimodal components such as images, sound, video, and animation. This study concludes that the teaching materials in use exhibit numerous deficiencies that affect both lecturers and students adversely.

Keywords: teaching materials; Indonesian language skills, primary school teacher education

1. Introduction

One important component in learning activities is teaching materials. This is because teaching materials contain essential elements for learning, ranging from experiential learning and content to assessment systems and study resources. Therefore, every educator must prepare teaching materials that meet the specific requirements of the teaching process in order to help achieve learning objectives more effectively (Ahmad, 2010; Muqodas et al., 2015). The creation of these materials is undertaken to enhance the quality of learning, provide students with alternative resources besides textbooks (Rahmani et al., 2021), and to offer engaging learning experiences tailored to the needs of the users (Rizaldi et al., 2020). This underscores the significant role that teaching materials play, as without them, effective learning would be impossible. The suitability of teaching materials to the expected goals and competencies determines whether these educational objectives are met.

The provision of these materials occurs at every educational level and within each field of knowledge, including at the higher education level in the Primary School Teacher Education (PGSD) Study Program, which focuses on developing Indonesian Languange Skills in primary schools. PGSD students require specially tailored teaching materials that cater to their needs, reflecting the characteristics of the current millennial generation, who are technologically savvy (Bahfiarti & Arianto, 2022). Students need teaching materials that incorporate digital technology, allowing them access anytime and anywhere, without the constraints of physical space and time.

Educational participants require materials that help them understand and grasp the six language skills that are utilized in daily communication activities, both within academic environments and beyond. Students are expected to grasp both theoretical and practical aspects of these four language skills: listening, speaking, reading, and writing, along with viewing and two new language skills that have emerged (Zyam & Nanang Khoirul Umam, 2022; Sakti et al., 2022), which will be increasingly necessary to support their future careers. These two new skills have arisen due to the introduction of the Independent Curriculum and rapid technological advancements, necessitating that learners adapt to contemporary developments.

Mastering these six language skills is not an innate process (Sadiku, 2015), but rather one that occurs through continuous and sustained learning and practice. Language proficiency involves the effective use of language, both orally and in writing, across various social contexts. This proficiency comprises six interconnected skills (Klinger et al., 2011; Huri et al., 2021). Listening, reading, and viewing are receptive language skills, which involve receiving and understanding messages from speakers, writers, or through visual media. Conversely, speaking, writing, and presenting are productive language skills because they involve generating speech and text in communicative activities (Aydoğan & Akbarov, 2014; Mustadi & et al., 2022). Mastery of these six skills in speaking correct and effective Indonesian is essential for educators in the field of Indonesian language and primary school teacher education.

To determine the teaching materials needed by lecturers and students, the first step is to assess the current condition of the Indonesian language teaching materials being used. Information about the current use of these materials will provide a basis to identify issues with existing resources, which can help guide future improvements. This research will explore the condition of Indonesian language teaching materials in the Primary School Teacher Education Study Program at five prominent universities in Indonesia.

2. Literature Review

Language teaching materials refer to all resources utilized by educators and learners in language learning activities. These materials are employed to expand the knowledge and experiences of language learners (Tomlinson, 2011). For lecturers, teaching materials serve as references for imparting knowledge; for learners, they are sources for acquiring additional information. The creation of teaching materials is an indirect, interactive way of teaching (Lachner et al., 2022), enabling learners to study not only from lecturers but also through the materials themselves. Moreover, teaching materials are presented as comprehensive learning tools that systematically and engagingly combine learning content, methods, limitations, and assessment systems to achieve specific competencies and address related challenges (Lestari, 2013). This perspective underscores the necessity for teaching materials to be thoughtfully designed and written according to instructional principles, as they support and facilitate the learning process.

The development of language teaching materials encompasses all processes used by educators to create and utilize materials in language learning activities, including material evaluation, design, data collection, and research (Tomlinson, 2012). This implies that teaching materials should not be

constructed solely based on the desires of the writer but must also be tailored to meet the future needs of the users. Crafting teaching materials requires consideration of the teaching context, as well as the needs and interests of both teachers and student participants, to ensure compatibility between them (Littlejohn, 1998; Cunningham, 1995). Teaching materials used in the learning process must evolve according to the needs of educators and learners to enhance the quality of learning.

With the availability of teaching materials, learners are aided in seeking information or equipping themselves with a range of experiences and practices. Learners can study material at their own pace, with ample opportunities to revisit or review content, and the convenience to make notes for future reference (Kosasih, 2022). Teaching materials can be reused, ensuring that the set learning targets are achieved. This highlights that teaching materials are a key component in language learning (Richards & Renadya, 2002). As a crucial element in language learning activities, teaching materials offer tangible benefits to both lecturers and learners.

3. Research Methods

This study employs a deep, descriptive qualitative research method conducted at five prominent universities spread across several regions in Indonesia, including DKI Jakarta, Bekasi City, Karawang, Bali, and Riau. Data is collected through observations, document analysis, interviews, and questionnaires. The data collection instruments include interview guidelines and questionnaires. Observations are conducted by directly monitoring language learning activities in the Indonesian Speaking Skills courses. Document analysis involves examining learning materials such as textbooks, modules, learning media, and the RPS (Semester Learning Plan). Interviews are conducted with lecturers teaching the Indonesian Speaking Skills courses, while questionnaires are distributed to students enrolled in these courses.

4. Results and Discussion

Based on document reviews and interviews with lecturers at several Primary School Teacher Education (PGSD) programs across Indonesia, including in DKI Jakarta, Bekasi City, Karawang, Riau, and Bali, it has been identified that the teaching materials used in courses on Indonesian Speaking Skills include slides, handouts, and textbooks. However, the textbooks are outdated and no longer align with technological advancements or the requirements of the Independent Curriculum. Additionally, the materials are not specifically designed for PGSD lecturers and students, who have distinct characteristics compared to other students. This inadequacy significantly hampers the learning process.

The use of slides, handouts, and textbooks results in an educator-centered approach in the Elementary School Teacher Education Program, which leads to low student motivation and passivity. Learners tend to passively receive information from educators without actively seeking to understand the material further. The lack of significant technology integration further contributes to student boredom and decreased curiosity about Indonesian Speaking Skills. Only a few students show enthusiasm and engage actively. Classes tend to be rigid and dominated by one-way communication from the lecturer to the students. By integrating technology into teaching materials, these issues could be minimized, making learning more active, creative, and dynamic, which is essential for the technologically literate millennial generation.

Technology plays a crucial role in addressing these issues. Its use in 21st-century education has a positive impact, enabling educators to develop pedagogical competencies that enhance student understanding (Riahi & Riahi, 2018). Employing digital technology in developing teaching materials for Indonesian Speaking Skills for PGSD students is now a necessity amid the rise of the digital era.

Educators must select materials that are relevant and appropriate for learners using the Independent Curriculum. Additionally, given that learners are from the tech-savvy millennial generation, teaching materials should leverage technology to be accessible anytime and anywhere, without constraints of time and place.

In this 21st-century educational context, educators must innovate to create engaging Indonesian Speaking Skills materials using technology to make learning enjoyable for students. The quality of learning will decline if traditional teaching materials are used without significant updates for contemporary needs. Utilizing technology in developing teaching materials can provide an effective, efficient, and enjoyable learning experience, enhancing motivation and engaging students in the learning process, whether via mobile phones or tablets.

Based on a survey conducted with students of the Elementary School Teacher Education Program across five campuses in Indonesia, it was found that cell phones and tablets are primarily used for communication, social media, and gaming, with only occasional use for googling educational material. These devices are seldom used for more educational purposes, although they have the potential to be effective learning mediums and sources, offering extensive learning opportunities and access without time and space limitations, thereby expanding knowledge, skills, and user engagement (Jahnke, 2015; Jahnke & Liebscher, 2020; Naciri et al., 2020).

Field findings indicate that educators and learners need mobile learning materials with appealing visuals and content to better utilize mobile devices for educational benefits, thus enhancing their scientific competencies. Mobile learning materials incorporate multimodal elements such as audio, visual, and kinesthetic components that boost enthusiasm, motivation, and a fresh interest in learning (Mayer, 2009; Montebello et al., 2019; Noor et al., 2022). Such digital media are suitable for independent use by learners, both online and offline, catering to a generation of digital natives.

Moreover, the curriculum for Indonesian Speaking Skills in the Elementary School Teacher Education Program does not yet incorporate an Independent Curriculum-based learning approach, such as project-based learning. Implementing a project-based approach in developing teaching materials aligns well with the latest curriculum. This method emphasizes student-centered learning, fostering creativity and innovation through project-based activities. Developed materials should independently provide necessary information, allowing learners to control their educational activities, thus facilitating a robust, participatory learning environment.

Project-based approaches enable learners to develop independence by seeking and acquiring knowledge through real-world interactions and social collaboration, performance demands, and goal setting, thereby shaping resilient educators suited to contemporary needs. This method not only fosters collaboration and communication among students but also produces innovative, problem-solving individuals.

As an innovation in teaching material development, project-based approaches can equalize learning experiences, supporting learners in developing their competencies. Each learner experiences the same learning opportunities, expected to lead to uniform competence levels. This approach also provides meaningful experiences that develop creativity, facilitate collaboration, communication, independence, academic achievement, and motivational encouragement, producing significant outcomes.

The implementation of project-based learning can also enhance collaboration and communication between lecturers and students through texts, images, and videos (Arias et al., 2018). Effective collaboration and communication are essential in a project-based classroom environment, enabling constructive discussions and the exchange of ideas (Halimah & Marwati, 2022), which are integral to the teaching materials being developed. Such collaboration is effective

5. Conclusion

This study was conducted to assess the current state of teaching materials for Indonesian Speaking Skills within the Elementary School Teacher Education Programs at five prominent universities distributed across various provinces in Indonesia. Additionally, the research aims to identify the specific types of teaching materials that are required by both lecturers and students. It has been observed that the teaching materials currently in use still consist of slides, handouts, and textbooks that are not specifically designed for Primary School Teacher Education students. Furthermore, the textbooks are outdated, no longer align with technological developments, and do not meet the needs outlined in the Independent Curriculum. The teaching materials also lack a specific pedagogical approach, resulting in students being overly dependent on lecturers. Implementing a project-based approach in teaching materials is expected to enhance student motivation and engagement, thereby improving academic outcomes.

Bibliography

[1] Ahmad, KIL (2010). Development of Teaching Materials for the Development of Elementary Age Children as a Means for Independent Learning for Students. *Educational Science Perspectives*, *22* (8), 183–193.

[2] Arias, E., Barba-Sánchez, V., Carrión, C., & Casado, R. (2018). Enhancing entrepreneurship education in a master's degree in computer engineering: A project-based learning approach. *Administrative Sciences*, *8* (4). https://doi.org/10.3390/admsci8040058

[3] Cunningsworth, A. (1995). *Choosing Your Coursebook*. Heinemann.

[4] Dian Rosdiana Noor, Siregar, E., & Chaeruman, U.A. (2022). Development of Mobile Learning using the Case Study Method for Class VI PPKn Subjects at SDN Telajung 01. *Journal of Innovative Learning*, *5* (1), 63–70. https://doi.org/10.21009/jpi.051.08

[5] Halimah, L., & Marwati, I. (2022). *Project Based Learning for 21st Century Learning*. PT Refika Aditama: Bandung.

[6] Jahnke, I. (2015). *Digital Didactical Designs: Teaching and learning in cross-action spaces*. New York, NY: Routledge.

[7] Jahnke, I., & Liebscher, J. (2020). Three types of integrated course designs for using mobile technologies to support creativity in higher education. *Computers and Education*, *146* , 103782. https://doi.org/10.1016/j.compedu.2019.103782

[8] Junita, W. (2019). Proceedings of the National Seminar on Postgraduate Education Technology at UNIMED Using Mobile Learning as a Media in Learning. *Use of Mobile Learning as a Media in Learning*, 602–609.

[9] Kosasih, E. (2022). *Development of Teaching Materials*. Literary Earth.

[10] Lachner, A., Hoogerheide, V., van Gog, T., & Renkl, A. (2022). Learning-by-Teaching Without Audience Presence or Interaction: When and Why Does it Work? In *Educational Psychology Review* (Vol. 34, Issue 2). Springer US. https://doi.org/10.1007/s10648-021-09643-4

[11] Lestari, I. (2013). *Development of Competency Based Teaching Materials*. Permata Academy.

[12] Littlejohn, A. (1998). *The analysis of language teaching materials: inside the Trojan Horse', in B. Tomlinson (ed.) Materials Development in Language Teaching* (pp. 190–216). Cambridge University Press.

[13] Mayer, R.E. (2009). *Multimedia learning (2nd ed).* New York: Cambridge University Press.

[14] Montebello, M., Cope, B., Kalantzis, M., Haniya, S., Amina, T., Tzirides, A.O., Searsmith, D., Zhao, N., & Chen, M. (2019). Multimodal Mastery Learning. *International Journal of Learning*, *5* (1), 19–23. https://doi.org/10.18178/IJLT.5.1.19-23

[15] Muqodas, R.Z., Sumardi, K., & Berman, E.T. (2015). Design and Manufacture of Teaching Materials Based on a Scientific Approach to Refrigeration Systems and Installation Subjects. *Journal of Mechanical Engineering Education*, *2* (1), 106. https://doi.org/10.17509/jmee.v2i1.1160

[16] Naciri, A., Baba, M.A., Achbani, A., & Kharbach, A. (2020). Mobile Learning in Higher Education: Unavoidable Alternative during COVID-19. *Aquademia*, *4* (1), ep20016. https://doi.org/10.29333/aquademia/8227

[17] Potvin, A.S., Boardman, A.G., & Stamatis, K. (2021). Consequential change: Teachers scale project-based learning in English language arts. *Teaching and Teacher Education*, *107*, 103469. https://doi.org/10.1016/j.tate.2021.103469

[18] Rahmani, R., Mustadi, A., Maulidar, M., & Senen, A. (2021). The Development of Teaching Materials Based on Context and Creativity to Increase Students' Scientific Literacy. *Peuradeun Scientific Journal*, *9* (2), 345. https://doi.org/10.26811/peuradeun.v9i2.506

[19] Riahi, S., & Riahi, A. (nd). *The Pedagogy of Higher Education: How to Evaluate the Quality of Training in Morocco to Improve it*. 92–108.

[20] Richards, JC, & Renadya, WA (2002). *Methodology in Language Teaching: An Anthology of Current Practice* (pp. 1–432).

[21] Rizaldi, DR, Nurhayati, E., & Fatimah, Z. (2020). The Correlation of Digital Literacy and STEM Integration to Improve Indonesian Students' Skills in the 21st Century. *International Journal of Asian Education*, *1* (2), 73–80.

https://doi.org/10.46966/ijae.v1i2.36

[22] Tan, J. C. L., & Chapman, A. (2016). *Project-Based Learning for Academically Able Students*. Netherlands: Sense Publishers.

[23] Tomlinson, B. (2011). *Material development in language teaching (2nd Ed)* . Cambridge University Press.

[24] Tomlinson, B. (2012). Materials development for language learning and teaching. *Language Teaching*, *45* (2), 143–179. https://doi.org/10.1017/S0261444811000528

[25] Yueyu, X., & Wenqi, L. (2010). Project Based Learning Approach: A Case Study in China. *Asia Pacific Education Review*, *11* (3), 363--370.

Meta-Analysis of Students' Scientific Literacy Skills in Indonesia

Lin Wahyuni[1*], Sarwanto[2] and Idham Ragil Widianto Atmojo[3]

123Postgraduate, Sebelas Maret University, Surakarta, Indonesia
1E-mail: linwahyuni711@student.uns.ac.id

Abstract. Science and technology play a significant role in improving the quality of education in a country. However, the low level of scientific literacy in Indonesia has placed the country at the 68th out of 78 countries participating in the assessment of international scientific literacy. Therefore, there is a need for special attention to improving the scientific literacy skills of students, particularly in Indonesia. The aim of this research is to understand the causes of the low level of scientific literacy and the efforts that can be made to improve it, focusing on the integration of students' scientific literacy. This research will map the results of previous research in the field of science education, both for junior high school and senior high school students, using the Systematic Literature Review method. This research method involves systematically reviewing and identifying journals, with the results of the analysis presented as qualitative descriptions.

1. Background

21st-century skills and scientific literacy are two important elements that mutually support ensuring individual success in the modern world (Sinaga et al., 2022). 21st-century skills involve a set of abilities required to adapt to the changes and challenges of the continuously evolving world, while scientific literacy encompasses knowledge and utilization of scientific concepts and methods in everyday life. The term literacy literally means "being literate" (Stylos et al., 2023). According to the National Academy of Sciences in the United States, scientific literacy is the ability of individuals to understand basic scientific concepts, recognize and interpret scientific data, and make decisions based on scientific evidence (Bauer & Booth, 2019). Scientific literacy refers to the ability of individuals to comprehend, evaluate, use, and communicate about scientific concepts and related evidence. It involves skills in reading, writing, and speaking about scientific topics, understanding scientific methods, and recognizing how science impacts daily life.

The Organization for Economic Cooperation and Development (OECD), more commonly known as PISA (Programme for International Student Assessment), plays a role in assessing students' scientific literacy and preparing the next generation to be better and more literate individuals. Literacy measurement has been conducted by the OECD, which measures the scientific, language, and mathematical literacy of elementary school students. According to the PISA test results, Indonesia ranks 68 out of 78 participating countries in the field of science, with a score of 398, which falls below the PISA standard average (OECD, 2023).

Suspected factors contributing to the low scientific literacy in Indonesia include the education system applied, choice of models, approaches, strategies, and teaching methods, learning resources used, students' learning styles, and facilities in the learning process (Siti Anisa Hidayati et al., 2022). However, the causes of low scientific literacy cannot be fully addressed solely by the implementation of teaching models, strategies, or methods (Razak et al., 2021). Based on this information, this research

aims to evaluate the level of scientific literacy of students by mapping the results of previous studies conducted at the science education level, both at the junior high school and senior high school levels. This research is conducted to understand the broad scope and aspects of scientific literacy among students. Therefore, this research is titled "Meta-Analysis of the Influence of Scientific Literacy of Students in Indonesia."

2. Method

The research method used is the Systematic Literature Review (SLR) method. This method involves a systematic review and identification of journals, where each step follows established procedures or protocols (Cabrera & Cabrera, 2023). The SLR method is presented in the form of qualitative descriptive data analysis. In this study, the journals analyzed are limited to those published between 2017 and 2024, considering the abundance of research addressing the topic of scientific literacy.

3. Result and Discussion

According to the PISA (OECD, 2023), scientific literacy is the ability of an individual to use their knowledge in the fields of science, technology, and society by thinking logically. This information reflects how well someone can apply knowledge and skills to face challenges in everyday life. Science educators, scientists, and policymakers agree that developing scientific literacy in students is an important goal in science education (Yusmar & Fadilah, 2023). Although scientific literacy has been defined in various ways, all definitions emphasize students' ability to use scientific knowledge in real-world contexts. Based on meta-analyses conducted by researchers, the data results obtained are in the form of qualitative descriptive, depicting the impact of implementing scientific literacy on students.

Scientific literacy among students in Indonesia is still relatively low, as evidenced by Indonesia's ranking data in PISA, where Indonesia still lags far behind other countries (OECD, 2023). Indonesia began participating in PISA in 2000, but since then, Indonesia has not shown significant improvement. This is very unfortunate, and the main cause is the low quality of human resources in terms of scientific literacy. In 2015, Indonesia experienced a slight improvement in scientific literacy, but this trend did not continue because in 2018 Indonesia's position fell back to rank 70 out of 79 countries (PISA, 2019). The low level of scientific literacy in Indonesia is also supported by various studies. For example, research conducted by Indrawati (Novita et al., 2021) stated that the low scientific literacy of students is caused by a lack of adjustment to the newly implemented 2013 Curriculum for students. Meanwhile, Andriani et al. (Firda & Suharni, 2022) found differences in the level of scientific literacy between students and teachers, where students' scientific literacy is categorized as low. This conclusion is in line with research by Hidayah and colleagues (2019) and Safira et al. (2021), which showed that more than 50% of students have scientific literacy in the categories of very low to low, and only around 10% of students have scientific literacy in the very good category.

The low level of science literacy among students in Indonesia is caused by several factors. One of the factors is that students are only able to memorize and recognize scientific knowledge without truly understanding the concepts, and they have not been able to connect them to scientific topics. Students also struggle to apply scientific concepts in their daily lives (Maulina et al., 2022). In addition, students have not been able to answer more complex questions, and the learning evaluation tools used are not fully based on scientific literacy (Zahro, 2020). Another contributing factor is the background of students, including low learning interest, learning intensity, and a still-low attitude towards science (Maulina et al., 2022). However, students' science literacy skills can be improved in various ways. Based on previous research, there are several effective efforts to improve science literacy. These include the use of science literacy-based teaching materials, the implementation of appropriate teaching models and

approaches, and the use of evaluation tools designed to support the assessment of students' science literacy skills.

Science literacy-based teaching materials are teaching materials that meet valid criteria and have been validated by experts, and they include all components of science literacy (Faisal et al., 2023). This is consistent with several studies indicating the importance of analyzing teaching materials to improve students' science literacy. Quality textbooks should cover four components of science literacy: science as a body of knowledge, science as a way of investigation, science as a way of thinking, and the interaction between science, technology, and society (Fuadi et al., 2020). Research by Nursamsu (2020) shows that the use of modules as teaching materials can improve students' science literacy in content dimensions with high categories. Meanwhile, Muzijah et al. (2020) state that modules are effective when used in the learning process, as long as they meet validity standards assessed by experts with specific qualifications. Based on this, the use of science literacy-based teaching materials can help improve students' science literacy. This statement is supported by several previous studies (Masithah et al., 2022; Dwi et al., 2021; Nanda Putri & Afrizon, 2020; L. D. Anggreni et al., 2020). Applying the appropriate models and approaches in the learning process can enhance students' scientific literacy skills. Several studies indicate that project-based learning models, which integrate science and technology approaches, can be an effective option (Syarifah et al., 2021; Sakti et al., 2021; Amiruddin et al., 2021; Nuraini & Waluyo, 2021). Problem-based learning models centered on students (student-centered) can also improve scientific literacy skills (Siagian et al., 2019). Nehru and Syarkowi (Lestari, 2021) suggest a constructivist-based learning approach with low-level inquiry or guided project models because it can train students to think analytically, critically, and creatively, thus enhancing students' scientific literacy (Manurung et al., 2020; Fidiantara & Merta, 2020; Nasir, 2021; Latif et al., 2022). Discovery learning models can also influence the improvement of students' scientific literacy because students are trained to discover concepts through direct experience, enabling the achievement of several scientific literacy indicators (Kulsum et al., 2020). Syntax in discovery learning models can be used to train students' scientific literacy because of structured learning (Yaumi, 2017). The application of this model shows an increase in scientific literacy according to previous research (Laila & Firaina, 2020; Setyawan et al., 2019; Maisyarah & Lena, 2020).

Measuring students' scientific literacy abilities is crucial to understanding the extent of their understanding of science (Putri et al., 2022). Scientific literacy instruments are also important for training students in scientific thinking (Yantiningsih et al., 2022). Instruments used to assess students must meet several requirements, including through validity and reliability testing stages (Chasanah et al., 2022). Based on the results of validity and reliability testing of various scientific literacy instruments developed by previous researchers, a good instrument is one that meets standards and is suitable for application to students (Rohana et al., 2020; Maulida & Sunarti, 2022; Setiawan, 2022; Kusuma Putri et al., 2020). However, even with good validity and reliability results, this does not always guarantee that the instrument will improve students' scientific literacy abilities. This is in line with Indrawati's research (2018), which indicates that students' low scientific literacy is due to their unfamiliarity with the curriculum. Anggraeni et al. (R. A. Anggreni et al., 2022) state that the development of scientific literacy instruments at the high school level is crucial because most existing scientific literacy instruments focus more on junior high school students and the more general science contexts.

4. Conclusion

In Indonesia, the level of scientific literacy remains low, especially when compared to international standards as indicated by PISA data. Indonesia ranks 70 out of 79 countries, a concerning reality. There are various factors contributing to the low scientific literacy in Indonesia, both internal and external to the students. Internal factors include students' perception that science is difficult to understand, leading

them to have a shallow understanding of scientific concepts. On the other hand, external factors such as teaching models, strategies, approaches, and methods used by teachers also play a crucial role. The lack of alignment in the use of teaching models and evaluation tools such as instructional media, textbooks, and scientific literacy instruments also poses a barrier, especially at the high school level where scientific literacy instruments are generally common and focused on integrated science. To improve students' scientific literacy, it is important to identify and understand both internal and external factors influencing the learning process. Thus, appropriate steps can be taken to address the challenges faced by students during the learning process, thereby enhancing their scientific literacy.

References

[1] Amiruddin, B., Budi, A. S., & Sumantri, M. S. (2021). Enhancing science literacy capabilities of prospective primary school teachers through the STEM Project Learning Model. *Journal of Physics: Conference Series*, *1869*(1). https://doi.org/10.1088/1742-6596/1869/1/012176

[2] Anggreni, L. D., Jampel, I. N., & Diputra, K. S. (2020). Pengaruh Model Project Based Learning Berbantuan Penilaian Portofolio Terhadap Literasi Sains. *Jurnal Mimbar Ilmu*, *25*(1).

[3] Anggreni, R. A., Putu Aditya Antara, & Putu Rahayu Ujianti. (2022). Pengembangan Instrumen Literasi Sains Pada Anak. *Jurnal Pendidikan Anak Usia Dini Undiksha*, *10*(2), 291–301. https://doi.org/10.23887/paud.v10i2.49303

[4] Bauer, J. R., & Booth, A. E. (2019). Exploring potential cognitive foundations of scientific literacy in preschoolers: Causal reasoning and executive function. *Early Childhood Research Quarterly*, *46*, 275–284. https://doi.org/10.1016/j.ecresq.2018.09.007

[5] Cabrera, D., & Cabrera, L. (2023). The Steps to Doing a Systems Literature Review (SLR). *Journal of Systems Thinking Preprints*. https://doi.org/10.54120/jost.pr000019.v1

[6] Chasanah, N., Widodo, W., & Suprapto, N. (2022). Pengembangan Instrumen Asesmen Literasi Sains Untuk Mendeskripsikan Profil Peserta Didik. *PENDIPA Journal of Science Education*, *6*(2), 474–483. https://doi.org/10.33369/pendipa.6.2.474-483

[7] Dwi, R., Maghfira Izzania, S., Winarni, E. W., & Koto, I. (2021). Pengembangan Bahan Ajar Berbasis PjBL Terintegrasi STEAM Untuk Memfasilitasi Kemampuan Literasi Sains Siswa Sekolah Dasar. *Https://Ejournal.Unib.Ac.Id*, *4*(2), 2654–2870.

[8] Faisal, S., Rusilowati, A., & Susilaningsih, E. (2023). Science Literacy Assessment Instrument for Additives and Addictive Substances: Development, Validation, and Rasch Model Analysis. *Jurnal Penelitian Pendidikan IPA*, *9*(10), 7826–7836. https://doi.org/10.29303/jppipa.v9i10.4376

[9] Fidiantara, F., & Merta, W. (2020). THE EFFECT OF USING SCIENCE TEACHING MATERIALS BASED ON INQUIRY SYSTEM TO INCREASE EXCRETION OF SCIENCE LITERACY. *J. Pijar MIPA*, *15*(1), 88–92. https://doi.org/10.29303/jpm.v15i1

[10] Firda, A., & Suharni. (2022). Tingkat Kemampuan Literasi Sains Guru Pendidikan Anak Usia Dini. *Universitas Lancang Kuning*, *6*(5), 3868–3876. https://doi.org/10.31004/obsesi.v6i6.1928

[11] Fuadi, H., Robbia, A. Z., Jamaluddin, J., & Jufri, A. W. (2020). Analisis Faktor Penyebab Rendahnya Kemampuan Literasi Sains Peserta Didik. *Jurnal Ilmiah Profesi Pendidikan*, *5*(2), 108–116. https://doi.org/10.29303/jipp.v5i2.122

[12] Hidayah, N., Rusilowati, A., Pendidikan Fisika, P., & Pascasarjana, P. (2019). *ANALISIS PROFIL KEMAMPUAN LITERASI SAINS SISWA SMP/MTs DI KABUPATEN PATI*. *09*(1), 36–47.

[13] Kulsum, N. N., Surahman, E., & Ali, M. (2020). Implementasi Model Discovery Learning terhadap Literasi Sains dan Hasil Belajar Peserta Didik pada Sub Konsep Pencemaran Lingkungan. *Jurnal Biologi Dan Pembelajarannya*, *15*(2).

[14] Kusuma Putri, R., Pendidikan, Y., & Medan, S. A. (2020). PENGEMBANGAN INSTRUMEN TES LITERASI SAINS SISWA PADA TOPIK KEANEKARAGAMAN MAKHLUK HIDUP. *Jurnal Pendidikan Dan Pembelajaran Biologi*, *4*(1), 71–78.

[15] Laila, R., & Firaina, R. (2020). Meta Analisis Pengaruh Model Discovery Learning terhadap Literasi Sains Siswa. *Jurnal Penelitian Dan Pembelajaran Fisika*, *6*(2), 120–127.

[16] Latif, A., Pahru, S., & Muzakkar, A. (2022). Studi Kritis Tentang Literasi Sains dan Problematikanya di Sekolah Dasar. *Jurnal Basicedu*, *6*(6), 9878–9886. https://doi.org/10.31004/basicedu.v6i6.4023

[17] Lestari, S. (2021). Pengaruh Model Pembelajaran Peer Lead Guided Inquiry terhadap Kompetensi Literasi Sains ditinjau dari Kemampuan Akademik. *Jurnal Inovasi Pendidikan IPA*, *7*(1). https://doi.org/10.21831/jipi.v7i1.29845

[18] Maisyarah, M., & Lena, M. S. (2020). Penerapan Model Project Based Learning (Pjbl) pada Pembelajaran Tematik Terpadu di Sekolah Dasar. *E-Journal Pembelajaran Inovasi, Jurnal Ilmiah Pendidikan Dasar*, *8*(10), 171–184.

[19] Manurung, F. I. U., Mailani, E., & Simanuhuruk, A. (2020). *PENERAPAN MODEL PEMBELAJARAN ARGUMENT DRIVEN INQUIRY BERBANTUAN VIRTUAL LABORATORY UNTUK MENINGKATKAN KEMAMPUAN LITERASI SAINS MAHASISWA PGSD.*

[20] Masithah, I., Wahab Jufri, A., & Ramdani, A. (2022). Bahan Ajar IPA Berbasis Inkuiri Untuk Meningkatkan Literasi Sains. *Journal of Classroom Action Research*, *4*(2). https://doi.org/10.29303/jcar.v4i1.1758

[21] Maulida, F., & Sunarti, T. (2022). *PENGEMBANGAN INSTRUMEN TES LITERASI SAINS BERBASIS KEARIFAN LOKAL DI KABUPATEN LAMONGAN. 8*(1).

[22] Maulina, D., Widyastuti, Maulina, H., & Mayasari, S. (2022). KAJIAN FAKTOR INTRINSIK DAN KEMAMPUAN LITERASI SAINS SISWA SMP DI KOTA BANDAR LAMPUNG. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, *12*(1), 1–8. https://doi.org/10.24929/lensa.v12i1.201

[23] Muzijah, R., Wati, M., & Mahtari, S. (2020). Pengembangan E-modul Menggunakan Aplikasi Exe-Learning untuk Melatih Literasi Sains. *Jurnal Ilmiah Pendidikan Fisika*, *4*(2), 89. https://doi.org/10.20527/jipf.v4i2.2056

[24] Nanda Putri, W., & Afrizon, R. (2020). ANALISIS VALIDASI MODUL FISIKA BERMUATAN LITERASI SAINTIFIK PADA MATERI GERAK LURUS DAN GERAK PARABOLA. In *Physics Education* (Vol. 13, Issue 1).

[25] Nasir, M. (2021). Implementasi Model Pembelajaran Discovery Learning untuk Meningkatkan Literasi Sains Siswa Kelas XI di SMA Negeri 1 Soromadi. *Jurnal Ilmu Sosial Dan Pendidikan (JISIP)*, *5*(4), 2598–9944. https://doi.org/10.36312/jisip.v5i4.2439/http

[26] Novita, M., Rusilowato, A., Susilo, & Marwoto, P. (2021). *Meta Analisis Literasi Sains Siswa di Indonesia. 10*(3).

[27] Nuraini, N., & Waluyo*, E. (2021). Pengembangan Desain Instruksional Model Project Based Learning Terintegrasi Keterampilan Proses Sains Untuk Meningkatkan Literasi Sains. *Jurnal IPA & Pembelajaran IPA*, *5*(1), 101–111. https://doi.org/10.24815/jipi.v5i1.20145

[28] OECD. (2023). *PISA 2022 Results (Volume I)*. OECD. https://doi.org/10.1787/53f23881-en

[29] PISA. (2019). *PISA 2018: Assessment and Analytical Framework*. OECD. https://doi.org/10.1787/9789264190511-en

[30] Putri, A. A., Hussain, H., & Ramdhani. (2022). *Pengembangan Instrumen Tes Literasi Sains pada Dimensi Pengetahuan Materi Asam Basa.*

[31] Razak, A., Apra Santosa, T., Pendidikan Biologi Universitas Negeri Padang, M., & Hamka Air Tawar, J. (2021). Meta-Analisis: Pengaruh Soal HOTS (Higher Order Thinking Skill) Terhadap Kemampuan Literasi Sains dan Lesson Study Siswa Pada Materi Ekologi dan Lingkungan Pada Masa Pandemi Covid-19 Meta-Analysis: The Effect of HOTS (Higher Order Thinking Skill) Questions on Students' Science Literacy Skills and Lesson Study on Ecology and Environmental Materials During the Covid-19 Pandemic. *Jurnal Pendidikan Biologi*, *6*(1), 2021. https://doi.org/10.37058/bioed.v6i1.2930

[32] Rohana, R., Asrial, A., & Zurweni, Z. (2020). Profil Kemampuan Literasi Sains Peserta Didik Berdasarkan Instrumen Scientific Literacy Assessments (SLA). *BIOEDUSAINS:Jurnal Pendidikan Biologi Dan Sains*, *3*(2), 176–185. https://doi.org/10.31539/bioedusains.v3i2.1848

[33] Safira, W. (2021). *ANALISIS KEMAMPUAN LITERASI SAINS SISWA DI SMA NEGERI 4 BANDA ACEH.*

[34] Sakti, I., Nirwana, N., & Swistoro, E. (2021). PENERAPAN MODEL PROJECT BASED LEARNING UNTUK MENINGKATKAN LITERASI SAINS MAHASISWA PENDIDIKAN IPA. *Jurnal Kumparan Fisika*, *4*(1), 35–42. https://doi.org/10.33369/jkf.4.1.35-42

[35] Samsu, N., Mustika, D., Nafaida, R., & Manurung, N. (2020). Analisis Kelayakan dan Kepraktisan Modul Praktikum Berbasis Literasi Sains untuk Pembelajaran IPA. *Jurnal IPA & Pembelajaran IPA*, *4*(1), 29–40. https://doi.org/10.24815/jipi.v4i1.15546

[36] Setiawan, A. R. (2022). *Menyusun Instrumen Penilaian untuk Pembelajaran Ekologi Berorientasi Literasi Saintifik.*

[37] Setyawan, R. I., Purwanto, A., & Sari, N. K. (2019). Model Pembelajaran Berbasis Proyek (Project Based Learning) Untuk Meningkatkan Hasil Belajar. *Jurnal Dikdas Bantara*, *2*(2), 81–93. https://doi.org/10.32585/jdb.v2i2.372

[38] Siagian, M. V., Saragih, S., & Sinaga, B. (2019). Development of Learning Materials Oriented on Problem-Based Learning Model to Improve Students' Mathematical Problem Solving Ability and Metacognition Ability. *International Electronic Journal of Mathematics Education*, *14*(2). https://doi.org/10.29333/iejme/5717

[39] Sinaga, W. A. L., Sumarno, S., & Sari, I. P. (2022). The Application of Multiple Linear Regression Method for Population Estimation Gunung Malela District. *JOMLAI: Journal of Machine Learning and Artificial Intelligence*, *1*(1), 55–64. https://doi.org/10.55123/jomlai.v1i1.143

[40] Siti Anisa Hidayati, Sudarti, S., & Rif'ati Dina Handayani. (2022). Pengaruh Pengaruh Kemampuan Literasi Sains terhadap Minat Belajar Materi Pewarisan Sifat sebagai Evaluasi dalam Pembelajaran pada Siswa SMP. *JURNAL PENDIDIKAN MIPA*, *12*(4), 1210–1216. https://doi.org/10.37630/jpm.v12i4.766

[41] Stylos, G., Siarka, O., & Kotsis, K. T. (2023). Assessing Greek pre-service primary teachers' scientific literacy. *European Journal of Science and Mathematics Education*, *11*(2), 271–282. https://doi.org/10.30935/scimath/12637

[42] Syarifah, L., Holisin, I., & Shoffa, S. (2021). *Meta analisis: Model pembelajaran project based learning. 8*(2), 256–272.

[43] Yantiningsih, N. M. S., Suastra, N. W., & Sanjaya, D. B. (2022). *PENGEMBANGAN INSTRUMEN LITERASI SAINS DAN HASIL BELAJAR SISWA KELAS VI SD. 6*(1).

[44] Yusmar, F., & Fadilah, R. E. (2023). ANALISIS RENDAHNYA LITERASI SAINS PESERTA DIDIK INDONESIA: HASIL PISA DAN FAKTOR PENYEBAB. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, *13*(1), 11–19. https://doi.org/10.24929/lensa.v13i1.283

[45] Zahro, U. R. (2020). *PENGEMBANGAN INSTRUMEN TES UNTUK MENGUKUR KEMAMPUAN LITERASI SAINS SISWA SMP PADA TEMA PEMANASAN GLOBAL*.

Teachers Voices on Teaching Writing for Students in Lombok Island: Overcoming the Barriers

Mia Febriana[1*], Gunarhadi[2]

[1] Educational Sciences, Universitas Sebelas Maret, Surakarta, Indonesia
[2] Universitas Sebelas Maret, Surakarta, Indonesia
[*]E-mail: mia@student.uns.ac.id

Abstract. This study aimed to explore the challenges faced by teachers and the teachers' innovation in teaching writing. A qualitative narrative approach was employed, gathering data through open-ended questionnaires and transcriptions, then followed by in-depth interview. The data was analyzed using the Glaser and Strauss' Constant Comparative Method. The primary difficulties encountered by teachers include student motivation, student prior knowledge, student confidence, and student limited vocabulary. Teachers provided innovations to teach writing skills such as additional lesson and assignment, games, and vocabulary booster. In response to these challenges, teachers implemented various innovative approaches. These included organizing additional lessons and assignments tailored to students' needs, integrating educational games to enhance engagement and learning, and employing vocabulary boosters such as daily word activities. These innovations aimed to address specific barriers identified in the teaching process and foster a more conducive learning environment for developing students' writing proficiency. Overall, the study underscores the importance of recognizing and addressing the multifaceted challenges in teaching writing. By adopting innovative strategies, teachers can effectively support students in overcoming barriers and advancing their language skills, thereby enhancing overall educational outcomes in writing proficiency. Future research could further explore the long-term impacts and effectiveness of these innovative teaching approaches in diverse educational settings.
Keywords: teaching writing, teacher challenges, teacher voices

1. Introduction

English proficiency is crucial in today's globalized world as it serves as the lingua franca. Proficiency in English communication skills is essential for success across various fields [1]. The primary objective of language teaching is to equip individuals with the ability to effectively and accurately communicate in English [2]. The increasing popularity of English as a foreign language underscores its importance both in and out of educational settings [3]. In essence, mastering English is not only beneficial on a personal level but also a societal necessity in the modern world.

Teaching writing presents various challenges for educators, impacting the quality and effectiveness of writing instruction. Cutler and Graham emphasize the importance of increasing the time students spend writing, fostering motivation, and integrating computers into writing programs [4]. Graham identifies obstacles such as instructional time, teachers' beliefs about writing, and educational policies [5]. Lele and Gqoli highlight challenges faced by teachers in rural schools, including inadequate teaching methods and time constraints [6]. Adam, et al. discuss challenges faced by Indonesian high school English teachers in teaching writing skills [7], while Moses and Mohamad point out difficulties faced by teachers in ESL contexts [8].

Furthermore, Hsiang et al. note that teachers' beliefs influence how writing is taught, impacting instructional practices [9]. Another research discusses obstacles faced by teachers and students in implementing communicative language teaching principles, such as time management and group dynamics [10]. Casas et al. highlight epistemological and methodological barriers to integrated writing and grammar instruction [11]. Malpique et al. reveal that teachers in Australia spend limited time on writing instruction, affecting their efficacy in teaching writing [12].

English teachers in Indonesia encounter numerous challenges when teaching writing skills. These obstacles include students' poor English grammatical competence, difficulty in generating ideas for writing, limited vocabulary knowledge, lack of motivation to learn writing, time management issues, restricted access to writing materials, and inadequate teaching facilities [13]. Additionally, teachers face difficulties related to inappropriate curriculum alignment, time constraints, lack of educational resources, ineffective teaching strategies, mismatched qualifications, and student attitude problems [14]. Moreover, poor internet connectivity, particularly in remote areas, hinders the utilization of online platforms for teaching [15].

Furthermore, the adoption of teaching methodologies like the Process-Based Approach can present challenges for English teachers, especially when working with tenth-grade students [16]. It is essential to optimize teaching content design, provide effective guidance to students, and emphasize the educational value of English writing to enhance students writing skills [17]. Additionally, the lack of familiarity with internet-based teaching methods among Indonesian EFL teachers contributes to the challenges encountered in teaching writing [18].

This article will explore the numerous teaching obstacles faced by English teachers in Lombok when instructing writing skills. It will provide an in-depth examination of the challenges that arise in the classroom, highlighting the complexities and difficulties that teachers must navigate. Additionally, the article will briefly discuss some of the solutions that have been attempted by these teachers, offering insights into the strategies they have employed to overcome these obstacles.

2. Research Method

The research conducted involved a narrative inquiry method to gather stories from six English teachers in Lombok, comprising both public and private school teachers. Initially, the teachers were provided with questionnaires to complete, followed by in-depth interviews. The data collected was then analyzed using the constant comparative method proposed by Glaser and Strauss [19],[20]. By employing narrative inquiry, the study delved into the lived experiences and perspectives of the teachers, providing a rich and detailed account of their practices and challenges in teaching English. This approach facilitated a deep exploration of the teachers' stories, shedding light on their motivations, beliefs, and instructional strategies [21],[22]. Through the narrative inquiry process, the researchers were able to capture the nuances and complexities of the teachers' experiences, offering valuable insights into the realities of language teaching in diverse educational settings.

By engaging in narrative inquiry, the study tapped into the power of storytelling as a means of sense-making and knowledge construction [23],[24]. This personalized approach to research not only enriches the academic understanding of language teaching but also honors the voices and experiences of the teachers involved [25],[26]. Through the lens of narrative inquiry, the study illuminated the intricate interplay between individual experiences, institutional contexts, and pedagogical beliefs, offering a nuanced portrayal of the complexities inherent in language education [27],[28]. This research underscores the significance of narrative inquiry as a powerful tool for capturing the complexities and nuances of educational practices, paving the way for future studies to continue unraveling the multifaceted nature of language teaching and learning.

3. Research Findings

In this section, the stories from English teachers about teaching writing skills will be described. From the stories gathered from six teachers on the island of Lombok, it is revealed that there are several challenges in teaching writing skills, including issues related to student motivation, student prior knowledge, student confidence, and vocabulary limitation. Here are some of the challenges faced by the teachers on the island of Lombok; in the second point, we will present the solutions that the teachers have implemented to address the challenges and obstacles they encountered while teaching writing skills.

a. Teachers' Challenges

Student Motivation

One of the challenges faced by teachers on the island of Lombok is related to student motivation. This was conveyed by a teacher at a school with very good conditions and excellent facilities. Students at this school use Chromebooks for learning, in addition to the textbooks and worksheets provided by the school. However, the availability of adequate facilities does not automatically increase student motivation to learn.

> *The obstacle I face is the lack of student willingness to study harder and master vocabulary in writing or speaking, and their interest in English is quite low; it can be said they are still in the learning stage* (NN, Interview, November 2023).

In the interview excerpt conducted by the researcher above, it is evident that the teacher experiences challenges in encouraging or providing motivation to students. Additionally, the students' interest or attraction to learning English is also a significant obstacle faced by the teacher. Furthermore, students at NN's school also struggle with vocabulary mastery.

Student Prior Knowledge

The second challenge faced by teachers on the island of Lombok was conveyed by teacher AR. The school where teacher AR teaches has very limited teaching facilities and an incomplete supply of books. This condition then impacts the students' ability to master English, particularly concerning basic skills. This was expressed by teacher AR in the following interview excerpt.

> *The basic English skills of students at my school are very lacking, which becomes the main obstacle in teaching writing skills* (AR, Interview, November 2023).

The limited facilities available at the school, especially the lack of English textbooks, are one of the reasons for the students' inability to understand the basic skills they need to support their future proficiency in English writing skills.

Student Confidence

The third challenge is the students' level of confidence. This was conveyed by teacher AF. The condition of teacher AF's school is similar to that of teacher AR's school, with inadequate facilities and a lack of textbooks. This situation affects the students' confidence due to the lack of learning materials. Here is an excerpt from the interview with teacher AF regarding the condition of the students at their school:

One of the challenges in teaching English writing skills at my school is the lack of confidence in the students (AF, Interview, November 2023).

This lack of confidence is not only a barrier to learning but also affects the overall classroom environment. When students are not confident, they are less likely to engage actively in lessons, ask questions, or seek help when needed. This can lead to a cycle of poor performance and decreased motivation. To address this, teachers must find creative ways to boost their students' confidence, such as providing positive reinforcement, creating a supportive and non-judgmental classroom atmosphere, and offering additional practice opportunities tailored to individual needs.

The challenge of low student confidence highlights the critical need for well-equipped educational environments. Schools must ensure that they provide adequate resources, such as textbooks and learning aids, to support both teachers and students. By addressing these infrastructural deficiencies, schools can help build a foundation where students feel more secure in their learning journey, ultimately leading to improved educational outcomes.

Vocabulary Limitation

The greatest challenge faced by teachers on the island of Lombok is the lack of vocabulary among students. The majority of respondents in this study indicated that the biggest obstacle is students' vocabulary mastery. For instance, teacher AI, who works at a school in the northern part of Lombok, mentioned that the greatest challenge in teaching writing skills is the students' limited vocabulary. Similarly, teacher AF also pointed out the same issue regarding the lack of vocabulary among students at their school. This is evident in the following interview excerpt.

The students at my school are lack of vocabulary to support their abilities (AF, Interview, November 2023).

In addition to the problem of limited vocabulary, another significant issue is the use of grammar, especially complex grammar. This was highlighted by teacher IH. While the school where teacher IH teaches has limited facilities, they are still optimally utilized because the school shares resources with a nearby elementary school. This allows teachers and students to use the elementary school's facilities when the middle school does not have the necessary resources. Textbooks are sufficiently available to meet students' needs. Despite this, teacher IH still faces challenges, as mentioned in the following interview excerpt.

The use of difficult grammar and the lack of memorization of a broader vocabulary (IH, Interview, November 2023).

A similar situation occurs at the school where teacher LN teaches, where students lack an understanding of grammar and do not have enough vocabulary to develop their writing skills. This lack of foundational language skills makes it challenging for students to construct sentences and paragraphs effectively, limiting their ability to express their thoughts clearly and coherently in writing.

The combination of these issues creates a substantial barrier to learning. Teachers must not only focus on expanding students' vocabulary but also on simplifying grammar instruction to make it more accessible. By integrating more practical exercises and real-life language use,

teachers can help students gradually build their vocabulary and improve their grammatical skills. Additionally, the development of customized learning materials that address the specific needs of their students could further support the learning process.

Overall, addressing these challenges requires a multifaceted approach that includes improving educational resources, adopting innovative teaching methods, and providing continuous support to both teachers and students. By doing so, schools on the island of Lombok can enhance their students' proficiency in English writing skills, paving the way for better educational outcomes.

b. **Teachers' Innovation**
Additional Lesson and Assignment

One of the solutions implemented by teachers on the island of Lombok to address the challenges in teaching writing skills is organizing additional lessons or classes for the students. This was conveyed by teachers NN and AR in the following interview excerpts.

I organize extracurricular activities for students who are interested in English so that they can broaden their knowledge and focus more on learning (NN, Interview, November 2023).

In addition to organizing extra classes for students who need them, teacher AR also created a simple dictionary to help students memorize vocabulary more easily. The aim is that with the help of this simple dictionary, the students' vocabulary at AR's school can improve.

I have organized a course as an extra class for my students, and I also created a simple dictionary (AR, Interview, November 2023).

Beyond offering additional English classes, teacher LN took further steps by assigning extra tasks to the students. This approach is explained in the following interview excerpt.

I give reading assignments and ask students to find the meanings of difficult words and provide explanations about related grammar (LN, Interview, November 2023).

These solutions reflect a proactive approach by teachers to address the obstacles their students face in learning English. By providing additional learning opportunities outside regular class hours, teachers aim to give students more time and resources to improve their skills. The creation of a simple dictionary by teacher AR is an innovative way to support vocabulary acquisition, which is crucial for developing writing skills.

Similarly, the additional tasks assigned by teacher LN, such as reading assignments and looking up difficult words, encourage students to engage more deeply with the language. This not only helps them build their vocabulary but also enhances their understanding of grammar, which is essential for writing. By explaining grammar related to their reading tasks, teacher LN ensures that students can apply what they learn in their writing.

Overall, these strategies highlight the dedication of teachers on the island of Lombok to overcoming the challenges in teaching English writing skills. By supplementing classroom instruction with extracurricular activities, simple dictionaries, and targeted assignments, they provide their students with the tools and support needed to improve their language proficiency.

Games

Another solution implemented by teachers in Lombok to address the barriers in students' writing skills involves using games. This approach was highlighted by teacher AF, who utilizes a game called *arranging the words or sentences* to enhance student motivation at their school. Additionally, teacher AI employs a *word wall* to display vocabulary words, aiming to facilitate students' memorization of English vocabulary. Apart from teachers AF and AI using games, teacher NN also incorporates games, as mentioned in the following interview excerpt.

> *We can use a guessing game model. The word can be written, and then this word will be made into sentences. This can increase the enthusiasm of students to be able to write, even though they are still lacking in many vocabularies* (NN, Interview, November 2023).

In the interview, it was mentioned that teacher NN's game model involves guessing words, which are then arranged into sentences. These teachers hope that integrating games into their English classes will boost motivation and encourage students to enhance their writing skills despite their vocabulary limitations.

These game-based approaches illustrate teachers' creativity in making learning engaging and effective. By incorporating interactive activities like word arrangement and guessing games, they create opportunities for students to practice language skills in a fun and stimulating manner. Furthermore, these games not only foster enthusiasm but also provide practical contexts for students to apply their knowledge, thereby reinforcing their learning and confidence in writing English. Overall, these strategies demonstrate a proactive effort by teachers in Lombok to overcome educational challenges and enhance students' language proficiency through innovative teaching methods.

Vocabulary Booster

In addition to the previously mentioned solutions, English teachers in Lombok also employ vocabulary boosters. One such teacher, teacher IH, advocates for the *One Day One Word* initiative, as described in the interview excerpt below.

> *At school, I promote vocabulary memorization through the* One Day One Word *movement by giving students vocabulary cards each class session* (IH, Interview, November 2023).

According to teacher IH, each morning, students receive vocabulary cards which they are required to submit to her by the end of the day. This approach aims to encourage students to expand their vocabulary daily through systematic memorization.

The *One Day One Word* strategy emphasizes consistent and incremental vocabulary learning, ensuring that students are exposed to new words regularly. By integrating vocabulary cards into daily classroom routines, teacher IH provides structured opportunities for students to strengthen their language skills effectively. This method not only supports vocabulary acquisition but also promotes active engagement and commitment to learning among students. Overall, initiatives like *One Day One Word* exemplify innovative teaching practices aimed at enhancing students' language proficiency and fostering a conducive learning environment in Lombok's schools.

4. Discussion

From the research findings, it is evident that the majority of teachers in Lombok face challenges due to the limited vocabulary of their students. This issue significantly hinders the students' ability to effectively learn and apply English language skills, particularly in writing. The limited vocabulary of students has been identified as a significant obstacle to developing writing skills in various studies. For instance, the research conducted by [29] showed that vocabulary plays a crucial thing in developing students' ideas to write. Besides, research has shown that university students learning a second language struggle with writing and expressing their ideas due to a restricted vocabulary [30]. This limitation not only affects their ability to convey thoughts effectively but also impacts their motivation and enjoyment in writing tasks [31]. Furthermore, students with inadequate vocabulary knowledge face challenges in developing ideas for writing, which can lead to demotivation and poor performance in English writing [32].

Effective vocabulary instruction is crucial in addressing these challenges. Studies emphasize the importance of vocabulary in enhancing writing skills, as vocabulary knowledge significantly influences the quality of writing [33]. It is not just about memorizing words but also about understanding their meanings and usage in the context of writing. Teachers play a vital role in helping students improve their vocabulary learning strategies to overcome writing difficulties [34]. Strategies such as interactive vocabulary learning, vocabulary building exercises, and engaging activities that incorporate vocabulary usage have been recommended to enhance students' vocabulary skills and, consequently, their writing proficiency [35].

5. Conclusion

In conclusion, the study underscores the importance of recognizing and addressing the multifaceted challenges in teaching writing. By adopting innovative strategies, teachers can effectively support students in overcoming barriers and advancing their language skills, thereby enhancing overall educational outcomes in writing proficiency. Future research could further explore the long-term impacts and effectiveness of these innovative teaching approaches in diverse educational settings.

References

[1] Robert, R. and Meenakshi, S. (2022). Rereading oral communication skills in english language acquisition: the unspoken spoken english. Theory and Practice in Language Studies, 12(11), 2429-2435. https://doi.org/10.17507/tpls.1211.25

[2] Leong, L. and Masoumeh, A. (2017). An analysis of factors influencing learners' english speaking skill. International Journal of Research in English Education, 2(1), 34-41. https://doi.org/10.18869/acadpub.ijree.2.1.34

[3] Kasztalska, A. (2014). English in contemporary poland. World Englishes, 33(2), 242-262. https://doi.org/10.1111/weng.12083

[4] Cutler, L. and Graham, S. (2008). Primary grade writing instruction: a national survey. Journal of Educational Psychology, 100(4), 907-919. https://doi.org/10.1037/a0012656

[5] Graham, S. (2019). Changing how writing is taught. Review of Research in Education, 43(1), 277-303. https://doi.org/10.3102/0091732x18821125

[6] Lele, M. and Gqoli, N. (2023). Challenges encountered by teachers in improving essay writing skills in rural schools of o.r. tambo inland district eastern cape province. International Journal of Research in Business and Social Science (2147-4478), 12(2), 416-421. https://doi.org/10.20525/ijrbs.v12i2.2339

[7] Adam, N., Abid, A., & Bantulu, Y. (2021). Challenges in teaching english writing skills: lessons learnt from indonesian high school english language teachers. Jambura Journal of English Teaching and Literature, 2(1), 12-21. https://doi.org/10.37905/jetl.v2i1.10632

[8] Moses, R. N., & Mohamad, M. (2019). Challenges faced by students and teachers on writing skills in ESL Contexts: A literature review. *Creative Education*, *10*(13), 3385-3391.

[9] Hsiang, T., Graham, S., & Yang, Y. (2020). Teachers' practices and beliefs about teaching writing: a comprehensive survey of grades 1 to 3 teachers. Reading and Writing, 33(10), 2511-2548. https://doi.org/10.1007/s11145-020-10050-4

[10] Asrotinengseh, A. and Sulistyanto, I. (2022). The implementation of communicative language teaching principles in teaching business letter writing at genta english course. Jurnal Pendidikan Bahasa Inggris Proficiency, 4(1), 47. https://doi.org/10.32503/proficiency.v4i1.2248

[11] Casas, M., Comajoan, L., & Santolària, A. (2020). The beliefs of primary education teachers regarding writing and grammar instruction. L1 Educational Studies in Language and Literature, 20, Running Issue(Running Issue), 1-23. https://doi.org/10.17239/l1esll-2020.20.03.04

[12] Malpique, A., Valcan, D., Pino-Pasternak, D., & Ledger, S. (2022). Teaching writing in primary education (grades 1–6) in australia: a national survey. Reading and Writing, 36(1), 119-145. https://doi.org/10.1007/s11145-022-10294-2

[13] Amalia, H., Abdullah, F., & Fatimah, A. (2021). Teaching writing to junior high school students: a focus on challenges and solutions. Journal of Language and Linguistic Studies, 17(2), 794-810. https://doi.org/10.17263/jlls.904066

[14] Febtiningsih, P. and Wibowo, A. (2021). Teachers' challenges in teaching english writing skills for visually impaired students at indonesian special senior high schools. Elt-Lectura, 8(1), 90-98. https://doi.org/10.31849/elt-lectura.v8i1.5472

[15] Wardani, A. and Munir, A. (2023). Teachers' perspective towards using the "lets view" application as innovative learning media for elementary students in english foreign language classroom. JTP - Jurnal Teknologi Pendidikan, 25(1), 1-14. https://doi.org/10.21009/jtp.v25i1.32336

[16] Pangestu, M., Juniarta, P., & Mahendrayana, G. (2022). The implementation of process based approach in teaching writing on the tenth grade students in senior high school. Indonesian Journal of Educational Research and Review, 5(1), 100-110. https://doi.org/10.23887/ijerr.v5i1.42346

[17] Xie, D. (2023). Analysis of types and solutions of errors in high school english writing. Frontiers in Educational Research, 6(23). https://doi.org/10.25236/fer.2023.062305

[18] Mutiaraningrum, I., & Cahyono, B. Y. (2015). Online debate in argumentative writing course: Potentials and challenges. *International Journal of Language and Linguistics*, *2*(4), 43-54.

[19] Glaser, B., Strauss, A., & Strutzel, E. (1968). The discovery of grounded theory; strategies for qualitative research. Nursing Research, 17(4), 364. https://doi.org/10.1097/00006199-196807000-00014

[20] Scott, J. and Glaser, B. (1971). The discovery of grounded theory: strategies for qualitative research.. American Sociological Review, 36(2), 335. https://doi.org/10.2307/2094063

[21] Clandinin, D. (2006). Narrative inquiry: a methodology for studying lived experience. Research Studies in Music Education, 27(1), 44-54. https://doi.org/10.1177/1321103x060270010301

[22] Kukner, J. and Orr, A. (2013). Narrative inquiry in the teacher education classroom: a review of narrative inquiries into curriculum making in teacher education. Teachers and Teaching, 22(1), 117-122. https://doi.org/10.1080/13540602.2013.780418

[23] Coulter, C., Michael, C., & Poynor, L. (2007). Storytelling as pedagogy: an unexpected outcome of narrative inquiry. Curriculum Inquiry, 37(2), 103-122. https://doi.org/10.1111/j.1467-873x.2007.00375.x

[24] Chan, E. (2012). The transforming power of narrative in teacher education. Australian Journal of Teacher Education, 37(3). https://doi.org/10.14221/ajte.2012v37n3.4

[25] Grady, G., Clandinin, D., & Toole, J. (2018). Engaging in educational narrative inquiry: making visible alternative knowledge. Irish Educational Studies, 37(2), 153-157. https://doi.org/10.1080/03323315.2018.1475149

[26] Lindsay, G. and Schwind, J. (2016). Narrative inquiry. Canadian Journal of Nursing Research, 48(1), 14-20. https://doi.org/10.1177/0844562116652230

[27] Norton, B. and Early, M. (2011). Researcher identity, narrative inquiry, and language teaching research. Tesol Quarterly, 45(3), 415-439. https://doi.org/10.5054/tq.2011.261161

[28] Craig, C., You, J., & Oh, S. (2012). Why school-based narrative inquiry in physical education research? an international perspective. Asia Pacific Journal of Education, 32(3), 271-284. https://doi.org/10.1080/02188791.2012.711295

[29] Febriana, M., Yusuf, M, dan Subagya. (2023). I Don't Know the Words: Teacher Narratives on Student Challenges in Creative Writing (Evidence from Bone, South Sulawesi). *Mahakarya: Jurnal Mahasiswa Ilmu Budaya*, *4*(2), 29-36. https://doi.org/10.22515/msjcs.v4i2.8089

[30] Dhuli, R., Lamo, P., & Larsari, V. (2023). An analysis of the significance of vocabulary in fostering esl/efl students' writing skills: an empirical study. International Journal of Contemporary Studies in Education (Ij-Cse), 2(1). https://doi.org/10.56855/ijcse.v2i1.252

[31] Wang, Z. (2023). The relationship between chinese efl learners' foreign language writing enjoyment and writing vocabulary strategy. Theory and Practice in Language Studies, 13(8), 1969-1975. https://doi.org/10.17507/tpls.1308.12

[32] Amalia, H., Abdullah, F., & Fatimah, A. (2021). Teaching writing to junior high school students: a focus on challenges and solutions. Journal of Language and Linguistic Studies, 17(2), 794-810. https://doi.org/10.17263/jlls.904066

[33] Maskor, Z. and Baharudin, H. (2016). Receptive vocabulary knowledge or productive vocabulary knowledge in writing skill, which one important?. International Journal of Academic Research in Business and Social Sciences, 6(11). https://doi.org/10.6007/ijarbss/v6-i11/2395

[34] Cui, L. (2016). Effect of schema based instructions on senior high school students' vocabulary learning strategies. International Journal for Innovation Education and Research, 4(5), 125-129. https://doi.org/10.31686/ijier.vol4.iss5.544

[35] Indriani, S. (2023). Interactive vocabulary learning through vcr (vocabulary in contexts and repetitions) strategy. Prosiding Konferensi Nasional Pengabdian Kepada Masyarakat Dan Corporate Social Responsibility (Pkm-Csr), 6, 1-5. https://doi.org/10.37695/pkmcsr.v6i0.2038.

Internalization of Moderation Values for Strengthen Literacy in Indonesian Language Learning at MAN 5 Sleman

Mimi Alpian

MAN 5 Sleman
mimialpian@gmail.com

Abstract. Draft implementation internalisation values moderation religious in Indonesian language learning is not The same with eye PAI and KWN lessons . Form concrete internalisation the more is adaptable fill material form variety texts and techniques learning used in Indonesian for strengthen literacy student . For example , when the teacher presents material about literature, in the form of rhymes, poetry , prose or novel quotes then selected material will customized with planting or internalisation mark moderation the Because neither do literary works few are pregnant religious moral messages , as well as work other literature . Besides that 's technique learning carried out customized with strengthening mark moderation through utilization *artificial intelligence* . This study aim For describe internalisation values moderation For strengthen literacy in learning Indonesian at MAN 5 Sleman. Method used is descriptive qualitative . Subject in study This is student class XA consisting of 30 students . Data collection was carried out with technique interviews and observations . Data obtained furthermore described in a way qualitative and the validity of the data was tested with technique triangulation . Research result show If MAN 5 Sleman students understand and put it into practice in a way Good values moderation internalized religion in learning Indonesian language and literature. Study This expected Can become studies beginning development teaching materials and methods effective learning in implementation values moderation in the eyes lesson Language Indonesia as one of the characteristic main learning at madrasas and the Ministry of Religion general .

Keywords : Internalization , moderation , literacy , learning Indonesian , MAN 5 Sleman

1. Introduction

Implementation education about moderation religion is required in give birth to generation moderate own Enough Lots obstacles in the field , in particular for eye teachers lessons outside PPKN and religious education in the madrasa environment , one of them is an Indonesian language teacher . Problems found the become something proper thing pay attention and look for it solution together remember implementation learning in the world of education moment This own a number of problem consequence covid-19 virus pandemic . In fact , become something normal thing when appear The term learning lost in the world of education after pandemic Because No only side competence academic different students , but also their morals (mental attitude).

Intensity stare face and internalization mark in a way explicit and implicit through previous concepts and examples constrained Because participant educate No Can interact or stare advance in a

way direct with the teacher, when This start Can done . Condition like moment this is what happened something problem heavy ones are not controlled . Following a number of related problems found with mark moderation that develops in participants educate especially in the MAN 5 Sleman environment and even in other madrasas , namely : (1) participants educate own attitude sympathy and empathy tend decrease . Proved with lack of attention to fellow like when There is sick friend or need help even do ; (2) Deep implementation learning online , participants educate tend show attitude not enough No controlled especially in use polite language during interact with teachers and friends (language used tend rude and emotional); (3) At the time learning Still There is participant mocking prodigy or problematic opinions expressed by participants educate others when learning held with method discussion ; (4) participants educate show different attitude or lack of response sympathy when reprimanded with use quite a language hard like warning continuously especially when the teacher conveys it error participant educate in a way straight away , and (5) still lack of understanding participant educate about draft moderation and practice in the field ; (6) not yet implementation activity Adiwiyata based local wisdom in the MAN 5 Sleman environment .

Based on problems that have been displayed the needed A possible solution made alternative solution problem the kind found in tiers school intermediate on . Therefore that , writer inspired For do study with title Internalization " *Internalization Moderation Values Religious Integrated Adiwiyata in Indonesian Language Subjects at MAN 5 Sleman"* .

2. Method

Study This use combination between Qualitative and quantitative **.** Approach qualitative used For describe the data in detail deep according to the variables used . Whereas approach quantitative used For disclose to what extent level moderation religion and the implementation of the Adiwiyata Madrasah at MAN 5 Sleman. Study This involving 2 experts , 6 teachers and 30 students as respondents . Data collection techniques use technique documentation , interviews , tests and questionnaires . Test instruments and questionnaires validated by 2 experts . Validation results expert analyzed using Gregory validity (*validity content) and reliability using Cronbach's Alpha* . The results of data collection were analyzed use analysis correlation use SPSS program assistance . Questionnaire results moderation and adiwiyata are converted in accordance Table following.

Table 1 . Quantitative Data Conversion to Qualitative Questionnaire Results Moderation and Adiwiyata

General Intervals	Score Intervals	Category
$X > X_i + 1.8$ Sbi	$X > 4.2$	Very good
$X_i + 0.6$ SBi $< X \leq X_i + 1.8$ Sbi	$3.4 < X \leq 4.2$	Good
$X_i - 0.6$ SBi $< X \leq X_i + 0.6$ Sbi	$2.6 < X \leq 3.4$	Enough
$X_i - 1.8$ SBi $< X \leq X_i - 0.6$ Sbi	$1.8 < X \leq 2.6$	Not good
$X \leq X_i - 1.8$ Sbi	$X \leq 1.8$	No Good

3. Discussion

Need remembered return that Language is one of the internal media convey various order , start from moral, social , religious messages and so on must Can used as a medium for disseminate values life including mark moderation . If both walk harmonious and balanced , then participant educate will more easy For directed , no easy deluded by the news lie , and act crime which is threatening through various applications in the world of deep society the practice use Language .

Besides that , language according to Pateda (1987:4) language interpreted as A the means used For convey feelings , thoughts , and what is known to other people. In matter this , language will become a

suggestion that would used in socialize mark moderation , complete with wisdom that becomes characteristic A institution . If draft Language the linked with eye lesson obligatory in madrasas , then eye lesson Language in the practice will play a big role in support implementation moderation religion and propagation mark the culture that is becoming wisdom local as well as an icon applied in madrasas.

Indonesian as Language unity must understood in a way intact by generation successor nation to remain develop and become riches nation and state. Results a study show If understanding to position and function can speak Indonesian become base in grow nationalism race young and students . This matter become instruction about function important from the Indonesian language . Moreover in context grow understanding about religious moderation to participant educate . Arifin (2008:12) explains a number of function Indonesian , among others namely : (1) as symbol pride nation ; (2) as symbol identity national ; (3) as Language introduction in the world of education , and (4) as tool development culture , science knowledge , and technology . If generation successor has merges with language , then That means participant educate has merges with his people . Therefore that is , internalization mark moderation will be very effective if entered in eye lesson Indonesian . That matter No means in in practice , eyes lesson Indonesian will taught material or the concept of religion, creed , and or the like . However , material about moderation the will insert with adjustment material essential nature must in learning Indonesian . That matter in line with opinion expressed by Helmanita , K. (2013) if that characteristic language is very dynamic and tends experience change .

a.   Internalisation **Draft Moderation in Indonesian Language Learning**

Move on from draft moderation presented by Qoyyim (2021) where explained If moderation in realm public compound is something an inevitability that is not Can avoided Because man own varying knowledge and experience . The more Good participant educate understand and apply draft moderation in life everyday , more and more good life too nation to front . Besides That draft originating moderation from KBBI shows If moderation as attitude No excessive in carry out religious teachings will be very useful If applied to the environment compound like Indonesia. On the basis of the author make moderation as One part mark important thing to do become product superior that can be disseminated massively to participant educate in environment education

Azizi and Anam (2021) explain If moderation is moral values must enforced . Moderation is very important for formation personality a Muslims , as well image public adherent Islam.

Oath young man who is formulation from all the young people of Indonesia are united in One meeting on October 28 , 1928 became beginning he admitted Indonesian as Language unity . In the paragraph third with clear be included the sentence " *uphold Language unity Indonesian* " . Sentence at a time pledge the become a spirit and strength in conserve Indonesian with full not quite enough answer based on duties and responsibilities each answered .

Indonesian as Language unity must understood in a way intact by generation successor nation to remain develop and become riches nation and state. Results a study show If understanding to position and function can speak Indonesian become base in grow nationalism race young and students . This matter become instruction about function important from the Indonesian language . Moreover in context grow understanding about religious moderation to participant based education wisdom local .

Draft moderation according to meaning literally originate from Language English , namely " *moderation* " which means attitude currently . Attitude No excessive . Besides that , the word moderation is also taken from draft Latin , namely " moderatio " which means No advantages and no deficiency (medium). Furthermore, in the KBBI, the word moderation own meaning avoid violence or extreme and is a loan word from the word " moderate " which means attitude avoid behavior extreme

and inclined go through road middle (Big Indonesian Dictionary (https://www.iainpare.ac.id/moderasi-beragama-dengan-perekat/).

Meaning literally that becomes basically determining the word moderation as part from Indonesian is basically also born from the concept of " Wasathiyah al- Islam " which has same meaning with the word moderation (in Indonesian). Term wasathiyah That Alone sourced from the Koran and is very much needed in form personality . Therefore that , the drafting team the book " Moderation Religion " according to Aziz and Anam (2021) stated If there is nine base moderation is a must owned , namely : (1) Behave in the middle (tawassuth) or No fanatical excessive ; (2) Maintain balance attitude or perpendicular (I'tidal); (3) Always tolerant to fellow (tasamuh); (4) Attitude to problem social / deliberation (shura); (5) Attitude towards reform (islah); (6) Have attitude pioneering (qudwah); (7) Behavior Love homeland (muwathanah); (8) Participation in business together to anti- violence attitude (launf), and (9) Attitude friendly to culture (I'tibar al- 'urf).

Achieved objective planting values moderation in the world of education must accompanied with step concrete actions carried out by all party . Writer as part from executor education own role For embed values moderation the at a time actualize it so that more easy understood and imitated by participants educate . In matter this , the teacher has the same role without see type eye lessons taught Because draft moderation is part from practice Pancasila values in life nation and state . Gunawan, Ihsan, and Jaya explained If internalisation mark own is a planting process at a time habituation values normative in the world of education so that it produces appropriate generation with guidance Islam , that is moral Muslim glorious . Through internalisation values moderation in learning Indonesian will materialized guarding generation unity and oneness as well as love of culture .

In learning Indonesian in the field what we can be certain of is draft implementation internalisation values moderation religious No The same with eye PAI and PKN lessons . Form concrete internalisation the more is adaptable fill material form variety text used in Indonesian . For example when the teacher presents material about literature, in the form of rhymes, poetry , prose or novel quotes then selected material will customized with planting or internalisation mark moderation the Because neither do literary works few are pregnant religious moral messages , as well as other literary works. Type nature text descriptive in fact it will too more easy For customized with values moderation , for example with describe or describe condition social economics on the environment public certain and others like that. Internalization process This naturally only Can accomplished when the teacher's eyes the lesson concerned active seek and find appropriate materials with characteristics and values moderation.

b. Internalisation **Draft Adiwiyata in Indonesian Language Learning**

One of role education based local wisdom is strengthen teaching materials in nature mandatory in class (Nadlir:2016). Besides that , explained if one possible way taken by the school for its existence local wisdom remains awake that is with integrate values wisdom culture local in the learning process , extra curricular or activity studentship other . One of form wisdom local that becomes criteria government is Adiwiyata based local wisdom .

In matter This is MAN 5 Sleman as one of the madrasas that has it position at Tempel Jalan Magelang become a madrasa already obtain charter as madrassa adiwiyata national . Award the raij through Work the teachers are strict conditioning madrasa environment with utilise various existing local opportunities . A number of among them namely , processing organic and non-organic waste , utilization remaining ablution water, utilization land and the like . That matter become indication If man 5 Sleman already literate environment . Roth explained If someone who is literate to environment will make business For guard balance environment become something things that must be done lifetime life (in Kapoor & Mirza: 2015)

Tompodung (2011) conveys that school adiwiyata is cultured school environment . Beside that , Despandi (2015) convey that school adiwiyata is a program with a purpose For create good condition for inhabitant school in frame push rescue environment and development sustainable For realize which school caring and cultured environment based on norms of togetherness , openness , honesty , justice and sustainability environment life and source Power nature.

c.   Correlation between Moderation and Literacy Values in Indonesian Language Learning

To know effectiveness from internalization mark moderation and adiwiyata da;am learning Indonesian language data obtained as following .

Table 2. Table Correlation

Correlations

		Moderation Religious	Adiwiyata Madrasah
Moderation Religious	Pearson Correlation	1	,733 **
	Sig. (2-tailed)		,000
	N	60	60
Adiwiyata Madrasah	Pearson Correlation	,733 **	1
	Sig. (2-tailed)	,000	
	N	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

Table above is results analysis from the research instruments developed based on theory obtained from various reference . In the beginning , writers look for indicator of each variable later research developed be an instrument or questionnaire study . After that , the questionnaire that has been arranged consulted to expert Then then used For collect data with object student class X MAN 5 Sleman. The data has been obtained Then analyzed use SPSS application .

Based on results analysis shown in the table above , obtained information If there is significant correlation between understanding moderation religious with application culture adiwiyata at MAN 5 Sleman with value 0.733 (level significance 0.5 %). These results obtained of 60 respondents students and 6 teachers involved moment data collection . The following is the complete statistical data .

Table 3. Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
Moderation Religious	60	42.00	71.00	3569.00	59.4833	6.56000	43,034
Adiwiyata Madrasah	60	18.00	36.00	1750.00	29.1667	4.29886	18,480
Valid N (listwise)	60						

Table above show If mark maximum is 71.00 and value at least is 42nd with a mean of 59.4833. This show If understanding and application mark moderation and adiwiyata at MAN 5 Sleman have walk with Good . As well as learning Language Indonesia.

4. Conclusion

Based on results analysis of the data obtained can concluded If internalisation mark moderation integrated adiwiyata have significant correlation . That matter means If the more wake up understanding student to mark moderation , then will It also has a good impact attitude to application adiwiyata which became an icon based local wisdom developed at MAN 5 Sleman. Proven with results analysis the data shows the figure above , 0.5% , namely 0.733. In implementation in the field is needed good cooperation between all party in implement Madrasa superiority . This is very necessary for the madrasa's goals and vision the mission Can achieved with maximum .

Bibliography

[1] Arifin dkk. (2010). Cermat Berbahasa Indonesia. Jakarta: AKIPRESS.
[2] Arifin, Zaenal. (2009). Evaluasi Pembelajaran. Bandung : Remaja Rosdakarya Offset.
[3] Azis, abdul dan Anam, Khoirul A. 2021. *Moderasi Beragama Berlandaskan Nilai-Nilai Islam*. Jakarta: Direktorat Jenderal Pendidikan Islam kementerian Agama RI.
[4] Desfandi, M. (2015). Mewujudkan masyarakat berkarakter peduli lingkungan melalui program adiwiyata. *SOSIO-DIDAKTIKA: Social Science Education Journal*, *2*(1), 31-37.
[5] Gunawan, H., Ihsan, M. N., & Jaya, E. S. (2021). Internalisasi Nilai-nilai Moderasi Beragama dalam Pembelajaran PAI di SMA Al-Biruni Cerdas Mulia Kota Bandung. *Atthulab: Islamic Religion Teaching and Learning Journal*, *6*(1), 14-25.
[6] Helmanita, K. (2013). Analisis sosiolinguistik perubahan bahasa pada masa pra-pasca pubertas.
[7] Kapoor, V., & Mirza, A. (2015). An enhanced LSB based video steganographic system for secure and efficient data transmission. *International Journal of Computer Applications*, *121*(10).
[8] M. Qoyyim dkk. (2021). Moderasi Beragama di Indonesia (kebangsaan, Kebudayaan, dan Keislaman) Jilid 5. Jakarta: Noorhanilaksmi wordpress.
[9] Nadlir, N. (2016). Urgensi pembelajaran berbasis kearifan lokal. *Jurnal Pendidikan Agama Islam (Journal of Islamic Education Studies)*, *2*(2), 299-330.
[10] Pateda, Mansoer. 1987. *Sosiolinguistik*. Bandung: Angkasa.
[11] Tompodung, T. C. G. (2011). *Efektivitas Program Adiwiyata Terhadap Perilaku Ramah Lingkungan di Kota Depok* (Doctoral dissertation, Bogor Agricultural University (IPB)).

An Analysis of Lecturers' Questioning Strategies in the Advanced Language Skills Classroom

Muhammad Farhan¹, Silvi Rahmadani Azis², Sukarno³ and Ricky Sriyanda⁴

1,3 Department of English Language Education, Faculty of Languages, Arts, and Culture
Universitas Negeri Yogyakarta, Indonesia
2 Department of English Language Education, Faculty of Education and Teacher Training, Ar-Raniry State Islamic University, Banda Aceh, Indonesia

muhammadfarhan.2022@student.uny.ac.id; sukarno@uny.ac.id; silvirahmadani8@gmail.com; rickysriyanda.2022@student.uny.ac.id

Abstract. The primary goal of this research is to investigate the questioning strategies used by instructors in an advanced language skill classroom and determine the rationale for using questioning strategies in English lectures. This study employs the interview method, emphasizing English lecturers from the English Department at Ar-Raniry State Islamic University. The sample includes four (four) lecturers who teach the Advanced Language Skill Class. The data is collected through an interview process and analyzed using a qualitative method. According to the findings, the lecturers used three different questioning strategies throughout the instructional and educational process, as described by Richard and Lockhart (1994). The lecturers used various questioning techniques, such as procedural, convergent, and divergent questions, throughout the teaching and learning process. The lectures argued that using these questioning strategies in teaching-learning can increase student's cognitive engagement, fostering more profound levels of critical thinking and attention to the subject matter under discussion.

Keywords: Lecturers questioning strategies, questioning strategies, advanced language skill classroom

1. Introduction

English is an essential global language, spoken in many countries and taught as the primary foreign language in Indonesian schools. Teachers are pivotal in teaching and learning, serving as directors, controllers, or facilitators. One of the most effective teaching techniques is questioning, which engages students and encourages them to respond to grammatical norms. This approach has been successfully employed with non-native English speakers of all ages and proficiency levels. Questioning is a vital skill for teachers, as it promotes active thinking, enhances analytical and creative abilities, and contributes to a successful learning experience (Filiz, 2009). The significance of questioning is underscored by physicist Einstein, who emphasized the importance of continuous inquiry (Sternheimer, 2014). In today's competitive environment, entrepreneurs in Silicon Valley assert that "questions are the new answers," highlighting the critical role of questioning in education.

Teachers play a crucial role in fostering a positive classroom atmosphere through effective questioning. However, some teachers might refrain from questioning due to time constraints, lack of content knowledge, indifference towards students, or laziness. Brown (2001) suggests that questioning strategies are among the best methods for maintaining student engagement. Questions not only describe tasks but also present challenges and issues. It is common in classrooms for students to need help with

answering questions, which can occur due to hesitation or lack of knowledge (Tan, 2007). In English classrooms, this often happens not because students need information but because they have difficulty articulating their responses in English, indicating a lack of necessary language competence. According to Al-Zahrani and Al-Bargi (2017), questioning strategies are crucial for developing critical, creative, and higher-level thinking skills, leading to positive educational outcomes. However, not all students grasp these strategies well due to language barriers. Therefore, this study examines the questioning strategies employed by lecturers in Advanced Language Skills courses to understand their effectiveness better.

3. Research Methodology

3.1 Research Design

Research design encompasses the specific methods involved in the research process, including data collection, data analysis, and report writing (Creswell, 2014). This descriptive-qualitative study uses a person-centered approach to examine the questioning strategies employed by lecturers in Advanced Language Skills classes. The research design prioritizes interpreting, describing, and developing theories about phenomena or settings, emphasizing words, language, and experiences over measurements, statistics, and numerical data.

3.2 Participants

The study focuses on English lecturers teaching Advanced Language Skills at Ar-Raniry Islamic State University in Banda Aceh in 2023. Participants include four lecturers, P1, P2, P3, and P4, selected using purposive sampling from six classes. These classes were chosen due to the lecturers' understanding of questioning techniques, though there is room for improvement in their strategies.

3.3 Instruments

Data was collected through in-depth interviews with lecturers to capture their perceptions of specific types of questions. The interview questions were based on Wajnryb's Theory of Teacher's Questions (1992, as cited in Kamile et al., 2012). The study sought to understand the impact of teacher questions on student learning, as discussed in the EFL Journal of Education and Instructional Studies.

4. Findings

4.1 The Kind of Lecturers' Questioning Strategies Used in Advanced Language Skill Classroom

Interviews with English lecturers in the English Education Department revealed their questioning methods in the Advanced Language Skills course. Three types of questions were identified: procedural, convergent, and divergent, providing insights into their teaching practices.

a) Procedural Questions

Lecturers use procedural questions to manage classroom activities. These questions are typically asked at the beginning of class to check on students' conditions and attendance.

Table 1. Procedural Questions at Advanced Language Skill Classroom

Procedural Questions		Class	Meeting	Total
How are you today?	Do you bring dictionary?	Unit 1 – 6	1	12
Do you have any questions?	Anyone bring notes?			
Any dictionary in your phone?	Any other answer?			
What did we talk about las week?	How was your weekend?			
Today's weather is great isn't it?	Do you have a pen?			
Do you bring the material?	Anyone to be a volunteer?			

Lecturers use procedural questions to manage classroom activities effectively. At the start of class, these questions help understand students' conditions and check attendance. Midway through the lesson,

they are used to refocus students and ensure they comprehend the material. At the end of the class, procedural questions help confirm that students have understood the lesson and encourage them to retain the information, especially if no further questions are raised.

b) Convergent Questions

Convergent questions are posed during the middle of the class and focus on the material being taught without requiring higher-order thinking skills. These questions can be answered with a simple yes or no. During interviews, lecturers mentioned using convergent questions to initiate discussions about tasks and provide examples for students.

Table 2. Convergent Questions at Advanced Language Skill Classroom

Convergent Questions		Class	Meeting	Total
Why is speaking important	What do you prepare?	Unit 1 – 3	1	11
Whom is speaking with?	How to make notes?			
Do you think practice is important	Do you use ice breaking?			
Can we read text while speaking	What is receiver means?			
What is structure of speaking	What is sender means?			
How you know a good topic could be?				

The data shows lecturers use convergent questions to prompt students to provide concise, grounded responses to the subject matter. These straightforward questions are designed to cultivate passion and engagement, avoiding higher-order cognitive processes and requiring little difficulty in formulating responses.

c) Divergent Questions

The data demonstrates that lecturers also employ convergent questions designed to elicit specific, concise responses related to the subject matter. These questions typically require straightforward answers based on factual information or the content presented. For instance, questions like "Why is the story that your friend talked about?" and "What information do you get from your friend's story?" are intended to prompt students to recall and summarize the material discussed.

In summary, while divergent questions are essential for promoting deeper analysis and critical thinking, convergent questions play a crucial role in reinforcing students' understanding of the material and encouraging active participation in the classroom. Both types of questions are valuable tools for lecturers in the Advanced Language Skill Classroom, enhancing different aspects of the learning experience.

4.2 Lecturers' Reason for Using Questioning Strategies in Advanced Language Skill Classroom
The researcher conducted interviews with lecturers to gather information about their questioning strategies, arguments, and perspectives.

a) *The Reasons of Lecturers Used Procedural Question*
  1. For asking students condition and warming up conversation
     Lecturers in Advanced Language Skills classrooms use procedural questions to gauge students' understanding and ease into conversations. This practice, highlighted in an interview with a teacher, involves incorporating such questions into early discussions. According to P1: "From my experience, the class routine included regularly incorporating procedural questions into the early discussions. I wanted to know how my classmates were doing when they arrived at school." Procedural questions often include basic inquiries at the beginning of class.

Since students may have only a short break between classes, questions like "What about the earlier class?" are beneficial as they encourage students to share their recent experiences. Other lecturers agree that these questions help build rapport between lecturers and students, fostering closer relationships through small talk. Consequently, procedural questions are crucial in the Advanced Language Skills classroom as they create a comfortable learning environment, stimulate engagement, build relationships, and ensure students are ready for the lesson.

2. To Avoid Student Drowsiness

According to the interview, some instructors think that asking procedural questions can keep students from falling asleep. The lecturers use these questions to gauge students' engagement with the learning process. Furthermore, the lecturers believe that drowsiness can occur at any time, whether studying or working and is often accompanied by difficulty focusing and managing emotions. One common cause of drowsiness is a lack of sleep, which impairs emotional regulation and concentration. To combat this, the lecturers sometimes use procedural questions to help students regain focus and alleviate their drowsiness during the lesson.

3. For Engaging Students to Stay Active.

Based on the interviews, procedural questioning is used by lecturers to engage students in classroom activities, as they tend to adopt a passive attitude when lectures lack a dynamic atmosphere. This approach ensures students remain active and engaged in the teaching-learning process. Understanding students' learning styles is crucial for effective learning management. By encouraging discussion, questioning, and voice of ideas, procedural questions help students become less passive in the classroom.

Procedural questioning is an effective tool for keeping students active and engaged in learning. By understanding and accommodating various learning styles, lecturers can create a dynamic and inclusive classroom environment that promotes active participation, critical thinking, and a deeper understanding of the material. This approach mitigates passivity and empowers students to take an active role in their education.

b) *The Reasons of Lecturers Used Convergent Question*

1. Paying more Students Attention Towards the Subject.

Convergent questions are used in teaching Advanced Language Skills to capture students' attention and ensure focus on the learning topic. These questions help minimize distractions, assess understanding, and enhance engagement. For example, when teaching speaking skills, convergent questions can ask students the meanings of new vocabulary, enhancing their critical thinking abilities. They also help assess students' understanding, allowing lecturers to adjust their methods and learning pace according to their abilities and needs. Convergent questions also help develop critical thinking skills, enabling students to recognize compelling arguments, analyze evidence, and reach logical conclusions. This approach not only keeps students focused but also enhances their learning experience.

2. Giving the Highlight of the Upcoming Lesson

Based on the interview results, the lecturers agree to use convergent questions to inform students about upcoming lessons and provide a synopsis of the week's topic. It helps assess students' preparation and facilitates comprehension. Additionally, convergent questions engage students with hints for future lessons, encouraging them to locate resources and prepare for the content. This approach enhances the overall learning experience by promoting advanced preparation and critical thinking, ensuring students stay focused and actively engage with the material.

3. Checking Students Understanding

According to the interview, lecturers evaluate students' comprehension, encourage critical thought, and make it easier to notice interpersonal communication patterns using convergent questions. The lecturers also assess vocabulary development and help students interpret logic that requires deep thought. These questions are particularly suitable for university students who can handle complex language and concepts. Convergent questions encourage students to integrate ideas and data from various academic fields, synthesize components, and draw logical conclusions. They work especially well for students who understand sophisticated vocabulary and ideas, making them an effective tool in higher education.

c) *The Reasons of Lecturers Used Divergent Question*

1. Enhancing Students' Comprehension and Proficiency

The interview with lecturers emphasizes the value of various questioning techniques in teaching and learning. These techniques allow students to explore multiple routes and generate various solutions, fostering a culture of collaboration and equipping them with skills for teamwork in college or professional environments. Divergent questioning is also used to assess students' comprehension and critical thinking abilities and improve engagement and attentiveness during the learning process.

Critical thinking is crucial for good decision-making, and the use of divergent questions can help students develop their capacity to generate innovative ideas through exploring multiple potential solutions. Brainstorming and mind mapping are valuable techniques for helping students think more deeply about a subject. The lecturer (P4) assigns challenging assignments and practical problem-solving activities to student groups through group projects as a teaching strategy. This approach allows for more flexibility in instruction and can be beneficial when there is a limited pool of project themes to allocate among students. Additionally, group assignments can reduce the number of final deliverables required by instructors.

Participating in collaborative endeavors is highly beneficial and recognized as a valuable skill for professional settings. Students learn about various cognitive processes and approaches to idea generation through collaborative work. These experiences are critical to their future success in college and professional settings. Students learn to appreciate different points of view, improve their problem-solving abilities, and develop the ability to work effectively in groups through collaboration, all of which are essential skills in today's interconnected world.

5. Discussions

Questioning is a crucial instructional strategy that enables teachers to evaluate students' knowledge and comprehension while fostering engagement and discussion. In advanced language classes, lecturers employ three types of questioning strategies: convergent, divergent, and procedural questions. Convergent questions focus on the subject matter, promoting deeper reflection and the development of higher-order thinking skills by requiring students to draw on prior knowledge, experiences, or new information. On the other hand, divergent questions encourage students to think broadly and explore various scenarios, disciplines, and ideas, leading to a broader perspective and greater understanding. These questions demand creative and critical thinking to identify multiple potential solutions. They are most effective in subjects without clear-cut definitions, allowing for diverse viewpoints without a correct answer. English lecturers use procedural questions to help students respond correctly based on their procedural knowledge. While about half of the students find these questions straightforward, the other half struggle because they require deeper thinking and more time for reflection. Questioning

strategies are vital in educational settings for several reasons. They spark and sustain students' interest, promote critical thinking and focus, assess comprehension, and encourage active participation during lessons. To encourage active engagement, lecturers often ask questions to evaluate students' understanding of the material covered in previous lessons or weeks.

The findings of Sujariati et al. (2016) underscore the strategic use of questioning in the EFL classroom to balance between eliciting specific information and encouraging broader analytical thinking. By employing a mix of convergent and divergent questions, teachers can cater to diverse learning needs and promote a more dynamic and interactive learning environment. Furthermore, questioning strategies are widely used in English language instruction to assess students' comprehension, engagement, and cognitive abilities. These strategies are based on the theoretical basis of Lestari et al.'s (2022) study, which suggests that questioning can encourage active participation, critical thinking, vocabulary acquisition, and enthusiasm for language study. The study found that lecturers mostly used two questioning strategies, adapting to new situations to teach each learner effectively. In the same line as Dös et al. (2016), this study analyzed the questioning strategies of 170 primary school teachers in Gaziantep Province, Turkey, during the 2014-2015 academic year. The findings revealed that teachers often used divergent questions to draw attention, misunderstandings about divergent and convergent questions, and often asked questions to the entire class rather than individual students. The study suggests that asking good questions should be more critical in pre-service education, and teachers should receive in-service training to improve their questioning skills.

In conclusion, questioning is vital in teaching and learning, particularly language teaching. Educators can use questioning strategies to enhance student engagement, foster critical thinking, and promote active learning. This approach keeps students attentive and involved and encourages a deeper understanding of the material. By incorporating various questions and understanding students' learning styles, educators can create a dynamic and interactive classroom environment that mitigates passivity and empowers students to participate actively in their education.

6. Conclusion

The research found that English lecturers in Advanced Language Skill classrooms use convergent and divergent questions, rather than procedural questions, to assess students' understanding and encourage broad thinking. Convergent questions are used to check assignment clarity, while divergent questions encourage higher-order thinking skills. These strategies are used to prepare university students for the world of work. The use of questioning strategies is attributed to checking students' understanding, arousing interest, focusing attention, and controlling the classroom.

References

[1] Al-Zahrani, M. Y., & Al-Bargi, A. (2017). The impact of teacher questioning on creating interaction in EFL: A discourse analysis. *English Language Teaching*, *10*(6), 135-150.

[2] Brown, H. D. (2001). *Teaching by principles: An interactive approach to language pedagogy*. New-York: Longman.

[3] Creswell, J.W. (2014). Research design*: Qualitative, quantitative, and mixed methods approaches*. London. Sage Publication, Inc.

[4] Dös, B., Bay, E., Aslansoy, C., Tiryaki, B., Çetin, N., & Duman, C. (2016). An analysis of teachers' questioning strategies. *Educational research and reviews*, *11*(22), 2065-2078.

[5] Filiz, S. (2009). Question and answer method to ask questions and technical information on the effects of teacher education. *Social Sciences Journal of Caucasus University*, *2*.

[6] Lestari, A. S., Yasim, S., & Imansari, N. (2022). An Analysis of Teacher's Questioning Strategies in Classroom Interaction. *English Language, Linguistics, and Culture International Journal*, *2*(1), 1-13.

[7] Tan, Z. (2007). Questioning in Chinese University EL classroom: What lies beyond it?. RELC Journal, *38*(1), 87-103.

[8] Sternheimer, D. (2014). "The important thing is not to stop questioning", including the symmetries on which is based the Standard Model. In *Geometric Methods in Physics: XXXII Workshop, Białowieża, Poland, June 30-July 6, 2013* (pp. 7-37). Switzerland: Springer International Publishing.

[9] Sujariati, S., Rahman, A. Q., & Mahmud, M. (2016). English teacher's questioning strategies in EFL classroom at SMAN 1 Bontomarannu. *ELT Worldwide*, *3*(1), 107-121.

Portrait of the Development of Literacy Culture Movement in Baubau, Southeast Sulawesi

Nety[1], Wiyatmi[2], Sri Harti Widyastuti[3]

[1,2,3] Universitas Negeri Yogyakarta
[1] nety.2023@student.uny.ac.id
[2] wiyatmi@uny.ac.id
[3] sri harti widyastuti@uny.ac.id
[1,2,3] Universitas Negeri Yogyakarta

Abstract. The rapid flow of information and technology in the education 4.0 era has had an impact on the development of various efforts and strategies to improve literacy culture in Indonesia such as reading literacy. This article aims to photograph the movement of literacy culture of reading. This research uses a case study design involving local government, literacy activists, both individuals and groups. The data in this research is taken through observation, interviews and document review. The results of the research show that local government has launched several routine activities in order to improve literacy culture, including through *Tula-Tula* Action or storytelling activities to students. Similar activities are also carried out by Resort Police Department through the distribution of books for students. Collaboration between Reading Community and campus through a campus teaching program in a literacy festival for elementary school students. Mayor's policy to civil servants in their official trip to buy books and donate them to libraries, then GLB will overseeing its human resources through the development of more creative, innovative and fun literacy methods. Local government has built a digital library that can be used by the students and local commmunity in obtaining reference srelated to their scientific field easily and free. Through various literacy movement programs initiated by the local government in collaboration with existing literacy communities will foster literacy culture, especialy reading interest for students and local community.
Keywords; Literacy, movement, reading, writing.

1. Introduction

Reading is recognized as one of the main skills in language ability that is acquired by people through education and that develops over time. Reading skills include reading literacy that is important in the context of self-improvement, personal branding, professional development, schooling, and national development (Rintaningrum, 2019). Indonesia is a country that still has a low level of reading literacy. According to the results of PISA 2022, Indonesia is ranked 10th lowest or 70th from 80 countries in terms of reading literacy levels. Of course, this is very unfortunate, considering that reading literacy is a basic ability that a person must have in developing their abilities. Moreover, in terms of infrastructure assessment, Indonesia is actually ranked higher than European countries (Tantri & Dewantara, 2017).

Problems related to students' reading literacy skills have been long become a concern for the government. Reading literacy as a real effort to increase knowledge and scientific insight is also seen as the key to a person's success in pursuing their gool. The Ministry of Education and Culture itself has developed an idea called the School Literacy Movement (GLS) with the aim that schools can become a

place for learning organizations (Vinet & Zhedanov, 2011). This movement targets not only students but all parties within school institutions. Even parents, guardians and the community are involved in this program. Literacy activities in schools are a concrete manifestation of government efforts in addition to changing the school curriculum (Faradina, 2017). One of the programs of this movement is the implementation of "15 minutes activity of reading non-study books before study time starts". This program is intended to foster interest in reading and improve students' reading skills so that knowledge can be mastered better. The reading material from this program contains moral values, such as local wisdom, both national and global according to the student's educational level. (Prasrihamni, Zulela, Edwita, 2022).

The government's concern continues by introducing the reading culture movement starting from an early age. Currently, in almost every region we find libraries, both local and digital libraries. In fact, there are many reading parks aimed to all ages that provide access to learning, especially reading activities. The rapid of literacy movement is currently not only carried out in areas that have a low reading literacy index, but also in areas where the average reading index is already in the good category, such as in Southeast Sulawesi, especially in Baubau.

Based on the National Library index, the literacy level achievement in Southeast Sulawesi (Sultra) in 2022 was 65.23 percent or in the good category. This shows that the level of awareness and interest in reading among the people of Southeast Sulawesi in seeking references for developing knowledge continues to increase year to year. One of the areas that has experienced an increase in the literacy cultural dimension indicator is the Baubau 59.82 percent and it is in the very good category. This achievement exceeds the national indicator 54.29 percent. This achievement cannot be separated from the efforts and contributions carried out by both local government and the movement of literacy communities to develop literacy culture in Baubau. This research aims to photograph the development of the literacy culture movement, especially in reading literacy, Baubau Southeast Sulawesi.

2. Method

This research uses a qualitative approach with a case study design. This research involved local government, and literacy activists, both individuals and groups. These literacy activists are Baubau Literacy Movement (GLB) and other literacy communities. The data in this research was taken through observation, interviews and document review.

- Observation is a data collection method where the researcher makes direct observations of the research object.
- Interviews are a data collection technique to obtain information extracted from data sources directly through conversations or questions and answers (Satori and Komariah, 2013: 130). The interviews conducted by researcher were in-depth interviews.
- Documentation was carried out to support data collection that is not obtained from interviews or observations. This data can be obtained from publications, magazines, the internet, and so on regarding information related to research.

Data sources of this research were primary data and secondary data. Primary data is the data obtained directly from research subjects by using measurement tools or data collection tools directly on the subject as a source of information sought (Azwar S, 2015:91). Primary data also gained from depth interview. Meanwhile, secondary data was obtained from reading material or supporting data in the form of evidence and notes that have been compiled to complete data related to the research theme.

Data analyze technique used in this research were data reduction, data display and verification/conclusion. Data analysis process was conducted in order to gain comprehensive result.

3. Findings

Through observations, interviews and analysis of documents found by researchers, it is known that local government of Baubau has initiated several ideas and programs in order to foster literacy culture, especially reading and writing literacy. This activity is not only carried out by local Government but also in collaboration with existing literacy communities. These literacy communities are those involving into a forum called Baubau Literacy Movement (GLB). GLB is a non-profit organization formed to accommodate community activities whose mission is to develop literacy culture in Baubau. The results of this research can be described as follows;
Literacy culture activities have been carried out through the following programs;

1) Tula-Tula Action Activities. (Storytelling)
Tula-Tula Action or storytelling activity initiated by the GLB which is carried out once a week is aimed to kindergarten and elementary school students. In its implementation, local government collaborates with the existing literacy community. Although, this movement carried out once a week, however it will become a massive program to enhance reading literacy culture especially for early age students.

2) There is an annual program carried out by Resort Police Department through the distribution of books to students starting from kindergarten, elementary and middle school levels. This program is one of a series of periodic activities under the Indonesian Police.

3) Local government provides a digital library located in strategy area.

4) There is a government policy aimed to all civil servants by requiring them to buy books and donate those books to libraries in the community when going on work visits outside the region. Furthermore, GLB overseeing existing human resources through the development of more creative, innovative and fun literacy method

Tula-tula action activity conducted once a week. This activity not only tells stories but there are also several other activities such as coloring for children at kindergarten and elementary school levels. By local community, this activity is considered very positive because it can reduce the level of children's dependence on gadgets. This condition is in line with the results of research conducted by (Chalim and Anwas, 2018) which states the average students spend their time in front of internet is 2 hours every day. This condition is very concerned that they are candidates for the nation's next generation who will play a major role in determining the future fate of this nation. Through this tula-tula activity, GLB invites the public to love and enhance the interest in reading.

From the results of interviews with the Literacy Mother of Baubau, its obtained the data regarding the emphasis on the importance of storytelling as a means of building character and creativity for Indonesian children. Routine activities through tual-tula actions will open an opportunity for teachers, especially at the Early Childhood Education (PAUD) level, to introduce stories that have cultural content, both local culture and global culture. This will help teachers in producing a generation of skilled storytellers, as well as ensuring that fairy tales are not only entertainment but also a guide for the nation's future generations in knowing and loving existing cultural diversity. With storytelling activities, every child in Indonesia has wider opportunities to become a skilled storyteller, loves reading and be proud to tell stories with a sense of pride in their cultural heritage. On the other hand, this action is also a meeting point for story creators, cultural preservers and literacy enlighteners. In addition, there is a hope that in the future, fairy tales can bring children's dreams to an ideal world where books are a window to knowledge and fairy tales are a gateway to cultural wisdom. The theme of storytelling is also a mainstay program as an effort to revive literacy from an early age. Storytelling is believed to be a magical tool

that not only sharpens children's emotional intelligence but also stimulates their creativity. Apart from that, this activity is also an invitation for all parties to take part in the journey of literacy and preservation of Indonesian culture.

The minimum number of availability of books in school is also considered to be the cause of lack students' interest in reading. Therefore, routine program of distributing free books carried out by various institutions, both government and non-government institutions can foster students' interest in reading. By distributing free books continuesly will increase the collection of students' reading materials. The distribution of various kinds of reading books, as carried out by police agencies and through government policy will enrich types reading material. With a wide choice of types of reading, it will attract people's interest in reading. This is in line with (Pratiwi, 2021), sated that varied types of reading allow us to know something we never know, and it will broaden our views and open more choices of life.

What is no less important in efforts to foster reading interest of students and local communities today is providing facilities that function as a forum for developing a culture of reading literacy such as library. Currently the construction of a digital library in Baubau has entered the final stage and will be operational soon. This library will become a place where various books of knowledge from various fields of science can be used by the students and local commmunity. For students, they will be easier to obtain reference sources related to their scientific field with free. besides, reading directly from the printed book source will create analysis and critical thingking skills. Using printed book is believed better than non printed book, and give a positive impact on students' reading achievement (Dahlia, Syam, U. K., & Junaid, 2020).

An interesting thing from this library is a thematic design located in a strategic area within the educational institutions in Baubau. This is in line with today's library branding which is transforming into a library based on social inclusion. This digital library will become a source of information either to students or local community to search information related to their needs. The library building is also equipped with a tribune which can be used as a space for social interaction such as discussions and seminar.

4. Conclusion

Through various literacy movement programs initiated by the local government in collaboration with existing literacy communities included GLB and other communities through Tula-tula activity, distributing free books for students, local government policy, and providing digital library will enhance literacy culture, especialy reading interest for students and local community.

References

[1] ChalimS., & AnwasE. O. M. (2018). Peran Orangtua dan Guru dalam Membangun Internet sebagai Sumber Pembelajaran. *Jurnal Penyuluhan*, *14*(1), 33-42. https://doi.org/10.25015/penyuluhan.v14i1.19558.

[2] Dahlia, Syam, U. K., & Junaid. (2020). The Impact of Using E-book and P-book in Students' Reading Achievement. Journal of Language Testing and Assessment, Vol (No), xx-yy. doi: https://doi.org/10.22219/jpbi.vxiy.xxyy.

[3] Faradina, N. (2017). Pengaruh Program Gerakan Literasi Sekolah Terhadap Minat Baca Siswa Di Sd Islam Terpadu Muhammadiyah an-Najah Jatinom Klaten. In Jurnal Hanata Widya (Vol. 6, Issue 8, pp. 60–69). http://journal.student.uny.ac.id/ojs/ojs/index.php/fipmp/article/view/9280.

[4] Hayati Akyol, Yasemin Boyaci-Altinay. (2019). Reading Difficulty and its Remediation: A Case Study. European Journal of Educational Research. Volume 8, Issue 4, 1269 - 1286. doi: 10.12973/eu-jer.8.4.1269.

[5] https://www.rri.co.id/sulawesi-tenggara/daerah/379500/indeks-pengembangan-kebudayaan-ipk-kota-baubau-49-81-persen. Dikutip 05/05/2024.

[6] https://sultra.tribunnews.com/2024/02/16/minat-baca-masyarakat-sulawesi-tenggara-capai-6523-persen-terus-meningkat-dari-tahun-ke-tahun. Dikutip 07/05.2024.

[7] https://www.lulopedia.id/bunda-paud-baubau-hidupkan-literasi-dan-budaya-melalui-dongeng/. 09/05/2024.

[8] Paige, D. D,. & Lavell, T. M. (2014). Reading Fluency in the Middle and Secondary Grades. IEJEE (International Electronic Journal of Elementary Education, 2014, 7(1), 83-96.

[9] Prasrihamni, M., Zulela, & Edwita. (2022). Optimalisasi Penerapan PTIMALISASI Kegiatan Literasi dalam Meningkatkan Minat Baca Siswa Sekolah Dasar. Jurnal Cakrawala Pendas Vol. 8 No. 1, Januari 2022 DOI: https://doi.org/10.31949/jcp.v8i1.1922. Hal 128-134.

[10] Pratiwi, H. (2021). Upaya Meningkatkan Literasi Membaca di Masa Pandemi melaui kegiatan Seminggu Siti FITRAH. Vol.3, No.1E-I. SSN 2722-7294 I P-ISSN 2656-5536 27.

[11] Rintaningrum, R. (2019). Explaining the important contribution of reading literacy to the country's generations: Indonesian's perspectives. International Journal of Innovation, Creativity and Change. www.ijicc.net. Volume 5, Issue 3, Special Edition: Science, Applied Science, Teaching and Education

[12] Tantri, A. A. S., & Dewantara, I. P. M. (2017). Keefektifan Budaya Literasi Di Sd N 3 Banjar Jawa Untuk Meningkatkan Minat Baca. Journal of Education Research and Evaluation, 1(4), 204–209. https://ejournal.undiksha.ac.id/index.php/JERE/article/viewFile/12054/7995.

[13] Vinet, L., & Zhedanov, A. (2011). A "missing" family of classical orthogonal polynomials. In

[14] Journal of Physics A: Mathematical and Theoretical (Vol. 44, Issue 8). Dirjen Dikdasmen Kemendikbud RI. https://doi.org/10.1088/1751-8113/44/8/085201.

Development of Beginning Reading Module with Phonics Method in Children with Mild Intellectual Barriers

Nur Hayati Harahap[1*], Mumpuniarti[2]

[1,2] Special Education, Universitas negeri Yogyakarta, Yogyakarta, Indonesia

*E-mail: nh2111380@gmail.com

Abstract. This study aims to analyze the need, feasibility, and effectiveness of using the development of the initial reading module with phonics method for learning children in the light category of IR children at SLBN 1 Yogyakarta. This type of research is Design and Development Research (*Design and Develompent Reseach*) by Richey Klein with 3 partisipans. The results of this study are: (1) the need for the development of the initial reading module with the phonics method lies in the results of need assessment in light category IR children at SLBN 1 Yogyakarta. (2) The module reads the beginning with validated phonic methods to subject matter experts and media experts. For assessment on the beginning reading material with a feasibility percentage of 86.4% is very feasible, by experts in the light category IR children with a 96% eligibility percentage is very feasible, and by media experts with a 92% eligibility percentage is feasible to use. (3) Based on the results of the intervention that has been implemented, there is a change in the light category of IR children in reading with assessment results with HN values of 65%, YES 73% and, AR 84%.

1. Introduction

Children with special needs (ABK) have many types and characteristics. One type of child with needs is an intellectual barrier child, abbreviated as (IR) (Hidayah et al., 2021). Light category IR children experience obstacles in the development of cognitive aspects, which inhibit academic abilities such as reading, writing, and counting (Da Rosa et al., 2020). The most crucial cognitive aspect that must be possessed by children in the light category is reading because reading is the basis for mastering various kinds of lessons at school (Maryanti et al., 2021).

The ability to read is a basic need in everyday life; in reading activities, some stages must be mastered by children (specifically et al., 2021). For light IR children, reading ability is more directed at functional reading, meaning the ability to read, which is associated with the daily life of IR children in the light category (Shelomita et al., 2021). Functional reading for IR children can be started by introducing vocabulary written on on-site instructions, food recipes, public facilities, instructions for activities in the house such as reading the use of household appliances, and others (Pardede et al., 2022).

There are light IR children who need help with reading due to the provision of inappropriate methods so that they do not attract the interest of light IR children in learning (Pradana & Susilawati, 2023). Based on the results of field observations, researchers found that children's cognitive ability in the light category of IR children found in school is still limited. The ability to read in children, namely children can read letters of the alphabet, letters, vowels, consonants, and combine letters into syllables, be it one syllable, two syllables, or three syllables. However, the child cannot yet read syllables combined from letters and still needs to beat.

Based on data from the Directorate General of Early Childhood Education, Primary Education and Secondary Education of the Ministry of Education and Culture and Technology, in the odd semester of the 2022/2023 Academic Year (FY), 26.85 thousand teachers are teaching in Special Schools (SLB) throughout Indonesia. Of these, 20.05 thousand SLB teachers are women, and 6.8 thousand are men. In the odd semester of FY 2022/2023, there are 2,286 SLB units spread across 34 provinces of Indonesia. A total of 1,656 junior high schools are private schools, and 630 junior high schools have the status of public schools (Kusnandar, 2022).

However, not all teachers in SLB have the same sound quality (Yunaini, 2021) Various studies and field data show serious problems related to the teaching quality of SLB teachers in Indonesia (Isma et al., 2023) According to the Inclusive Education Report by the Ministry of Education and Culture (MoEC) in 2022, around 30% of SLB teachers need adequate educational qualifications, such as a unique educational background or training in educating students with special needs. In addition, the lack of adequate facilities and resources in SLB also contributes to the low quality of teaching (Arriani et al., 2022).

In addition, researchers found that teachers still use learning methods that do not match children's abilities and need help understanding the characteristics of light-category IR children (Sulastri, 2023) Then, there are limitations for teachers in developing reading learning materials suitable for children's abilities and conditions (Amanullah, 2022). Teachers only focus on textbooks, so developing an initial reading learning module is necessary to help teachers teach children with mild intellectual disabilities in schools (Andani et al., 2023).

Seeing IR children's problems in learning to read, unique methods are needed to help them learn. In this study, researchers will use the phonics method in reading the beginning. The author chose the phonics method because the implementation of the phonics method starts from the recognition of words consisting of syllables, making it easier for children to read the beginning (Novianti, 2021). Word recognition in this phonics method will later focus on reading functional beginnings, namely word recognition in the environment around children, such as words related to children's daily lives and words related to limbs and family members accompanied by pictures of each word (Putri et al., 2021).

This research is similar to previous research's theme, namely research from (Maharani, 2021) entitled "Phonic Method in Improving the Initial Reading of Students with Intellectual Disabilities." Then, research work from (Rahmanah, 2022) entitled "The Effectiveness of the Cheerful Phonics Method to Improve the Ability to Recognize Bilabial Consonant Letter Symbol Sounds for Children with Mild Intellectual Impairment: Single Subject Research in Class V SLB Al-Ishlaah Padang." Finally, the study was entitled "The Effectiveness of the Phonics Method on Reducing the Rate of speech delay in children aged 4-5 years" (Putri et al., 2021). The similarity of the research theme is the exposure of the Phonics Method for children with intellectual disabilities. In contrast, the value of the difference, as well as the novelty value of this research, is the development of an initial reading model using the phonics method for children who have mild intellectual barriers. This study aimed to analyze the development needs of the initial reading module with phonics method in light category IR children. In addition, it will analyze the feasibility of the beginning reading module with the phonics method in light category IR children based on expert assessment. Finally, to analyze the effectiveness of using the beginning reading module with phonics method in improving early reading skills for IR children.

2. Method

This research method uses quantitative types with the Design and Developmental Research (DDR) model from Richey and Klein. Design and Developmental Research focuses on using, developing, implementing, and evaluating products, tools, and programs using instructional design models and frameworks (Richey & Klein, 2007) The participants of this study were three students at Sekolah Luar

Luar Negeri 1 Yogyakarta with the initials HR, YN, and AR. This school is a place of research because there are no learning modules used by teachers in the learning process in the classroom. Data collection techniques used in this study were through observation, interviews, and questionnaires. Another data obtained was the results of the ability to read the beginning with the phonics method in children in the light category of IR children at SLBN 1 Yogyakarta. Research with the Design and developmental model has two categories: product and tool research and model research. The products and tools developed in this study are the beginning reading learning module with phonics method, which is used to assist teachers in teaching the initial reading learning module with phonics method to light category IR children. The stages of the development research design model can be seen in the picture below:

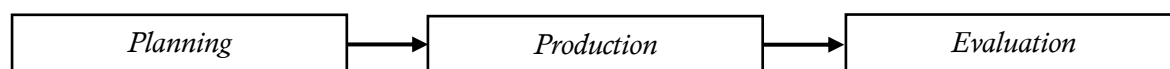| *Planning* | → | *Production* | → | *Evaluation* |

Figure 1. The level of development of the initial reading module using the PPE model (Richey & Klein, 2007).

The development model used in this study is the PPE (planning, production, and evaluation) model developed by (Richey & Klein, 2007). This PPE (planning, production, and evaluation) development model is analytical from beginning to end, including planning, production, and evaluation. Research data analysis was statistically descriptive with several stages: 1) Analysis of the need to develop the initial reading module with the phonics method. 2) Production by designing an outline to prepare the module reading the beginning using the phonics method. 3) Evaluation tests and assesses whether the developed module meets the product with predetermined specifications.

3. Results and Discussions

3.1 Startup Readinng Module Expansion Stage

Development research aims to produce modules based on phonic methods adapted to the conditions and characteristics of light-category IR children. The module developed is expected to meet the criteria and be valid, practical, and effective so that it can be used in light category IR children to improve initial reading skills with phonic methods in pronunciation of the sounds of letters that are read. The following are the test results in the development of the beginning reading module with the Phonics Method for light category IR children:

3.1.1 Material Comprehension test of Beginning Reading Module with Phonic Method in Chilren of IR Light Category Developed

Researchers measured children's comprehension in the light category IR in early reading in the early stages. Researchers and teachers determine reading learning scenarios and learning method strategies used in beginning reading. Then, after determining the learning scenario, the researcher and the teacher agreed regarding the time of implementation of the initial reading learning with the phonics method in light category IR children.

The initial ability process begins with the teacher carrying out tests of category IR children to determine the initial ability of light-category IR children in reading. The initial test is carried out with approximately 30 minutes to carry out a reading ability test for each IR child in the light category with material that includes recognizing alphabets, vowels, consonants, syllables, and simple words.

At the time of the initial ability test for HN, YES, and AR, they showed that they were very enthusiastic in pronouncing letters of the alphabet, vowels, consonants, and syllables of

letters of the alphabet to simple words. However, HN is given repetition several times in training initial reading skills. Then, for YES and AR, it only requires repeating a few letters. When carrying out initial abilities in the three children, it is done by using flash cards as a medium that can attract children's interest in learning to read. The following will explain the results of children's initial abilities related to reading without using the initial reading lesson module with phonics methods. The results of early reading skills in children are as follows:

Table 1. Results of early reading skills in light category HI children

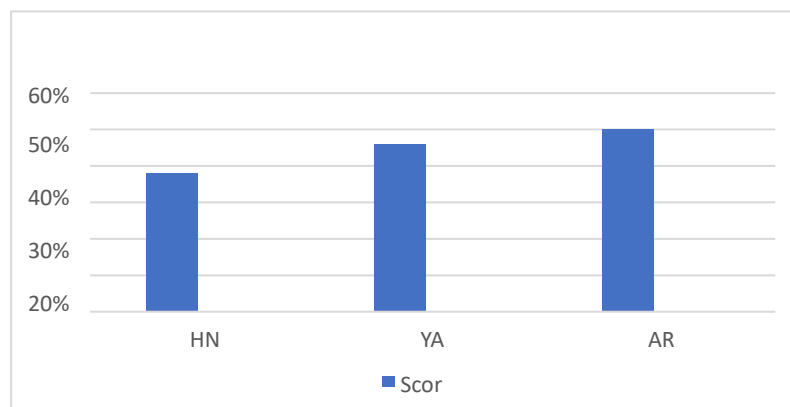| No.	Name	Value	Interpretation
1.	HN	38%	Not Enough
2.	YA	46%	Enough
3.	AR	50%	Enough

Figure 1. Data on the results of the initial ability of children in the light category of IR

Based on early abilities, the initial reading comprehension ability in HN, YES, and AR children has reached the result criteria with the minimum completeness expected. Children with initials HN get a score of 38% with less interpreter, children with initials YES get a score of 46% with sufficient interpretation, and children with initials AR get a score of 50% with sufficient interpretation.

3.1.2   Implementation of Interview Using Startup Reading Module with Phonic Method

The initial reading intervention with the phonics method was implemented in IR children at SLBN 1 Yogyakarta during learning in class. The implementation of learning each week is as many as three meetings, with one meeting being 30 minutes in each light category IR children. Furthermore, it will explain the steps in learning to read, beginning with the phonics method in light-category IR children, which are carried out individually with material adapted to the conditions of light-category IR children.

Division of profiles of light-category IR children through need assessment helps identify the abilities of light-category IR children. The need assessment process is carried out with teachers giving reading books to see the results of early reading skills of IR children in the light category one by one. Designing a classroom environment adapted to the conditions of light-category IR children with a learning process that refers to teachers teaching light-category

IR children in early reading. Based on the assessment results obtained it is used as a reference to place the ability of IR children in the light category related to early reading. Each IR child in the light category has its characteristics and needs that are by the division of the understanding profile of IR children in the light category based on the results of the need assessment.

The intervention is implemented by adjusting the material to be developed in the initial reading learning module based on pretest results with material that has yet to be developed to be used to select material to be taught by teachers to light category IR children individually. Furthermore, based on the division of the profile of initial reading material for IR children in the light category, there is material that is assessed, namely the child's ability to read.

Learning to read beginning with the phonics method emphasizes pronunciation, sounding letters in each material, and images in the module developed according to the conditions of children in the light category. The intervention carried out in this study aims to see the development and progress of IR children in early reading skills through the material contained in the module during four weeks of meetings with a duration of 30 minutes at one meeting.

There were differences between the three children when intervening in each mild IR child. The location of the difference is in the approach taken by the teacher to each child in the light category of IR. The implementation of initial reading learning in each intervention was carried out alternately for each child in the light category of IR. The steps in learning to read, beginning with the phonics method, are outlined in the lesson implementation plan (RPP) that has been modified. The learning activity begins with giving perceptions to IR children in the light category of the teacher, then continues with the teacher delivering the material to be taught, which is related to reading the beginning with the phonics method developed in the module.

After completing the intervention twelve times using the module, the following will be the results of the implementation of the intervention made in the form of tables and graphs below:

Table 2. Results of initial reading intervention with phonic methode in mild category IR Children

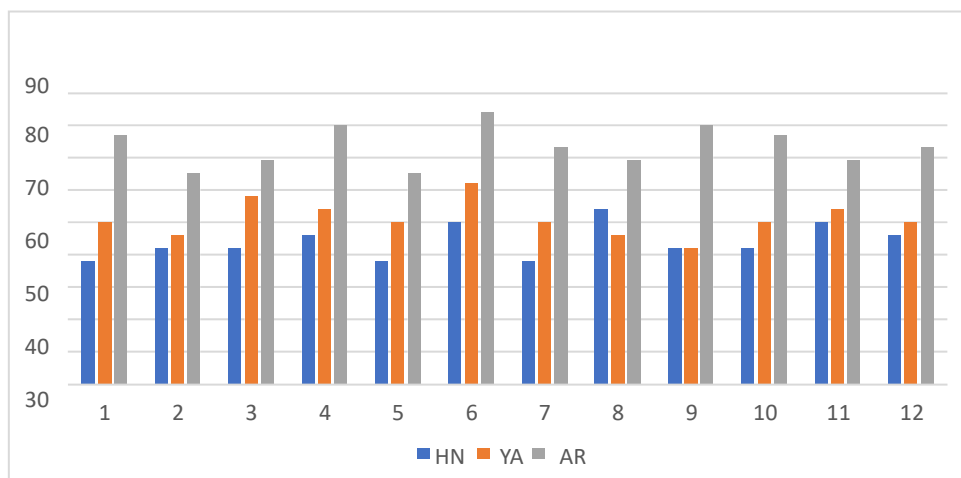| Target Behaviour	HN	YA	AR	Information
Beginning reading skills in HI children in the light category	38	50	77	Day-1
	42	46	65	Day-2
	42	58	69	Day-3
	46	54	80	Day-4
	38	50	65	Day-5
	50	62	84	Day-6
	38	50	73	Day-7
	54	46	69	Day-8
	42	42	80	Day-9
	42	50	77	Day-10
	50	54	69	Day-11
	46	50	73	Day-12
Average	**44%**	**51%**	**74%**	
Predicate	**Enough**	**Enough**	**Good**	

Figure 2. Results of Initial Reading Intervention in Light Category IR in Light Category IR Children

3.1.3 Analysis of the Final Ability of Children in the Light Category arter Intervention Using thr Beginning Reading Module

After the intervention, a final ability test is conducted for children to determine their reading ability using a learning module consisting of several meetings. The result given is the same as the initial test ability. Furthermore, to clarify the results of the final ability of light category IR children in early reading using modules, below will be explained as follows, along with tables and graphs in the final ability results of light category IR children (*postest*).

Table 3. Obtaining the final test result of the beginning reading ability of IR Children in the light category

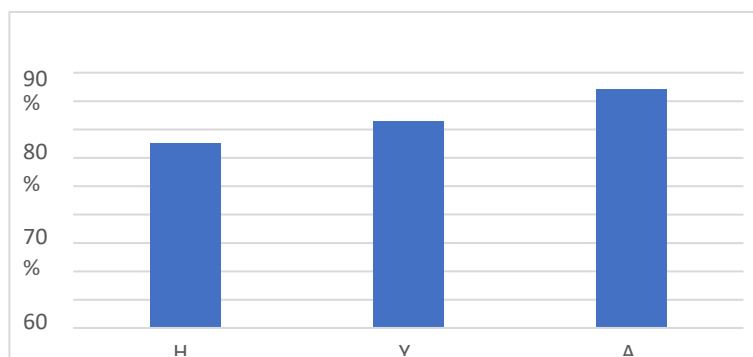| No	Name	Value	Interpretasi
1.	HN	65 %	Good
2.	YA	73 %	Good
3.	AR	84 %	Excellent

Figure 3. Results of final beginning reading ability in light category IR Children

Based on the results of the final test, there is a significant increase in the achievement of the three IR children in the light category of the material taught. The comparison of the

results of understanding of light category IR children in the initial and final tests is very significant from understanding each light category IR child who is sufficient and less to be very good. To clarify the achievement of the results of understanding IR children in the light category both before intervention using modules, during the learning process using modules, and after using modules, it is illustrated in tables and graphs as follows:

Table 4. Recapitulation of Anak IR scores in the light category

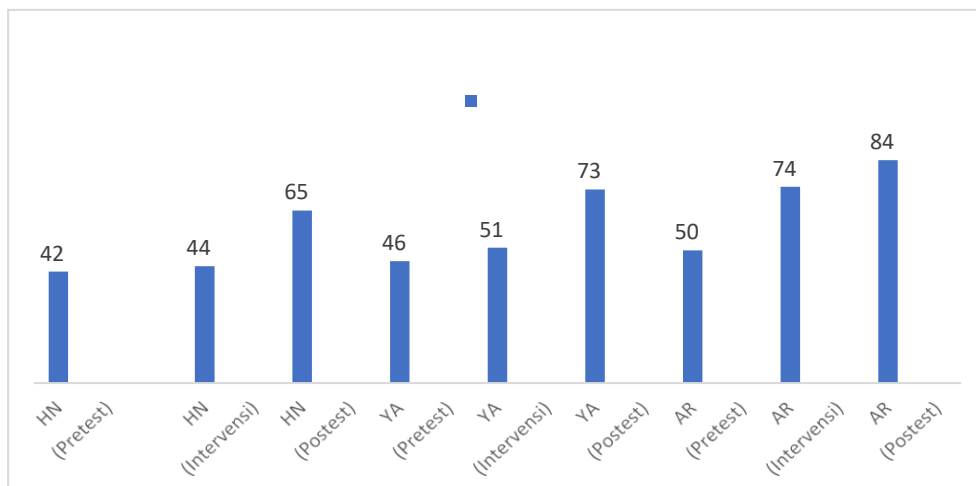| Target Behaviour	Name	Average	Interpretation
Startup Reading Ability in a Child	HN (Pretest)	42 %	Enough
	HN (Intervensi)	44 %	Enough
	HN (Postest)	65 %	Good
	YA (Pretest)	46 %	Enough
	YA (Intervensi)	51 %	Enough
	YA (Postest)	73 %	Good
	AR (Pretest)	50 %	Enough
	AR (Postest)	84 %	Excellent

Figure 4. Results of Initial Reading Ability in Children in the Light Category of IR

3.2 Startup Reading Module Analysis with Phonic Method for Light Category IR child
 The initial reading module with the developed phonic method has done the validation process for the experts. As for the results of the expert evaluation in the

development of the starting reading module with the phonic method in the light category IR child in the following SLBN 1 Yogyakarta:

Table 5. Expert Assessment Table

No	Validator Name	Department	Result of Validation
1.	Dr.Sukinah, M.Pd. (As an expert in material about reading the beginning)	PLB Lecturer at Yogyakarta State University	86 % Can be used with revisions
2.	Erkariani Wijaya, S.Pd (An expert in education for IR children in the light category)	Class Teacher of SLBN 1 Yogyakarta	96% Can be used with minor revisions
3.	Dr. Lis Yulianti Syafrida Siregar, M.A (As an expert in the development of startup reading modules by phonic method)	Vice Dean Syeh Ali Hasan Ahmad Addary State Islamic University Padangsidimpuan	92 % Can be used with revisions

Based on the validation process of the learning media products that have been developed, the results of feasibility validation of the developed media are obtained. Learning media products are validated from several aspects by related experts. Related experts who provide validation of the media consist of experts in the field of experts in material about beginning reading, experts in education for children in the light category of IR, and experts in the development of beginning reading modules with phonics methods. The three validators provide an assessment of media products developed based on assessment items based on the aspects carried out by the assessment.

In media products, in terms of the material developed, validation is carried out by experts in material about initial reading. The results from calculating the given value items amounted to 86%, explaining that the material related to the beginning reading developed was included in the feasible category. Thus, the validation results by material experts can be used for improvements. Module development is seen from material related to the education of light category IR children that media experts have carried out by obtaining results from instrument items, which is 96% meat, meaning that the modules developed are feasible to be given to light IR children.

The validation results show that module development can be used with improvements. Furthermore, the development of the last module was validated by media experts who are experts in the field of developing the beginning reading module. The results obtained from calculating the items of the media expert validation instrument are 92%, which means that the developed media is feasible for use. The validation results show that the product can be used with several improvements for module development. To clarify the validation results of the initial reading module development, the researcher presents a recapitulation graph of the expert validation result scores as follows:
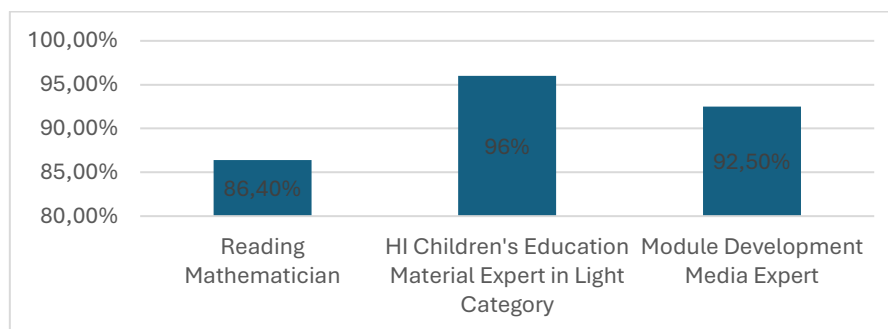
Figure 5. Score Recapitulation Graph of Expert Validation Results

The achievement of the results of this expert validation score is, of course, also accompanied by suggestions for improvements that are outlined in the expert review. The qualitative notes from validators are also the basis for researchers to make improvements before this media is used. The following are notes from validators for improvements before this media can be used:

Table 6. Table of Suggestions and Feedback from Validators

No	Validator Name	Department	Feedback
1.	Dr.Sukinah, M.Pd. (As an expert in material about reading the beginning)	PLB Lecturer at Yogyakarta State University	• The consistency of the term IR title for some general people needs to be understood; it needs to be extended, not short. • Please adjust the existing in the script.
2.	Erkariani Wijaya, S.Pd (An expert in education for IR children in the light category)	Class Teacher of SLBN 1 Yogyakarta	• The font type in the beginning reading module material for IR children's light category was changed from Times New Roman to Comic Sans MS. • Hyphenation of syllables in module material for IR children
3.	Dr. Lis Yulianti SyafridaSiregar, M.A (As an expert in the development of startup reading modules by phonic method)	Vice Dean Syeh Ali Hasan Ahmad Addary State Islamic University Padangsidimpuan	• Pay attention to the layout of the writing. • Clarify the table on the module. • Find a reference source for the length of each meeting from 4 meetings. • Set criteria for indicators of ability and mastery of the material. • Please adjust the existing script.

On the advice and input of expert validators, this became the basis for researchers to improve the quality of this media in terms of material, suitability for light category IR children, and the modules developed. So that when used, improvements have been made by the suggestions and input of validators. Furthermore, a comprehension test was carried out on the light category of IR children consisting of three children to determine the improvement in reading.

Data analysis on comprehension evaluation uses data analysis with a single subject. The determination of the two students was based on specific considerations, namely in terms

of age and the results of psychological examinations to determine the intelligence score of the students. Data analysis with a single subject by looking at the acquisition of scores on the ability of the initial – intervention – final baseline with descriptive statistics analysis.

3.3 The Need for Development of Beginning Reading Module with Phonics Method in Children of IR Light Category at SLBN 1 Yogyakarta

Based on the results of the need assessment that has been carried out on three children in the light category of IR at SLBN 1 Yogyakarta, it shows that children's ability to read is still low and requires repetition for children to read well and fluently. In this study, researchers developed a module that can assist teachers in teaching early reading learning to children in the light category of IR. Then, based on the results of interviews that researchers conducted with teachers related to children's ability to read is still very low, and it is also supported because it has just entered a new semester, so teachers carry out identification and assessment activities to see the initial condition and ability of children in the light category. After the teacher carries out identification and assessment activities for children, the teacher prepares programs or materials for the conditions of each child. Then, researchers also found that teachers had never previously made learning modules that would be taught to children.

The results of the observation data found that determining the needs in the development of modules related to the initial reading learning material given to children is referred to as phase B. The ability to read in grade IV children based on the independent curriculum is to be further explained in the appendix. Based on the results of the information that the researchers collected, they found a need to develop modules for teacher materials in teaching beginning reading to children in the light category of IR. This is in line with the research results by Maryono et al. (2022), which state that the development stage of the initial reading module starts from analyzing the potential and problems in children, both in terms of ability and material.

Then, in the results of the research, Mau et al. (2022) explained that there are planning and development stages in module development. The planning stage can be done to determine the material, the select materials, and the preparation material to be developed in the module's contents after carrying out the next planning stage, which is preparing modules using the module framework that has been prepared. Then, based on the results of the needs analysis described above, it can be seen that learning to read beginning with the phonics method is material that will be developed in the initial reading module with the phonics method in light category IR children at SLBN 1 Yogyakarta which is adjusted to the needs of the conditions and abilities of light category IR children in the development phase of independent curriculum material.

3.4 Qualification of Startup Reading Module with Fonic Method On Children IR Light Category at SLBN 1 Yogyakarta Based on Expert Assessment

The feasibility of the initial reading module with the phonics method in children in the light category of IR children is based on determining the teacher's needs in teaching children early reading learning with the phonics method. The module developed in this beginning reading learning starts from collecting information about what the teacher needs to teach beginning reading learning. After obtaining information related to the needs of the teacher, then the researcher carried out a design related to the development of the initial reading module. At this design stage, researchers formulate material or an outline that will be taught in the

beginning reading module and then compile a module display design. Researchers also devised a validation instrument for the beginning reading module.

The results of validation from experts are used as suggestions and improvements to assess whether the modules that have been developed are suitable for use by teachers in teaching beginning reading with the phonics method to light category IR children at SLBN 1 Yogyakarta. The validation results from material experts in the field of beginning reading obtained percentage results of 86.4% with very feasible criteria. Assessment from experts in the education material of IR children in the light category with a value of 96%. Assessment from the media with a value of 92.5%. The assessment results from experts then obtained suggestions and input to improve the initial reading module with the phonics method in light category IR children at SLBN 1 Yogyakarta.

3.5 Effectiveness of Startup Reading Module With Fonic Methods In Improving Startup Reading Ability In Light Category IR Children at SLBN 1 Yogyakarta

In the learning of the initial reading module compiled by researchers using the phonics method in light category IR children, the three children have their own learning needs that are adjusted to the child's condition. With the phonics method used in early reading learning, there are changes in children's reading. Furthermore, the phonics method is also more appropriate for developing this initial reading module because, in this study, researchers emphasize the sound of each letter that children will read.

So that the child will know what letters are read and how the letters sound; then, in the development of the modules, it is adjusted to the conditions of children in the light category, namely in each learning. The material needs to be accompanied by pictures of each letter representative and also give motivation to children so that when in the implementation of reading, the beginning of the child is more excited.

In connection with the results of research from Audina et al. (2022) that learning with the phonics method helps and improves children's ability to read because this phonics method emphasizes more about letter sounds, distinguishing letter sounds one by one, and stringing words into short sentences, so that children can learn to read effectively. Then this phonics method is also designed to help the needs of children who are reading and recognizing letters because reading activities can increase children's spirits (Hulme et al., 2022).

4. Conclusions

Based on the results of research on the development of the beginning reading module with the phonics method in light category IR children carried out, it can be concluded that the need for the development of the beginning reading module with the phonics method for learning light category IR children at SLBN 1 Yogyakarta is needed and helps teachers in teaching beginning reading to light category IR children. After being tested by validators, the feasibility of the initial reading module with the phonics method in light category IR children at SLBN 1 Yogyakarta obtained suitable results for use in learning. The beginning reading module with the phonics method effectively improves early reading skills for light category IR children at SLBN 1 Yogyakarta.

References

[1] Amanullah, A. S. R. (2022). Mengenal Anak Berkebutuhan Khusus: TunaGrahita,Down Syndrom Dan Autisme. Jurnal Almurtaja: Jurnal PendidikanIslamAnak Usia Dini, 1(1), 1–14. http://ejournal.iai-tabah.ac.id/index.php/almurtaja/article/view/1793/1113

[2] Andani, F., Octavia, R., Pahera, D., Alisah, S. ., Erda, W., & Andani, N. S. (2023). Strategi Guru Dalam Memberikan Pembelajaran Pada Anak Berkebutuhan Khusus Di Kelas III Sekolah Luar Biasa (SLB) Negeri 5 Kota Bengkulu. JKIP : Jurnal Kajian Ilmu Pendidikan, 4(1), 152–165. http://journal.al-matani.com/index.php/jkip/index

[3] Arriani, F., Agustiyawati, A., Rizki, A., Widiyanti, R., Wibowo, S., Tulalessy, C., Herawati, F., & Maryanti, T. (2022). Panduan Pelaksanaan Pendidikan Inklusif. In Badan Standar, Kurikulum, dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia (1st ed.). Badan Standar, Kurikulum, dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia. https://doi.org/10.17509/eh.v2i1.2755

[4] Audina, N., Ma'muroh, S., & Ulfa, R. N. (2022). The Advantages of the Phonics Method for Early Childhood Reading Skills. JEdu: Journal of English Education, 2(2), 130–137. https://doi.org/10.30998/jedu.v2i2.6666

[5] Da Rosa, S. V., Moysés, S. J., Theis, L. C., Soares, R. C., Moysés, S. T., Werneck, R. I., & Rocha, J. S. (2020). Barriers in Access to Dental Services Hindering the Treatment of People with Disabilities: A Systematic Review. International Journal of Dentistry, 2020. https://doi.org/10.1155/2020/9074618

[6] Hidayah, R., Solichah, N., Solehah, H. Y., & ... (2021). Persepsi dan peran guru terhadap pembelajaran anak berkebutuhan khusus. Psikoislamika: Jurnal Psikologi Dan Psikologi Islam, 18(2), 330–344.http://repository.uin-malang.ac.id/10343/%0Ahttp://repository.uin malang.ac.id/10343/2/10343.pdf

[7] Hulme, R. C., Webber, C. E., Fox, A. C., Ricketts, J., Shapiro, L. R., & Taylor, J. S. H. (2022). Do family learning phonics courses improve parents' reading-related skills and ability to support their children's reading? Journal of Research in Reading, 45(3), 258–276. https://doi.org/10.1111/1467-9817.12377

[8] Isma, A., Isma, A., Isma, A., & Isma, A. (2023). Peta Permasalahan Pendidikan Abad 21 di Indonesia. Jurnal Pendidikan Terapan, 01(September), 11–28. https://doi.org/10.61255/jupiter.v1i3.153

[9] Khusus, P., Pendidikan, F. I., Jakarta, U. N., Muka, J. R., Timur, J., Khusus, D., & Jakarta, I. (2021). BERKEBUTUHAN KHUSUS KEPADA WARGA RUSUNAWA warga Rusunawa Jatinegara Kaum Masyarakat oleh dosen dan mahsiswa program studi Pendidikan Luar Biasa atau Pendidikan Khusus berupa kegiatan. Sarwahita: Jurnal Pengabdian Kepada Masyaraka, 18(2), 215–224. https://doi.org/10.21009/sarwahita.182.10

[10] Kusnandar, V. B. (2022). RI Punya 26 Ribu Guru untuk Anak Berkebutuhan Khusus pada 2022. Databoks. https://databoks.katadata.co.id/datapublish/2022/11/25/ri-punya-26-ribu-guru-untuk-anak-berkebutuhan-khusus-pada-2022

[11] Maharani, S. P. (2021). Metode Fonik dalam Peningkaan Membaca Permulaan SiswaTunagrahita. Universitas Negeri Jakarta.

[12] Maryanti, R., Nandiyanto, A. B. D., Hufad, A., & Sunardi, S. (2021). Science Education for Students with Special Needs in Indonesia: From Definition, Systematic Review, Education System, to Curriculum. Indonesian Journal of Community and Special Needs Education, 1(1), 1–8. https://doi.org/10.17509/ijcsne.v1i1.32653

[13] Maryono, M., Akib, E., & Akhir, M. (2022). Analisis Pelaksanaan Pembelajaran Membaca Permulaan Anak Berkebutuhan Khusus. JPD: Jurnal Pendidikan Dasar, 13(2), 37–52. https://doi.org/10.21009/JPD.13.02

[14] Mau, P. M. T., Indarti, T., & Subrata, H. (2022). Pengembangan media kartu huruf untuk meningkatkan kemampuan membaca permulaan pada siswa sekolah dasar. Jurnal Basicedu, 6(5), 8992–9006. https://jbasic.org/index.php/basicedu/article/view/3989

[15] Novianti, R. (2021). Penerapan metode fonik dalam meningkatkan kemampuan membaca permulaan pada anak tunagrahita ringan kelas 5 SD Di Slb Bc Nike Ardilla Ypwn. INCLUSIVE: Journal of Special Education, VII, 55–64. http://ojs.uninus.ac.id/index.php/Inclusi/article/view/1310%0Ahttp://ojs.uninus.ac.id/index.php/Inclusi/article/viewFile/1310/863

[16] Pardede, L. O. E., Azzahra, N., & Sofyan, H. (2022). Pendidikan Bagi Anak Tuna Grahitastudi Kasus Tunagrahita Slb C Kuntum Mekar 02. Seminar Nasional Ilmu Pendidikan Dan Multi Disiplin, 5, 103–107. prosiding.esaunggul.ac.id

[17] Pradana, T. A., & Susilawati, S. (2023). Strategi Intervensi Layanan Bimbingan dan Konseling bagi Anak Berkebutuhan Khusus. IIlmiah BK, 6(2), 27–33.

[18] Putri, S., Laily, N., & Amelasasih, P. (2021). Efektivitas Metode Fonik terhadap Penurunan Tingkat Keterlambatan Bicara Anak Usia 4-5 Tahun. AL-MURABBI: Jurnal Studi Kependidikan Dan Keislaman, 7(2), 171–184. https://doi.org/10.53627/jam.v7i2.4256

[19] Rahmanah, F. (2022). Efektivitas Metode Fonik Ceria untuk Meningkatkan Kemampuan Mengenal Bunyi Simbol Huruf Konsonan Bilabial bagi Anak Tunagrahita Ringan: Single Subject Research di Kelas V SLB Al-Ishlaah Padang. Universitas Negeri Padang.

[20] Richey, R. C., & Klein, J. D. (2007). Design and Development Research. Routledge.

[21] Shelomita, N., Mulya, D., & Abadi, R. F. (2021). Interaksi sosial siswa reguler terhadap siswa dengan hambatan intelektual di SMP penyelenggaraan pendidikan inklusif. Jurnal UNIK: Pendidikan Luar Biasa, 6(2), 88. https://doi.org/10.30870/unik.v6i2.12960

[22] Sulastri, dkk. (2023). Strategi Guru Pendidikan Agama Islam DalamPenyampaian Materi Pada Anak TunagrahitaDi Sekolah Luar Biasa Negeri SambasTahun Pelajaran 2022/2023. Jurnal Literasi Unggulan, 1(3), 571–583.

[23] Yunaini, N. (2021). Model Pembelajaran Anak Berkebutuhan Khusus Dalam Setting Pendidikan Inklusi. Journal Of Elementary School Education (JOuESE), 1(1), 18–25. https://doi.org/10.52657/jouese.v1i1.1326

A Study of Listening-Speaking Supplementary Materials Design Integrated with the Value of Independence and Creativity

Radhiyatul Jamilah[1]*and Joko Priyana[2]

[1]English Education Department, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia, radhiyatuljamilah.2022@student.uny.ac.id
[2]English Education Department, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia, joko.priyana@uny.ac.id

Abstract. This research aims to determine how to design supplementary listening-speaking materials integrated with the value of independence and creativity for first-grade students in junior high school. This research is part of research and development (R&D) in education under the ADDIE framework. Hence it was only until the analysis phase. The researchers conducted a needs analysis through interviews to determine students' target needs and learning needs and document analysis to gain more related information, which was then analyzed qualitatively. The research found that first-grade junior high students struggle with vocabulary, pronunciation, and understanding spoken English. Using audiovisual materials with subtitles and interactive activities was suggested by the teacher. So that students can improve their inferential skills and communication abilities. In addition, small groups and pairs of work with a facilitator role for the teacher are preferred. The results also showed how English language learning aligns with values education in Indonesia's curriculum, specifically emphasizing independence and creativity, which are essential for students' overall development. In addition, the value of independence and creativity can be integrated implicitly and explicitly into the materials. This research highlights the need for well-designed supplementary materials that tackle specific language difficulties in listening and speaking while also promoting important educational values.

Keywords: Listening, Needs Analysis, Speaking, Supplementary Learning Materials, Value

1. Introduction

The landscape of education is undergoing a significant shift. While the core function of schools has always been to transmit knowledge and fundamental skills. Then, educators increasingly recognize the need to develop well-rounded students (Lickona & Davidson, 2018). This humanistic approach, often referred to as "value integration," prioritizes the holistic development of the individual and equips students to navigate the complexities of the modern world (Eslit, 2023). Integrating values into language and literature education becomes particularly crucial in this context.

One of the key values gaining prominence in this evolving educational landscape is creativity. Children are naturally curious and possess an inherent ability to think creatively (Russ & Wallace, 2013). Fostering this creativity through "practice with problem solving and practice with emotions" equips students with the tools they need to address challenges in both personal and academic settings effectively (Yeh & Ting, 2023). Farrington et al. (2019) emphasize the importance of

understanding creativity's role in promoting learning and achieving significant results. Furthermore, creativity allows students to create something original and impactful, a highly valued characteristic in today's workforce, as identified by social scientists like Florida (2014). Similarly, research by Nizaruddin & Kusmaryono (2023) highlights the connection between independence and self-regulation, both of which are crucial for fostering critical thinking skills and long-term academic success (Dent & Koenka, 2016). Furthermore, in order to more effectively foster lifelong learning characteristics in EFL learners, it is crucial that they receive comprehensive training to trigger their utmost self-regulation potential (Wijaya, 2022). It shows how creativity and independence are important values to be integrated into the educational context.

Despite this growing awareness of the importance of integrating values, effectively doing so can be challenging. Values integration, defined as the practice of introducing values education into academic courses (Mascarenhas & Menezes, 2018), often faces obstacles within traditional classroom content. A study examining character education in Indonesian secondary school English textbooks based on the 2013 curriculum found an emphasis on values related to oneself. These values were the most common. Values related to interacting with others were also present but less frequent. The focus on national values and religious values was even lower. Furthermore, the values of independence and creativity are not integrated into the book. In another textbook, the most frequent character value was also only related to self, followed by others, environment, nation, and God (Serasi et al., 2022). Fortunately, there have been positive advancements. The "English for Nusantara" textbook, launched in 2022 and designed for the seventh grade with the Merdeka Curriculum, incorporates values and the Sustainable Development Goals (Damayanti et al., 2022). However, even with such improvements, the focus in most current materials tends to lean heavily on appreciating global diversity.

Additionally, current textbooks offer a well-rounded approach to skill development, encompassing listening-speaking, reading-viewing, and writing-presenting. Supplementary materials further enhance specific areas. For instance, "Practice Your English Competence" in 2017 improved grammar, while "English Listening Activities" in 2019 honed listening comprehension. Additionally, a "Speaking Extra" was released in 2004, and another one, namely "Skillful Reading and Writing Students' Book Pack 4," was published in 2013. However, a crucial gap remains about the lack of listening-speaking materials. Whereas language programs worldwide prioritize courses that enhance listening and speaking capabilities. Brown and Lee (2015) noted that Listening and speaking are closely associated in communicative language courses, where they are occasionally called Oral Communication Skills or Listening/Speaking. The ever-increasing demand for English proficiency has made identifying more effective teaching methods essential. As a result, it is crucial to reevaluate our current beliefs and methodologies for instructing these fundamental linguistic abilities in the context of English language teaching and materials design (Richards, 2008).

This research bridged this gap by focusing on determining ways to design supplementary listening-speaking materials integrated with the values of independence and creativity. Therefore, this research aims to find out the learning needs and target needs of seventh-graders in a state junior high school and how to design appropriate listening-speaking supplementary materials integrated with independence and creativity.

2. Method of Research

This study is a component of research and development (R&D) conducted in the field of education. According to Gall, Borg, and Gall (2003), this research method focuses on developing novel products and practices. These are then examined, assessed, and improved until they meet specific criteria for efficacy, quality, or comparable requirements. This research followed the ADDIE framework presented by Dick et al in 2005, outlining key instructional design phases, including analysis, design,

development, implementation, and evaluation. In this research, the phases only until the analysis phase. The focus of this study was on the first-grade students of secondary school. Therefore, the English teacher of the seventh-grade students becomes a sample to obtain information for the need analysis. Which is then analyzed qualitatively using the data analysis procedures suggested by Miles et al. (2019). In this approach, data analysis is divided into several stages: data collection, data reduction, data display, and drawing conclusions. In this paper, the researcher carefully examined the data to uncover the research's insights and conclusions by connecting narrative threads. Furthermore, documents related to the curriculum and values were analyzed for completion, which involved examining both written and electronic materials to gather additional research data and gain insights. The qualitative data acquired through document analysis provided supplementary insights pertinent to the study, which were analyzed by skimming (superficial examination), reading (thorough examination), and interpretation, as suggested by Bowen (2009). Both instruments underwent a rigorous validation process conducted by experts prior to their application in the field. This validation ensured that the instruments met the necessary accuracy, reliability, and relevance standards for the intended fieldwork.

3. Main Discussion

3.1. Result

3.1.1 The Result of the Teacher Interview

An interview with a first-grade English teacher at a secondary school was conducted to gather detailed information for needs analysis aimed at designing supplementary listening-speaking materials. The teacher revealed that the students were studying descriptive text, both in written and oral forms. The teacher noted significant challenges in the students' ability to acquire vocabulary, pronounce words correctly, and comprehend spoken English. These difficulties hinder their vocabulary development, self-expression, and overall understanding of information. Furthermore, the teacher stressed the importance of focused interventions to address these issues. She highlighted vocabulary and pronunciation as crucial areas for improvement, as they are fundamental to effective communication and understanding. According to the interview, the goals were to improve students' fluency, grammar, expression, pronunciation, vocabulary, and tone comprehension. The teacher's observations indicate the need for supplementary materials that enhance listening and speaking skills and integrate the values of independence and creativity, aligning with Indonesia's educational curriculum. To support learning, the teacher recommended using audio-visual materials accompanied by subtitles. This approach provides both auditory and visual cues, which can significantly aid students in better comprehending spoken language and improving their pronunciation. The teacher suggested that such multimedia elements could reinforce vocabulary acquisition and make the learning experience more engaging and effective.

Additionally, interactive activities were also emphasized as essential for increasing student engagement. The teacher shared her experiences under the Merdeka Curriculum, noting that students were more active and motivated when involved in games, ice-breaking exercises, video-watching sessions, or activities utilizing audio. These methods make learning more dynamic and enjoyable, which can enhance students' listening and speaking skills. According to the teacher, the preferred learning environment is the classroom, as it provides a structured and conducive space for focused learning activities. The teacher believes learning is most effective when conducted in pairs or small groups of three to four students. This setup allows for personalized attention and increased interaction, facilitating a more tailored and participatory learning experience. The teacher also emphasized the importance of students taking an active role in their learning. She encouraged students to ask questions and seek information actively, fostering a more engaged and involved

learning process. Regarding her own role, the teacher described herself as a facilitator and supervisor rather than a traditional instructor. The teacher sees her role as supporting and guiding struggling students, helping them navigate challenges, and monitoring their progress in classroom activities. Overall, the interview highlighted the need for targeted supplementary materials addressing the specific challenges of listening and speaking skills while promoting independence and creativity. These materials should incorporate multimedia elements and interactive activities to enhance engagement and effectiveness, providing students with a well-rounded and proficient learning experience.

3.1.2 The Result of Document Analysis

The documents examined in this study provided additional research data on learning objectives based on the Merdeka Curriculum and the content of independence and creativity, which is part of the Pancasila student profile. Furthermore, this study's documents included both printed and electronic content.

The first document is the learning objective listed in the Ministry of Education's Merdeka Curriculum. The researcher examined Phase D, or secondary school, from class VII to IX. The text under analysis refers to the particular secondary school goals and the goals related to speaking and listening in secondary education. The document's full description can be found below.

Table 1: Learning Outcomes Phase D Based on Merdeka Curriculum

Documents Selected	English Subject Learning Outcomes Phase A–Phase F
	(Badan Standar, Kurikulum, Dan Asesmen Pendidikan Kementerian Pendidikan, Kebudayaan, Riset, Dan Teknologi Republik Indonesia, 2022)
Data Analysed	Learning Outcomes Phase D (*Capaian Pembelajaran (CP) fase D*) (Page 12-21)
Content of Learning Objective Phase D	By the end of Phase D, learners use oral, written, and visual texts in English to interact and communicate in more diverse contexts and in both formal and informal situations. Learners can use various types of texts such as narratives, descriptions, procedures, specialized texts (short messages, advertisements), and authentic texts as the main references in learning English in this phase. Learners use English to discuss and express desires/feelings. Their understanding of written texts is further developed, and inferential skills begin to emerge when understanding implied information. They produce structured written and visual texts in English with a more diverse vocabulary. They understand the purpose and audience when producing written and visual texts in English.
Content of Listening-speaking learning objectives of Phase D	By the end of Phase D, students use English to interact and exchange ideas, experiences, interests, opinions and views with teachers, peers, and others in an increasing variety of familiar formal and informal contexts. With some repetition and rewording, they comprehend the main ideas and relevant details of discussions or presentations on a variety of general interest topics. They engage in discussion such as giving opinions, making comparisons, and stating preferences. They explain and clarify their answers using basic sentence structure and verb tenses

The second document was the steps of learning objectives (*Alur Tujuan Pembelajaran (ATP)*) from the platform of Merdeka Mengajar (PMM) facilitated by the Ministry of Education, culture, research, and technology to assist teachers in teaching students. The platform has many aspects, one of which is an illustration of the ATP, or how the learning objectives of every stage or degree of education ought to be applied. The ATP from the English course, notably the Phase D of class VII in listening-speaking ability, was examined by the researcher. A comprehensive overview of the information in the document is given in the table below.

Table 2: Steps of Learning Outcomes (*Alur Tujuan Pembelajaran (ATP))*

Documents Selected	**Platform of Merdeka Mengajar** https://guru.kemdikbud.go.id
Data Analysed	Steps of learning outcomes (*Alur Tujuan Pembelajaran (ATP))*
Steps of learning outcomes from the element of listening – speaking	Understand the main idea and relevant details about a variety of topics that are familiar and in context life at school and at home.
	Repetition and replacement of vocabulary about various familiar topics and in the context of life at school and at home.
	Express answers, ideas, experiences, interests, opinions, views and preferences with teachers, friends peers and other people in a variety of familiar contexts formal and informal one's basic sentence structure and verb tenses.

The third document comes from the Dimensions, Elements, and Sub-elements of the Pancasila Student Profile in the Independent Curriculum, as stated in the Decision of the Head of the Education Standards, Curriculum, and Assessment Agency of the Ministry of Education, Culture, Research, and Technology, numbered 009/H/KR/2022. The researcher examined the aspects of creativity and independence that will be included in the supplementary speaking and listening materials. Each dimension consists of elements, some of which are further elaborated into sub-elements. A detailed overview of the information in the document is given in the table below.

Table 3: Dimensions of Pancasila Student Profile (Independent and Creative)

Documents Selected	**Dimensions, Elements, and Sub-elements of the Pancasila Student Profile in the Independent Curriculum Based on the Decision of the Head of the Education Standards, Curriculum, and Assessment Agency of the Ministry of Education, Culture, Research, and Technology Number 009/H/KR/2022**
Data Analysed	Independent Dimension and Creative Dimension of Phase D (Pages 23-35)
Content of Independent Value	
Sub-elements	**At the End of Phase D (Class VII - IX, age of 13-15 years old)**
Elements of Self-Understanding and the Faced Situations	
Recognizing self-qualities and interests as well as the challenges faced	Making a realistic assessment of abilities and interests, as well as prioritizing self-development based on learning experiences and various other undertaken activities
Developing self-reflection	Monitoring the achieved learning progress and predicting personal and academic challenges that

	may arise based on self-experiences to consider the appropriate learning strategies.
Elements of Self-Regulation	
Emotional regulation	Understanding and predicting the consequences from emotions and its expression and formulating steps to manage the emotions in the implementation of learning and interactions with others.
Setting learning goals, achievements, and personal development, along with strategic plans to achieve them	Designing appropriate strategies to support the achievement of learning goals, accomplishments, and personal development by considering personal strengths and weaknesses, as well as the faced situations.
Demonstrating initiative and working independently	Critically assessing personal effectiveness in working independently by identifying factors that facilitate or hinder the attainment of goals.
Developing self-control and discipline	Committing and maintaining consistency in achieving the planned goals to attain the desired learning and personal development objectives
Confident, resilient, and adaptive	Creating a new plan by adapting and modifying strategies when previous efforts have not succeeded, and executing the task again with renewed confidence
Content of Creative Value	
Sub-elements	**At the End of Phase D (Class VII - IX, age of 13-15 years old)**
Element of generating original ideas	
Generating original ideas	Connecting existing ideas with new information or concepts to generate a combination of fresh and imaginative ideas to express thoughts and/or feelings.
Element of producing original works and actions	
Producing original works and actions	Exploring and expressing thoughts and/or feelings through works and/or actions, evaluating them, and considering their impact on others.
Element of having flexibility in thinking to seek alternative solutions to problems	
Having flexibility in thinking to explore alternative problem-solving solutions	Generating alternative solutions by adapting various ideas and feedback to address situations and problems

3.2. Discussions

After assessing students' needs and analyzing relevant documents, it shows that the teacher identified significant challenges in vocabulary acquisition, pronunciation, and comprehension of spoken English. These difficulties hinder overall understanding and self-expression, emphasizing the necessity of targeted interventions in vocabulary and pronunciation for effective communication. Consistent with Brooks et al. (2021), who highlighted the importance of vocabulary for learners acquiring English as an additional language, the teacher believes in actively helping students build their vocabulary. This is essential as vocabulary directly influences the effective use of the four fundamental language skills, encompassing pronunciation, spelling, conceptual understanding, and meaning classifications (Mete et al., 2023). To address these challenges, the teacher recommended using audiovisual materials with subtitles to provide auditory and visual cues, enhancing comprehension and pronunciation. Interactive activities like games and video watching were highlighted as crucial for

student engagement, aligning with the Merdeka Curriculum. Ulloa Salazar and Díaz Larenas (2018) noted that audiovisual materials are more interesting and easier to follow due to clearer instructions. The preferred learning environment focuses on pair or small group work to facilitate personalized attention and interaction. The teacher's role is seen as a facilitator, guiding and supporting students while encouraging active participation, which aligns with Nunan's description (2004).

Document analysis indicates that by the end of the activities, students should be able to interact and communicate in diverse contexts, engage with various text types, and develop inferential skills. Specifically, for listening and speaking, students are expected to exchange ideas, understand discussions, and express opinions using basic sentence structures and verb tenses. Brown and Lee (2015) highlighted the strong interconnection between listening and speaking in communicative language instruction, also referred to as Oral Communication Skills. The focus is on understanding and discussing familiar topics, repetitive vocabulary practice, and expressing ideas in both formal and informal settings. The analysis also examines dimensions of independence and creativity, emphasizing self-awareness, self-regulation, goal-setting, and adaptability for independence, and generating original ideas, evaluating creative actions, and flexible thinking for problem-solving. Nizaruddin and Kusmaryono (2023) emphasize the link between independence and self-regulation, which is essential for developing critical thinking skills and achieving long-term academic success, as noted by Dent and Koenka (2016). The documents collectively highlight the need for designing supplementary listening and speaking materials that integrate the values of independence and creativity to support students' comprehensive development.

Integrating values and skills into learning materials significantly impacts students. These materials serve as primary learning sources, teaching life, character, and soft skills based on national values through engaging activities like stories, songs, and attitude evaluations. Emphasizing life values, such as unity, collaboration, and tolerance, greatly influences students' skills and character development (Komalasari & Saripudin, 2018). Strategies for integrating symbolic values into texts can use implicit and explicit methods (Feng, 2017), and experts support integrating moral values into English language teaching materials through overt and covert models (Sudartini, 2019). Values can be implicitly and explicitly integrated into learning materials using texts and pictures, with implicit strategies often used to convey ideals (Marinković & Erić, 2014). For example, the English textbook for the XI middle school classroom predominantly uses an implicit strategy to integrate values (Utami et al., 2021).

The value of independence and creativity can be integrated into learning materials through texts reflecting character traits or activities depicted in textbooks. Learning materials focusing on language abilities, including listening and speaking, are integrated into various texts. ICT-supported learning materials can provide practical activities explicitly explained in textbooks, guiding and enhancing the learning process with ICT.

4. Conclusions

In conclusion, designing supplementary listening-speaking materials integrated with the values of independence and creativity involves a multifaceted approach. The analysis highlights the importance of addressing key challenges in vocabulary acquisition, pronunciation, and comprehension. Effective materials should incorporate audiovisual elements with subtitles to provide both auditory and visual cues, enhancing comprehension and pronunciation. Engaging, interactive activities such as games and video watching are essential for maintaining student interest and aligning with curriculum requirements. To foster independence, materials should include tasks that encourage self-awareness, self-regulation, and goal-setting. Creative thinking can be promoted through activities that require students to generate and evaluate original ideas, engage in flexible thinking, and solve problems. The teacher's role as a facilitator is crucial, providing guidance and support while encouraging active student participation. Additionally, integrating values implicitly and explicitly through texts and activities helps students apply life principles and develop essential soft skills. ICT-supported learning materials can further enhance the process by providing practical, guided activities. By combining these elements,

supplementary materials can effectively develop students' listening and speaking skills while promoting independence and creativity.

References

[1] Bowen, Glenn A., 2009. Document Analysis as a Qualitative Research Method. Qualitative Research Journal, 9 (2), pp. 27-40. http://dx.doi.org/0.3316/QRJ0902027

[2] Brooks, G et al., (2021). Exploring the importance of vocabulary for English as an additional language learners' reading comprehension. Studies in Second Language Learning and Teaching. 11 (3), 351-376, http://dx.doi.org/10.14746/ssllt.2021.11.3.3

[3] Brown, H. D,. & Lee, H,. (2015). *Teaching by Principle: An Interactive Approach to Language Pedagogy*. New York: Pearson Education, Inc.

[4] Cultural Politics of Education, 40(4), 458–473. https://doi.org/10.1080/01596306.2017.1356806

[5] Dent, A. L., & Koenka, A. C. (2016). The relation between self-regulated learning and academic achievement across childhood and adolescence: A meta-analysis. Educational Psychology Review, 28(3), 425–474. https://doi.org/10.1007/s10648-015-9320-8

[6] Eslit, E. (2023). Enduring Synergy of Values Integration, Critical Thinking, and Moral Reasoning in Language and Literature Education. *Preprints*. https://doi.org/10.20944/preprints202305.1244.v1

[7] Farrington, C.A., Maurer, J., Aska McBride, M.R., Nagaoka, J., Puller, J. S., Shewfelt, S.Weiss, E.M., & Wright, L. (2019). Arts education and social-emotional learning outcomes among K-12 students: Developing a theory of action. *University of Chicago Consortium on School Research*.

[8] Feng, W. D. (2019). Infusing moral education into English language teaching: an ontogenetic analysis of social values in EFL textbooks in Hong Kong. *Discourse: Studies in the Cultural Politics of Education*, 40(4), 458–473. https://doi.org/10.1080/01596306.2017.1356806

[9] Florida, R. (2014). The rise of the creative class—revisited, revised and expanded. Basic Books.

[10] Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction (7th ed.)*. Boston: Allyn & Bacon.

[11] Komalasari, K., & Saripudin, D. (2018). The influence of living values education-based civic education textbook on student's character formation. *International Journal of Instruction*, *11*(1), 395–410. https://doi.org/10.12973/iji.2018.11127a

[12] Lickona, T., & Davidson, M. (2018). How to educate for character. *Educational Leadership*, 75(1), 38-44.

[13] Marinković, S., & Erić, M. (2014). The Problem of Value in a Textbook. *Procedia - Social and Behavioral Sciences*, *128*, 72–76. https://doi.org/10.1016/j.sbspro.2014.03.120

[14] Mascarenhas, O. A., & Menezes, L. M. (2018). Integrating values in English language teaching: A curriculum innovation. *Journal of Language and Linguistic Studies*, 14(2), 164-183. https://doi.org/10.17263/jlls.431071

[15] Mete, F., Alibaşiç, B., & Köksal, B. (2023). Impact of Vocabulary Teaching Approach in Turkish Curriculum on Turkish Textbooks and Use of Technology in Vocabulary Teaching. *Journal of Learning and Teaching in Digital Age*, 8(1), 124-135, https://doi.org/10.53850/joltida.1179069

[16] Miles, M, B., Huberman, A, M., & Saldana, J. (2019). *Qualitative Data Analysis: A Method Source Book*. SAGE Publication.

[17] Nizaruddin & Kusmaryono, I. (2023). How are Critical Thinking Skills Related to Students' Self-regualtion and Independent Learning?. *Pegem Journal of Education and Instruction*, Vol. 13, No. 4 , 2023 (pp. 85-92). https://doi.org/10.47750/pegegog.13.04.10

[18] Nunan, D. 2004. *Task-Based Language Teaching*. Hongkong: Cambridge University Press.

[19] Richards, J. C. (2008). *Teaching Listening and Speaking from Theory to Practice*. New York: Cambridge University Press.

[20] Russ, S.W., & Wallace, C.E. (2013). Pretend play and creative processes. *American Journal of Play*, 6(1), 136–148. https://www.journalofplay.org/sites/www.journalofplay.org/files/pdf-articles/6-1-article- pretend-play.pdf

[21] Serasi, R., Peransiska, L., & Hakim, M. A.R. (2022). Character Education Analysis Represented in English Textbooks for Secondary School Based on the 2013 Curriculum in Indonesia. *Metathesis: Journal of English Language Literature And Teaching*.Vol. 6, No.2, April 2022 PP 157-167. https://doi.org/0.31002/metathesis.v6i2.273

[22] Sudartini, S. (2019). Presenting Indonesian Character in English Language Teaching Materials: Is it possible. *Character Education for 21st Century Global Citizens,* ed. Endah Retnowati et.al. London: *Routledge* Taylor & Francis Group

[23] Ulloa Salazar, G., & Díaz Larenas, C. (2018). Using an audiovisual materials-based teaching strategy to improve EFL young learners' understanding of instructions. *HOW,* 25(2), 91-112. https://doi.org/10.19183/how.25.2.419

[24] Utami, P.A.A., Rohmatillah, R., & Kholid, M.R. (2021). Character values: What are they and how they are integrated in English textbook texts?. English Education: *Jurnal Tadris Bahasa Inggris*,14(2), 106–130.

[25] Wijaya, K. (2022). The Important Role of Self-Regulation in Worldwide EFL Learning Contexts. *Journal of English Language Pedagogy, Literature, and Culture.* 7(1), https://doi.org/10.35974/acuity.v7i1.2578

[26] Yeh, Y & Ting, Y. (2023). Comparisons of Creativity Performance and Learning Effects through Digital Game-Based Creativity Learning between Elementary School Children in Rural and Urban Areas. *British Journal of Educational Psychology,* 3(93), 790-805, https://doi.org/10.1111/bjep.12594

Revealing the Practice of Differentiated Instruction to Improve Students' Reading Literacy

Rr. Hasti Robiasih [1*], Dinar Martia Azizah [2], and Hanandyo Dardjito [3]

[1,2,3] Magister Pendidikan Bahasa Inggris, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia
*E-mail: name@institution.edu

Abstract. The literacy skills are emphasized as the basis for the development of 'refinement' in various aspects. From year to year, the literacy skills, especially reading skills, of Indonesian students have not significantly improved despite various efforts being made. One of the main causes is that in the learning process teachers tend to ignore student variability in cognitive development, talents, interests, attitudes, learning motivation and learning styles. Differentiated learning implemented by teachers is proven to be carried out partially and less systematic. The aim of this research is to reveal the implementation of the differentiated learning model in English language subjects as a case study involving students and English teachers of classes VII E and F at SMPN 1 Ngaglik Sleman. The objectives of this research are: To reveal literacy differentiation and student characteristics, and to analyse differentiated learning in English language subjects. Data collection is done through the analysis of Rapor Pendidikan documents related to literacy achievement as the result of AKM and lesson plans prepared by teachers, interviews, and student needs questionnaires to reveal student characteristics related to readiness, interests, and learning profiles. and to compile student needs mapping. The results of the research are as follows: 1. The needs mapping does not yet accommodate student readiness aspects. 2. The preparation of lesson plans does not fully utilize the results of pre-assessment. There are differences between the differentiated outlined in the lesson plans and the mapping results. 3. Learning activities have not shown the development of literacy reading competencies, especially in L2 and L3. 4. Content, process, and product differentiation are included in the lesson plans and in the implementation of learning, but are not well-suited to the mapping of student characteristics.

Keywords: differentiated learning, lesson plan, literacy, reading skills, student characteristics

1. Introduction

Reading skills are the basis for the acquisition of knowledge, skills, and the formation of students' attitudes. Various efforts have been made by the government in order to increase reading skills such as the School Literacy Movement - Gerakan Literasi Sekolah (GLS) [1] which has been launched since 2016. The results of PISA from year-to-year, however, show that the reading skills of Indonesian students has not increased significantly and even tends to decrease. The reading score of Indonesian students is ranked 72 out of 77 countries. Among Southeast Asian countries, Indonesia is at the bottom with the Philippines which ranks last in reading literacy [2]. This condition is concerning and some more efforts should be applied.

Different contexts of the students could become one of the hurdles in literacy development. Differentiated learning may facilitate this issue. Some teachers have applied differentiated instructions, but the results are unsatisfactory. Some studies indicate that most teachers are struggling to understand differentiated learning and implement it [3]–[5]. Ki Hajar Dewantara suggests that learners must develop according to their nature, therefore learning must be student-centred to provide the best rights for the learners [6]. His suggestion is contextual and one of his education concepts is 3N (Niteni-Recognising, Nirokke-Imitating, Nambahi-Developing). The learning model with the concept of Scaffolding 3N of Ki Hajar Dewantara is expected to provide an alternative learning model with English language learning differentiation to strengthen student literacy. However, before being able to develop the scaffolding model of 3N, some case studies of differentiated English language learning may pave the way to shape the modelling. One of the cases was the differentiated learning implementation at SMPN 1 Nganglik Sleman. This study focuses on 1) the mapping of students' needs, 2) the preparation of lesson plans, 3) the learning activities, and 4) the differentiation of content, process, and product in the lesson plans and in the implementation.

The observation results at SMPN 1 Ngaglik Sleman show that not all teachers have implemented differentiated learning. Teachers who had implemented this usually paid special attention to students who looked different. Literacy activities had not been fully carried out in the learning process. They were in the form of habituation of reading activities before lessons and competitions such as storytelling or asking students to find other sources from the internet. Teachers were enthusiastic about implementing differentiated learning to improve student literacy.

2. Method

This study aims to describe the literacy categories and characteristics of SMPN 1 Ngaglik Sleman students and reveal the weaknesses of teachers' differentiated learning practices in improving student literacy. Some stages carried out in this study were 1) analysing the results of AKM related to literacy in the SMPN 1 Ngaglik Education Report, 2) analysing the differentiated lesson plans prepared by teachers, 3) providing a questionnaire on students' needs related to readiness, interests and student profiles, and 4) observing differentiated classroom activities process to get an idea of how teachers were trying to improve the literacy of SMPN 1 Ngaglik students through learning.

3. Findings

3.1 Differentiation of literacy and characteristics of SMPN 1 Ngaglik students.

3.1.a Differentiation of literacy.
Table 1 shows that the literacy level of students is dominated by a moderate level, namely capable at a percentage of 71.11%. Meanwhile, 22.22% of students' literacy is at an advanced level. There are 6.6% of students who are at an elementary level.

The highest literacy score is 3 and the students only achieved a score of 2.19. It takes systematic efforts to increase the literacy level at an advanced level for most students.

Table 1. Literacy level.

Indicator	Score	Value Range
Literacy skills	2.19	1 - 3

Indicator	Score	Value Range
Advanced	22.22%	0 - 100
Moderate	71.11%	0 - 100
Elementary	6.67%	0 - 100
Need special attention	0%	0 - 100

ᵃ The Education Quality Report.

3.1.b Characteristics of SMPN 1 Ngaglik students.

1. Learning Style

Figure 2 illustrates the student's learning style where the most dominant learning style owned by students is visual 40%, while the second is kinesthetic as much as 33.85% and the last is auditory as much as 26.25%.
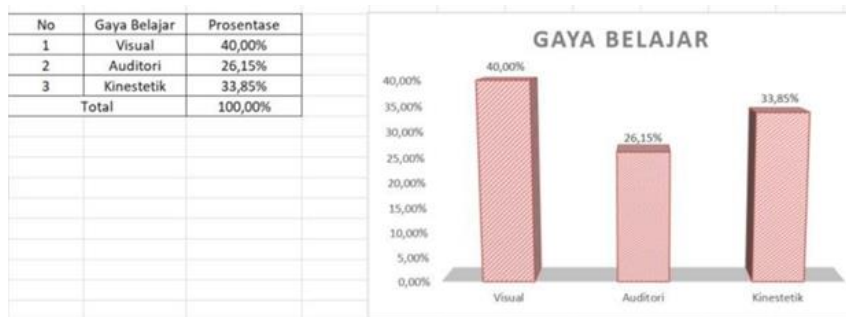
Figure 1. Students Learning Styles.

2. Multiple Intelligence

Figure 2 illustrates that most students have intrapersonal multiple intelligence with a percentage of 23.73%. As for mathematical logic is 15.25%, for musical, spatial and interpersonal skills it is in the range of 10-12%. While the lowest is linguistic at 5.08%. It indicates, in the context of English language learning, the students need attention because it is related to the ability to use language effectively. This intelligence is characterized by the ability to speak, tell stories, remember, get information, and read.
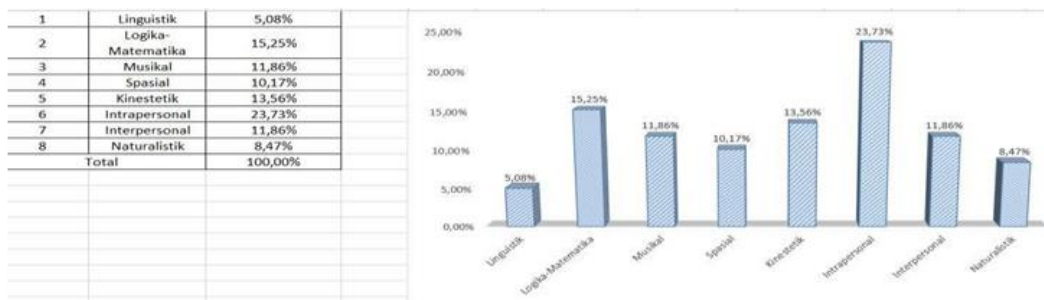

Figure 2. Multiple Intelegence.

3. Students Interest

Figure 3 depicts the students' interests and it can be seen that most students have a tendency to realistic category interests of 27.07%, social 25.76% and conventional 24.24%. As for the artistic category, 12.12% was shown, followed by investigative at 6.06% and daring to try at the lowest figure of 4.45%.
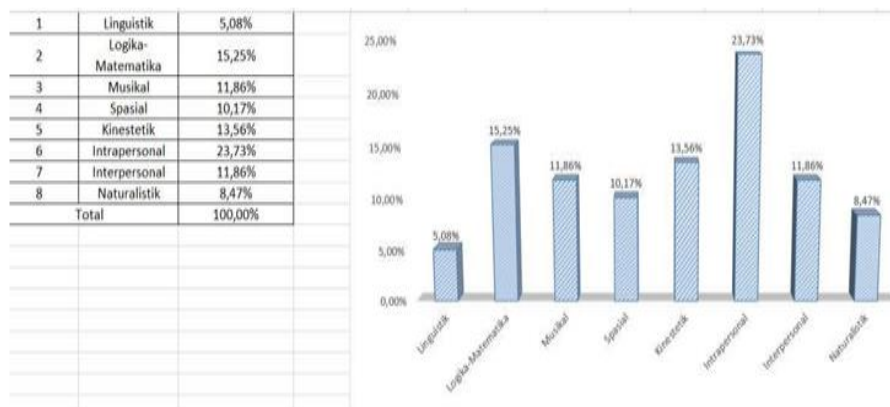
1	Linguistik	5,08%
2	Logika-Matematika	15,25%
3	Musikal	11,86%
4	Spasial	10,17%
5	Kinestetik	13,56%
6	Intrapersonal	23,73%
7	Interpersonal	11,86%
8	Naturalistik	8,47%
	Total	100,00%

Figure 3. Students Interest

4. Students Talent

Figure 4 shows that most students feel that they have the talent of drawing 16.67%, reading 14.09%, football 11.28%, volley 9.28%, cooking and playing musical instruments 7.14%, badminton, futsal, singing and swimming are at 4.76%, while for English, dancing, fishing, and table tennis are all on the percentage scale of number 2. 38 %. This shows that only 2.38% of 40 students are interested in English lessons. Similarly, the reading talent revealed only showed a total of 14.09% of 40 students.
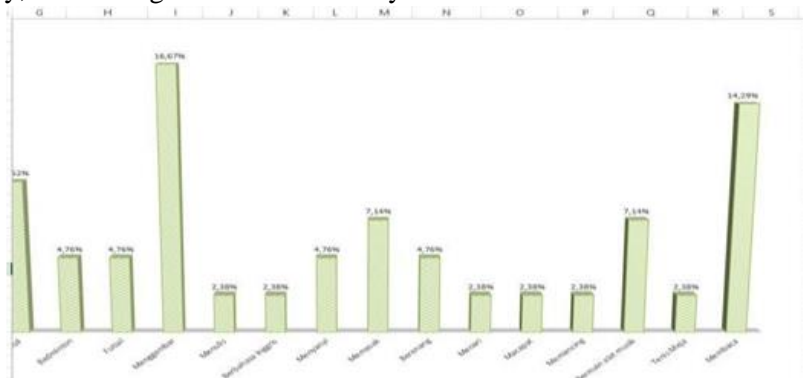
Figure 4. Students Talent

5. Learning expectation

Figure 5 displays the students' learning expectation. They expect fun learning with a percentage of 44.12%, easy to understand 20.59%, learning activities are carried out outside the classroom and relaxed 8.82%, while 5.88% of students still expect detailed explanations and the choice of topics they want is History/Nature 5.88%, While 2.94% of students want learning that is not boring 2, 94% as well as 2.94% of students choose online learning.

Figure 5. Learning Expectation

6. Favourite Subject

Figure 6 depict the students' most favourite subjects which are Indonesian with a percentage rate of 45.65%, followed by the Science map with a percentage of 23.91%, while the English is in 4th place with a percentage of 13.04%, the mathematics and IPSD with a percentage of 4.34% are in fourth place. The subject of sport, civic, Japanese Language, and Religion are in last place with a percentage of 2.17%.

Figure 6. Favourite Subject

3.2 Differentiated learning models carried out by teachers in improving student literacy.

The differentiated learning model used by teachers follows a learning pattern/model with a generic syntax, namely Introduction, Core Activities, and Closing. The following is a differentiated learning model obtained from the results of observation (See Table 2).

Table 2. Differentiated Learning Model

No	Learning Activities	Differentiation aspects
A	**Introduction**	
1	Opening the lesson by doing routine initial activities, saying greetings, praying and doing student attendance.	
2	Ask questions about previously learned material using a short quiz. (Wordwall)	Differentiation of learning profiles, learning readiness and learning interests
3	Explain the learning objectives or basic competencies to be achieved.	
4	Convey the scope of the material and description of the activity according to the Lesson Plan.	
B	**Core Activities**	
1	Showing different text	Content differentiation and learning profiles
2	Students observe the text, then are asked to write down the linguistic elements found in the text.	
3	Showing a video/song about the linguistic elements in the video.	Differentiation of learning profiles and singing/audio-visual content
4	Students listened to the video of the song, then were asked to write down the expressions used in the video.	
5	Students are asked to submit questions about the material discussed.	
6	Students do group work. (Teachers help students who are not yet able)	Process Differentiation
7	Ask each group to present or explain the results of their work.	
8	Providing opportunities for students to ask questions	
9	Students practice writing/designing texts individually based on the teacher's questions/according to pictures/props/realia	
C	**Closing**	
1	Teachers and students jointly make a summary of the material studied.	
2	Teachers ask questions to students to help them reflect on the learning activities they have done.	
3	Conduct process assessments	
4	Teachers give assignments according to the material	Product Differentiation
5	The teacher explains the plan for the upcoming learning activities	

4. Discussion

All reported results or achievements must be related to the stages of research implementation as planned in the proposal. Data presentation can be in the form of images, tables, graphs, and the like, and analysis is supported by relevant and up-to-date primary library sources.

4.1   Characteristics and level of student literacy.

From the analysis of the results of the initial diagnosis, it can be seen that students have diverse characteristics, namely visual learning style of 40%, while the second is kinesthetic as much as 33.85% and the last is auditory as much as 26.25%.

The second characteristic of students is the above multiple intelligence, which can be seen that most students have intrapersonal multiple intelligence with a percentage of 23.73%. As for mathematical logic is 15.25%, for musical, spatial and interpersonal skills it is in the range of 10-12%. While the lowest is linguistic at 5.08%.

By using the RIASEC instrument which is an acronym for realistic, investive, artistic, social, enterprising, and conventional, it was revealed that the characteristics of most students' interests were realistic 27.07%, social 25.76% and conventional 24.24%. As for the artistic category, the number is shown

12.12% followed by investigative at 6.06% and daring to try at the lowest figure of 4.45%.

As for talent, after the initial assessment was revealed, most of the students felt that they had the talent of drawing 16.67%, reading 14.09%, football 11.28%, volley 9.28%, cooking and playing musical instruments 7.14%, badminton, futsal, singing and swimming were 4.76%, while the percentage for English talent, dancing, fishing, and table tennis was 2. 38 %. This shows that only 2.38% of 40 students are interested in English lessons. Similarly, reading aptitude only showed 14.09% of 40 students.

From the above explanation, if there is a common thread between the literacy level of students and the characteristics of the students above. In interests, for example, students tend to

For the learning expected by students they expect exciting/enjoyable learning with a percentage of 44.12%, easy to understand 20.59%, learning activities are carried out outside the classroom and relaxed 8.82%, while 5.88% of students still expect detailed explanations and the choice of topics they want is History/Nature 5.88%, While 2.94% of students want learning that is not boring 2, 94% as well as 2.94% of students choose online learning.

Related to the subjects that are preferred by Indonesian with a processing rate of 45.65%, followed by the science map with a percentage of 23.91%, while the English map is in 4th place with a percentage of 13.04%, the mathematics and social studies map with a percentage of 4.34% is in fourth place. Mapel Sport, Civic, Japanese Language, and Religion are in last place with a percentage of 2.17%.

As for the level of literacy, most of the students are at the capable level at a percentage of 71.11%. Meanwhile, 22.22% of students' literacy is at an advanced level. There are still students who are at the basic literacy level of 6.6%.

4.2 Differentiated learning model

Teachers' efforts to accommodate student characteristics in learning learning styles in learning are to design learning tools based on the results of initial assessment analysis and mapping student characteristics. The application of learning according to Defitriani (2018) The differentiation that teachers can do in learning as stated in DI Learning is designed by differentiating content, processes, and products based on differences in student learning readiness, interests, and learning profiles.

From the results of the analysis of the learning tool documents prepared by the teachers, they have tried to design learning by accommodating the diversity of students both in content, processes, and products. By following the generic learning model in the form of preliminary stages, core and closing activities, the teacher pours out the differentiation at each stage.

In the preliminary stage, the teacher describes the differentiation of learning as follows.

Guru mengajukan pertanyaan tentang materi yang dipelajari sebelumnya dengan menggunakan kuis singkat. kuis link   https://wordwall.net/resource/24179294
(Diferensiasi_profil belajar, kesiapan belajar dan minat belajar)

Teachers ask questions about the previously learned material using a short quiz. The link quiz:..
(Differentiation of learning profiles, learning readiness, and learning interests)

From the data above, it can be seen that teachers understand the differences in student characteristics including learning profiles, learning readiness and learning interests. However, the teacher did not provide a clear category whether the differentiation was in the content, process or product. Based on the results of the mapping, it can be concluded that teachers provide facilitation to students who have a visual learning profile and foster students' interest and readiness with fun learning, namely by playing games. This is in accordance with the purpose of providing aperception and motivation at the beginning of learning At the core activity stage, the teacher differentiates the content by providing a variety of different texts (content) in the form of written texts and pictorial texts.

a. Guru menayangkan 2 teks yang berbeda, yaitu teks tulis percakapan menanyakan dan menyatakan waktu dan teks berupa gambar jam beserta penulisannya. (Diferensiasi konten dan profil belajar)

The teacher shows two different texts, namely:
Transcript of a conversation asking and stating the time
Text in the form of a picture of a clock and its writing
(Content differentiation and learning profiles)

In addition, teachers also provide a variety of different texts (content) in the form of written texts and YouTube video media texts.

Guru menayangkan sebuah video lagu tentang waktu. Di link berikut
https://www.youtube.com/watch?v=BImDM3xetYc_ (diferensiasi profil belajar dan konten menyanyi/ audio visual)

Guru menayangkan sebuah video lagu tentang waktu. Di link berikut: ...
(Differentiation of learning profiles and singing/audio-visual content)

For process differentiation, teachers provide worksheets that must be completed in groups. In the lesson plan and its implementation, the teacher provides scaffolding or support for students who are not able to discuss well during group activities so that students can discuss and understand the material and assignments well. From the results of the interview, it was confirmed that the teacher's understanding related to the differentiation of the process was represented on the scaffolding as stated in the following excerpt.

f. Murid berkelompok. Guru membagikan *students worksheet* pada kelompok, murid mencoba mengumpulkan jawaban atas pertanyaan-pertanyaan pada *students worksheet* dari berbagai sumber.
Selama murid melakukan kerja kelompok, guru dapat memberikan dukungan kepada kelompok murid yang kemampuannya kurang untuk memastikan bahwa diskusi berjalan dengan baik dan mereka memiliki pemahaman yang baik (memberikan scaffolding yang lebih banyak). (Diferensiasi Proses)

Students in groups. Teachers distribute student worksheets to groups; Students try to collect several answers to the questions on the student worksheet from various sources.
(Process differentiation)

The above excerpt shows that teachers have not fully accommodated the results of mapping student characteristics in the differentiation of content and process processes. The visual learning profile gets a larger portion, while the auditory profile may be covered by the utilization of YouTube videos, while the kinesthetic profile has not received an adequate portion.

In the closing activity, product differentiation learning is carried out by providing opportunities for students to do homework assignments in a form that is not explained or explicitly mentioned related to the differentiation of their students.

d. Guru memberikan tugas kepada peserta didik untuk **membuat jadwal kegiatan sehari-hari (timetable) (Diferensiasi Produk)**
   Teachers give assignments to students to make a schedule of daily activities (timetable) (Product Differentiation)

Observation of the differentiated learning process at SMPN 1 Ngaglik can be found several very important things, namely: 1. Teachers carry out differentiated learning by providing a variety of different texts (content) in the form of written texts and YouTube video media texts. 2. Process differentiation is shown by activities such as answering questions on worksheets, group work and discussions, providing scaffolding to underprivileged students to ensure that they are going well and that they have a good understanding, presenting the results of each group's discussion, and providing opportunities for students to ask questions before the teacher then assigns students to individually. 3. Product differentiation: given as an assignment that students must do at home.

4.3 Lesson Plan Analysis

From the differentiated lesson plan prepared by the teacher, the differentiation of content, processes and products that are claimed to be based on the results of the mapping of needs analysis (interests, readiness, talents, multiple intelligences and learning profiles) carried out before learning. Differentiation is contained in the opening, core and closing activities. The opening activity was carried out by providing quizzes/games to accommodate differences in learning profile interests, learning readiness and learning interests. Meanwhile, the core activities of differentiation are contained in content and processes. Where in content differentiation is shown by the design of providing different texts in writing mode and text with the same genre but presented in the form of songs taken from YouTube videos. The differentiation of the process is outlined in several activities such as: answering questions, group discussions, presentations and answering questions according to the topic individually (speaking) and writing answers on the board. Product differentiation is designed in the closing activity of providing follow-up activities in the form of homework.

5. Conclusion

In this section, the conclusions of the research results are formulated in line with the problems raised.

a. The preparation of the Lesson Plan has not fully used the results of the assessment of student needs diagnosis. There is a difference between the differentiation contained in the Lesson Plan and the mapping results.

b. Learning activities have not shown the development of literacy competencies Reading in particular interprets and evaluates texts.

c. The differentiation of content, processes and products has been listed in the lesson plan and in the implementation of learning but is not in accordance with the mapping of student characteristics. There is a tendency to only accommodate the learning profile.

d. The tasks given to students still tend to develop a basic literacy level, namely finding the content of the text.

e. The development of learning activities has not used a learning model that supports the development of literacy and higher-level thinking.

References

[1] Kementerian Sekretariat Negara, *Peraturan Pemerintah Republik Indonesia nomor 13 tahun 2015 tentang perubahan kedua atas peraturan pemerintah nomor 19 tahun 2005 tentang tentang Standar Nasional Pendidikan*. Republik Indonesia, p. 23.

[2] Pengelola web kemdikbud, "Hasil PISA Indonesia 2018: Akses Makin Meluas, Saatnya Tingkatkan Kualitas," 2019. https://www.kemdikbud.go.id/main/blog/2019/12/hasil-pisa-indonesia-2018-akses-makin-meluas-saatnya-tingkatkan-kualitas (accessed Sep. 09, 2022).

[3] Kementerian Sekretariat Negara, *Peraturan Pemerintah (PP) Nomor 4 Tahun 2022 tentang Perubahan atas Peraturan Pemerintah Nomor 57 Tahun 2021 tentang Standar Nasional Pendidikan*. 2012.

[4] Pusat Penilaian Pendidikan Balitbang Kemendikbud, "Pendidikan di Indonesia: Belajar dari hasil PISA 2018," Jakarta, 2018. [Online]. Available: https://repositori.kemdikbud.go.id/16742/1/Laporan Nasional PISA 2018 Indonesia.pdf.

[5] M. B. Imbeau and C. A. Tomlinson, "Managing a differentiated classroom," *Break. mold Classr. Manag. What Educ. should know do to enable students*, pp. 11–18, 2013.

[6] C. A. Tomlinson, *How to differentiate instruction in academically diverse classrooms*. Ascd, 2017.

[7] F. M. Firdaus, "Pelatihan implementasi pembelajaran tematik (Learning by Doing) berbasis diversity dalam meningkatkan kemampuan literasi siswa sekolah dasar di era digital," *J. Pengabdi. Masy. Pemberdayaan, Inov. dan Perubahan*, vol. 1, no. 2, pp. 115–122, 2021.

[8] A. P. Sari, D. A. E. Agustini, and L. D. S. Adnyani, "The Implementation of English Teacher's Differentiated Instruction to Disabled Student in an Inclusive School," *Indones. J. Disabil. Stud.*, vol. 7, no. 2, pp. 170–182, 2020.

[9] T. G. Ginja and X. Chen, "Teacher Educators' Perspectives and Experiences towards Differentiated Instruction.," *Int. J. Instr.*, vol. 13, no. 4, pp. 781–798, 2020.

[10] Panitia Penerbitan, "Ki Hadjar Dewantara: Pendidikan." UST Press, Yogyakarta, 2013.

An Analysis of Students' Proficiency in Using Past Tense at Junior High School

Shabrina Yumna Azhra¹, Nur Hidayanto Pancoro Setyo Putro²

[1] English Department, Yogyakarta, Indonesia
[2] English Department, Yogyakarta, Indonesia

*E-mail: nur_hidayanto@uny.ac.id

Abstract. The purpose of this research is to analyze grade eight junior high school students' proficiency in grammar, especially on using simple past tense for writing a recount text. This research was held at a junior high school in a big city in Java, Indonesia. This is a mix method research, that has a written test as the instrument to understand how far the students' proficiency in using past tense in writing recount text. The qualitative data was gained from an interview with the students. Purposive sampling was used to choose the participants in this research. 31 students participated in this research. The findings reveal that students demonstrate a moderate to high level of proficiency, with frequent errors involving determiners, verb, punctuation and spelling of past tense. The research highlights several key factors affecting these results, including teaching methods and the extent of language exposure outside the classroom. The study offers recommendations for instructional strategies to improve past tense teaching, to enhance overall language proficiency among junior high school students. This analysis adds to the ongoing discussion on language acquisition and curriculum development in secondary education.

1. Introduction

Indonesia was ranked 79th out of 113 countries and in 13th position out of 23 Asian countries based on *EF Education English Prificiency Index (EPI)* on 2023 [1] which makes it considered as a country that has quite low English proficiency and needs to be improved. There are several factors affecting this, one of them is the students' mastery of English four skills. Writing is the most difficult skill in the English language, especially for second-language learners. [2] believes that it requires a long time for students to master writing because it also contains other skills such as grammar. Writing requires a joint application of many cognitive skills. These processes often require advanced thinking and application skills. As a result, a wide range of mental abilities can be acquired [3]. Students who speak Indonesian as their first language may struggle with learning English [4].It is considered as difficult because they need to arrange words and combine them, as well as pay attention to the grammatical rules at the same time. Punctuation marks play a crucial role in the writing process as well [5].

To improve the retention of information, it's important to recognize students unique intelligence areas in content and activities that address these areas can help [6]. In fact, the content of the writing is also a requirement of good writing. In short, students naturally believe that writing is not easy [2]. Writing is a key language skill for teaching English to EFL students at all educational levels, particularly junior high school students. However it is considered as complicated skill to be taught as well to the students [7]. Writing errors are inescapable for EFL students due to the complexity of the English language [8]. Several factors affecting students' proficiency in writing are as follows; (1) the limited

vocabulary they have, followed with the repetition of words that also limit their creativity as well; (2) students are usually spelling words not appropriately enough; (3) usually only use present tense; (4) unstructured writing so it is difficult for the readers to understand the meaning; (5) students are not willing to get feedback from others [9]. Furthermore, EF Education reported that Indonesia ranked 79th out of 113 countries and in 13th position out of 23 Asian countries based on *EF Education English Prificiency Index (EPI)* on 2023. By this, Indonesia is still considered in the "low" category for English proficiency. Four skills in English are important.

To improve Indonesian students' English skills, it is important to understand their proficiency in each skill first, one of which is grammar which will be discussed in this study. The understanding of the structure of grammar can help EFL learners to improve their communicative skills [10]. In short, the purpose of this study is to explore whether grammar is an issue for students who participated in a particular school in Java, Indonesia, and then find out the specific aspect of the issue. This study will focus on the use of simple past tense in recount text, that also one of the factors that affect students' writing proficiency according to [9]. Another factors such as spelling and punctuation would also be discuss on this study. Spelling, grammar, and punctuation all predict written composition success [11].By understanding the specific issue, the development and improvement of the writing skills of students can be planned in the future. Also, attempts to add to pedagogical practices targeted at improving students' writing skills. A previous study by [12] found that EFL students committed four sorts of errors when writing narrative text in the simple past tense, including omission, addition, misformation, and misordering. So, the formulation of the problem is how the grammatical issue happens in English class for junior high school students focusing on the use of past tense in writing recount text. The objective is to analyze students' proficiency on using past tense in writing English text.

[13] indicates that grammar is the description of how words change shape and connect with sentences in a language. Simple past tense refers to actions that occurred in the past and do not extend to the present. It began and finished in the past. Based on Milda Broukal cited in [14] there are three types of simple past tense as follows;

* Table 1. The Concluded Form of Simple Past Tense

Form	Formula	Example
Positive	Verbal = S + V2 + Complement Nominal = S + was/were + Complement	She bought a new book yesterday
Negative	Verbal = S + did + not + Verb 1+Complement Nominal = Did + not + S + Verb 1 + Complement	The case was not hard to solve
Interrogative	Verbal = did + S + V1 + complement Nominal = Was + S + V1 + complement	Did she buy a new book yesterday?

The table above illustrates the simple past tense that this study is going to focus on, especially on junior high-school students.

Several previous studies about writing have been well-investigated to show that simple past tense usually confuses students. It leads them to make mistakes on several tests and it is difficult for them to learn, remember, and apply the grammar formula to the sentences [15]. Another research also examines how students in writing classes contributed to this content. Then it is suggested that English teachers should address these issues by improving students' ability to use simple past-tense [16]. A study by [17] found a moderate level of eleven grade students' proficiency on using past tense. Several ways are available to improve students' writing skills, one of which is technology. A study by [9] shows a significant improvement between writing pre-tests and post-tests after the implementation of the use of technology on first and second-year undergraduate students. The previous study focused on undergraduate students while this study will focus on junior high school students' writing proficiency, and focusing on the errors students might make in the use of simple past tense. Another study on junior high school students also conducted in Tasikmalaya by [7] examines that there are sub-themes on students' difficulty in writing, there are poor grammatical competence, their incapability of developing ideas, unable to construct sentences due to the limitation of vocabulary, demotivation, time management, and limited sources.

Finally, there is a growing body of research concentrating on teaching and learning writing in EFL and ESL settings. However, a few studies focused on the issues of teaching writing at the university level. Furthermore, there have not been empirical examinations emphasizing the problems. English language teachers go through while teaching writing to junior high school pupils. There is also research on how teachers address obstacles when teaching English writing. This study examines the obstacles and error of students writing skill especially on the grammatical issue in using simple past tense.

2. Method

This study used a mixed-method design. [18] define mixed methods research as the collection, analysis, and "mixing" of quantitative and qualitative methodologies to better understand a research problem. Combining quantitative and qualitative methodologies improves knowledge of study problems and questions compared to using only one method. For qualitative, I used descriptive design to focus on information of the current problem. So descriptive method is considered as suitable. In gathering the data, the numeric data can be analyzed by quantitative approach. Quantitative research an empirical assessment based on numerical data, whereas qualitative methods entail interpreting a text or other materials without numerical measurements [19].

The quantitative data were collected from the students' English writing scores based on their capability. The score was gained from a writing test in some types. Starting by arranging words, filling in the blank, and writing a recount text. The rubric assessment was adapted from Brown's writing rubric assessment. The data were analyzed by qualitative and quantitative methods. The interviews and observations were examined and used to produce qualitative data. By comparing the final result of the average scores between the post-test and pre-test assessment, the quantitative data were then examined based on the scoring of the writing assessment. The analysis will be a simple descriptive statistic and descriptive qualitative.

The study was conducted at a junior high school in a big city in Java, Indonesia. The sample was collected through purposive sampling. Descriptive qualitative study generally uses purposive sampling [20]. This involves finding and selecting individuals or organizations with extensive expertise

or experience with a subject of interest [21]. There are 31 participants in this study with the age range from 14-15 years old. A class of students who learn English twice a week. I chose this school because the teacher said that their students found some problems related to writing in English. Also in teaching, and learning activities based on the field practicum. Participants discuss their personal experiences while also listening to and reflecting on those of others in the group [22]. The research steps are illustrated on the figure below;
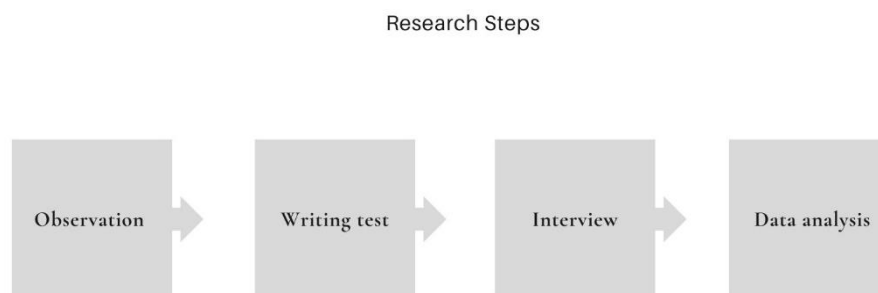
Figure 1. Research steps

The research starts with an observation to give a brief understanding of the students' responses in English class. Furthermore to find out students' grammatical knowledge before conducting the test. On the observation step, I also tried to bond with the students, because young learners should treated differently, one of which is by giving affection. The following step is giving a writing test. The writing test is divided into three parts, first, fill in the blank, second arrange words and third write a recount text by themselves. The written test follows the writing rubrics from Brown. The written test is also based on a theme to make it more structural. Theme-based education organizes language courses beyond official curriculum requirements [23]. In this case, I chose the most relatable theme for the students, it is "favorite experience at school". The last step is to analyze the data both quantitative and qualitative. [24] in [25] define the error analysis into several points; (1) Identification of the errors, (2) Classification of error, (3) explanation of error, (4) Tabulation of error.

3. Result and Discussion

The findings of this study aim to answer the research objective stated in the background of the study. The result of this study sheds light on new findings of students' proficiency in using past tense, by looking at how many errors they have made. The writing overall was scored refers to a rubric by Brown [23] that already adapted and measured five aspects; (1) topic, (2) grammar, (3) originality, (4) accuracy, and (5) tidiness. The analysis of this study focused on the past tense use. The result started with the students' average scores. The next analysis found students' error on their grammar, namely determiner, verb, punctuation, and spelling. The interview results also support the data.

3.1. Score

The score used as the quantitative data that was also shown us the students level on mastering writing recount text. The score was presented on the table below:

*Table 2. Students writing score

Number of students	Overall score	Average
31	2.359	76

The table above presented students score overall and their average on writing test. The average is 76 which is actually already beyond the minimum score set by general school. The minimum score is 75. The analysis focused on their flaws while writing, as well as mentioned earlier in the beginning of the result part. In fact there are 9 students who wans't reach the minimum score, or 29% of them. It means that students proficiency level on writing is already in moderate level but not yet in advanced level. This also clarifies that the degree of students skill in utilizing the past tense is moderate, since 26% have not met the minimum threshold, but the majority are over the minimum standard. However, no one has yet received a perfect score. However, 5 pupils were recognized as virtually faultless in their writing, earning an 85 on their score.

3.2 Grammar

Grammar is how words can change their form and combine into sentences in a particular language [13]. According to the simple past tense formula presented in the introduction section, grammar is one of the skills of arranging and remembering, in this case, the formula. When I did the observation, the formula such as S+V2+complement had already been taught. But in a simple way. As a result, students grammar skill also depends on their efforts to explore more. Besides, an error in grammar sometimes comes from the inability ti understand punctuation marks [25]. The aspects of grammar that found as an issue in students writing are related to determiners, verb, punctuation, and spelling. Those aspects are explained as follows:

*Table 3. Percentage of students; grammatical error

Grammar Aspect	Determiner	Verb	Punctuation	Spelling
Percentage	26% of students	26% of students	9% of students	39% of students

The table above describe the percentage of students' grammatical error, it measured by the frequent errors they have made. Surprisingly, punctuation is considered as a non high level of errors occurs in the classroom comparing to the other. For example, punctuation errors are highly occurs in 9% students in the classroom or there are 3 students in the classroom who had punctuation issue the most on their writing. The table presents a quite high level of students' error in terms of determiner (8 data or 26%), it means that there are 8 students who had issued the most on determiner terms. This aligns with a study by [25] that also got a high level of determiner error on the research findings, which is 43%. Followed by verbs' errors with the same percentage as determiner (8 data or 26%). Followed by the first rank which is spelling (12 data or 39%). The fact, that there are actually 5 students that had a very minimum error, indicates that there are also some students who already understand the use of past tense. It is supported by the interview transcript with the participants. Some students believed that writing is difficult, but some others didn't think so. For example as follows:

"I think writing is the most difficult skill in English, Miss, because we need to arrange the words one by one. Sometimes, I need Google Translate."

(S1/WD)

"I don't think writing is that difficult, Miss, I think the most difficult skill in English is listening"

(S2/WE)

Both of the quote from the interview transcript above shows a contradictive opinion related to difficulties in writing. Student 1 believe that writing is difficult, regarding the word arrangement, it means the student migh have issues on the verb or determiner. The second student is the contradictive opinion, the student belive that listening is more difficult compared to writing. The further specific discussion are point out below:

3.2.1. Determiner

An example of students 4 writing test sentence:

"There **is** scouting activity" should be replaced with " There **is a** scouting activity".

The example above shows an error in the determiner/article aspect of grammar. It appears that an article is missing before the word scouting. It should be started by an article "a" so it would be "**a** scouting".

The next example from students 3 writing text sentence:

"We gossip, joke, and talk about school lessons" should be replaced with "We gossip, joke, and talk about **the** school lessons".

The example above shows there is an error in the aspect of grammar especially determiner/ articles. In this case "talk about school lessons" is better replaced with "talk about **the** school lessons".

Another example related to determiner writing error from the next student:

"was playing with friends" is better replaced with "was playing with **my** friends"

The example above shows that there is an error in terms of determiner, the word "friends" here should be referred to someone. Whom friends is the sentence means. Therefore, the suitable replacement is "with **my** friends".

Besides, an interview transciprt also supporting the data above:

"The most difficult skill in my opinion is writing, because I myself still don't have a lot of vocabulary in English, I don't really understand grammar and the rules of writing. When it comes to writing ideas, it's actually not that difficult, but sometimes I just get confused if I haven't thought of it yet."

(S5/WD2)

The answer above shows that grammar is considered as difficult regarding its vocabulary mastery, that also refers to the use of articles in a sentence. 26% of students struggle with grammar, particularly the use of determiners.

3.2.2. Verb

An example of students 5 writing a sentence:

"I enjoyed **was** basketball" this sentence has an error in terms of verbs. The word "was" is actually not necessary. Because the students might want to state that he/she anjoy playing basketball. So the word "was" should be erased. The sentence then be "I enjoy playing basketball". But if the students want to explain that he/ she enjoy basketball in the past, then the correct sentence will be "I enjoyed playing basketball".

Another example of the error in terms of verb is:

"After school **passed**.." the word "passed here is unfamiliar on that case. It is better to replace it with "ended". Therefore the sentence would be "After school **ended**…".

The other example that shows a clear misunderstanding of past tense is from student 6:

"My school **helding** 17's contest" the word "helding" should be replaced with Verb 2, because the text should be a recount text. Which shows something happen in the past. The word "helding" had to be "held". So the sentence can be "My school **held** a 17's contest last night". In this case, the students might forgot that they need to use past tense ti recall story. Another similar issue happened on the other student 7. The sentence is "I **meet** my friend, Bagas". On recount text, the verb should be in Verb 2. So the sentence should be "I **met** my friend, Bagas". 26% of students struggle with grammar, particularly the use of verb 2 on writing a recount text.

3.2.3 Punctuation

Surprisingly, this aspect is the lowest aspect that has been an issue in classroom writing. Only three students show an issue in this aspect. However, punctuation marks help structure and arrange your work. Punctuation is crucial for readers to understand written content. Errors in punctuation are typically caused by a writer's lack of understanding of punctuation marks. This findings is in contrast with a findings by [6] which states that the study found that students improved their punctuation skills and were more creative writers. However, some punctuation problems were used to help students write paragraphs. While on this study, as a result, several punctuation error is presented below:

"Last Saturday, I had an extracurricular at school**,** I…" The use of **coma** there should be changed with **full stop** (.), because the next sentence is should be another new sentence. Not in one sentence. Another punctuation issue comes from another student (student 9). The sentence is "very happy at that time **plus** the atmosphere". The word "plus should be started by a coma (,). Because it is a two different activities. So the sentence would be "very happy at that time**,** plus (or can be replaced by also) the atmosphere".

This is in line with the interview, almost none of the students state that they have problems with punctuation. In fact there are also 9% of the students who got this issue.

3.2.4 Spelling

As well as the punctuation, this aspect also surprised me. Because it got a high level of percentage compared to the other. This is in line with a study by [11] that discusses how spelling training is crucial for improving written composition in today's educational climate, and found that spelling is the most significant predictor of written composition achievement, followed by grammar and

punctuation .From the interview, we can see that a lot of students state that their writing issues usually comes from vocabulary and grammar, but the fact, they forgot spelling terms.

In the example of the students 10 writing composition:

"In the 17 **august** competition" the word "august" was written in lowercase latter, while it should be started with a capital letter. So the sentence should be "In the 17ᵗʰ **August** competition".

In the example of the students 11 writing composition:

"…yesterday. **the** competition.." the word "the" after fullstop (.) should be in a capital letter. So the sentence should be "…yesterday. **The** competition..".

The same case happen on student 13, the sentence is "…was really fun. **during** the race…". The word "during should be started with capital letter because it appears after full stop (.). So the sentence should be "…was really fun. **During** the race…".

In the example of the student 12 writing composition:

"The school management held a competition in the context of celebrating the **independence day**" the sentence consists of one of the big days in Indonesia, which should be started with a capital letter. So, the sentence should be "The school management held a competition in the context of celebrating the **Independence Day"**.

The data presented are mostly supported by the interview result, the interview result shows the difficulties in writing based on the students' perspective, it can be seen from the table below.

Writing challenges	Content	Verb use	Vocabulary
Percentage	10%	60%	30%

* Table 4. Percentage of students' writing difficulties based on the interview

The data above shows that the most common difficulties in writing English among Junior high school students is verb use. This related to the tenses, word placement, word arranging and more. Further examples are quoted below:

"Sometimes I have an idea but I'm confused about writing it, sometimes I'm confused about the grammar too"

(S7/WD3)

Student 6 is struggling on grammar correction in a sentence, sometimes it confusing to arrange the word. Another quote by student 8 is related to the verb use as well:

"In my opinion, what makes writing difficult is figuring out tenses, past tense, Miss, actually I was taught it earlier during a tutoring session but before I was confused, now it's not that awful"

(S6/WD4)

The student believe that grammar is the main issue on writing English text.

This is in contrass with the findings by [10] that shows only 14% of students found the grammar issues in the first test difficult. However, the majority of the students assumed that the grammar issues on the second test were easy or somewhat easy for them. For simple present tense, 100% of students found it easy or relatively easy or in short, it shows that grammar is generally not a big deal for the participants.

"Writing, since my writing is awful so sometimes I can't even read it, how to locate the words correctly, and English is sometimes reversed like that. Also confused about the use of past tense, when and where"

(S4/WD5)

This student is referring to the fact that the placement of a word in English might be perplexing at times since the word order is reversed, which is not the case in Indonesian. For example, if we say "my pencil" in Indonesian and then change it to English, it will become "my pencil." This will also impact students' ability to employ the past tense. This is supporting the statement on this study's result that past tense use of the students is considered moderate. This is in line with a findings by [17] which describe ability to use the perfect past tense in sentences is rated as medium. This means that only certain students can use the past perfect form in sentences.

Based on the interview and written test result, we can conclude several points. In the interview, several writing difficulties were stated by students. It starts with the content, 10% of the students believe that it is difficult to find ideas before writing something, in terms of recounting text, sometimes they were confused about which experiences they want to write. The verb use gained 60% of students which means, this is the most difficulties that appears on students' writing proficiency. The verb used here related to the use of past tense. Based on this study objective, we can see that there are more than 60% students considered the use of past tense on their writing is an issue. It means, based on the interview, students' proficiency level on using past tense is on moderate level. The issue usually appears in the use of "ed" on past tense. Students sometimes unsure when to employ verb 2. Aside from that, students may not know the second form of a verb. Lastly, 30% students believe they were lacking of vocabulary, thus they are occasionally unsure what to write; they grasp the content and the idea but lack a few English words.

A study by [4] also find investigation revealed 104 faults in active sentences in the Simple Past tense. This is the most common error among the students. The error rate in employing passiveSimple Past was 8 mistakes. The final category of fault was the use of the Past Continuous Tense. There was only one error discovered in this category. According to the Comparative Taxonomy, the source of the students' error was interference with their mother tongue, also known as interlingual errors. Finally, the lesson plan was developed in response to the findings of this study's analysis. It is meant to assist students in understanding English writing and minimizing errors.

In short grammatical errors in using past tense is on moderate level, including verbs and determiner, got high percentage, the rest, related to punctuation and spelling got a lower level. It shows that grammar is considered as quite difficult for students. This is in line with a findings by [8] that stated that grammar is the highest percentage of writing error rather than the other aspects such as organization of the writing. Based on the verb aspect, actually students are already familiar with the use of simple past tense. They are already aware that the past tense employs verb 2 and frequently ends in "ed". This

is seen in the example above, where they utilized multiple past-tense phrases such as "passed" and "was". It's only that some of these children continue to struggle with sentence structure. Vocabulary issues might also make sentence construction less precise.

4. Conclusion

In summary, this study aims to analyze students' proficiency on using past tense. The result of this study occurs from interview and written test. It was found that students' proficiency on using past tense in junior high school in a particular school in Java shows a moderate level. There are several grammatical aspects found affecting the students writing skill. From the written test, there are four aspect occurs as grammatical issue in writing, especially on writing a recount text. First, determiner, it is related with articles. Second, punctuation, followed by verb and spelling. These four aspects are the most frequently aspects that occurs on students writing errors. The score were also shows 9 students were still got a score below the average. It can be said that, the use of past tense is still be an issue, and need to be improved, especially on these four factors. By understanding the factors it would be easier for teachers to find out an appropriate model for improvement. As well as the written, the interview alsos hows the highly errors students faced on writing is the use of verb. They oftenly confused about the use of past tense on writing recount text.

It shows that, teachers must begin teaching utilizing additional media technologies to boost creativity, make it easier for pupils to recall, and address other aspects highlighted in the study. Of course, junior high school pupils are now quite comfortable with technology, therefore there is nothing wrong with teachers offering instruction through collaboration with technology. Several characteristics, like as spelling and punctuation, can be improved by getting students used to reading and learning the correct spelling for specific words in English. Likewise for punctuation. Finally, this study was successful in determining the degree of competency of students in junior high schools in one of Java's cities. With moderate-level results, four major grammatical context difficulties were identified: determiner, verb, spelling, and punctuation.

References

[1] E. Indonesia, "EF English Proficiency Index." [Online]. Available: https://www.ef.com/wwen/epi/regions/asia/indonesia/

[2] N. Falihah, E. Rahmawati, and A. Baihaqi, "EFL Students' Difficulties in Writing Narrative Text," *J. English Lang. Teach. Cult. Stud.*, vol. 5, no. 1, pp. 77–90, 2022, doi: 10.48181/jelts.v5i1.15026.

[3] Ü. E. Kara and Ö. F. Tavşanlı, "The effect of a peer and self-assessment-based editorial study on students' ability to follow spelling rules and use punctuation marks correctly," *Particip. Educ. Res.*, vol. 8, no. 3, pp. 268–284, 2021, doi: 10.17275/per.21.65.8.3.

[4] I. G. A. V. Purnama, "the Problems of Students in Using Past Tenses," *SPHOTA J. Linguist. dan Sastra*, pp. 1–15, 2014.

[5] J. Kirkman, "Punctuation for scientific and technical writing," *Punctuation Sci. Tech. Writ.*, pp. 1–145, 2006, doi: 10.4324/9780203967089.

[6] N. S. Wati, "Exploring the Impact of Punctuation Usage on Students' Writing Skills," *Pedagog. J. English Lang. Teach.*, vol. 9, no. 2, p. 108, 2021, doi: 10.32332/joelt.v9i2.3654.

[7] F. Hilma Amalia Abdullah and A. S. Fatimah, "Teaching writing to junior high school students: A focus on challenges and solutions," *J. Lang. Linguist. Stud.*, vol. 17, no. 2, pp. 794–810, 2021, [Online]. Available: www.jlls.org

[8] R. P. Nanda, N. Inayah, and S. A. Gani, "Students' writing errors in an EFL classroom," *English Educ. Int. Conf.*, pp. 229–236, 2016.

[9] D. Adas and A. Bakir, "Writing Difficulties and New Solutions : Blended Learning as an Approach to Improve Writing Abilities," *Int. J. Humanit. Soc. Sci.*, vol. 3, no. 9, pp. 254–266, 2013.

[10] moh Aditya, "STUDENTS' DIFFICULTIES IN LEARNING BASIC GRAMMAR," Satya Wacana Christian University, 2020. [Online]. Available: https://repository.uksw.edu/bitstream/123456789/23716/2/T1_112016108_Full text.pdf

[11] T. Daffern, N. M. Mackenzie, and B. Hemmings, "Predictors of writing success: How important are spelling, grammar and punctuation?," *Aust. J. Educ.*, vol. 61, no. 1, pp. 75–87, 2017, doi: 10.1177/0004944116685319.

[12] V. F. R. Fanny, J. Juhansar, U. Amalia, and A. Prasetyoaji, "Investigating EFL Students' Tense Errors in Writing Narrative Text," *Int. J. Business, Humanit. Educ. Soc. Sci.*, vol. 4, no. 2, pp. 53–63, 2022, doi: 10.46923/ijbhes.v4i2.172.

[13] J. Harmer, "Jeremy_Harmer_How_to_Teach_Writing_Longm.pdf." p. 6, 2004. [Online]. Available: www.longman.com

[14] M. S, "Analysis of the students' ability in using the simple past tense," 2013.

[15] W. Rianti, "An Analysis on Students' Ability in Using Simple Past Tense at Universitas Pahlawan Tuanku Tambusai," *J. Innov. Creat.*, vol. 1, no. 2, pp. 1–10, 2021.

[16] V. A. Hardi, "The Rules Of Feedback In Writing Class," *Edukatif J. Ilmu Pendidik.*, vol. 2, no. 3, pp. 244–252, 2020, doi: 10.31004/edukatif.v2i3.147.

[17] O. Zebua, "Students ' ability In Using The Simple Past Tense And Past Perfect Tense At Eleventh Year Students Of SMK Faliera Nias," vol. 1, no. 1, pp. 200–204, 2022.

[18] W. J. Creswell, *Educational Research Planning, Conducting and Evaluating Quantitative and Qualitative Research*, Fourth Edi. Boston: Pearson, 2012. [Online]. Available: http://repository.unmas.ac.id/medias/journal/EBK-00121.pdf

[19] A. S. T. Olanrewaju, M. A. Hossain, N. Whiteside, and P. Mercieca, "Social media and entrepreneurship research: A literature review," *Int. J. Inf. Manage.*, vol. 50, no. May 2019, pp. 90–110, 2020, doi: 10.1016/j.ijinfomgt.2019.05.011.

[20] L. A. Palinkas, S. M. Horwitz, C. A. Green, J. P. Wisdom, N. Duan, and K. Hoagwood, "Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research," *Adm. Policy Ment. Heal. Ment. Heal. Serv. Res.*, vol. 42, no. 5, pp. 533–544, 2015, doi: 10.1007/s10488-013-0528-y.

[21] J. W. Creswell and V. L. P. Clark, "Choosing a mixed methods design," in *Designing and Conducting Mixed Methods Research*, California: Sage Publications, Inc., 2011, pp. 53–106.

[22] L. Doyle, C. McCabe, B. Keogh, A. Brady, and M. McCann, "An overview of the qualitative descriptive design within nursing research," *J. Res. Nurs.*, vol. 25, no. 5, pp. 443–455, 2020, doi: 10.1177/1744987119880234.

[23] Brown H. Douglas & Abeywickrama Priyanvada, *Language Assessment Principles and Classroom Practices*, Third edit. Pearsson, 2018.

[24] R. Ellis, *Second Language Acquisition*. New York: Oxford University Press, 1997.

[25] T. N. Fitria, "Error Analysis in Using Simple Past Tense Found in Students' Writing of Recount Text," *Ahmad Dahlan J. English Stud.*, vol. 7, no. 1, p. 39, 2020, doi: 10.26555/adjes.v7i1.12238.

Literature Review of Local Wisdom in Elementary Schools in Indonesia

Suci Annisa Ilmi[1], Nazri[1], Asmiah[1], Zetra Hainul Putra[2], Dahnlisyah[2], Hadriana[2]

Departement of Elementary Education, University of Riau, Pekanbaru, Indonesia
Departement of English Education, University of Riau, Pekanbaru, Indonesia
E-mail: suci.annisa6873@grad.unri.ac.id, nazri7052@grad.unri.ac.id,
asmiah6880@grad.unri.ac.id

Abstract. The collapse of a nation is generally marked by the erosion of the nation's cultural values and the fragmentation of local wisdom even though physically the existence of the nation still exists and is recognized. With the increasing number of cases of deprivation of character and character of the nation's children, it is necessary to raise awareness not only among educators and the government, but also the awareness of the Indonesian people to uphold good morals and character for the Indonesian nation. Local wisdom is a concept related to the wisdom, understanding or intelligence of people in a place and is used to help them overcome the various life problems they face. This research uses a literature study apporach. The research was conducted by collecting and studying various literature and literature studies. The research data used were sourced from various research publications published in journals and downloaded in the Google Scholar online database and Garda Rujukan Digital (GARUDA). The results of the discussion and conclusions in this article are the results of analyzing various relevant scientific sources to discuss the importance of local wisdom content in building positive character for students in elementary school. There is of 13 articles affiliated with learning based on local wisdom for character education. The most common theme among the 13 articles is thinking skills, with 5 articles dedicated to this topic. The other articles focus on appreciation, nationalism, creativity, and religion, with 2 articles on each of these themes. Through learning local wisdom, students can better understand and appreciate their cultural identity, strengthening their sense of pride and courage to preserve traditions.

1. Introduction

Education is a process of being able to influence students so that they can adapt well to the environment. Through this, education is expected to produce changes in individuals that provide opportunities for improving national development (Ariasa & Natajaya, 2020). The process of passing from generation to generation so that cultural values are maintained in the long term is the most important educational practice (Prasetya et al., 2022). Jean Piaget said that while humans evolve and grow from birth, the World of Education is responsible for pushing them towards cultural, social, intellectual and moral values. Building the nation by optimizing the role of the younger generation in global competition cannot be separated from the participation of the government, youth institutions and youth organizations or other community organizations.

The government's efforts in this regard are appropriate (Permendiknas, 2018) (Permendikbud, 2017) Number 20 of 2018 concerning strengthening character education in Formal Education Units

article 2 Character education includes religious values, honesty, tolerance, discipline, hard work, creativity, independence, democracy, enthusiasm for learning, national spirit, love of the country, respect for achievement, communication, love of peace, likes to read, cares about the environment (Riyanti et al., 2021). The importance of character education in the psychological development of students is because character education does not only teach what is right and what is wrong. Furthermore, character education is interpreted as an effort to instill good habits, so that students can act and act based on the values that have become their personality.

The collapse of a nation is generally marked by the erosion of the nation's cultural values and the fragmentation of local wisdom even though physically the existence of the nation still exists and is recognized (Budiwibowo, 2016). Disharmony in social life is often found in acts of exemplary deviation that are displayed. With the increasing number of cases of deprivation of character and character of the nation's children, it is necessary to raise awareness not only among educators and the government, but also the awareness of the Indonesian people to uphold good morals and character for the Indonesian nation. The best effort to answer this problem is through character education. Character education makes noble values the main goal that needs to be achieved (Harun et al., 2020).

In the context of a pluralistic Indonesian society, the values that are the focus of character education will differ from one another depending on the prevailing local wisdom. Local wisdom is a concept related to the wisdom, understanding or intelligence of people in a place and is used to help them overcome the various life problems they face. This diversity can be a potential for the character education process in Indonesia.

2. Methods

This research uses a literature study apporach. The research was conducted by collecting and studying various literature and literature studies. A literature study is used to collect data or sources related to specific topics from various sources such as journals, books, and other libraries (Snyder, 2019). As for the context of this study, the topics studied were related to local wisdom which was made part of the character education process. The literature search process was carried out on April 24, 2024. The research data used were sourced from various research publications published in journals and downloaded in the Google Scholar online database and Garda Rujukan Digital (GARUDA) that can be accessed in https://garuda.ristekbrin.go.id/. (Retrieved as many as 13 articles that meet the specified criteria).

The standard eligibility criteria used in screening or selecting research publications are as follows; (1) published in national or international journals; (2) the research was conducted in Indonesia; (3) can be accessed at the Google Scholar and GARUDA; (4) student learning outcomes are limited to elementary school (SD) level, (5) using selected keywords: local wisdom, elementary school, character formation in Indonesian as well English, and (6) publications of at least the last 10 years. The data analysis in the article consisted of two stages: data reduction and data presentation. Data reduction makes it easier for the author to select data from the literature validly while presenting the data in tables and diagrams (Jumriani et al., 2021). The results of the discussion and conclusions in this article are the results of analyzing various relevant scientific sources to discuss the importance of local wisdom content in building positive character for students in elementary school.

3. Result and Discussion

Based on the results of an in-depth analysis of articles that meet the criteria, the application of local wisdom in character education is observed in diverse manifestations, as outlined in Table 1.

**Tabel 1** Application of Local Wisdom in Character Education

No	Author and Year	Title
1	(Roesmawati et al., 2022)	Pengembangan Handout Pembelajaran Berbasis Kearifan Budaya Lokal Reog pada Pembelajaran IPS untuk Penguatan Pendidikan Karakter Siswa Sekolah Dasar
2	(Putra et al., 2022)	Development of computational thinking tasks based on Riau Malay culture: a study of fifth-grade public school students in Pekanbaru, Indonesia.
3	(Kurniawan, 2018)	Permainan tradisional Yogyakarta sebagai sumber belajar alternatif berbasis kearifan local bagi pembelajaran di sekolah dasar
4	(Sugiyo & Purwastuti, 2017)	Local Wisdom-Based Character Education Model in Elementary School in Bantul Yogyakarta Indonesia
5	(Dewinta et al., 2021)	Development of Teaching Material Local Wisdom-Based "Pati" in Elementary School
6	(Susanti et al., 2022)	Permainan Tradisional: Upaya Pewarisan Budaya dan Pendidikan Karakter Melalui Kearifan Lokal di Sekolah Dasar
7	(Murwaningsih et al., 2020)	The Implementation of Characters' Values Through Local Wisdom of Sadranan in Elementary Schools
8	(Pratiwi et al., 2022)	Digital Storybook to Transform Character Education of Local Wisdom Figures for Elementary School Students
9	(Murti et al., 2020)	Development of Educational Comic with Local Wisdom to Foster Morality of Elementary School: A Need Analysis
10	(Badeni et al., 2023)	Model Pendidikan Nilai Budi Pekerti Berbasis Kearifan Lokal Bagi Siswa Sekolah Dasar
11	(Sudigdo, 2018)	Penumbuhan Budi Pekerti Berbasis Kearifan Lokal Melalui Pembelajaran Sastra Anak Pada Siswa Kelas Tinggi di Sekolah Dasar Yogyakarta
12	(Suparya, 2020)	Pengaruh metode Belajar Tri Kaya Parisudha Pada Pembelajaran IPA Bermuatan Kearifan Lokal Terhadap Keterampilan Berpikir Kritis dan Religiusitas Siswa Sekolah Dasar
13	(Widodo, 2020)	Nilai Budaya Ritual Perang Topat Sebagai Sumber Pembelajaran IPS Berbasis Kearifan Lokal di Sekolah Dasar

There is of 13 articles affiliated with learning based on local wisdom for character education. We present them in the following subsections based on the categories described in the method section.
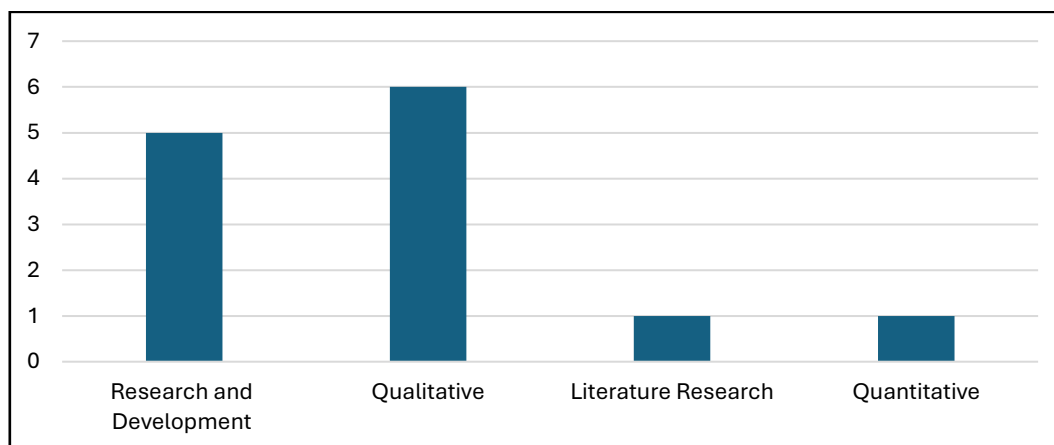
Figure 1. Methods concerning the research with Local Wisdom at Elementary School in Indonesia

After reviewing 13 research articles from the Indonesian Research database, the research use four different method. The qualitative is the most common method used. And it is followed by Research and Development. The literature research and Quantitative is the least used. It can be seen in this research that many use qualitative methods.
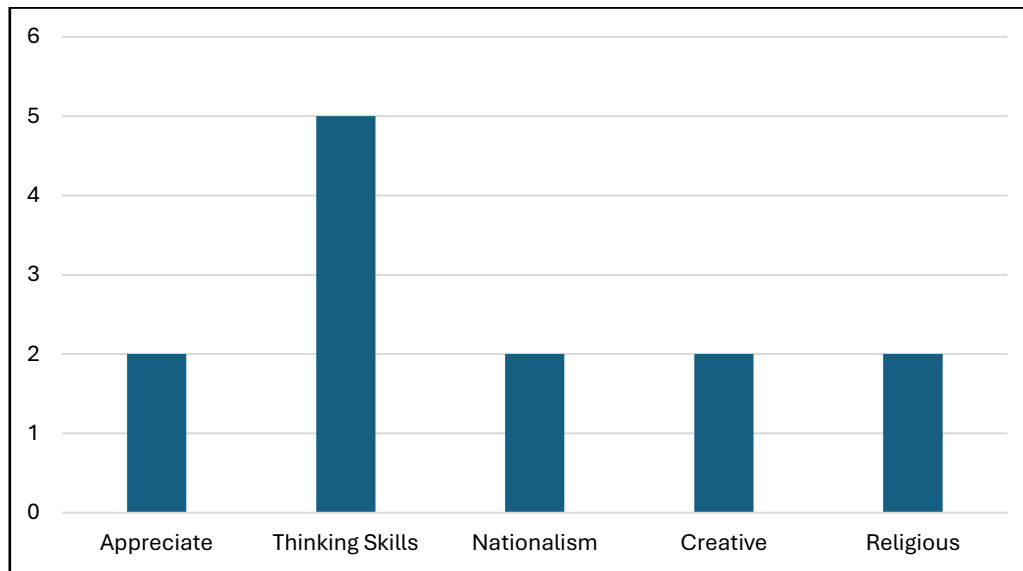
Figure 2. Character domains concerning the research with local wisdom in elementary school

Based on Figure 2, The most common theme among the 13 articles is thinking skills, with 5 articles dedicated to this topic. The other articles focus on appreciation, nationalism, creativity, and religion, with 2 articles on each of these themes. Understanding and analyzing local wisdom encourages students to think critically about their cultural values and practices, as well as their relevance in a modern content.

Local wisdom-based learning teaches values derived from local cultural characteristics that are familiar to individuals, enhancing students' critical thinking skills. This approach not only enhances the potential success of character education but also contributes to preserving local wisdom and internalizing positive values in the younger generation of Indonesia. Local wisdom makes character education more contextual as it is closely related to individuals' lives, more varied as it can be implemented in various forms, and more comprehensive as it can be carried out beyond the school environment. Therefore, character education based on local wisdom will equip the younger generation of Indonesia with cultural values applied in their surroundings.

4. Conclusion

Local wisdom is an important aspect of community life that reflects cultural values, traditions, and norms passed down from generation to generation. Amid the tide of globalization, preserving and maintaining local wisdom becomes a unique challenge, especially for the younger generation. Therefore, integrating local wisdom into education, particularly in elementary schools, is crucial for shaping students' character that is rooted in their own culture. Thirteen articles mention that local wisdom-based learning can enchance critical thinking skills, appreciation, nationalism, creativity, and religious values. Learning based on local wisdom is more relevant to students' lives. This makes the learning process more engaging and meaningful because students can relate lesson materials to their real-life experiences in their environment. Local wisdom often contains important moral and ethical values. Learning and understanding these values help in the development of students' character, such as

responsibility, honesty, and cooperation. Some students may be less interested in local wisdom due to the influence of foreign cultures. Presenting materials in an engaging and relevant way to students' daily lives can increase their interest. Through learning local wisdom, students can better understand and appreciate their cultural identity, strengthening their sense of pride and courage to preserve traditions.

Reference

[1] Ariasa, I. M., & Natajaya, I. N. (2020). Pengaruh Pendidikan Karakter Berbasis Kearifan Lokal Tri Kaya Parisudha Untuk Mewujudkan Budaya Cerdas Dalam Perlindungan Anak Sekolah Dasar. *JURNAL ADMINISTRASI PENDIDIKAN INDONESIA*, *11*(1), 11–20.

[2] Badeni, Saparahayuningsih, S., & Makmurtomo, A. (2023). Model pendidikan nilai budi pekerti berbasis kearifan lokal bagi siswa sekolah dasar. *Sekolah Dasar*, 19–30.

[3] Budiwibowo, S. (2016). MEMBANGUN PENDIDIKAN KARAKTER GENERASI MUDA MELALUI BUDAYA KEARIFAN LOKAL DI ERA GLOBAL Satrijo Budiwibowo *. *Jurnal Pendidikan Dasar Dan Pembelajaran*, 39–49.

[4] Dewinta, A., Nur, F., Sri, S., Imaniar, P., & Zaman, A. (2021). Development of Teaching Material Local Wisdom-Based " Pati " in Elementary School. *Asian Pendidikan*, *2*, 59–64. https://doi.org/https://doi.org/10.53797/aspen.v1i2.10.2021

[5] Harun, H., Jaedun, A., Sudaryanti, S., & Manaf, A. (2020). Pendidikan Karakter Anak Usia Dini Dalam Dimensi Berketuhanan. *Jurnal Kependidikan*, *Vol 4*, *No*.

[6] Jumriani, Mutiani, & Hidayat Putra, M. A. (2021). *The Urgency of Local Wisdom Content in Social Studies Learning : Literature Review*. *2*(March), 103–109.

[7] Kurniawan, M. R. (2018). Permainan tradisional Yogyakarta sebagai sumber belajar alternatif berbasis kearifan lokal bagi pembelajaran di sekolah dasar. *Jurnal Pendidikan Dasar Dan Pembelajaran*, *8*(2), 98–111. https://doi.org/10.25273/pe.v8i2.2697

[8] Murti, D. K., Gunarhadi, & Winarno. (2020). Development of Educational Comic with Local Wisdom to Foster Morality of Elementary School Students : A Need Analysis. *International Journal of Educational Methodology*, *6*(2), 337–343. https://doi.org/10.12973/ijem.6.2.337

[9] Murwaningsih, T., Fadhilah, S. S., & Sholeh, A. R. (2020). The Implementation of Characters ' Values Through Local Wisdom of Sadranan in Elementary Schools. *International Journal of Multicultural and Multireligious Understanding*, *2015*, 450–458. https://doi.org/http://dx.doi.org/10.18415/ijmmu.v7i1.1315

[10] Prasetya, F., Fahrozy, N., Nurdin, A. A., & Hadiansyah, Y. (2022). Analisis Unsur Kearifan lokal Dalam Pembentukan Karakter Siswa di Sekolah Dasar. *Attadib : Journal of Elementary Education*, *6*(2), 237–254.

[11] Pratiwi, V. U., Andayani, Winarni, R., & Anindyarini, A. (2022). Digital Storybook to Transform Character Education of Local Wisdom Figures for Elementary School Students. *Journal of Social Studies Education Research*, *13*(4), 250–264.

[12] Putra, Z. H., Ramiati, Zufriady, Hidayat, R., & Jismulatif. (2022). Development of computational thinking tasks based on Riau Malay culture: a study of fifth-grade public school students in Pekanbaru, Indonesia. *International Journal of Primary, Elementary and Early Years Education*. https://doi.org/10.1080/03004279.2022.2150063

[13] Riyanti, A., Novitasari, N., Studi, P., Bahasa, P., Tarakan, U. B., Studi, P., Guru, P., Dasar, S., & Tarakan, U. B. (2021). *Pendidikan multikultural berbasis kearifan lokal bagi siswa sekolah dasar*. *3*(1), 29–35.

[14] Roesmawati, L., Suprijono, A., & Yani, M. T. (2022). Pengembangan Handout Pembelajaran Berbasis Kearifan Budaya Lokal Reog pada Pembelajaran IPS untuk Penguatan Pendidikan Karakter Siswa Sekolah Dasar. *Jurnal Basicedu*, *6*(5), 8909–8922.

[15] Snyder, H. (2019). Literature Review As A Research Methodology: An Overview And Guidelines. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

[16] Sudigdo, A. (2018). Penumbuhan Budi Pekerti Berbasis Kearifan Lokal Melalui Pembelajaran Sastra Anak Pada Siswa Kelas Tinggi di Sekolah Dasar Yogyakarta. *Journal UAD*, *XXXVIII*(1), 1–7. https://doi.org/http://dx.doi.org/10.26555/bahastra.v38i1.7627

[17] Sugiyo, R., & Purwastuti, L. A. (2017). Local Wisdom-Based Character Education Model in Elementary School in Bantul Yogyakarta Indonesia *. *Sino-US English Teaching*, *14*(5), 299–308. https://doi.org/10.17265/1539-8072/2017.05.003

[18] Suparya, I. K. (2020). Pengaruh Metode Belajar Tri Kaya Parisudha Pada Pembelajaran IPA Bermuatan Kearifan Lokal Terhadap Keterampilan Berpikir Kritis dan Religiusitas Siswa Sekolah Dasae. *Jurnal Pendidikan Dasar*, *5*(1), 17–28. https://doi.org/http://ejournal.ihdn.ac.id/index.php/AW

[19] Susanti, A., Darmansyah, A., & Aulia, N. (2022). Permainan Tradisional: Upaya Pewarisan Budaya dan Pendidikan Karakter Melalui Kearifan Lokal di Sekolah Dasat. *Jurnal Dikoda*, *3*, 40–51.

[20] Widodo, A. (2020). Nilai Budaya Ritual Perang Topat Sebagai Sumber Pembelajaran IPS Berbasis Kearifan Lokal di Sekolah Dasar. *Jurnal Studi Sosial*, *5*(1), 1–16. https://doi.org/10.25273/gulawentah.v5i1.6359

The Value of Local Wisdom in Betawi Children's Literature, Tangerang City (Pangeran Cisadane)

Velayati Khairiah Akbar[1]*, Zuriyati[2] and Syamsi Setiadi[3]

[1] Universitas Negeri Jakarta
[2] Universitas Negeri Jakarta
[3] Universitas Negeri Jakarta

*E-mail: velayatikhairiahakbar_9906921014@mhs.unj.ac.id
Dosen02351@unpam.ac.id zuriyati@unj.ac.id, Syamsi.setiadi@unj.ac.id

Abstract. Children's literature is not only entertaining, but also a place to instill ethical and moral values, reflect and preserve local wisdom which is very important in guiding people's behavior in Tangerang City. However, the cultural relevance and influence of literature has faded, leading to the marginalization of literature in contemporary cultural practices. This study underscores the urgent need for strategic interventions aimed at preserving Betawi children's literature, thereby ensuring its accessibility and relevance for future generations. This research focuses on exploring the local wisdom values inherent in Betawi children's literature. This research uses qualitative data; These findings reveal that local wisdom packaged in literature is closely related to the core characteristics of the people of this city—namely, caring, brave, intelligent, and preserving the environment.
Keywords: Children's Literature, Pangeran Cisadane, Local Wisdom Value

1. Introduction

The rapid development of technology and science that is currently occurring has certainly had an influence on the shift in life values in our society. The loss of oral literature may be impossible, the possible consequences are more about efforts to develop new norms that the Indonesian people are fighting for. Efforts to preserve culture are very important because with the extinction of the richness of language and literature, the values contained therein will also disappear, as well as the values that reflect the psychological culture, character, and civilizational environment that has been formed in these traditions will also disappear. . Darma says that literature is an imitation of real life or what is called mimesis (2004, p. 42). Therefore, the reality of life is closely related to a literary work.

Literary works are not mere nonsense but rather a reflection of the past which has so many noble values in it. The inheritance of folklore has a very long history, this shows that folklore certainly contains wisdom values in it, although not in its entirety, but at least regarding the culture at the time they lived (Endraswara, 2002, p. 12).

One effort to discover and explore these noble values is research on the structure and values of local wisdom. The values contained in literature in the city of Tangerang have many noble values, diversity and are rich in local wisdom values. It would be a shame if the folk tales born in the city of Tangerang are not well expressed. In an effort to preserve local wisdom values, it is very important and relevant to current conditions. Challenges in the current 4.0 era can be a guide in establishing balance in managing life in relation to humans and nature, the relationship between humans and society and the relationship with the Creator. Three forms of relationship that can be linked are the form of human

relationship with the Creator, the relationship between humans, and how humans relate as individuals (Djamaris, 1993, p. 25).

Local wisdom in the folklore of Prince Cisadane, Tangerang city is an effort to preserve the nation's cultural riches by expressing the value of local wisdom contained in the prose folklore of Prince Cisadane, can enrich the treasures of Indonesian literature, and can become additional knowledge for teachers and students to understand. literature, especially regional literature, so that teachers' and students' appreciation of literature increases.

The value of local wisdom can also be said to be something valuable, something useful, important and useful for humans. The Big Indonesian Dictionary defines values as traits (things) that are important or useful for humanity, something that perfects humans according to their nature (Offline Version V). The definition of value is broadly defined as something that is true, good and beautiful. While the definition of culture is the mind or reason found in humans, from these two definitions, the value of local wisdom can be interpreted as an abstract concept within humans regarding what is good and what is bad. From these opinions, it can be concluded that cultural values are noble values that are useful in human life and can also perfect human life itself in accordance with its essence.

According to Damono, myths, legends and various other types of oral traditions are the crystallization of human efforts to answer questions that arise in relation to the relationships between humans and the world around them (1978, p. 18). Folklore is a story that circulates orally regarding the traditions and beliefs of society, such as myths, legends, fables, fairy tales, sages, and others (Zaidan, 2002, p. 5). Folklore is classified as a type of oral folklore. Boscom divides folklore into three groups, namely myths, legends and fairy tales (Danandjaja, 2007, p. 50). Regarding the definition of local wisdom values, he states that "Local wisdom values are conceptions that are still abstract regarding the basis of something important in life." This means that a local wisdom value is a form of life and contains provisions that have been used as a basis for behavior and regarding judgments of good or bad in life in society.

The values in a literary work can be enjoyed by literature lovers if they have gained experience and enjoyed the literary work they read. In other words, only readers who succeed in gaining literary experience can gain values or benefits in literature. It would be a shame if readers, listeners or viewers of a literary work do not get the values contained in the literary work they enjoy. Because it is not uncommon for a literary work to contain noble thoughts, valuable soul experiences, and high human views. These noble values will be a good example for all of us in maintaining relationships between each other, relationships with the natural environment, and relationships with the Creator. In literary research, an appropriate theoretical basis is absolutely necessary to reveal the function and value of literary works as fully as possible (Sudikan, 2017, p. 13).

Currently, these local wisdom values are starting to be marginalized by civilization. Not many people care about the regional literature they own anymore. The transition to digital technology, which should be used as a medium for promoting regional literature, is becoming less important. People are busy absorbing foreign cultures which are not necessarily compatible with their own culture. Apart from that, this is also in line with the government's intentions which are intensively carrying out a mental revolution through ongoing character education. The existence of moral values in a literary work means that literature is often linked to the function of literature for character formation, especially for the younger generation in the context of literature learning. Even though literature learning does not touch all aspects of education, it is hoped that the affective aspect which is the source of literature learning can be better developed.

2. Research methods

This research method uses descriptive research methods, in principle it cannot be separated from how to study, investigate or carry out something systematically. In the research methods section, research materials, tools, research paths, data variables and data analysis are explained (Mahsun, 2005, p. 13). Methods can also be said to be ways of working to understand an object. A research requires a certain way of working so that it can be collected in accordance with the research objectives and scientific way of working, which is often called research methods. A method is the main way used to achieve a goal, for example to test a series of hypotheses using certain tools.

The method used in this research is a descriptive method, a presentation that explains the relationship between data obtained from the literature and the object of research. The data obtained is presented in the form of a description. This means that research is carried out as objectively as possible based solely on facts, even though the material processed is selected from all the data collected in accordance with the research objectives (Latifah Ratnawati, et al., 2002, p. 5) namely obtaining a complete and complete picture of Local wisdom values in the folklore of Prince Cisadane, Tangerang city, which will be studied as the research object. Each local wisdom value contained in the folklore of Prince Cisadane, Tangerang city, will be accompanied by a quote or statement, either in the form of narrative or dialogue.

3. Results and Discussion
a. Summary of the story Pangeran Cisadane Tangerang city

Pada zaman dahulu kala, di Sungai Cisadane kota Tangerang terdapat kisah siluman Buaya. Siluman ratu buaya tersebut adalah roh atau jin yang menyerupai buaya. Siluman buaya ini kerap meresahkan warga sekitar, bahkan masyarakat yang tinggal di pinggir sungai pun tak luput dari gangguannya. Apalagi kepada warga yang berperilaku kasar, kotor dan tidak ramah terhadap Sungai Cisadane. Setiap warga yang melintasi sungai harus selalu berhati-hati. Begitu pula warga yang kerap mandi, mencuci, dan memancing di tepian sungai.

Suatu hari Seorang pria tampan bernama Sarif tiba-tiba menghilang saat sedang memancing di tepian Sungai Cisadane. Sarif adalah anak Pak Sanusi, kepala desa. Anehnya, meski berhari-hari warga mencarinya di sepanjang sungai, namun tetap tidak bisa menemukannya. Pria itu menghilang tanpa jejak. Dia menghilang seolah ditelan bumi. Warga menghentikan pencarian karena mengira Sarif telah dimakan siluman ratu Buaya. Setelah kejadian tersebut, penduduk diteror dan dihantui rasa takut terus-menerus. Warga menjadi cemas dan tertekan.

"Apa yang sudah kita lakukan sehingga musibah ini menimpa dan menghantui kita. Gerakan kita sepertinya selalu didorong oleh rasa takut menjadi korban berikutnya, kita sangat takut" siluman ratu buaya.

Hingga suatu hari, kabar burung itu sampai kepada seorang pemuda tampan dan sangat baik. Pemuda itu datang dengan kharisma seorang ksatria. Dia memiliki kain ungu yang diikatkan di kepalanya. Nama pemuda itu adalah Aby.

"Maaf pak, benarkah di sungai ini banyak buaya?" tanya Aby pada salah satu warga.

"Jadi di sungai Cisadane banyak buayanya, diantara buaya-buaya itu ada ratu siluman buaya. Dia selalu menakuti penduduk dengan berbagai cara, apa sebenarnya yang membawamu kesini Kisanat?" warga bertanya kepada Aby.

"Oh, saya hanya ingin memastikan kabar yang saya dengar dari masyarakat tentang kejadian yang sering meresahkan warga di sini." Jawab Aby dengan sangat bijak.

"Sebenarnya Kisanat ini siapa dan dari mana asalnya?"

"Izinkan saya memperkenalkan diri, saya kepala desa di sini, nama saya Sanusi." ucap kepala desa bingung dengan pemuda misterius itu.

"Saya dari desa seberang, sekitar lima desa dari sini, nama saya Aby." Jawab Abi sambil tersenyum.

"Jadi, apa yang Kisana lakukan? Bisakah Kisana menolong kami? Kita semua berharap Kisana dapat membantu menyelesaikan permasalahan desa kami. Desa kami selama bertahun-tahun mempunyai masalah yang tak kunjung usai, sudah banyak warga yang hilang dan tidak diketahui keberadaannya, termasuk anak saya Sarif yang hilang saat sedang memancing di Sungai ini, namun sebelum Sarif menghilang, salah satu warga melihat Sarif bersama wanita cantik dipinggir Sungai Cisadane ini." ucap Pak Sanusi dengan kesedihan yang mendalam menceritakan apa yang terjadi di desa tersebut.

"Insya Allah Pak. Kami semua berusaha dan berdoa kepada Tuhan Yang Maha Esa agar apa yang terjadi di desa ini cepat terselesaikan dan masyarakat desa ini dapat kembali hidup damaidan tenteram." Jawab Aby dengan penuh keyakinan.

Dengan semangat dan tekad yang kuat, setelah mendengarkan cerita Pak Sanusi, Aby langsung menuju ke tepi sungai dan bertemu dengan seorang wanita cantik. Seorang wanita sedang duduk di tepi sungai dengan raut wajah yang nampak sedih, sehingga Aby merasa kasihan padanya. padahal dia adalah jelmaan Ratu Buaya yang berubah menjadi seorang Wanita. Aby menghampiri wanita itu dengan sangat penasaran siapa wanita itu. Aby merasakan aura yang sangat berbeda, aura yang terpancar dari wanita tersebut membuat Aby mengira bahwa dia bukanlah orang biasa, melainkan penjelmaan dari siluman ratu Buaya. Aby kemudian berpura-pura tidak mengetahui bahwa dia adalah ratu siluman buaya dan ia ikut serta dalam permainan yang dimainkan siluman ratu buaya tersebut.

"Maaf, dari jauh aku melihatmu duduk sendirian dan sedih. Kalau boleh aku bertanya, apa yang kamu lakukan di sini?" Aby bertanya pada wanita itu.

"Aku baru saja kehilangan seseorang yang sangat kucintai, anakku." jawab wanita itu.

"Apa yang terjadi pada anakmu?" tanya Aby

"Anak saya tenggelam saat bermain di tepi sungai ini." jawab wanita itu.

"Apakah jenazah putramu telah ditemukan?" tanya Aby

"Belum, maukah kamu membantuku mencari mayat anakku yang tenggelam di dasar sungai ini?" katanya sambil menitikkan air mata.

Aby berhati-hati terhadap ratu buaya itu, Aby mencari cara untuk mengetahui di mana ratu buaya itu bersembunyi. Sementara itu, dia terus membujuk Aby agar menyelam ke dasar sungai. Aby percaya ada sesuatu yang melindunginya dan Aby menyelam untuk berpura-pura mencari anak dari Wanita tersebut. tiba-tiba Aby hilang kesadaran, dan Ketika bangun dari pingsannya Aby sudah berada dikerajaan di dasar Sungai.

"Siapa kamu?" tanya Aby.

"Kami adalah korban tawanan ratu buaya. Kami sangat ingin terbebas dari tempat ini. Bagaimana kita keluar dari tempat ini? Bisakah Anda membantu kami?" kata tahanan itu.

"Sebenarnya saya datang ke sini untuk membantu kalian, saya sengaja mengikuti perangkap siluman ratu buaya untuk masuk ke dalam sungai untuk mencari tahu di mana dia bersembunyi. Semua ini saya lakukan karena mendengarnya dari warga dan salah satunya adalah Kepala Desa pak Sanusi." ucap Aby dengan tenang.

"Haa..Ini ayahku! Apakah dia sehat dan baik-baik saja?"

"Kalau tidak salah, apakah namamu Sarif? - Anak Pak Sanusi yang sudah bertahun-tahun tidak ditemukan?" ucap Aby serius sekali sambil menatap wajah Sarif.

"Bagaimana kamu bisa sampai di sini? Apakah Anda datang ke sini karena ingin membantu seorang wanita dan tidak menyadarinya sampai Anda tiba di sini?"

"Ya, sama seperti yang lainnya." kata Abi. "Tapi aku sengaja datang."

Di kejauhan mendengar suara langkah kaki, suara itu mendekat dan kami melihat seorang wanita anggun berpakaian kebaya yang sangat cantik. Dia tersenyum begitu Aby menatap wajahnya. Wanita itu berkata "Maukah kamu ikut denganku?" Wanita berlesung pipit dan tersipu itu mengulurkan tangannya, sebelum Aby sempat menjawab, Ratu Buaya segera meraih tangan Aby dan akhirnya berjalan bersama Ratu Buaya. Saat berjalan di dalam gua, Aby berpikir bahwa dia bisa menggunakan kesempatan ini untuk menambah pengetahuan tentang alam gua ini. Karena Ratu Buaya tertarik pada Aby, dia dengan senang hati menjawab semua pertanyaannya. Mulai dari menanyakan identitas ratu buaya hingga sejarah keberadaan gua tersebut.

"Dengar Aby, sebenarnya ini bukan gua biasa, ini kerajaanku. Aku ratu kerajaan ini, hanya aku yang berhak mengundang orang untuk masuk kesini." kata ratu buaya.

Sedikit demi sedikit, Aby mendapatkan informasi yang dibutuhkannya. Mendengar jawaban Ratu Buaya, Aby membayangkan rencananya untuk membebaskan para tahanan. Lalu tiba-tiba Aby bertanya.

"Kalau kamu masuk, bagaimana cara keluar dari singgasana terindah milikmu itu? Sejujurnya, aku sangat kagum melihatnya." kata Abi.

"Sebenarnya mudah untuk keluar dari gua ini, ikuti saja jalan sampai ke ujung istanaku, sambil menundukkan kepala karena banyak jin yang sangat sakti diujung gua sana. Jika kamu menghormatinya, kamu keluar dari gua ini dengan mudah" kata ratu buaya.

Hasilnya, dia mengetahui situasi gua ratu buaya dari dalam. Aby mulai merencanakan dan mengatur waktu yang tepat untuk melepaskan seluruh tahanan yang ditahan Ratu Buaya. Aby terus mengamati ratu buaya. Akhirnya, dia menemukan waktu yang tepat. Ia berencana melepaskan para tahanan saat bulan purnama tiba. Saat itu, ratu buaya sedang melakukan ritualnya. Aby juga mengetahui bahwa Ratu Siluman Buaya mempunyai kekuatan Mustika, Aby dengan hati-hati mengambil mustika milik ratu buaya dan berjalan bersama tahanan lainnya, sepanjang jalan menuju ujung gua abi dan para tahanan lainnya menundukkan kepalanya seperti yang dikatakan ratu buaya. .Aby dan para tawanan lain pun berhasil keluar dari gua Siluman itu. Masyarakat desa di tepian sungai

Cisadane pun menyambut gembira karena Aby dapat membebaskan para warga yang menghilang di sungai itu. Setelah berhasil menyelelamatkan para warga, Aby menitipkan pesan kepada warga yang tinggal di sekitar sungai Cisadane.

"Kalian jagalah selalu kelestarian sungai ini, karena sungai ini adalah sumber kehidupan bagi semua makhluk !"Setelah peristiwa itu keresahan warga dengan adanya Ratu Siluman Buaya pun sirna, karena Aby telah berhasil mengambil sebuah mustika sakti yang selama ini membuat Ratu Siluman Buaya beserta kerajaannya itu kekal. Tetapi saat ini, semua itu telah lenyap. Setelah itu ia dijuluki Pendekar Cisadane sebagai tanda terima kasih masyarakat karena ia adalah sosok pemberani yang mampu menghadapi Ratu Iblis Buaya dan menang. Suasana kampung kembali tenang, karena warga yang tinggal di pesisir sungai Cisadane tak lagi dihantui teror.

b. The value of local wisdom, the folklore of Prince Cisadane, Tangerang city care

The value of caring wisdom can be seen from the character Aby who has a caring nature towards the people of the Cisadane River who at that time were feeling afraid, sad and affected by disaster.

> *"Maaf pak, benarkah di sungai ini banyak buaya?" tanya Aby pada salah satu warga.*
>
> *"Jadi di sungai Cisadane banyak buayanya, diantara buaya-buaya itu ada ratu siluman buaya. Dia selalu menakuti penduduk dengan berbagai cara, apa sebenarnya yang membawamu kesini Kisanat?" warga bertanya kepada Aby.*
>
> *"Oh, saya hanya ingin memastikan kabar yang saya dengar dari masyarakat tentang kejadian yang sering meresahkan warga di sini." Jawab Aby dengan sangat bijak.*

This caring nature can be seen in the quote above, the character Aby who deliberately came to meet the residents of Sungai Cisadane to express his condolences and ask what really happened. Aby's caring nature is very good, how should a human or community member who hears that a neighbor or other person has been affected by a disaster must immediately care and help. Caring is a noble value that everyone must have. This sense of caring must be cultivated from childhood until adults become accustomed to caring about other people's difficulties and hardships.

Brave

Aby is a very brave figure, Aby dared to risk his life to help the residents around the Cisadane River who were being held captive by the evil crocodile queen. Aby dared to trap the crocodile demon queen by pretending to be sympathetic to help the woman who was crying on the bank of the river, but Aby actually knew that the woman who was crying was a crocodile demon who was pretending to have lost her son. Abi dared to meet the demon and dared to fall into the crocodile demon's trap and enter the river of the crocodile queen's palace.

> *Aby berhati-hati terhadap ratu buaya itu, Aby mencari cara untuk mengetahui di mana ratu buaya itu bersembunyi. Sementara itu, dia terus membujuk Aby agar menyelam ke dasar sungai. Aby percaya ada sesuatu yang melindunginya dan Aby menyelam untuk berpura-pura mencari anak dari Wanita tersebut. tiba-tiba Aby hilang kesadaran, dan Ketika bangun dari pingsannya Aby sudah berada dikerajaan di dasar Sungai.*
>
> *"Siapa kamu?" tanya Aby.*

> *"Kami adalah korban tawanan ratu buaya. Kami sangat ingin terbebas dari tempat ini. Bagaimana kita keluar dari tempat ini? Bisakah Anda membantu kami?" kata tahanan itu.*

> *"Sebenarnya saya datang ke sini untuk membantu kalian, saya sengaja mengikuti perangkap siluman ratu buaya untuk masuk ke dalam sungai untuk mencari tahu di mana dia bersembunyi. Semua ini saya lakukan karena mendengarnya dari warga dan salah satunya adalah Kepala Desa pak Sanusi." ucap Aby dengan tenang.*

The value of local wisdom is that bravery is not just about lifting weapons, fighting or physical combat. However, the brave nature of the character Aby dares to fight the crocodile queen's demon with tactics to trick the crocodile queen's demon. Aby's character's courage in trapping the crocodile queen bore fruit, so Aby was able to meet the captive crocodile queens who were locked up at the bottom of the Cisadane River. This courageous characteristic must be possessed by every individual in carrying out his life.

Intelligent

The intelligent nature possessed by the character Aby is a local wisdom value or noble value that every child must have. Being smart or cunning in dealing with difficult situations and having a way out to solve problems are local wisdom values possessed by the character Abi in the folklore of Prince Cisadane, Tangerang city.

> *Sedikit demi sedikit, Aby mendapatkan informasi yang dibutuhkannya. Mendengar jawaban Ratu Buaya, Aby membayangkan rencananya untuk membebaskan para tahanan. Lalu tiba-tiba Aby bertanya.*

> *"Kalau kamu masuk, bagaimana cara keluar dari singgasana terindah milikmu itu? Sejujurnya, aku sangat kagum melihatnya." kata Abi.*

> *"Sebenarnya mudah untuk keluar dari gua ini, ikuti saja jalan sampai ke ujung istanaku, sambil menundukkan kepala karena banyak jin yang sangat sakti diujung gua sana. Jika kamu menghormatinya, kamu keluar dari gua ini dengan mudah" kata ratu buaya.*

The intelligence value of the character Aby is very good, so Aby can find out the way out of the crocodile demon queen's palace. Aby's intelligence in approaching the crocodile demon queen to find a way out of her palace paid off. With Aby's intelligence, Aby was finally able to bring the captive crocodile demon queen out of the seabed. So that the prisoners can return home and meet their respective families. This intelligent characteristic must be possessed by every individual to live a good life. Don't be fooled by other people or unable to solve the problems they face. This intelligence is not just about completing homework, doing mathematics or anything else, but this intelligence is about how we are able to solve problems that exist in social life.

Protect the preservation of the river

The value of preserving the environment must be shared by every individual on this earth. The preservation of the Cisadane River must continue to be maintained, don't throw rubbish carelessly so that it can disturb other creatures that live in the river.

"Kalian jagalah selalu kelestarian sungai ini, karena sungai ini adalah sumber kehidupan bagi semua makhluk !"Setelah peristiwa itu keresahan warga dengan adanya Ratu Siluman Buaya pun sirna, karena Aby telah berhasil mengambil sebuah mustika sakti yang selama ini membuat Ratu Siluman Buaya beserta kerajaannya itu kekal. Tetapi saat ini, semua itu telah lenyap. Setelah itu ia dijuluki Pendekar Cisadane sebagai tanda terima kasih masyarakat karena ia adalah sosok pemberani yang mampu menghadapi Ratu Iblis Buaya dan menang. Suasana kampung kembali tenang, karena warga yang tinggal di pesisir sungai Cisadane tak lagi dihantui teror.

The crocodile demon queen's anger was a form of rebuke to the residents of the Cisadane River whose sustainability had been destroyed. In the Cisadane River, there are many creatures that depend on it for life, such as fish, crocodiles, coral growth, and so on. Therefore, let every individual care about the surrounding environment. Don't let the preservation of the river not be maintained and become polluted with rubbish which will cause other creatures to feel disturbed and die. River preservation can be maintained and maintained by every citizen for future life.

4. Conclusions and Recommendations

Based on the results of the analysis that has been carried out on the folklore of Prince Cisadane, Tangerang city above, it can be seen that this folklore has four noble values that we can emulate in living our lives, namely: the value of caring, the value of courage, the value of intelligence, and the value of caring. environmental sustainability. These four values are a legacy that must always be maintained and applied in good life in protecting the lives of fellow humans, side by side with nature, and the Creator. The balance of these three relationships will create a harmonious and harmonious ecosystem which will of course create peace and unity. Preservation of folklore must continue to be carried out to maintain the noble values in it. Research on these folk tales must also be carried out so that the values contained in them can also be studied by various generations in the future. Finally, the researcher realized that there were still many shortcomings in this paper. This research is only a small part of research on cultural values which is still far from perfect.

References

[1] Damono, S. D. (1978). Sosiologi Sastra sebuah Pengantar Ringkas. Jakarta: Pusat Pembinaan Bahasa, Kemdikbud.
[2] Danandjaja, J. (2007). Folklore Indonesia; Ilmu Gosip, Dongeng dan lain-lain. Jakarta: PT Pustaka Utama Grafitti.
[3] Darma, B. (2004). Pengantar Teori Sastra. Jakarta: Pusat Bahasa Depdiknas.
[4] Djamaris, E. (1993). Menggali Khazanah Sastra Melayu Klasik (Sastra Indonesia Lama). Jakarta: Balai Pustaka.
[5] Endraswara, S. (2002). Metodologi Penelitian Folklor; Konsep, Teori, dan Aplikasi. Jakarta: PT. Buku Kita.
[6] Mahsun. (2005). Metode Penelitian Bahasa. Jakarta: PT RajaGrafindo Persada.
[7] Sudikan, S. (2017). Metode Penelitian Sastra Lisan. Lamongan: CV Pustaka Ilalang Grup.
[8] Zaidan, A. R. (2002). Pedoman Penelitian Sastra Daerah. Jakarta: Pusat Bahasa

The Practice of Critical Reading using Porpe Technique Among EFL University Students in Indonesia

Winda Widyaningrum[1], Ninuk Lustyantie[2], Nuruddin[3]

[1,2,3]Doctoral Program of Applied Linguistics of Jakarta State University, DKI Jakarta, Indonesia

Author Emails
[a] Corresponding author: widyaningrumwinda@yahoo.com
[b] ninuk.lustyantie@unj.ac.id
[c] nuruddin.unj@unj.ac.id

Abstract. Reading skills are closely related to the level of literacy comprehension of students. The importance of mastering 21st century skills where students are required to be able to develop life skills and soft skills, including the ability to think critically and solve problems (critical thinking and problem solving) so that learning critical reading is an important thing for students to learn because reading is the main requirement to master science can also improve literacy. The study of reading techniques is an important aspect of reading learning to overcome reading problems and make learning materials easier and faster to understand. In this study, the practice of critical reading using PORPE technique (Predict, Organize, Rehearse, Practice, and Evaluate). The research is done at university in Jakarta with a total sample of 56 students. Researchers use classroom action research consists of the cycle of I, II and III, including observations about student behavior during instruction. Planning the teaching consists of preparing the lesson plans and schedules, then takes action by implementing reading teaching materials using PORPE technique. The results of the tests in each cycle can be described as: an average is 71,3 of 58% (cycle I) becomes 73,6 of 75% (cycle II) and 76,8 of 95% (cycle III). Based on the results of the research, it is necessary to implement critical reading using PORPE technique in universities because it has been shown to significantly improve students' reading comprehension and develop their critical discourse analysis skills.

Keywords: critical reading learning, PORPE technique, reading skills.

1. Introduction

Reading becomes a major need to get information and knowledge. Reading skills are not only able to understand the content of the reading but also able to analyse and criticize the text read. A person's level of reading comprehension is influenced by how much interest and mastery of reading skills. The results of the 2015 Program for International Student Assessment (PISA) survey published by the Organization for Economic Co-operation and Development (OECD), Indonesia ranked 62nd out of 70 countries due to its low literacy rate. In March 2016, Central Connecticut State University (CCSU) published in "The World's Highest Literacy Country" published literacy rankings for countries around the world and Indonesia ranked 60 out of 61 countries surveyed, including a ranking in the bottom 10 which means the ability to read and critically evaluate information is still very poor. This is concerning because the

ability to be able to understand, analyse, and think critically about a discourse becomes a solution to a complicated and complex situation.

Reading is one of the important skills in language learning, especially English. Critical Reading is one of the important subjects in Higher Education. This course is an advanced course that has prerequisites that can only be followed by students who have graduated from taking Basic Reading and Active Reading courses. Both courses have competency achievements, namely reading comprehension where students are able to pronounce every word in the text with the correct pronunciation, are able to understand reading, and are able to process information from the text they read. Meanwhile, the Critical Reading Course Learning Outcomes are students who are able to understand implicit information in the text, are able to distinguish between opinions and facts, are able to respond critically to the content of the text, and are able to express their opinions about the content of the reading into writing. Critical reading is a process that is passed by readers by combining some information in the text with the background knowledge they have to know or develop the purpose of the text (Nunan, 2012). Slattery (2021) argues that critical reading is a transaction process when readers negotiate the meaning or interpretation of the text read. Meanwhile, according to (Støle et al., 2020) is the process of encoding (decoding), which is connecting written words with oral language meaning which includes converting writing or printing into meaningful sounds. Briefly it can be interpreted if the meaning of a text read does not come by itself to the reader, there are a series of processes that occur until finally the reader can capture the message or information from the text he reads. From a linguistic perspective, critical reading is a process of recoding and decoding a process in which a process of negotiation occurs that occurs continuously until meaning emerges. The negotiation process is in the form of a set of ideas, ideas, or thoughts contained in the text. The reader carries out the process of interaction between the mind, eyes, and the text he reads as a representation of the opposite of communication, that is, the writer.

Reading skills are an interactive process that combines reader knowledge and information from the text (Ninsuwan, 2015). Along with the development of civilization there have been fundamental changes that require human ability to access information, so reading must contain an effort that can bring a series of skills that are closely related to the processes that underlie a person's mind increasingly intelligent and broad point of view. Critical reading skills if mastered properly will prepare students to be trained to think sequentially, access ideas well, and master logic appropriately and maturely. Critical reading skills are very important to improve student literacy so that they are smarter in understanding the truth of an information. The latest PIRLS (Progress in International Reading Literacy Study) framework provides an overview of reading comprehension theory that includes elements of non-verbal text and reading in different media. From a theoretical perspective, the reading comprehension model affects the interaction process between individual characteristics, for example: decoding skills, concentration, reading goals, content and text structure (Delgado & Salmerón, 2021). The PIRLS definition describes reading literacy as a "constructive and interactive" process (Mullis et al., 2015). This means that reading is not just about pronouncing letters and understanding text but can also be integrated into changes in all areas of life. Knowledge gained from reading results can be a solution to existing problems. Reading is one of the language skills that must be mastered by students. Reading skills are an interactive process that combines the reader's knowledge and information from texts (Ninsuwan, 2015). These skills if mastered well will prepare students to be trained to think in a coherent manner, to access ideas well, and to master logic accurately and maturely (Lustyantie & Aprilia, 2020). Along with the development of civilization, there have been fundamental changes that require human ability to access, reading must contain an effort that can bring a series of skills that are closely related to the processes that underlie one's mind the more intelligent and broad the

perspective. The importance of improving reading skills includes the interests of students to develop their potential, as well as social interests to form a literacy society that is needed in global competition. Reading literacy is an absolute prerequisite for humans who want to achieve progress.

Reading is an integrated unit of activity that includes several activities such as recognizing letters and words, connecting them with sounds and their meanings, and drawing conclusions about the purpose of reading (Gruhn et al., 2020). Reading is a receptive skill of written language. Reading skills can be developed independently, apart from listening and speaking skills. Anderson (Mekar et al., 2017) states that reading is a process to understand the meaning of a piece of writing. The ability to read is a complex ability that requires cooperation between a numbers of abilities. Reading is a process in which a person uses what he already knows (Nunan, 2012). In reading, the eye recognizes words and the mind associates them with their meaning. The meaning of a word is related to the meaning of phrases, clauses, sentences, and finally the whole reading. Understanding the meaning of this reading is not possible without prior knowledge, for example terms, word forms, sentence structures, expressions, etc. used while reading (Slattery et al., 2021). In short, when reading, the mind processes information at the same time, including its relation to written, spoken sounds. Syntax information related to sentence patterns, and information related to semantic aspects. In general, it can be concluded that reading is a process of translating signs and symbols into their meanings and integrating new meanings into the cognitive and affective systems that the reader already has. According to the General Indonesian Dictionary, reading comes from the word read, reading has the meaning of seeing the writing and understanding or being able to pronounce what is written.

According to Burns (Retno Kuspiyah et al., 2020) literal understanding is the ability to understand ideas that appear explicitly in discourse. Literal understanding is a low level understanding. Literal comprehension is needed in the overall reading comprehension process. Literal understanding is a prerequisite for higher understanding. Inferential understanding is the ability to understand information given indirectly in discourse. It can be concluded that understanding discourse means understanding the deeper meaning of discourse than sentences written with explicit information. Background knowledge and personal experience are used to make conclusions and hypotheses. Reasonable understanding as interpretive understanding is achieved by reading the text between the lines. Evaluative understanding is the ability to assess the content of a discourse. Critical understanding is the same as evaluative understanding. With this understanding, the reader evaluates various aspects of the discourse related to the content by comparing the information found in the discourse with certain norms with the reader's own knowledge and background. Creative understanding is the ability to express emotional and aesthetic responses to discourse according to personal and professional standards of literary forms, styles, genres, and literary theories. Since gratitude is concerned with the psychological and aesthetic effects of discourse, creative understanding includes all the cognitive aspects involved in previous levels of understanding. Understanding appreciation includes abilities such as; (1) The ability to respond to discourse emotionally by expressing feelings related to the content of the discourse, such as feelings of pleasure, hate, dislike, satisfaction, and so on. (2) The ability to identify with the actors, events presented in the discourse. (3) The ability to react to the author's language by revealing the extent to which the author is proficient in using his language. (4) The ability of imagination which is done by restating what seems to be seen, heard, smelled, or felt while reading.

In detail the aspects of reading can be seen from the following chart:
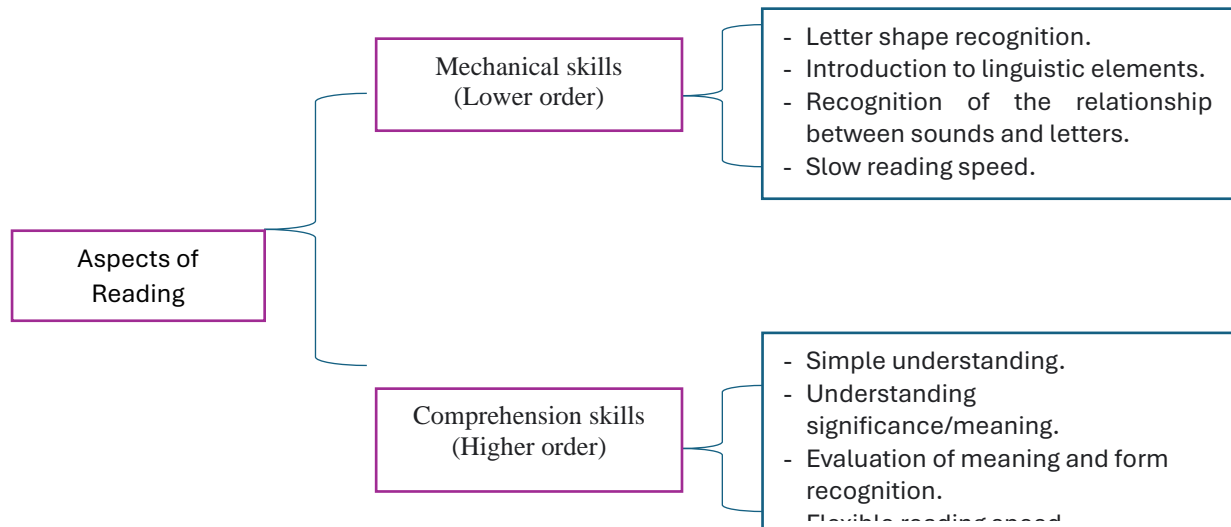
Figure 1. Aspects of Reading

In reading, students must have reading techniques to help understanding the text they read. Reading techniques have a good impact because they help students overcome reading problems and make learning materials easier and faster to understand. This means that reading activities play a very important role for students because by reading students can know and understand various kinds of science, technology, and art. Reading is also an important aspect in facing challenges and global competition in work and career development, especially in facing the development of civilization along with advances in science and technology. The study of reading techniques is an important aspect in learning reading. The PORPE technique is a reading technique coined by Simpson. Simpson in (Nikmatulaili & Hariani, 2019) states that, "...the various reading subjects presented in universities are never accompanied by proper reading techniques...". Based on this opinion, it can be seen that students are not given knowledge about the right technique in reading. An innovation in learning to read is needed so that these problems can be overcome, one of which is by applying the PORPE technique which is one of the many reading techniques that have existed before. The PORPE technique basically aims to prove that writing can be used as the best means of establishing reading independence in each type of reading material and overcoming students' weaknesses when dealing with essay questions. In addition, as stated by Brown in (Damaianti et al., 2020) that the best way to understand a reading is through rewriting the reading in your own language.

In the distance learning process, if only relying on explanations in books makes students easily bored and do not understand the meaning of the explanations in books without anyone guiding them in learning activities. The function of teaching materials for educators is to save educators' time in teaching, change the role of educators from a teacher to a facilitator and can improve the learning process to be more effective and interactive (Erfiani et al., 2019).

The study of the application of techniques and strategies in reading is an important aspect in learning reading. The techniques and strategies applied in previous studies were limited to observing and understanding the contents of reading texts and did not involve critical thinking skills, a reading competency that must be possessed by a student. Some of the advantages of applying the PORPE technique in reading learning include (1) the PORPE technique can encourage students to think, analyze, and synthesize the main concepts of reading (2) it can help students prepare for essay exams, especially for questions that require students to conclude and applying information to new contexts (3) can help students remember reading material over time; and (4) can be a learning strategy for students who are less able to learn well through increasing cognitive and metacognitive abilities. Based on the

research gap and the reasons stated above, it is deemed necessary to implement the PORPE technique in the reading learning process in universities to overcome reading comprehension problems faced by students and to develop critical discourse analysis skills which will be the strength of the research focus.

2. Research Methodology

This research is Classroom Action Research. As for design classroom action research which is used in this study is to use a model of Kemmis and McTaggart. The model composing four steps: planning, acting, observing and reflecting.
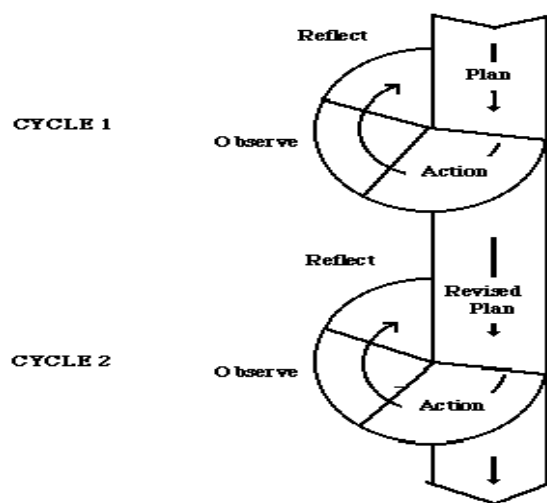
Population

The population of this is research is the entire regular class of English Educational programme with total 60 students.

Data Collection

Technique of data collected in this research was qualitative data. The qualitative data were students reading scores. The qualitative data were collected by using test. In this case, the researcher gives a test after each cycle. The students were asked to read a text based on certain topic and certain time given. Then the students' reading will scored by using analysis scoring rubric. Therefore, it provides information about the difficulty that the students find. The scoring covers each element of reading including content, organization, vocabulary, grammar, and mechanic. The qualitative data will collective by observe, interview and test.

Technique of Data Analysis

There are three stages that were followed in data analysis. Those are elaborated as follow:

- **Data Reduction**

  The researcher selects the data that relevant with the objective of the research. The researcher makes the summary of data observation and make list of reading scores.

- **Data Description**

  The researcher provides the qualitative and quantitative data to be information that makes the researcher makes a conclusion. Data description provide by qualitative analysis, it explains about

the result of reading score in every cycle by comparing score result of reading test that attained in every cycle.

- **Data Verification**

  The researcher is interpreted the date based on the data description in pic chart form and the diagram from that shown the result of the research in every cycle.

Validity of the Data

Data validity for this research is using interview, observation, and test. For getting accurate and current information the researcher can use triangulation method, triangulation is a method that is done by comparing the information in different ways. In this research to be seen is a success indicator, namely if the average value with a value of more than 75.

Research Instrument

In this research, each student was asked to complete a reading problem based on the PORPE technique. The same types of questions and scoring will be used in 3 cycles to determine the progress of students' abilities in working on questions after being given treatment in cycle 1 and cycle 2. Each student will have three different or same scores from the three research instruments, which can be observed through table 1.

Table 1. Research Instrument

No.	Aspects	Instructions	Responses	Score
1	Predict	Students are asked to make essay questions that have the potential to arise. This stage is designed to guide students after they finish a reading, it is hoped that they can clarify their goals in reading, identify important aspects in the reading text, and focus on the main idea.	Poor-Excellent	1-5
2	Organize	Students are asked to organize the main information which is the answer to the predicted essay questions. For each prediction question, students are asked to outline the answers in their own words or create a concept map, chart, or graph.	Poor-Excellent	1-5
3	Rehearse	Students are asked to place key ideas, examples, and organization of general ideas into their memory. Students begin to rehearse (rehearse) by reciting aloud from the organizational stages that have been prepared in the previous stage. It is hoped that they can test themselves on the structure of the ideas that have been made by repeating orally or writing down what they remember from the reading texts they have read.	Poor-Excellent	1-5
4	Practice	Students are asked to test their learning outcomes by writing in detail the things that have been stated orally in the previous step.	Poor-Excellent	1-5
5	Evaluate	Students were asked to evaluate the quality of the answers to the essay questions they had written in the previous step. Students are expected to evaluate their answers; in this way they will learn to monitor whether they need to repeat the previous steps or not.	Poor-Excellent	1-5

While the second instrument measures the results of student answers. Assignments are graded according to a modified reading assessment rubric based on the textbook used by students which includes the five elements of reading writing composition as shown in table 2.

Table 2. Reading assessment indicators

Criteria	Descriptions	Score
Predict	Accuracy in determining the Main Idea, detail of Supporting sentences and Concluding from the reading text	20
Organize	Accuracy in presenting the main information from the reading text	20
Rehearse	Accuracy in retelling the contents from reading text	20
Practice	Accuracy in rewriting the contents from reading text	20
Evaluate	Accuracy in making of summary of the contents from reading text	20

3. Results and Discussions

This research is Classroom Action Research. As for design classroom action research which is used in this study is to use a model of Kemmis and McTaggart. The model composing four steps: planning, acting, observing and reflecting. Theoretically an action research should be undertaken in the class, together with the process of teaching and learning. This research was conducted in three cycles applying the model proposed by implementing actions using PORPE technique in teaching and learning process.

This research was conducted in two phases. First phase was conducted before implementing PORPE technique and the second was conducted after applying PORPE technique. It is aimed to know whether the students score got improvement before and after applying PORPE technique in teaching reading comprehension.

Table 3. Research finding in using the PORPE technique

| Phases	Title of reading text	Research finding in using the PORPE technique		
		Cycle 1	Cycle II	Cycle III
First phase	Hopes high Permanent ban on forest, peat land clearance will stop deforestation	Students still have difficulty finding the main idea of the text they read.	Students cannot re-explain the information fully in the text.	Students still have difficulty for making summary from the text.
Second phase	City to boost development of parks to reduce air pollution	Students can identify the main idea, supporting sentences and concluding of the text.	Students can fully explain the information in the text.	Students can rewrite and making summary from the text.

By using the same research instrument and scoring for 3 cycles, the student test results are obtained as listed in the diagram below.

The Average Score of Passing Grade Score Each Cycle
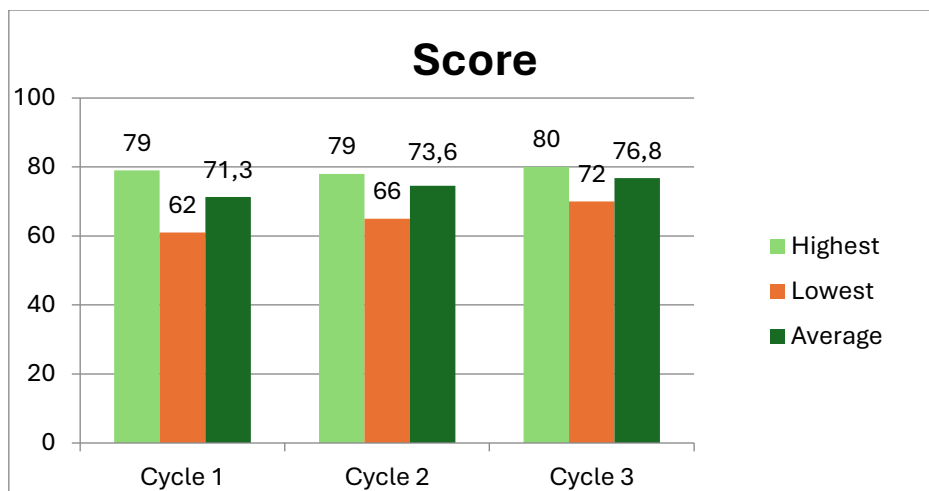
In that diagram shows that the average score in cycle 1 is 71,3 the cycle 2 is 73,6 the cycle 3 is 76,8 represent the students' score average is more increased and it was the students improvement on the students achie

Graphic student's cycle percentage in Cycle 1, Cycle 2 and Cycle 3
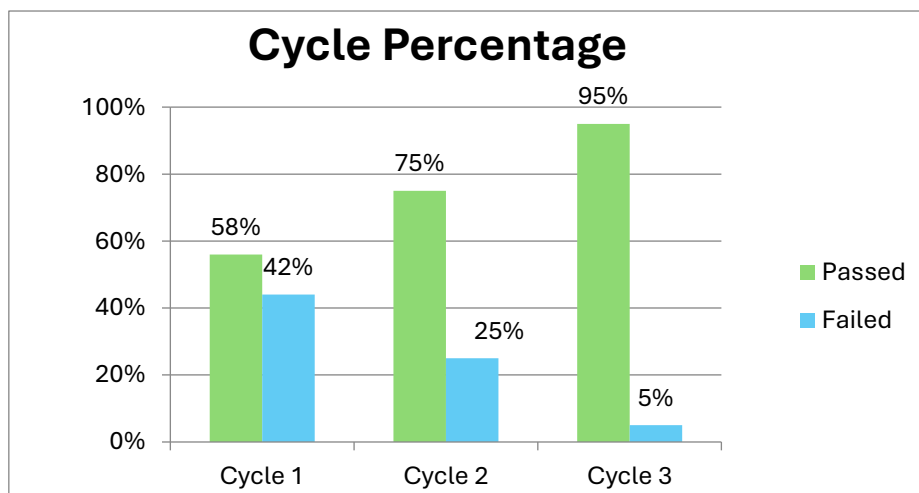
Based on the graphic above it can be seen that the average of passing students are also improved in each of the cycle 1 there are 58%, In Cycle 2 there are 75% and in cycle 95% students are passed. Based from cycle 1, cycle 2, and cycle 3 that the process of study of reading using PORPE technique, the students has an improvement with their reading skill with getting the target score 74,8. Even though there were 2 students are failed in the last cycle and so many problems in the classroom but the researcher could solve them. The researcher assumed the result of the reading test conducted after cycle procedures while showing the list of the result students' test and the process of study gets the achievement.

4. Conclusion

In essence, the purpose of reading is the main capital of reading. Clear goals will provide internal motivation or encouragement from within a person. Someone who is fully aware of the purpose of reading in order to direct the target to think critically in processing reading material so as to obtain satisfaction in reading. The conclusion from some of the opinions above, reading is an integrated skill that is expressed through thoughts that are poured out by receiving and understanding commands from the nerves of the brain, and can understand the meaning of reading. Readers and listeners capture and understand the author's information, thoughts, and feelings. Good reading requires the reader to be able to speed up and see far, because the reader needs to see the reading to maintain eye contact with the listener. To be able to read aloud well, readers need to acquire perceptual skills to know and understand words quickly and accurately.

In essence, learning and teaching materials are two things that are closely related in teaching activities. Teaching itself is a learning activity that is usually carried out by an educator or someone who understands a material that will be delivered to students. As a teacher, you must master the material to be delivered. In delivering a teaching material, the teacher must be precise in choosing the learning methods and media used, so that in delivering the material it can be understood by students. If the delivery of material uses well-designed learning media, it will very easily help students to achieve their learning goals. In situations and conditions in the modern era, teachers are required to master technology that continues to develop in order to apply effective and efficient teaching and learning activities. Based on the results of the research, it is necessary to implement reading teaching materials using PORPE technique in universities because it has been shown to significantly improve students' reading comprehension and develop their critical discourse analysis skills.

References

[1] Damaianti, V. S., Abidin, Y., & Rahma, R. (2020). Higher order thinking skills-based reading literacy assessment instrument: An Indonesian context. *Indonesian Journal of Applied Linguistics*, *10*(2), 513–525. https://doi.org/10.17509/IJAL.V10I2.28600

[2] Delgado, P., & Salmerón, L. (2021). The inattentive on-screen reading: Reading medium affects attention and reading comprehension under time pressure. *Learning and Instruction*, *71*(August 2020). https://doi.org/10.1016/j.learninstruc.2020.101396

[3] Erfiani, N. N., Ngadiso, N., & Suparno, S. (2019). Developing supplementary reading materials for grade 11 students at a multimedia study program. *Studies in English Language and Education*, *6*(1), 13–25. https://doi.org/10.24815/siele.v6i1.11667

[4] Gruhn, S., Segers, E., Keuning, J., & Verhoeven, L. (2020). Profiling children's reading comprehension: A dynamic approach. *Learning and Individual Differences*, *82*(July). https://doi.org/10.1016/j.lindif.2020.101923

[5] Lustyantie, N., & Aprilia, F. (2020). Reading Interest and Achievement Motivation: A Study in an EFL Context. *TESOL International Journal*, *15*(4), 147–166.

[6] Mekar, R., Stkip, I., & Bandung, S. (2017). KREATIVITAS DALAM PEMBELAJARAN LITERASI TEKS SASTRA. *Semantik*, *2*(2), 67–86. https://doi.org/10.22460/SEMANTIK.V2I2.P67-86

[7] Mullis, I. V. S., Martin, M. O., & Sainsbury, M. (2015). PIRLS 2016 Reading Framework. *PIRLS 2016 Assessment Framework*, 13–31. https://timssandpirls.bc.edu/pirls2016/downloads/P16_FW_Chap1.pdf

[8] Nikmatulaili, R., & Hariani, S. (2019). Penerapan Strategi Predict , Organize , Rehearse , Practice , and Evaluate (Porpe) Dalam Pembelajaran Keterampilan Membaca Pemahaman. *Jpgsd*, *7*(5), 3439–3448.

[9] Ninsuwan, P. (2015). The Effectiveness of Teaching English by Using Reading Aloud Technique towards EFL Beginners. *Procedia - Social and Behavioral Sciences*, *197*, 1835–1840. https://doi.org/10.1016/J.SBSPRO.2015.07.243

[10] Nunan, D. (2012). Learner-centered English language education: The selected works of David Nunan. *Learner-Centered English Language Education: The Selected Works of David Nunan*, 1–292. https://doi.org/10.4324/9780203096888

[11] Retno Kuspiyah, H., Fitriyah, L., & Nurul Huda Sukaraja, S. (2020). Pengembangan Bahan Ajar Pembelajaran Membaca Pemahaman Literal Berbasis Literasi Kitab Kuning Mahasiswa Program Studi PBSI STKIP Nurul Huda Sukaraja. *GERAM*, *8*(2), 33–40. https://doi.org/10.25299/GERAM.2020.VOL8(2).5586

[12] Slattery, E. J., Ryan, P., Fortune, D. G., & McAvinue, L. P. (2021). Contributions of working memory and sustained attention to children's reading achievement: A commonality analysis approach. *Cognitive Development*, *58*(March), 101028. https://doi.org/10.1016/j.cogdev.2021.101028

[13] Støle, H., Mangen, A., & Schwippert, K. (2020). Assessing children's reading comprehension on paper and screen: A mode-effect study. *Computers and Education*, *151*(June 2019). https://doi.org/10.1016/j.compedu.2020.103861

The Level of Knowledge and Utilization of AI (Artificial Intelligence) in Chemistry Education in Kulon Progo Regency Academic Year 2023/2024

Setiyarini

SMAN 1 Wates, Kulon Progo, DIY
Setiyarini63@guru.sma.belajar.id

Abstract. The rapid advancement of information and communication technology has brought significant changes in the field of education. This requires educators to not only be skilled in delivering information but also to quickly adapt to changes and utilize advanced technology as a learning tool. Educators in the digital era must align the curriculum with the needs of Industry 4.0, ensuring that students are equipped with skills and knowledge relevant to current technological developments. This includes not only technical aspects but also in developing creative and innovative teaching methods, motivating students to learn, and designing learning experiences that are responsive to technological advancements, one of which is utilizing AI in education. This qualitative research aims to determine the level of knowledge and the utilization of AI-based applications in chemistry education among high school chemistry teachers in Kulon Progo Regency during the academic year 2023/2024. Data collection in this study was conducted using questionnaires. The subjects of this research are high school chemistry teachers in Kulon Progo Regency, all of whom are members of the chemistry subject teachers' association (MGMP) in Kulon Progo, totaling 23 teachers. This study uses descriptive qualitative methods through questionnaire data collection techniques. The data analysis revealed that of the 23 respondents, 82.60% are civil servants, with most having worked for more than 20 years. The analysis results show that 52.20% of the 23 chemistry teachers have used technology in chemistry teaching, but are not confident they have a basic understanding of AI and even do not know how AI works. Among the 23 chemistry teachers, 60.87% have used AI several times in chemistry teaching, but only 34.78% use AI to create chemistry teaching materials. Furthermore, 73.90% of teachers have never used AI-based chemistry simulation software, and 65.20% have never attended workshops or training on AI in education. However, 78.26% of teachers agree to utilize AI in designing chemistry lessons to make them more engaging and relevant to current developments, even though 60.90% of chemistry teachers are concerned that the use of AI may have adverse effects on education. Based on the data analysis results, it can be concluded that high school chemistry teachers in Kulon Progo Regency agree to utilize AI in chemistry teaching. However, the level of knowledge and utilization of AI among high school chemistry teachers in Kulon Progo Regency is still low, indicating the need for training/workshops on the utilization of AI in education, particularly in chemistry.

1. Introduction

1.1 Background

In today's digital era, the biggest challenge for teachers in education is dealing with students who are digital natives, whose lives are inseparable from digital technology and heavily dependent on technological devices. According to Ratih Ika Wijayanti, this generation has advantages over previous generations, being more adaptive to change, more creative, and more critical of information. Educators in the digital era must balance these skills by aligning the curriculum with students' learning needs and ensuring they are equipped with skills and knowledge relevant to current technological developments through engaging and enjoyable learning processes to achieve effective learning outcomes. Educators in the digital era are expected not only to be skilled in delivering classroom materials but also to adapt quickly to changes and utilize advanced technology as a learning tool, including in developing creative and innovative teaching methods to motivate students, especially in subjects like chemistry, which many students find difficult. To meet the learning needs of students in the digital era, one way educators can do this is by utilizing AI in chemistry education to enhance the mastery of chemistry material in a more enjoyable way.

The term AI has been around since 1956 and has rapidly developed in the 2000s with the availability of computers and the internet. Recently, AI has become a widely discussed topic in various fields. The utilization of AI technology has been proven to lighten our workload, supported by AI's speed in processing large amounts of data to produce accurate decisions in all sectors of human life, including education. Education must be able to align with the times by adapting the curriculum to the needs of the 4.0 industry era to equip students with skills and knowledge relevant to current technological developments.

1.2 Research Objectives

The objectives of this action research are:

1. To determine the level of knowledge about AI-based applications in chemistry education among high school chemistry teachers in Kulon Progo Regency during the academic year 2023/2024.
2. To determine the level of utilization of AI-based applications in chemistry education among high school chemistry teachers in Kulon Progo Regency during the academic year 2023/2024.

1.3 Benefits and Significance

The benefit of this research is to understand the level of knowledge and utilization of AI-based applications in chemistry education among high school chemistry teachers in Kulon Progo Regency during the academic year 2023/2024. As is known, in today's digital era, educators face students who are digital natives, whose lives are inseparable from the use of digital technology devices. In this digital era, all activities in the classroom learning process should be adjusted to the development of science and technology to be relevant to students' learning needs in this digital era. Teachers are expected to quickly adapt to changes and utilize advanced technology as a learning tool to equip students with the knowledge and skills needed in this digital era, one of which is by utilizing AI in the learning process.

2. Discussion

Ideally, the current learning process should be designed to be more engaging, enjoyable, and contextual, packaged to be relevant to technological developments to meet the learning needs of today's digital native students and equip them with the knowledge and skills needed in the Industry 4.0 era. One

technological development that has recently been widely discussed and proven to show its potential in helping to lighten human tasks in all sectors of life is AI technology. The utilization of AI technology in education allows classroom learning to be designed according to students' learning abilities, so learning activities can be tailored to students' needs. This is in line with differentiated learning methods that allow teachers to accommodate the learning needs of all their students, despite diverse characteristics. For teachers, AI can automate administrative tasks, preparing learning tools more quickly, allowing teachers to focus more on teaching and guiding students. Through AI technology, educational accessibility can be increased as AI can provide various educational content in formats that are easier for everyone to access. Digital era educators must not only be competent in delivering classroom learning but also ensure their students have the knowledge and skills needed in the Industry 4.0 era and beyond. One way to conduct engaging and enjoyable learning is by utilizing AI technology in designing lessons, creating learning media, and developing assessments tailored to diverse student characteristics to meet their learning needs. However, in reality, not all educational institutions use AI in education. This is not without reason, as utilizing internet-based applications is closely related to the available facilities and infrastructure at schools, teacher competence, and, importantly, the conditions and readiness of students at the school to access the required devices. To support teachers' competence in increasing their knowledge and utilization of AI technology, many factors are needed, and this is still an issue that needs to be resolved so that classroom learning does not lag behind technological advancements, especially ICT-based technology devices.

2.1 Research Methods

The research respondents were high school chemistry teachers in Kulon Progo Regency during the academic year 2023/2024, totaling 23 teachers consisting of 10 male and 13 female teachers. The data collection technique in this study used a questionnaire distributed to respondents via Google Forms. The questionnaire contained questions related to the level of understanding and utilization of AI technology in chemistry education among high school chemistry teachers in Kulon Progo Regency during the academic year 2023/2024. The data analysis technique used in this study was descriptive qualitative, with the collected data being recapitulated and percentage calculated to determine the level of knowledge and utilization of AI technology in the chemistry teaching process among high school chemistry teachers in Kulon Progo Regency.

2.2 Results and Discussion

The data analysis of this research consists of the percentage results of responses to the questionnaire given to respondents, totaling 18 questions related to the level of knowledge and utilization of AI technology among chemistry teachers in Kulon Progo Regency in chemistry education, and one suggestion or feedback, with results presented in the following pie chart:
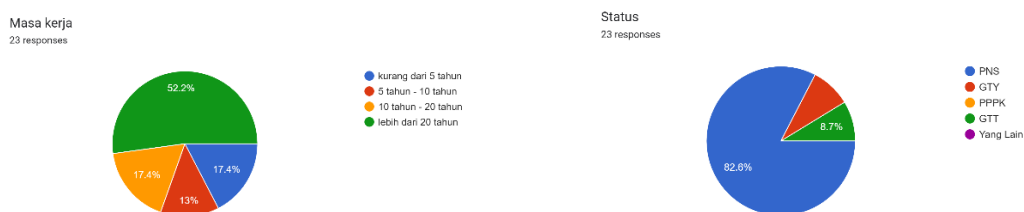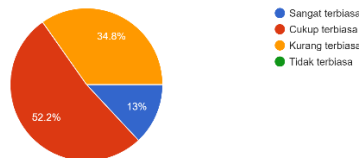

Based on the chart, most respondents (82.61%) are civil servants with more than 20 years of service (52.20%).

Seberapa sering Anda mendengar atau membaca tentang Kecerdasan Buatan (AI) dalam konteks pendidikan?
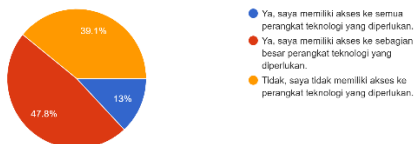23 responses
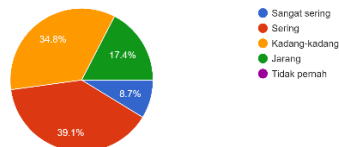
Apakah Anda merasa terbiasa menggunakan teknologi dalam pembelajaran?
23 responses

The analysis results show that 52.17% of the 23 chemistry teachers have used technology in chemistry teaching, but only 8.70% have a good understanding of AI, with the rest unsure about having a basic understanding of AI.

Apakah Anda memiliki akses ke perangkat teknologi yang diperlukan untuk menggunakan AI dalam pembelajaran kimia?
23 responses

Apakah Anda mengetahui bagaimana cara kerja AI ?
23 responses
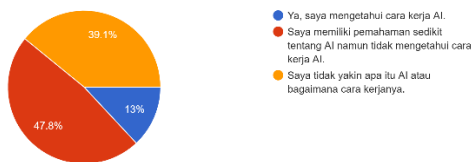
About 47.80% of teachers have access to the necessary technology devices for using AI in chemistry education but do not know how AI works.

Apakah Anda pernah menggunakan alat atau aplikasi berbasis AI dalam pembelajaran kimia atau dalam mempersiapkan presentasi atau hal lainnya?
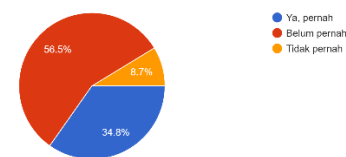23 responses
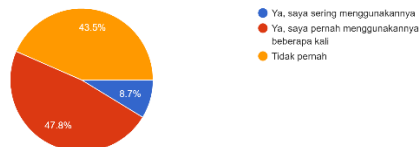
Seberapa sering Anda menggunakan platform pembelajaran online yang menggunakan AI?
23 responses
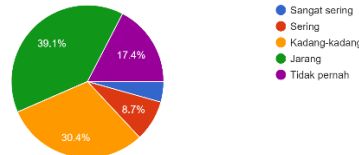
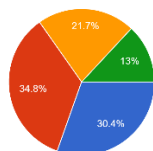Apakah Anda pernah menggunakan software simulasi kimia yang menggunakan AI?
23 responses

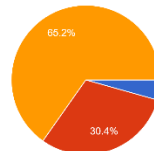Pernahkah Anda mencoba menggunakan AI untuk membuat perangkat pembelajaran?
23 responses

Among the 23 chemistry teachers, 56.5% have used AI several times in chemistry education, and only 17.40% have never used an online learning platform that utilizes AI. 73.90% have never used AI-based chemistry simulation software, and only 34.8% of teachers have tried using AI to create teaching materials.

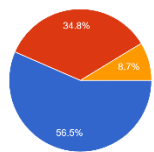Almost all teachers agree that AI should be utilized in education in today's digital era, although to varying extents, but only 34.80% of teachers have attended AI training or workshops.

Based on the questionnaire responses, 52.2% are willing to attend AI training/workshops, and 56.8% are willing to participate in such activities. From the feedback, it was found that 78.26% of teachers agree to utilize AI in designing chemistry lessons to make them more engaging and relevant to current developments, although 60.90% of chemistry teachers are concerned that AI utilization may have adverse effects on education.

3. Conclusion and Recommendations

3.1 Conclusion
Presence of AI technology is a breakthrough in educational technology to facilitate learning. However, to avoid adverse effects, technology must be used wisely. The emergence of AI can be utilized to design learning experiences that are relevant to technological developments while equipping students with the knowledge and skills needed in the Industry 4.0 era, fostering independence in learners. Furthermore, teachers are not burdened with dominant roles, allowing them to focus more on their primary duties of teaching, which include shaping students' morals and behavior. However, in some areas, specifically in Kulon Progo Regency, the level of knowledge and utilization of AI technology still needs improvement.

3.2 Recommendations
Most high school chemistry teachers in Kulon Progo Regency agree to utilize AI in chemistry education. However, the level of knowledge and utilization of AI among high school chemistry teachers in Kulon Progo Regency is still low, indicating the need for training/workshops on AI utilization in education, particularly in chemistry.

Although AI technology can have a positive impact, such as analyzing large amounts of data quickly and accurately, it also has potential negative impacts. This concern is shared by some chemistry teachers in Kulon Progo Regency. Therefore, to prevent adverse effects on students, educators need to provide moral guidance, emphasize character development, and inform students about the ethical use of technology to avoid undesirable outcomes.

References

[1]   Sehan Rifky. (2024). Islamic Education Management, The Impact of AI Utilization on Higher Education. Cendikia Media Jurnal Ilmiah Pendidikan UIN Siber Syekh Nurjati Cirebon https://orcid.org/0009-0006-4001-0088

[2]   Lukman Hakim. (2022). The Role of Artificial Intelligence in Education. https://ppg.kemdikbud.go.id/news/peranan-kecerdasan-buatan-artificial-intelligence-dalam-pendidikan

[3]   https://stekom.ac.id/artikel/apa-itu-ai-kecerdasan-buatan-pengertian-kelebihan-kekurangan

[4]   https://www.acerid.com/pendidikan/dampak-ai-dalam-dunia-pendidikan-dan-dunia-kerja

[5]   Ratih Ika Wijayanti. (2024). What is meant by the digital native generation. IDX Channel https://www.idxchannel.com

Online Teacher Professional Education (PPG) in Papua: Challenges and Approaches for In-Service Teachers

Martha Betaubun¹*, Desy Eva Laila Rokhmah²

¹Universitas Musamus, Indonesia
²Universitas Musamus, Indonesia
*Corresponding Author: marthabetaubun@unmus.ac.id

Abstract. This study examines the challenges and factors for accelerating learning in the online Professional Teacher Education Program (PPG) for teachers working in remote areas in Papua regions. Significant Obstacles, including limited internet access and frequent power outages, are highlighted. Through a mixed approach involving surveys and interviews with 150 participants, the study reveals issues and suggests strategies such as offline learning materials, local support networks, and flexible scheduling to mitigate these challenges. These findings underscore the need for infrastructure investment and program design that is flexible and aligned with government policy. Policy and practice recommendations are discussed to improve the effectiveness of online teacher training in remote areas.
Keywords: PPG, Teacher Professional Education, Challenges, Accelerated Learning, Papua.

1. Introduction

The Teacher Professional Education Program (PPG) is an important Indonesian government initiative aimed at improving the competency of in-service teachers across the country. Launched to respond to the needs of the growing education sector, PPG provides structured training to in-service teachers, equipping them with advanced pedagogical skills and the latest knowledge essential for the demands of modern education(Lokita & Utami, 2018). This program is an important component in Indonesia's broader education reform strategy, designed to improve the quality of teaching and student outcomes nationally(Afriadi et al., 2023). PPG is administered by the Ministry of Education and Culture, with many universities and educational institutions serving as implementing partners know as Lembaga Pendidikan Tenaga Kependidikan (LPTK). The program encompasses both pre-service and in-service training, with the latter focusing on currently practicing teachers who need to upgrade their qualification and skills. Since its inception, PPG has undergone significant changes to better align with global educational standards and to address specific challenges within the Indonesian Educational landscape (Maulana et al., 2023).

The role of the government in supporting and facilitating PPG is critical. Regulations such as the Indonesian Government Regulation No. 74 of 2008 on Teachers and Lecturers stipulate the need for continuous professional development for teachers (Indonesian Government, 2008). Additionally, the Ministerial Regulation No. 37 of 2017 concerning the PPG program outlines the framework and guidelines for its implementation (Ministry of Education and Culture, 2017). These regulations highlight the government's commitment to improving teacher quality through structured professional development programs.

The categorization of the in-service PPG program according to Indonesian regulations further underscores its comprehensive nature. The program is divided into three main components: academic enhancement, professional competence, and teaching practice. Academic enhancement involves deepening subject matter knowledge, professional competence focuses on pedagogical skills, and teaching practice provides real-world teaching experience under the guidance of experienced mentors (Ministry of Education and Culture, 2017). These components are designed to ensure that teachers not only possess theoretical knowledge but also practical skills essential for effective teaching.

Despite the structured framework and clear objectives, the implementation of the PPG program, especially in remote and underserved areas, presents significant challenges. Papua, characterized by its geographical isolation and limited infrastructure. Before the COVID-19 pandemic, PPG training was primarily conducted through face-to-face sessions, which facilitated direct interaction and hands-on training (Paramita et al., 2023). The pandemic, however, required a rapid shift to online learning modalities. While this transition expanded access to professional development opportunities, it also introduced a host of new challenges, particularly for teachers in remote areas like Papua (Isharyanti et al., 2023).

This study aims to systematically review the implementation of the PPG program, focusing on the challenges and accelerated learning factors for in-service teachers in Papua regions. Understanding the significance of this research is crucial. In-service teachers in Papua are instrumental in shaping the educational experiences of students in one of Indonesia's most challenging regions. Enhancing their access to quality professional development through the PPG program can directly impact educational outcomes and help bridge the educational disparities .This study aligns with the broader educational objectives outlined in Indonesia's National Medium-Term Development Plan (RPJMN) 2020-2024, which emphasizes equitable access to education and teacher professional development (The National Medium Term Development Plan 2020 - 2024, 2020).

2. Methods

This study employs a mixed-methods approach to gather comprehensive data on the challenges and accelerated learning factors in the PPG program for in-service teachers in Papua's regions. Quantitative data were collected through structured surveys, while qualitative insights were obtained via semi-structured interviews. The study involved 150 in-service teachers from various remote areas of Papua regions, including Asmat, Boven Digoel, Mimika, and Merauke. Participants were selected using purposive sampling to ensure a representative sample of teachers experiencing diverse challenges. The selection criteria included teachers who were currently enrolled in the PPG program at LPTK Universitas Musamus and had at least one year of teaching experience in remote areas.

Surveys were administered online, comprising questions on internet access, power stability, technological familiarity, and resource availability. The survey instrument included both closed-ended and open-ended questions to capture quantitative data on the prevalence of challenges and qualitative data on the participants' personal experiences. The survey was piloted with a small group of teachers to ensure clarity and relevance of the questions. Follow-up interviews provided deeper insights into the personal experiences and coping strategies of the teachers. The semi-structured interview guide included questions on the specific challenges faced during online learning, the impact of these challenges on their professional development, and their suggestions for improving the PPG program. Interviews were recorded and transcribed verbatim, with participants' consent, to ensure accurate data analysis.

3. Results

Identified Challenges

Limited Internet Access

A significant number of participants (85%) reported difficulties accessing stable and high-speed internet. This issue severely impacted their ability to engage fully in online learning activities. The lack of reliable internet connectivity in remote areas means that teachers often struggle to participate in live sessions, access online resources, and submit assignments on time. The challenges associated with limited internet access are further worsen by the high cost of internet services in remote regions. Many teachers reported that they had to travel long distances to access better internet facilities, which added to their stress and workload. Moreover, the lack of internet access also affects teachers' ability to stay connected with their peers and mentors, limiting opportunities for collaboration and professional support. This isolation can lead to feelings of frustration and demotivation, impacting their overall engagement with the PPG program. Addressing this challenge requires an approach that includes improving internet infrastructure and providing alternative offline learning resources(Isharyanti et al., 2023).

Frequent Power Outages

Frequent power outages were reported by 70% of participants, causing interruptions in their learning continuity. These blackouts often coincided with scheduled online classes. The unpredictability of power outages makes it difficult for teachers to plan their learning activities and maintain a consistent study schedule. Power outages also affect the functionality of electronic devices, leading to potential data loss and hardware damage. Teachers often expressed concerns about the impact of blackouts on their ability to complete assignments and participate in online discussions. The stress associated with power outages adds to the overall challenges faced by teachers in remote areas. To mitigate the impact of power outages, some teachers suggested the provision of backup power solutions, such as generators or solar panels. Additionally, flexible scheduling and the availability of offline learning materials can help ensure that teachers can continue their professional development despite power interruptions. These strategies can enhance the resilience of the PPG program in remote regions(Afriadi et al., 2023).

Technological Barriers

Approximately 85 % of the teachers struggled with using online learning platforms due to a lack of familiarity and technical skills. This barrier was compounded by inadequate training and support. Many teachers reported difficulties in navigating the various features of online platforms leading to frustration and reduced engagement. The rapid shift to online learning due to the COVID-19 pandemic has highlighted the importance of digital literacy for educators. However, teachers in remote areas often have limited access to training opportunities and technical support, which hampers their ability to effectively use online tools. This lack of familiarity with technology can also affect their confidence and willingness to engage with the PPG program. Addressing technological barriers requires a comprehensive approach that includes providing ongoing technical training and support for teachers. This can be achieved through the establishment of local support networks, where teachers can share their experiences and learn from each other(Averina & Kuswandono, 2023).

Resource Limitations

Many teachers (55%) lacked access to essential devices such as laptops or tablets, which are crucial for participating in online training programs effectively. The lack of adequate technological resources poses a significant barrier to teachers' engagement with the PPG program. Without access to reliable devices, teachers struggle to complete assignments, participate in online discussions, and access learning materials. Resource limitations are further compounded by the financial constraints faced by

many teachers in remote areas. The high cost of purchasing electronic devices and maintaining them in good working condition can be prohibitive for some teachers. This issue highlights the need for targeted interventions to provide affordable access to technological resources.

One potential solution is the establishment of community resource centers, where teachers can access shared devices and internet facilities. Additionally, providing financial assistance or subsidies for the purchase of electronic devices can help alleviate the burden on teachers. Ensuring that teachers have access to the necessary resources is crucial for the successful implementation of the PPG program (Ajam & Sahamdan, 2022; Maulana et al., 2023)

Time Management

Balancing regular teaching duties with the demands of professional development was particularly challenging for 65% of the participants, leading to increased stress and workload. The dual responsibility of managing classroom teaching and engaging in professional development activities can be overwhelming for teachers, especially in understaffed schools which commonly happened in remote schools. Teachers often reported that the additional workload associated with the PPG program left them with little time for personal and family commitments. This imbalance can lead to burnout and reduced motivation, affecting their overall performance and engagement with the program.

Time management challenges are particularly pronounced in remote areas, where teachers may have additional responsibilities related to community engagement and resource management. To address these challenges, it is essential to implement strategies that provide greater flexibility in the PPG program. Moreover, the establishment of support networks within schools can help distribute the workload more evenly among teachers. Collaborative planning and sharing of responsibilities can reduce the burden on individual teachers and create a more supportive environment for professional growth. These strategies can help mitigate the time management challenges faced by teachers in remote areas and enhance their engagement with the PPG program(Paramita et al., 2023).

Accelerated Learning Factors

Offline Learning Materials

Providing downloadable resources that can be accessed offline was identified as a key strategy to mitigate the impact of internet issues and blackouts. Offline materials ensure that teachers can continue their learning without relying on constant internet connectivity. These resources can include pre-recorded lectures, reading materials, and interactive exercises that can be accessed at any time through learning management system (LMS). Offline learning materials offer several advantages, including flexibility and convenience. Teachers can study at their own pace and revisit the materials as needed, which can enhance their understanding and retention of the content. Additionally, offline materials can be distributed in various formats, such as USB drives or printed booklets, to accommodate different preferences and technological capabilities. Furthermore, clear instructions and guidance on how to use the materials can help teachers navigate the resources independently.

Local Support Networks

Establishing local support groups where teachers at the same area can gather to access resources and support each other was suggested to alleviate some of the challenges associated with isolation and lack of technical assistance. Local support networks create a sense of community and provide a platform for teachers to share their experiences, challenges, and solutions. Support networks can facilitate peer-to-peer learning and collaboration, enabling teachers to learn from each other's expertise and insights. Regular meetings, whether in-person or virtual, can foster a sense of mutual support. These interactions

can also provide opportunities for professional development, such as workshops and training sessions, that are tailored to the specific needs of the community.

Flexible Scheduling

Allowing for flexible schedules to accommodate teachers dealing with power outages and internet connectivity issues was recommended to ensure they can participate in the program without stress. Flexible scheduling options, such as asynchronous learning modules and self-paced courses, can provide teachers with the autonomy to manage their learning according to their individual circumstances. Asynchronous learning allows teachers to access course materials and complete assignments at their convenience, without the constraints of fixed class times. This flexibility is particularly beneficial for teachers in remote areas, where connectivity and power issues can disrupt synchronous sessions. Self-paced courses enable teachers to progress through the content at their own speed, accommodating varying levels of prior knowledge and learning styles. Implementing flexible scheduling and flexibility in submission deadlines by providing a range of options for demonstrating learning, such as written assignments, video presentations, and online discussions, can cater to different preferences and technological capabilities. These strategies can reduce the stress associated with rigid schedules and enhance teachers' engagement with the PPG program.

Incentivized Participation

Offered incentives such as certifications, career advancements, or financial rewards was identified as a motivating factor for teachers to engage actively in the PPG program. Incentives can provide recognition and motivation for teachers, encouraging them to invest time and effort into their professional development despite the challenges they face. Certifications and career advancements can provide tangible benefits for teachers, such as increased job security and higher salaries.

4. Discussion

Impact on Teaching Practices

Adaptation to Challenges

Teachers who successfully navigate these challenges develop stronger problem-solving skills and resilience, which are crucial traits for educators (Bandura, 1997). The process of overcoming obstacles such as limited internet access and power outages requires teachers to think creatively and develop innovative solutions. These problem-solving skills can be applied to various aspects of their teaching practice, enhancing their overall effectiveness. Resilience, or the ability to bounce back from setbacks, is another important outcome of facing and overcoming challenges. Teachers who demonstrate resilience are better equipped to handle the daily demands and pressures of the classroom. They are more likely to maintain a positive attitude, persevere through difficulties, and continue striving for professional growth. This resilience can also serve as a valuable model for their students, who can learn from their teachers' determination and perseverance. Moreover, the experience of overcoming challenges can boost teachers' confidence and self-efficacy. As they successfully navigate obstacles and achieve their goals, teachers develop a stronger belief in their own abilities. This increased confidence can translate into more dynamic and effective teaching, as teachers feel empowered to implement new strategies and take on new challenges.

Improved Digital Literacy

Overcoming technological barriers enhances teachers' digital literacy, enabling them to incorporate digital tools into their classroom practices effectively(Selwyn, 2022). Digital literacy encompasses a range of skills, including the ability to use digital devices, navigate online platforms,

and critically evaluate digital content. As teachers engage with online learning, they develop these skills, which are essential for 21st-century education. Enhanced digital literacy enables teachers to integrate technology into their teaching in meaningful ways. They can use digital tools to create interactive and engaging lessons, facilitate online discussions, and provide personalized feedback to students. These practices can enhance student engagement and learning outcomes, as digital tools offer new opportunities for collaboration, creativity, and critical thinking. Furthermore, improved digital literacy can help teachers stay current with educational trends and innovations. The ability to access and evaluate online resources, participate in professional learning communities, and engage with digital content ensures that teachers remain informed and up-to-date. This ongoing professional development is crucial for maintaining high standards of teaching and adapting to the evolving educational landscape.

Enhanced Teaching Methods

Exposure to innovative teaching strategies through the PPG enriches classroom practices, ultimately benefiting students and improving learning outcomes(Koehler et al., 2013). The PPG program provides teachers with access to a wide range of pedagogical approaches, instructional techniques, and educational resources. This exposure can inspire teachers to experiment with new methods and incorporate best practices into their teaching. Innovative teaching strategies, such as project-based learning, flipped classrooms, and differentiated instruction, can enhance student engagement and motivation. These approaches encourage active learning, critical thinking, and collaboration, which are essential skills for the modern workforce. By incorporating these strategies into their teaching, teachers can create a more dynamic and inclusive learning environment that meets the diverse needs of their students. The adoption of new teaching methods also supports continuous professional growth and development. As teachers explore and implement innovative practices, they reflect on their teaching and seek opportunities for improvement. This reflective practice fosters a culture of continuous learning and development, where teachers are committed to refining their skills and enhancing their effectiveness. The benefits of these enhanced teaching methods extend beyond the classroom, contributing to the overall improvement of the education system.

Policy Recommendations

Infrastructure Investment

There is an urgent need for increased investment in reliable internet infrastructure and stable power supply in remote areas to support the PPG program. Ensuring that teachers have access to reliable internet and electricity is essential for the successful implementation of online learning initiatives. Investment in infrastructure can address the digital divide and provide equal opportunities for professional development across different regions (Kelly & Rossotto, 2012). Improving internet infrastructure involves expanding broadband coverage, increasing bandwidth, and reducing the cost of internet services. These measures can ensure that teachers in remote areas have access to high-speed internet, enabling them to participate fully in online learning activities. Additionally, investing in renewable energy sources, such as solar power, can provide a stable and sustainable power supply, reducing the impact of frequent blackouts. Government and private sector collaboration is crucial for infrastructure development. Public-private partnerships can leverage resources and expertise to implement large-scale infrastructure projects.

Facilited Resources

Government and educational bodies should ensure that teachers have access to necessary devices and offline materials, aligning with the goal of universal access to education (OECD, 2021). Providing teachers with the tools and resources they need to participate in online learning is essential for the success of the PPG program. This includes access to laptops, tablets, and other electronic devices, as

well as offline learning materials that can be used when internet connectivity is limited. One approach to resource provision is the establishment of technology loan programs, where teachers can borrow devices for the duration of their training. These programs can be supported by educational institutions, local governments, and non-profit organizations. Additionally, providing financial assistance or subsidies for the purchase of electronic devices can help alleviate the financial burden on teachers. The distribution of offline learning materials, such as printed booklets, USB drives, and pre-loaded tablets, can ensure that teachers have continuous access to educational content. These materials should be designed to be interactive and engaging, incorporating multimedia elements and clear instructions. Ensuring that teachers have access to the necessary resources is a critical component of creating an inclusive and effective professional development program.

Technical Support and Training

Continuous technical support and training programs should be mandated to help teachers become proficient in using online platforms, in line with PPG objectives (UNESCO, 2023). Providing ongoing technical support ensures that teachers can effectively navigate online learning platforms and utilize digital tools. This support can be provided through helplines, online forums, and in-person assistance, ensuring that teachers have access to help when they need it. Training programs should focus on building digital literacy skills, including the use of online platforms, digital content creation, and internet safety. These programs can be delivered through workshops, webinars, and self-paced online courses, providing teachers with flexible options to enhance their digital skills. The training should be practical and hands-on, allowing teachers to apply what they learn to their everyday teaching practices. Additionally, peer mentoring and coaching can be effective strategies for supporting teachers' ongoing professional development. Ensuring that training programs are culturally relevant and context-specific is also important. The content and delivery methods should be designed to the unique needs and challenges of teachers in remote areas. Involving local educators and experts in the design and delivery of training programs can enhance their relevance and impact.

5. Conclusion

The challenges faced by in-service teachers in Papua regions highlight the need for targeted strategies to ensure the successful implementation of the PPG program. By addressing these challenges and leveraging government rules and policies, it is possible to provide effective professional development for teachers, ultimately leading to improved educational outcomes in these remote regions. The identified challenges, including limited internet access, frequent blackouts, technological barriers, resource limitations, and time management issues, require comprehensive and context-specific solutions. Accelerated learning factors, such as offline learning materials, local support networks, flexible scheduling, blended learning models, and incentivized participation, can mitigate these challenges and enhance teachers' engagement with the PPG program.

Policy recommendations emphasize the importance of infrastructure investment, resource provision, continuous technical support and training, flexible program design, and community and government support. These recommendations align with existing government policies and highlight the need for collaborative efforts to create an enabling environment for teacher professional development. The findings of this study provide valuable insights for policymakers, educational institutions, and stakeholders involved in teacher training programs. By implementing the proposed strategies and recommendations, it is possible to overcome the barriers to effective online learning and support the professional growth of educators in remote areas. This, in turn, can contribute to the overall improvement of the education system and ensure that all teachers have the opportunity to develop the skills and knowledge needed for effective teaching.

References

[1] Afriadi, B., Tola, B., & Triana, D. D. (2023). *Professional Education in Indonesia*. *1*(1), 1–9.

[2] Ajam, A., & Sahamdan, S. (2022). PREFERENSI MAHASISWA TERHADAP PROGRAM PENDIDIKAN POFESI GURU (PPG): MATERI DAN STRATEGI DIKLAT. *Edukasi- - Jurnal Pendidikan*, *20*(1), 54–61.

[3] Averina, F. E., & Kuswandono, P. (2023). Professional development of Indonesian in-service EFL teachers: Perceived impacts and challenges. *Englisia: Journal of Language, Education, and Humanities*, *10*(2), 71. https://doi.org/10.22373/ej.v10i2.15589

[4] Bandura, A. (1997). Self-Efficay: The Excercise of Control. *Springer Reference*.

[5] The National Medium Term Development Plan 2020 - 2024, Pub. L. No. NO. 18 OF 202, Indonesian National Development Planning Board (2020). https://www.bappenas.go.id/files/rpjmn/Narasi-RPJMN-2020-2024-versi-Bahasa-Inggris.pdf

[6] Ministry of Education and Culture, Peraturan Menteri Pendidikan Dan Kebudayaan Republik Indonesia Nomor 37 Tahun 2017 TENTANG SERTIFIKASI BAGI GURU DALAM JABATAN YANG DIANGKAT SAMPAI DENGAN AKHIR TAHUN 2015 1 (2017).

[7] Isharyanti, N., Dewi, F., & Jati, A. G. (2023). How Ready Can You Be? Profiling Indonesian Teacher's Preparedness for an Online Teacher Professional Development Program. *VELES: Voices of English Language Education Society*, *7*(1), 167–178. https://doi.org/10.29408/veles.v7i1.7905

[8] Kelly, T., & Rossotto, C. M. (Eds.). (2012). *Broadband Strategies Handbook* (Vol. 4). The World Bank. https://doi.org/10.1596/978-0-8213-8945-4

[9] Koehler, M. J., Mishra, P., & Cain, W. (2013). What is Technological Pedagogical Content Knowledge (TPACK)? *Journal of Education*, *193*(3), 13–19. https://doi.org/10.1177/002205741319300303

[10] Lokita, I. G. A., & Utami, P. (2018). The Online Learning of Teacher Profession Education Program (PPG) for In-service English Teachers: Challenges and Accelerated Learning Factors. *Jpi*, *7*(2), 2541–7207. https://doi.org/10.23887/jpi-undiksha.v7i2.15650

[11] Maulana, I., Rahma, N. A., Mahfirah, N. F., Alfarizi, W., & Darlis, A. (2023). Meningkatkan Profesional Guru dengan Program Pendidikan Profesi Guru (PPG). *Journal on Education*, *5*(2), 2158–2167. https://doi.org/10.31004/joe.v5i2.867

[12] OECD. (2021). *education at Glance*. https://doi.org/https://doi.org/10.1787/b35a14e5-en.

[13] Paramita, P. P., Andriani, F., Handayani, M. M., & Rusli, R. (2023). Teacher Participation in Professional Learning Programs in Classroom Behavior Management. *Jurnal Prima Edukasia*, *11*(1), 96–105. https://doi.org/10.21831/jpe.v11i1.53637

[14] Selwyn, N. (2022). *Education and Technology* (Third). Bloomsbury Academic.

[15] UNESCO. (2023). Technology in education: a case study on Indonesia. *Technology in Education: A Case Study on Indonesia*. https://doi.org/10.54676/wjmy7427

Integrating The 4C Skills into English Language Learning Using Team-Based Thematic English Learning Model at The Age of Artificial Intelligence for Senior High School

Kusworo[1*], Endang Nurhayati[2]

[1] SMAN 3 Yogyakarta, Yogyakarta, Indonesia
[2] Faculty of Language and Arts, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

[*]E-mail: kusworo2002@yahoo.com.au

Abstract. This study aims to: (a) develop a model of English language instruction that has potential to develop learners' 4Cs skills, (b) verify the effectiveness, practicality, and feasibility of the team-based thematic English learning model to develop learners' 4Cs skills, and (c) study the role of the Artificial Intelligence technologies in the practice of the learning model. This research employs the R&D approach by applying the ADDIE instructional design model. To validate the model, the author conducted an action research. The research subjects comprised a group of Year XI students and English teachers. The data were collected by using learning assessment, reflection, class observation, questionnaire, interview, and focus group discussion. The data were analysed using a convergent mixed method design. The results showed that the learning model was effective to develop both the language skills and the 4Cs skills of the learners; the model was practical and feasible; and AI-based technologies played an important role in the practice of the learning model.

Keywords: team-based, thematic, 4C skills, English language instruction

1. Introduction

The trends changing the world in the beginning of the 21st century, such as automation, globalization, and workplace have an impact on education. Now education must emphasizes not only on the mastery of content knowledge but also on development of learners' broader competencies essential for their life in the future, like critical thinking and problem solving, collaboration, creativity, and communication. Fandino (2013) suggested foreign language education in the 21st century ought to respond to the change and growing needs of students so that they were fully prepared for effective functioning in the modern world.

There is no single universally accepted definition of the concept of 21st century skills. Study by Voogt & Roblin, (2010) revealed that 21st century skills were a very broad concept and may be related to thinking process, such as creativity, problem solving, decision-making, self-knowledge, critical thinking, accessing and analyzing information. They may also embrace learning and employability skills, for example ICT literacy, agility and adaptability, cooperation, communication, motivation, or time management. Great School Partnership (2016) referred these skills as as cross-curricular, cross-disciplinary, or interdisciplinary skills. The framework of Partnership for 21st Century Learning (P21, 2019) includes three groups of skills: (1) life and career skills, (2) learning and innovation skills, (3) information, media, and technology skills, all of which constitute the integral part of 21st century

learning. The concept of learning and innovation emberacess the so-called 4Cs: creativity and innovation, critical thinking and problem solving, communication, and collaboration.

1.1 Critical Thinking and Problem Solving

Critical thinking and problem solving skills are the most important competency in the 21st century to succeed in the work place as shown by surveys conducted by the Conference Board in 2006. According to Ketabi, Zabihi & Ghadiri (2013) critical thinking appears to be an indispensable component of effective education in the 21st century; hence, teachers and policy makers tend to agree that it needs to be incorporated into the curricula, also in the context of foreign language teaching. Hurst, et al. (2018) stated that there is some place for critical thinking in L2 classroom because such skills can be improved by means of, for example, content-based instruction, project work, debates, or task-based learning.

According to Neil Browne (2007), critical thinking consists of an awareness of a set of interrelated critical questions, plus the ability and willingness to ask and answer them at appropriate times. Some of the critical questions are as follow: What are the issue and the conclusion? What are the reasons? Are there any fallacies in reasoning? How good is the evidence? Are there rival causes? Are the statistic deceptive? While Lai & Viering (2012) referred critical thinking as a wide array of mental processes, such as analyzing information, deductive and inductive reasoning, judging or evaluating, problem solving.

1.2 Communication and Collaboration

Communication is understood as two-way process of deciphering information and conveying thoughts and ideas by means of oral, written, and nonverbal channels as well as making use of multiple media and technologies (P21 2019). Wagner (2012) put this competency in the list of seven survival skills. It is also considered one of the most important skills required by employers. Both oral and written communication are in the rank of important skills to get jobs.

Collaboration skill is also crucial for the success in the 21st century. According to Jerald (2009), employers rank "teamwork/collaboration" second only to "professionalism" when asked which skills are currently very important for new entrants in the workforce. We can say that teamwork and collaboration are the key competencies for a successful career in the 21st century.

Both communication and collaboration skills are indispensable component of effective education in the 21st century; consequently, there should be place in the school curriculum and classroom practice for them. Communication include the skill to articulate thought and ideas clearly and effectively through speaking and writing; while collaboration skills includes sub skills, such as (a) demonstrating the ability to work effectively with diverse teams, (b) exercising flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal, and (c) assuming shared responsibility for collaborative work.

1.3 Creativity

Creativity and innovation is the key factor for business success. Employers rank creativity and innovation 4 among skills expected by employers. Lai & Viering (2012) stated that in order to be called creative, such acts or products need to be not only new and original but also useful; they result from divergent thinking process, including flexibility, fluency, originality, and elaboration. Thomlison (2015) believed that fostering learners' creativity is a vital role for any teacher, as doing so can help learners to develop predictive, analytical, and critical and problem solving skills, to develop confidence and to develop self-esteem. Creativity includes sub skills like creating that is produce new or original work; putting ideas together to form a new and different whole; developing, implementing, and communicating new ideas to others, and being open and responsive to new and diverse perspective.

This study aims to: (a) develop a model of English language instruction that has potential to develop learners' 4Cs skills, (b) verify the effectiveness, practicality, and feasibility of the team-based

thematic English learning model to develop learners' 4Cs skills, and (c) study the role of the Artificial Intelligence technologies in the practice of the learning model.

2. Research Method

2.1 Research Design and Procedure of the Development
To develop team-based thematic English learning model the researcher used the ADDIE instructional design model. To validate effectiveness, practicality, and feasibility of the learning model, expert judgment and action research was carried out.

2.2 Research Location and Participant Development
The was model was tried-out at SMA N 3 using an action research approach. It was carried out through two circles. consisted of four classroom meetings. The research subject was 30 students of Year XI of SMAN 3 Yogyakarta.

2.3 Data Collection Procedure
This study used some different instruments to collect different types of data. To measure the effectiveness of the model, a test was used. Questionnaire, interview, class observation notes, reflection sheet, and teaching documents analysis were used to assess the students' and teacher's perception towards the application of the learning model to integrate the 4Cs skills into English instruction.

3. Research Findings and Discussion

3.1 Research Findings
3.1.1 Team-Based Thematic English Learning Model
Based on the characteristics of Michaelsen's team-based learning, the author developed team-based thematic English learning model to integrate 4Cs skills into English instruction. There are three main differences between the team-based thematic English learning model developed by the author and Michaelsen's team-based learning. First, the class activities are aimed not only at applying concepts such as those in Michelson's team-based learning, but also at developing students' 4Cs skills. Second, unlike Michelson's team-based learning, the model developed by the author ends with reflection activities. Third, the learning model developed by the author uses thematic approach. The use of themes is aimed to build learners' characters. Learning themes should be contextual.

The sequence of learning activities in Team-Based Thematic English Learning model to integrate the 4Cs Skills into English instruction consist of four-phase: knowledge acquisition, knowledge application and skills development, assessment, and reflection.

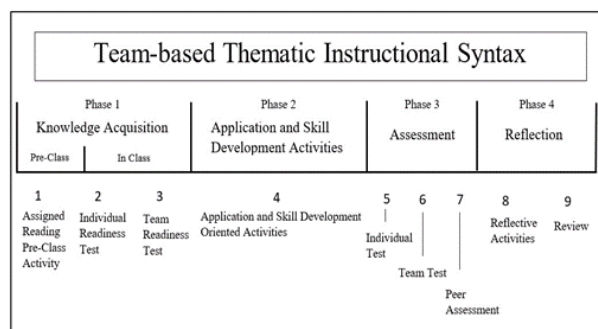Syntax of Team-Based Thematic Instruction Model is as follows.

Figure 1. Team-based Thematic Instructional Syntax

Phase 1: Knowledge acquisition.

This initial phase is aimed for the students to gain prior conceptual knowledge required for classroom group discussion. There were two main activities in this phase: assigned reading which is done as pre-class activity and readiness assurance process which is done at the beginning of classroom activity to make sure that learners have mastered prior knowledge. For this purpose, teachers can assign students to learn concepts that will be used for discussion in the classroom from English language learning platforms available free online, such as British Council, BBC Learning English, Cambridge English, English VOA, TED Talks, etc.

Phase 2: knowledge application and skill development activities.

In this phase, learners were engaged in small group activities designed for the application of the conceptual knowledge that they learned in the assigned reading activity and to develop their language skills, i.e. reading, writing, listening, and speaking. The activities are also designed to improve learners' skills of critical thinking and problem solving, creativity, communication, and collaboration or 4Cs skills. The class sessions are devoted to a series of small group application exercises. It was in this stage that students develop their language skills and the 4Cs' skills simultaneously through several problem solving activities. Challenging learning tasks and more complex problems to solve help students acquire the critical thinking and problem solving skills. Creativity, communication, and collaboration skills were also increasingly developed during the sequence of application activities in which students work collaboratively in teams to answer questions of higher-order thinking skills (HOTS). It is necessary to notice that the team or group are diverse, in which each group consist of students with low, middle, and high level of English competence.

Phase 3: Assessment.

To assess learners' knowledge, language skills, and their 4Cs skills various authentic assessment techniques were adopted including test, reflection, and class observation. Students take assessment both individually and in team. They also do peer assessment in which each team member gives score to their teammates.

Phase 4: Reflection.

The aims of reflection activities were to help students briefly review the course content, reflect their experience in the application and skill development activities, learn about the value of teams, recognize effective team interaction, and learn about themselves.

3.1.2 Classroom Implementation Result

To validate the effectiveness, practicality, and feasibility of the model action research method was applied. The model was implemented in the classroom four times or two circles. Data were gathered through tests, reflection, classroom observations, questionnaire, interview with students and the teacher, and focus group discussion with some English teachers of high schools.

Each circle or learning process follows the following syntax: knowledge acquisition, knowledge application and skills development activities, assessment, and reflection. Learning topics and learning materials were song lyrics. Learning themes were environment and humanity.

3.1.2.1 Analysis of Test Results

Data on table 1 showed that the assigned reading was effective to facilitate learners gain prior conceptual knowledge. The difference score between individual score and that of the team showed that team working has a positive impact on students' grades.

Table 1. Readiness Test Score of Implementation 1 & 2

	Readiness Test Score	
	Circle 1	Circle 2
Individual	99.35	82.6
Team	100	94
Average	99.67	88.3

Data on Table 2 Assessment scores showed the effectiveness of the model. The different assessment score between individual score and that of the team prove the positive impact of teamwork.

Table 2. Assessment Score of Implementation 1 & 2

	Assessment Test Score	
	Circle 1	Circle 2
Individual	72.85	87.08
Team	94.11	95.78
Average	83.43	91.43

3.1.2.2 Analysis of Reflection Results

Table 3. Reflection Score of Implementation 2

Number	Concept Knowledge	Already Mastered	Not mastered yet
1	Structure of song lyrics	100,00%	0,00%
2	Social function of Songs	100,00%	0,00%
3	Theme	100,00%	0,00%
4	Language of song	100,00%	0,00%
5	Rhyme	100,00%	0,00%
6	Personification	96,43%	3,57%
7	Metaphor	92,86%	7,14%
8	Simile	85,71%	14,29%
9	Hyperbole	100,00%	0,00%
10	Repetition	100,00%	0,00%
	Average	97,50%	2,50%

Data on table 3 proved the effectiveness of the model to facilitate the learners to attain conceptual knowledge, develop their language skills, as well as their 4Cs skills.

Reflective testimonies also showed that the learners' had positive attitude toward the model of team-based thematic learning of English. They claimed that the learning course content was applicative, attractive, very engaging, and dynamic. They also testified that the learning model was great, applicative on daily life, and useful to develop their language skills.They also improved their critical thinking, creativity and collaboration skills when they were learnig English using this model. In addition, They stated that the learning themes was impactful, eye opening, realistic, and still relevant today.

3.1.2.3 Analysis of Class Observation

Data gathered from the classroom observation showed that students were active working within teams solving problems and answer questions about the songs. They exchanged ideas during team discussion. They used English for discussion activities. Learning tasks supported the activities that develop students' skills on critical thinking and problem solving, communication, collaboration, and creativity.

3.1.2.4 Analysis of Questionnaire Results

The finding displayed on Table 4 below confirmed the effectiveness of the assigned reading as proven by the learners' score on the readiness test. As for teamwork, data proved the benefits of teamwork for the learners' skill development. Data analysis also showed that the learning activities in the class effectively help the learners develop their language skills. As regard with the critical thinking and problem solving skills development, the data analysis approved the positive impact on the learning activities on the learners' developing their critical thinking and problem-solving skills. The learning activities were also proven to be quite effective to develop learners' creativity. Team learning activities were also proven to be effective in facilitating the learners to improve their communication skills. As for the collaboration skills, most of the learners accepted that team-based learning gave them opportunity to develop their ability to work collaboratively with diverse team. In brief, it can be concluded that learning activities with this model of English learning were effective to develop learners' 4Cs skills. Data collected from questionnaire show that most of the learners have positive perception about the use of team-based learning model to develop 4Cs skills.

Table 4. Learners' perspective on the Assigned Reading and Readiness Test Activities

Statement	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Assigned reading activities	0,00%	4,32%	24,69%	55,56%	15,43%
Teamwork skill development	0,00%	0,00%	4,53%	50,21%	45,27%
Language skill development	0,00%	3,70%	18,52%	51,85%	25,93%
Critical thinking & Problem solving skill development	0,00%	0,00%	7,41%	57,17%	35,45%
Creativity development	0,00%	1,23%	14,81%	46,91%	37,04%
Communication skill development	0,00%	0,00%	9,26%	57,41%	33,33%
Collaboration skill development	0,00%	0,00%	4,94%	51,8%	43,21%
Effectiveness of learning tasks	1,85%	1,85%	1,85%	51,85%	42,59%

Statement	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Assessment activities	0,00%	3,07%	14,81%	54,32%	27,16%
Reflection activities	0,00%	5,56%	12,96%	44,44%	37,04%
Teaching materials and Themes	0,00%	2,4%	8,64%	49,38%	39,51%
Overall average	0,17%	2,08%	11,13%	51,90%	37,72%

3.1.2.5 Analysis of The Results of Interview with Students and the Teacher and FGD

Interviews were conducted with four students. They stated that they learned better using this model than doing with the regular one. They agreed that the model was very engaging way of learning. They also said that the assigned reading was beneficial. It made them learn at their own pace. Concerning with the integration of 4Cs skills into English instruction using this model, one student said

> "I think what this learning model does better compared to the traditional one, because in the traditional one you only learn about the English part but in this one you learn on how to collaborate with your teammate".

Another student stated:

> ".We'll also learn how to accept diversity…You know different opinion and may be just different way of thinking and really tried to work it together…."

As for the themes of the songs, i.e. the environment and the social problem. Student 1 responded

> "It taught us to be more critical about the world surround us. So it open my mind to think more critically about one person to another."

The researcher also interviewed the teacher who practiced the model in his English class to get information about his feeling and opinion teaching with the model. The result showed that the integration of the 4Cs skills into English instruction was related to the demand of living. He also underlined the benefit of small group or teamwork activities. In general he had positive impression about the team-based thematic English learning model. In addition, At the Focus Group Discussion held to evaluate the feasibility of the model, all the participating teachers agreed that the model was very practical and feasible

3.2 Discussion

The assigned reading done prior to the class was effective to facilitate the learners acquire conceptual knowledge. This finding was in line with the active learning and learning autonomy theory. Some learners stated that they were actively involved in the learning even before the class began. Piaget (1973) and Vigotsky development theories suggested the learners' active involvement in the learning process. As for the learning autonomy perspective, Bill Puka (2008) stated that having autonomy or being given autonomy involves having the space to do things for oneself. According to Kumaravadivelu in his book "Beyond Method", promoting learner autonomy is a matter of helping learners to develop a capacity for critical, decision making, and independent; to discover their learning potential; to take responsibility for learning and for using appropriate strategies to achieve their general and specific objectives; and to develop self-control and self-discipline, which lead to self-esteem and self confidence.

The effectiveness of the assigned reading to facilitate learners acquire conceptual knowledge proved that the use of AI-based English learning platforms is beneficial for learners. According to Gawate (2019) the AI-based learning platform help learners to learn at their speed, to repeat topics, and to cater their interest. This is in line with what Harvard University Online Resources states that some benefits of a flipped classroom are that students can learn at their own pace, Students take responsibility

for their learning, and students learn rather than encounter material in the class. As Mudit Verma (2018) stated, some tutoring programs based on AI can teach students fundamental, but so far are not ideal for helping students learn high-order thinking and creativity, something that rest-world teachers are still required to facilitate.

The result finding on the positive impact of the use of small group discussion or teamwork activities to facilitate the development of the learners' language skills and the 4Cs skills was in accordance with the active learning theories. Siberman (1996) underlined that students learn more actively only if they do most their tasks. They learn ideas, solve problems, and apply what they have learned. To do all of these, students must 'do' – search by themselves, give examples, apply the skills, and do tasks based on the knowledge they have already had or the one they have to learn, learning by doing.

This finding support Van Lier's statement that diverse team provide students with opportunity to scaffold one another's learning including assistance from more capable peers, interaction with equal peers, and interaction with less capable peers. In addition, Vygotsky's concept of a scaffolding allows students to perform tasks that would be otherwise exceed their ability without that important assistance and guidance from the teacher (Hogan & Pressley, 1997).

Learners' opinion about peer collaboration was supported by Guavian's perspective on it. According to Guavain, working together with peers has many advantages. First, through discussion about various perspective of the peers on a certain situation and problems, a child can often construct more complete understanding about a certain topic. Second, although the discussion involve debate and disagreement, children were able to internalize argument process and because of it they gain ability to see situation from different point of view. Third, children can accomplish tasks that are more complicated when they were working together. In that situation, they were providing 'scaffolding' each other, and fourth, children learn meaningful social behavior when doing cognitive tasks together with peers (Ormod, J.E., 2008). Finally, as Erdogan (2019) stated that if we need to improve the 4Cs of our students, EFL classroom are perfect to improve the 4C skills integratedly with four language skills of reading, writing, listening, and speaking.

4. Conclusion

In conclusion, the team-based thematic English learning model has proven to be effective for integrating 4Cs skills into English language learning. This learning model is also practical and can be implemented in the classroom. In other words, this model is feasible. It can also be concluded that the use of an AI-based English learning platform has proven effective in helping students master concept knowledge.

References

[1]   Brown, M.N. (2007). Asking the Right Questions – A Guide to Critical Thinking eight edition. New Jersey: Pearson Education, Inc.

[2]   Erdogan, V., (2019). Integrating 4C Skills of 21st Century into 4 Languages Skills in EFL Classes. International Journal of Educational Research, Vol. 7, No. 11. November 2019

[3]   Fandino, Yamith J..(2013) "21st Century Skills and the English Foreign Language Classroom: A Call for More Awareness in Colombia."[In:] Gist Education and Learning Research Journal. Vol.7; 190-208

[4]   Gawate, S (2019). Artificial Intelligence (AI) Based Instructional Programs in Teaching-Learning of English Language.

[5]   Great School Partnership (2016) "21st Century Skills." https://www.edglossary.org/21st-century-skills/ (Accessed 3 June, 2022)

[6]   Hurst, Nicolas, Carla Diogo, Catarina Abelha, Carolina Teixeira (2018) "English Langage Teaching and 21st Century Skills. The Four Cs: Not a Soft Option." [In:] The APPI eJournal; 35-40.

https://bokcenter.harvard.edu/flipped-classrooms#:~:text=A%20flipped%20classroom%20is%20structured,that%20involve%20higher%20order%20thinking..

[7] Jacobs, G. M., & Farrell, T. S. C. (2001). Paradigm Shift: Understanding and Implementing Change in Second Language Education. TESL-EJ.Retrieved May 15, 2010, from TESL-EJ: http://tesl-ej.org/ej17/a1.html

[8] Jerald, C. D., (2009). Defining a 21st Century Education. The Center for Public Education

[9] Ketabi, Saeed, Reza Zabihi, Momene Ghadiri (2012) "Critical Thinking across the ELT Curriculum: A Mixed Method Approach to Analyzing L2 Teachers' Attitudes towards Critical Instruction." [In:] International Journal of Research Studies in Education. Vol. 2/3; 15 – 24.

[10] Kumaravadivelu, B.,(2003). Beyond Methods – Macrostrategies for Language Teaching. the United States of America: Mary Jane Peluso Publisher

[11] Lai, Emily R., Michaela Viering (2012). Assessing 21st Century Skills: Integrating Research Findings. Vancouver, B.C.: National Council on Measurement in Education

[12] Maley, Alan, Nik Peachy (eds.) (2015). Creativity in the English Language Classroom. London: British Council.

[13] Mullins, M.M. (2008). "Constructivism" , in Moral Education: A Handbook, Volume 1 & 2. The United States of America: Praeger.

[14] Ormrod, J. E., (2008). Educational Psychology Developing Learners. Pearson.

[15] Partnership for 21st Century Learning (2019). Framework for 21st Century Learning Definition. https: //www.battelforkids.org/network/p21/framework-resouces (Accessed 3 June, 2022)

[16] Piaget, J. (1973). To understand is to invent. New York: Grossman

[17] Puka, B. (2008). Autonomy in Power, F.C. et al. Moral Education: A Handbook, Volume 1&2. The United States of America: Preager Publishers

[18] Silberman, M. (1996). Active Learning: 101 Strategies to Teach Any Subject. Massachusetts: Pearson

[19] Tomlison, Brian (2015). "Challenging Teachers to Use their Coursebook Creatively. [In:] Alan Maley, Nik Peachy (eds.) Creativity in the English Language Classroom. London: British Council; 24-28.

[20] Verma, M. (2018). Artificial Intelligence and Its Scope in Different Areas with Special Reference to the Field of Education. International journal of Advanced Educational Research, Volume 3; January 2018. Page No 05 – 10.

[21] Voogt, Jake, Natalie P. Roblin (2010). 21st Century Skills: Discussion Paper. Enschede, Netherlands: University of Twente

[22] Wagner, Tony. (2012). Creating Innovators. New York. A Division of Simon and Schuster, Inc.

Artificial Intelligence in Elementary School in Indonesia : Systematic Review

Shafira Baroroh, Miftari Putri Destari

Abstract. In today's learning environment, the development of artificial intelligence design is a necessity to support the education system. The involvement of artificial intelligence will help students understand classroom lessons more easily and facilitate interaction between students and teachers. Through the development of the concept of learning design and training, it is expected to encourage the participation of students and teachers to be able to support the learning system in order to obtain better educational output through the utilization of appropriate technology. The method used in this research is a literature study approach, specifically a systematic review. During the implementation of the activity, it was found that students tend to learn faster and like to explore new things. It is expected that the design of artificial intelligence learning through these three applications can help the learning process in the present.

1. Introduction

Globalization plays an important role, including the development of the information and communication technology sector in Indonesia. Along with these developments, computer systems and networks are also growing, increasing the role of the Internet as a means of information and communication. The Internet is a necessity in everyday life (Franz et al., 2023). Along with the times, challenges in the world of education are also increasing, so students are required to be able to compete globally.

The application of technology in learning is something that needs to be considered in preparing the younger generation. One technology that is changing the learning paradigm is Artificial Intelligence (AI). AI has the potential to improve the quality and effectiveness of learning at the basic education level (Rahadiantino et al., 2022). AI has the capacity to analyze data, identify student learning patterns and is able to provide learning recommendations that match the level of student understanding.

The implementation of artificial intelligence (AI) in education can provide many benefits, one of which explains that in the scope of education, AI can play a role in many aspects that can help teachers in facilitating their performance, especially in administrative matters such as final grades determined based on assessment weights.

AI is an application that can be used in developing active, interesting and creative learning content so that it can increase student interest in learning. Therefore, the researcher wants to see how the application of AI in elementary schools through a literature review of articles from 2019-2024. Research questions from this study are from the application of AI in elementary schools from 2019-2024.

2. Methods

The method used in this research is a literature study approach, specifically a systematic review. This research was conducted to find out how the results of the application of AI in elementary schools from the articles that have been collected.

To find related articles we used the Garuda portal and Google Classroom using two keywords namely AI and Elementary School. Researchers took 28 related articles from 2019-2024.

3. Results

Of the 28 articles consisting of 2 articles in 2024, 6 articles in 2023, 5 articles in 2022, 5 articles in 2021, 3 articles in 2020, 2 articles in 2019 state that in general the application of AI at the elementary school level is very influential in improving the quality of teaching. The application of AI in education in general also facilitates teachers and students in the learning process.

Overview Of Artificial Intelligence Implementation
There are several Artificial Intelligence-based learning media that can be collaborated with teachers and students. Duolinggo application is a website-based and mobile (smartphone) English platform application. This application is considered suitable as a student learning tool which contains animations that can move so that students like playing games. This application is useful for improving English language skills, increasing English vocabulary, and training students in pronunciation.

Khan Academy is a free learning resource for students, teachers and parents. In this app, there are exercises, quizzes, and tests for students to practice. In addition, there are vedeo tutorials of the subject matter that can help students. For teachers, it is easy to see the progress made by students.

Kejarcita application is an application that focuses on question bank services for elementary school students. This application contains interactive learning videos, material summaries, worksheets, question and answer features, announcement attendance, and management.

These three applications are very helpful for teachers and students in learning. In addition, the three applications can be connected to Google Classroom, making it easier for teachers to provide assessments.

Some articles also mention that in the ease of using AI, there are several obstacles such as lack of network stability. Given that AI is an application that must be continuously connected to a stable internet, but in some areas in Indonesia, internet access is sometimes inadequate. Therefore, attention from the government is needed so that the learning process can run properly.

4. Conclution

The implementation of AI for elementary schools in Indonesia generally affects learning and has a positive impact on its use. Learning becomes more effective and efficient, and it can also open students' knowledge about technology which has a positive impact on education. In addition, there are several obstacles in the application of AI in elementary schools. Therefore, it takes the role of all parties including teachers, students, parents, and the government to improve the quality of education in Indonesia.

References

[1] Franz, dkk. (2023). Pelatihan Penerapan Artificial Intelligence (AI) untuk Menunjang Aktifitas Pembelajaran pada Sekolah Dasar Daarul Hijrah Al-Amin Samarinda. *Jurnal lentera Pengabdian,* 1(4).
[2] Rahadiantino, dkk. (2022). Implementasi Pembelajaran Artificial Intelligence Bagi Siswa Sekolah Dasar di Kota Batu, Malang, Jawa Timur. *Jurnal Inovasi Pendidikan dan Pembelajaran Sekolah Dasar,* 6(1).
[3] (Imroatul Maufidhoh1), 2023). Implementasi Pembelajaran Berbasis Artificial Intelligencemelalui Media Puzzle Makerpada Siswa Sekolah Dasar. ABUYA: *Jurnal Pendidikan Dasar,*
[4] (Pratikno1, 2019). Implementasi Artificial Intelligence dalam Memetakan Karakteristik, Kompetensi, dan Perkembangan Psikologi Siswa Sekolah Dasar Melalui Platform Offlne. *Proceeding KMP Education Research Conferece Keluarga Mahasiswa Pascasarjana (KMP).*
[5] (Dardya Putr Hastungkara, 2019). APPLICATION OF E-LEARNING AND ARTIFICIAL INTELLIGENCE IN EDUCATION SYSTEMS IN INDONESIA. *ANGLO-SAXON*, 117-133.
[6] Lienggar Rahadiantino1), A. F. (2022). Implementasi Pembelajaran Artificial Intelligence Bagi Siswa Sekolah Dasar di Kota Batu, Malang, Jawa Timur. *Jurnal Inovasi Pendidikan dan Pembelajaran Sekolah Dasar, 6.*

[7] Imroatul Maufidhoh1), I. M. (2023). MPLEMENTASI PEMBELAJARAN BERBASIS ARTIFICIAL INTELLIGENCEMELALUI MEDIA PUZZLE MAKERPADA SISWA SEKOLAH DASAR. *ABUYA: Jurnal Pendidikan Dasar*.

[8] Pratikno1, A. S. (2019). Implementasi Artificial Intelligence Dalam Memetakan Karakteristik, Kompetensi, dan Perkembangan Psikologi Siswa Sekolah Dasar Melalui Platform Offline. *Proceeding KMP Education Research Conference Keluarga Mahasiswa Pascasarjana (KMP)*.

[9] Nurkhalik Wahdanial Asbara1*, A. F. (2024). PENERAPAN AI SEBAGAI ALAT BANTU PROSES PEMBELAJARAN DI TINGKAT PENDIDIKAN SEKOLAH DASAR. *JMM (Jurnal Masyarakat Mandiri)*, 831-841.

[10] Ahmad Sudi Pratikno1, d. S. (2019). Adopsi Artificial Intelligence pada Pengawasan dan Evaluasi Kinerja Guru Sekolah Dasar. *Journal XX (XXXX) XXXXXX*.

[11] Ishmatun Naila1, A. A. (2023). Pengaruh Artificial Intelligence Tools terhadap Motivasi Belajar Siswa Ditinjau dari Teori Rogers . *At-Thullab: Jurnal Pendidikan Guru Madrasah Ibtidaiyah*.

[12] Nanik Puji Arsanti, B. I. (2023). Membangun Kredibilitas Manajemen Pendidikan Dasar Melalui Penerapan Artificial Intelligence, Kompetensi Manajemen, dan Etos Kerja. *Jurnal Inovasi Pendidikan dan Pembelajaran Sekolah Dasar*.

[13] Farida Nur Kumala1*, A. D. (2024). PENDAMPINGAN IMPLEMENTASI ARTIFICIAL INTELLIGENCE DALAM PEMBELAJARAN BAGI SISWA SEKOLAH DASAR PADA KURIKULUM MERDEKA. *Jurnal Pengabdian Kepada Masyarakat* .

Exploring Pre-Service Primary School Teachers Strategies in Solving Addition of Fractions

Puri Pramudiani[1*], Fitri Alyani[2], Maarten Dolk[3], Alfida Mukti Utami[4], Marcella Wijayanti[5]

[1,2]Universitas Muhamadiyah Prof. DR. HAMKA Jakarta Indonesia
[3]Freudenthal Institute Utrecht University, The Netherlands
[4,5]Universitas Muhamadiyah Prof. DR. HAMKA Jakarta Indonesia

Corresponding email: puri.pramudiani@uhamka.ac.id

Abstract. Fraction is one of the mathematical topics studied in primary school. Current methods of teaching fractions often lack a solid conceptual foundation, leading to the perception that fractions are difficult and confusing. Consequently, it is crucial to understand the strategies employed by prospective teachers in solving fractional problems to enhance pupil comprehension. The aim of this research is to explore the strategies used by pre-service primary school teachers to solve problems involving fractions. This study employs a descriptive qualitative methodology through an exploratory approach, utilizing data collection techniques such as video recordings, observations and interviews. The subjects of this research were first-year students in the Primary School Teacher Education Program at a private university in Jakarta, Indonesia. By analyzing the written test responses of pre-service primary school teachers, the researchers examined the strategies used to solve basic fraction calculation problems. The findings indicate that pre-service primary school teachers employ various strategies in addressing fraction computation problems, highlighting notable differences in their approaches.

Keywords: fraction, pre-service primary school teacher, strategies

1. Introduction

Mathematics is a mandatory subject studied in Indonesia. This is consistent with the findings of Utami et al., (2024), who state that mathematics is taught at every level of education in Indonesia, both formal and informal. Mathematics plays a crucial role in human life (Raj Acharya 2017). Therefore, every aspect of human life is invariably related to mathematics. One of the topics covered in elementary school mathematics is fractions, as they are considered essential for students' future lives. This importance stems from the fact that fractions form the foundation for understanding algebra and other more complex mathematical concepts (Benbow & Faulkner, 2008; Booth & Newton, 2012; Roesslein & Codding, 2019).

Studying fractions is still considered challenging for some students (Lortie-Forgues et al., 2015). This difficulty is attributed to numerous weaknesses in students' understanding of fractions. This assertion is supported by test results and research studies conducted in previous years (e.g, Perie et al., 2005; Stigler et al., 2014). The lack of understanding regarding fractions is not confined to developed countries; Asian countries, including Indonesia, also exhibit low levels of comprehension in this area.

According to the Trends in International Mathematics and Science Study (TIMSS) 2015 results, the average correct response rate for fraction problems among students was 24.45% (TIMSS, 2015), placing Indonesia 46th out of 51 countries (Ramadhan et al., 2023). These results indicate that students' understanding of fractions remains relatively low (Fatmahanik, 2019).

Previous research has revealed that many students often perform calculations using formulas without understanding the underlying reasons (Kerslake, 1986; Gabriel et al., 2013). The poor understanding of fractions among students can be attributed to a lack of conceptual teaching by educators. Frequently, teachers explain fraction topics by directly presenting formulas without employing strategies, media or instructional tools that could enhance students' comprehension in the classroom. This observation aligns with the findings of Prawismo et al., (2022), who noted that teachers tend to simply write down formulas and demonstrate how students should use them without explaining the origins of these formulas or their relevance to everyday life.

To foster student understanding of fraction topics, especially in solving fraction problems, teachers need to employ strategies that teach fractions conceptually. As noted by Ball (1989); Rosli et al., (2020); Stephan & Akyüz (2013), a teacher's understanding can significantly influence the classroom learning environment. Consequently, many researchers argue that teacher comprehension is crucial for creating meaningful mathematics learning experiences. If teachers lack understanding, mathematics instruction will likely be challenging for students (Loewenberg Ball et al., 2008). Based on this explanation, as pre-service primary school teachers (PST) who will eventually teach mathematics, particularly fractions, it is essential for pre-service teachers to develop effective strategies for addressing fraction problems.

According to Baek et al., (2017); Lloyd (2014); Thurtell et al., (2019), it is increasingly important for pre-service primary school teachers to grasp fractions conceptually. Meanwhile, Simon (1993) explains that there are numerous misconceptions among prospective teachers regarding fraction concepts, such as operations and conceptualization. This is often due to the procedural differences taught to them. Therefore, to expand upon previous research by Webel et al., (2016) concerning strategies used by pre-service teachers in addressing fractions, further investigation is warranted.

Although much previous research has discussed the knowledge of teachers and PSTs (e.g, Cramer et al., 2002; Son & Lee, 2016), several research questions remain unanswered. For instance, there is limited information on the strategies that teachers and prospective teachers use to learn or solve fraction problems. Conceptual understanding among prospective teachers is still limited; for example, in Finland, PSTs tend to view rational numbers sequentially (e.g., after 3/5 comes 4/5) (Merenluoto & Lehtinen, 2006). Additionally, research by Depaepe et al., (2015) investigated and compared PSTs' abilities regarding rational numbers in fractions, finding that teacher understanding is essential for classroom instruction. Consequently, the aim of this study is to explore the strategies used by prospective elementary school teachers in solving fraction calculations. By examining the relationship between prospective teachers' understanding and their approaches to solving fraction problems, researchers can explore and characterize the various strategies employed by prospective elementary school teachers in fraction computation.

2. Method

The participants in this study comprised approximately 44 students enrolled in a teacher education program at a private university in Jakarta, Indonesia. All participants were in their third year of the teacher preparation program. This research employed a qualitative descriptive method, utilizing research instruments such as test, interview and documentary materials such as photos and videos. The researcher investigated the study of fraction arithmetic, specifically aiming to explore primary school PSTs strategies in solving fraction addition problems. Prior to the study, participants had completed problem-solving tasks introducing them to various strategies for addressing such problems.

Subsequently, to further delve into the students' responses to the given problems, a question-and-answer session was conducted.

The question-and-answer session was conducted to delve deeper into the students' responses to the questions. Unstructured interviews were employed in this study. According to Saihu & Mailana (2019), utilizing unstructured interview techniques can facilitate informants in defining their knowledge in their own linguistic style. The students' responses and interview outcomes will subsequently be analyzed and described in accordance with the occurrences observed in the classroom.

3. Result & Disccusion

In the subsequent research findings and discussion, the strategies employed by prospective elementary school teachers in solving fraction computation problems are analyzed based on their responses to the given problems during the implementation phase. Out of 44 participants divided into 2 classes, the majority still relied on procedural strategies commonly taught in schools. Seven participants were unable to answer the given problems, while 37 participants demonstrated varying levels of understanding in their responses. For instance, consider Figure 1, which illustrates the responses of the prospective elementary school teachers.

Figure 1. The Problem-Solving strategy for mixed fractions by subject A6a.

Based on figure, the response from subject A6a demonstrates a procedural strategy, which is commonly taught in schools. The steps undertaken by subject A6a include: 1) Converting the mixed numbers to improper fractions. 2) Multiplying the numerator by the same number required to obtain a common denominator. 3) Adding or subtracting the numerators. 4) Converting the fraction back to a mixed number. According to subject A6a, this strategy has been regularly used for solving problems involving mixed fractions, as it was the initial method taught during fraction instruction. The use of this procedural strategy is not limited to subject A6a; similar examples can also be seen with subjects A8a and B4a (Figure 2).
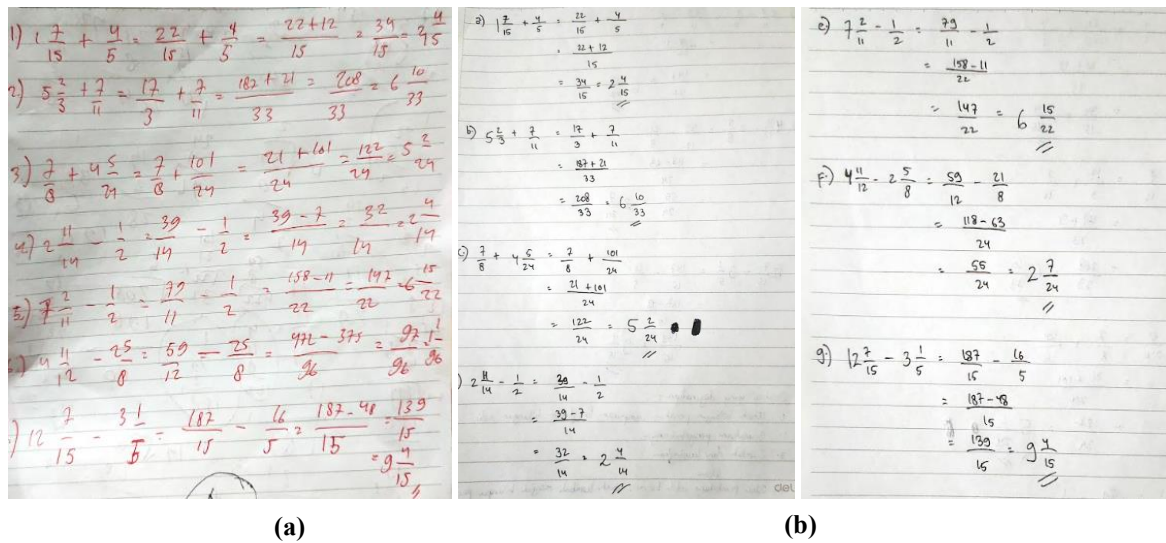
(a)   (b)

Figure 2. The Problem-Solving strategy for mixed fraction by subject A8a and B4a.

In addition to the responses from subjects A6a, A8a and B4a, which involve converting fractions back into mixed numbers, several participants left their answers in fractional form, as shown in Figure 3. The response from subject B13a demonstrates the following strategic steps: 1) Converting the mixed numbers to improper fractions. 2) Finding the least common multiple (LCM) of the fractions. 3) Adding or subtracting the numerators.
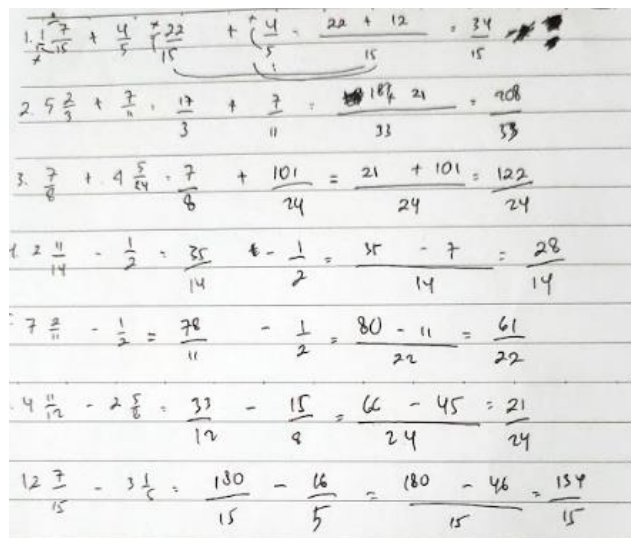
Figure 3. The Problem-Solving strategy for fraction by subject B13a.

Furthermore, a different strategy from those previously mentioned was employed by another subject. Refer to Figure 4. As shown in the figure, subject B7a used a strategy that differs from the one commonly taught in Indonesia. The steps used by subject B7a to solve the fraction computation problem are as follows: 1) Rewrite the problem to extract the whole numbers. 2) Add or subtract the whole numbers. 3) Add or subtract the fractions using one of the earlier methods.

Figure 4. other strategies used by B7a subjects to solve questions.

According to subject B7a, using the following strategy facilitates working with fractions and furthermore, the resulting numbers are much smaller compared to using the commonly taught strategy. Based on their explanation, this strategy has been employed since elementary school (see Figure 5).

Translation:
• Strategy Used:
1. Start by examining the mixed fractions in the middle and then operate on them.
2. Make the denominators the same for both fractions, divide the denominator by the first fraction, and multiply the numerator.
3. Then operate on it.
4. Perform step 2 on the second fraction.
5. Then operate all the integer fractions.

• Reason:
It's easier and the numbers are smaller than having to simplify them first. And of course, I learned this knowledge in elementary school.

Figure 5. explanation of the strategy used and the reason.

Based on the explanation above, it can be concluded that there are two types of strategies used by pre-service teachers (PSTs) to solve mixed fraction calculations. In this study, the researchers divided participants into two classes, A and B. In class A, there were 17 participants who solved the problems using procedural strategies. Five participants were unable to complete the given problems. Similarly, in class B, 17 participants successfully solved the problems using procedural strategies, while 5 participants used strategies different from procedural methods.

For participants who were unable to solve the given problems, they expressed confusion, particularly with subtraction of fractions (as depicted in Figure 6). In class B, 5 participants used a significantly easier and time-saving strategy, although out of these 5 participants, only 1 was able to answer all the questions correctly. The other 4 made calculation errors and misunderstood the questions

provided. This aligns with Simon (1993) observation that many prospective teachers have misunderstandings in comprehending fraction concepts, such as operations and conceptualization of fractions.
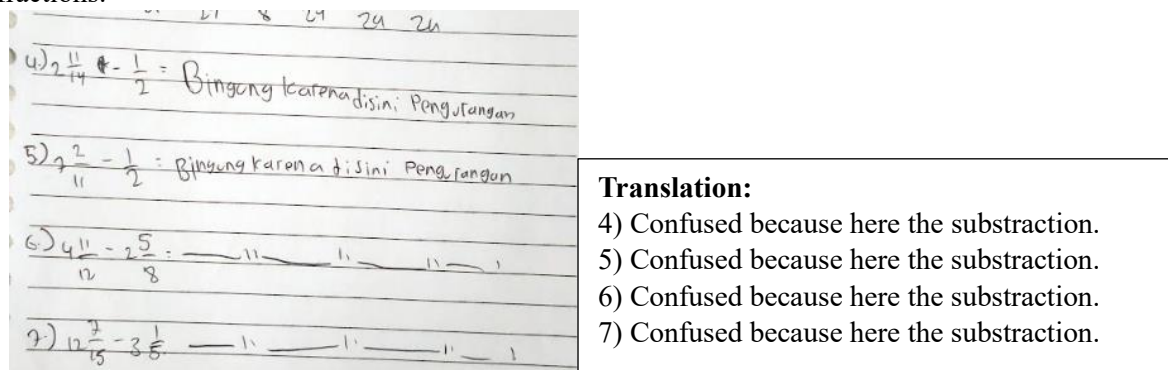

Translation:
4) Confused because here the substraction.
5) Confused because here the substraction.
6) Confused because here the substraction.
7) Confused because here the substraction.

Figure 6. The reason from subject why he can't answers that question.

The findings of this study aim to explore the strategies used by pre-service teachers (PSTs) in solving fraction problems. A total of 44 participants took part in this research, engaging in tasks prepared beforehand by the researchers. The study reveals variations in PST strategies concerning their understanding of fractions. Therefore, based on previous research by Depaepe et al., (2015); Son & Lee (2016), understanding and strategies among teachers are crucial in addressing fraction problems.

4. Conclusion

Although this study reveals a lack of understanding among prospective teachers in solving fraction problems and the strategies used for computation, the results indicate diverse approaches in solving fraction problems, as supported by previous research conducted by Baek et al. (2017), Lloyd (2014), and Thurtell et al. (2019). Post-assessment reveals that the majority still rely on procedural strategies commonly taught in schools. Five individuals employed different strategies in solving the problems, which were notably easier and more flexible. On the other hand, five others were unable to answer or complete the problems due to inadequate understanding of fraction concepts. Therefore, there is a need for enhanced educational services in teacher training to improve prospective teachers' understanding and strategies related to fractions. Educators bear the responsibility of equipping prospective teachers with the necessary knowledge and profound experience to teach fundamental fraction concepts effectively.

Reference

[1] Baek, J. M., Wickstrom, M. H., Tobias, J. M., Miller, A. L., Safak, E., Wessman-Enzinger, N., & Kirwan, J. V. (2017). Preservice teachers' pictorial strategies for a multistep multiplicative fraction problem. *Journal of Mathematical Behavior*, *45*, 1–14. https://doi.org/10.1016/j.jmathb.2016.10.005

[2] Ball, D. L. (1989). *Halves,Pieces,and Twoths:Constructing Represetational Contexts in Teaching Fractions*. 1–41.

[3] Benbow, C. P., & Faulkner, L. R. (2008). Rejoinder to the Critiques of the National Mathematics Advisory Panel Final Report. *Educational Researcher*, *37*(9), 645–648. https://doi.org/10.3102/0013189x08329195

[4] Booth, J. L., & Newton, K. J. (2012). Fractions: Could they really be the gatekeeper's doorman? *Contemporary Educational Psychology*, *37*(4), 247–253. https://doi.org/10.1016/j.cedpsych.2012.07.001

[5] Cramer, K. A., Post, T. R., & Delmas, R. C. (2002). Initial fraction learning by fourth- And fifth-grade students: A comparison of the effects of using commercial curricula with the effects of using the rational number project curriculum. *Journal for Research in Mathematics Education*, *33*(2), 111–144. https://doi.org/10.2307/749646

[6] Depaepe, F., Torbeyns, J., Vermeersch, N., Janssens, D., Janssen, R., Kelchtermans, G., Verschaffel, L., & Van Dooren, W. (2015). Teachers' content and pedagogical content knowledge on rational numbers: A comparison of prospective

elementary and lower secondary school teachers. *Teaching and Teacher Education*, *47*, 82–92. https://doi.org/10.1016/j.tate.2014.12.009

[7] Fatmahanik, U. (2019). Radikalisme yang merasuki pesantren menurut Tan dapat dicegah dengan mendorong pesantren menerapkan educative tradition guna mengembalikan pesantren pada wajah. *Jurnal Kependidikan Dasar Islam Berbasis Sains*, *4*(1).

[8] Gabriel, F., Coché, F., Szucs, D., Carette, V., Rey, B., & Content, A. (2013). A componential view of children's difficulties in learning fractions. *Frontiers in Psychology*, *4*(OCT), 1–12. https://doi.org/10.3389/fpsyg.2013.00715

[9] Lloyd, G. M. (2014). Research into teachers' knowledge and the development of mathematics classroom practices. *Journal of Mathematics Teacher Education*, *17*(5), 393–395. https://doi.org/10.1007/s10857-014-9285-4

[10] Lo, J. J., & Luo, F. (2012). Prospective elementary teachers' knowledge of fraction division. *Journal of Mathematics Teacher Education*, *15*(6), 481–500. https://doi.org/10.1007/s10857-012-9221-4

[11] Loewenberg Ball, D., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, *59*(5), 389–407. https://doi.org/10.1177/0022487108324554

[12] Lortie-Forgues, H., Tian, J., & Siegler, R. S. (2015). Why is learning fraction and decimal arithmetic so difficult? *Developmental Review*, *38*, 201–221. https://doi.org/10.1016/j.dr.2015.07.008

[13] Merenluoto, K., & Lehtinen, E. (2006). Conceptual Change in Mathematics: Understanding the Real Numbers. *Reconsidering Conceptual Change: Issues in Theory and Practice*, 232–257. https://doi.org/10.1007/0-306-47637-1_13

[14] Perie, M., Moran, R., & Lutkus, A. D. (2005). NAEP 2004 trends in academic progress: Three decades of student performance in reading, 1971-2004 and mathematics, 1973-2004. *Statistics*, 148.

[15] Prawismo, S. A., Sajida, A. H., Habibah, P. J. M., Zainuddin, M., & Mas'ula, S. (2022). Pengembangan Media Puzzle dalam Pembelajaran Materi Pecahan bagi Siswa Kelas Rendah SD Negeri Jatinom 03. *Caruban: Jurnal Ilmiah Ilmu Pendidikan Dasar*, *5*(2), 102. https://doi.org/10.33603/caruban.v5i2.6846

[16] *Pub d°″1,*. (n.d.).

[17] Raj Acharya, B. (2017). Factors Affecting Difficulties in Learning Mathematics by Mathematics Learners. *International Journal of Elementary Education*, *6*(2), 8. https://doi.org/10.11648/j.ijeedu.20170602.11

[18] Ramadhan, A. H., Alfiatussyifa, A., Aji, B., & Fadillah, N. N. (2023). Analisis Kesulitan Peserta Didik Dalam Menyelesaikan Soal Cerita Pada Siswa Kelas VII SMP TRIPLE J. *Jurnal Pendidikan Indonesia (JOUPI)*, *1*(4), 27–36.

[19] Roesslein, R. I., & Codding, R. S. (2019). Fraction interventions for struggling elementary math learners: A review of the literature. *Psychology in the Schools*, *56*(3), 413–432. https://doi.org/10.1002/pits.22196

[20] Rosli, R., Goldsby, D., Onwuegbuzie, A. J., Capraro, M. M., Capraro, R. M., & Gonzalez, E. G. Y. (2020). Elementary preservice teachers' knowledge, perceptions and attitudes towards fractions: A mixed-analysis. *Journal on Mathematics Education*, *11*(1), 59–76. https://doi.org/10.22342/jme.11.1.9482.59-76

[21] Saihu, S., & Mailana, A. (2019). Teori pendidikan behavioristik pembentukan karakter masyarakat muslim dalam tradisi Ngejot di Bali. *Ta'dibuna: Jurnal Pendidikan Islam*, *8*(2), 163. https://doi.org/10.32832/tadibuna.v8i2.2233

[22] Son, J.-W., & Lee, J.-E. (2016). Pre-service Teachers' Understanding of Fraction Multiplication, Representational Knowledge, and Computational Skills. *Mathematics Teacher Education and Development*, *18*, 5–28.

[23] Stephan, M., & Akyüz, D. (2013). Journal for Research in Mathematics Education. *Journal for Research in Matematics Education*, *43*(5), 428–464.

[24] Stigler, J., Angeles, L., Givvin, K. B., & Angeles, L. (2014). *about Mathematics What Community College Developmental Mathematics Students Understand about Mathematics DRAFT REPORT – DO NOT CITE WITHOUT PERMISSION The Carnegie Foundation for the Advancement of Teaching*. May.

[25] Thurtell, E., Forrester, T., & Chinnappan, M. (2019). Building conceptual knowledge of fraction operations among pre-service teachers: Effect of a representation-based teaching approach within a teacher education program. *Mathematics Teacher Education and Development*, *21*(1), 100–124.

[26] Timss. (2015). International Mathematics Achievement. *Timss 2015*, 2015. http://timssandpirls.bc.edu/timss2015/international-results/timss-2015/mathematics/student-achievement/

[27] Utami, A. M., Adelia, R., Kurniawati, I., Damayanti, E., Damara, T. D., & Pramudiani, P. (2024). Implementasi Permainan Tic-Tac-Toe sebagai Konteks Pembelajaran Matematika pada Materi Keliling Bangun Datar dalam Menanamkan Kemampuan Pemecahan Masalah Siswa Sekolah Dasar. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *8*(1), 180–188. https://doi.org/10.31004/cendekia.v8i1.3036

[28] Webel, C., Krupa, E., & McManus, J. (2016). Using Representations of Fraction Multiplication. *Teaching Children Mathematics*, *22*(6), 366–373. https://doi.org/10.5951/teacchilmath.22.6.0366

The Impact of Implementing the Pancasila Student Profile Strengthening Project Policy on Character Education

Imada Cahya Septiyaningsih[1*], Aulia Mutiara Putri[2]

[1] History Education, Universitas Negeri Yogyakarta, DIY, Indonesia
[2] History Education, Universitas Negeri Yogyakarta, DIY, Indonesia

[*]E-mail: ImadaCahya22@gmail.com, auliatiara13@gmail.com

Abstract. The Pancasila Profile Strengthening Project (P5) at 1 Bojong State High School, Tegal district, has not been implemented optimally. This is because students have not been able to implement democratic attitudes consistent with Pancasila's values. The study uses qualitative methods and aims to evaluate the process and impact of P5 implementation in shaping the character education of the student. The research involved all eleventh-grade students, the head of school, the deputy head of the curriculum field, teachers, and parents. The data was collected through passive participation observations, interviews, and documentation then processed using SWOT analysis. The results of this study informed that students have not had an optimal democratic attitude so there is a potential for fraud or dishonesty. Following the findings in this study, it is necessary to provide optimum and structured instruments and assessments before, during, and after the implementation of P5.

Keywords: Student Profile Strengthening Project of Pancasila, Character Education, Democracy Voice

1. Introduction

The Strengthening Pancasila Student Profile Project is an effort to develop the character of students' Pancasila student profiles. Through this project, students are invited to observe the surrounding environment to find solutions to various existing problems. The synergy that is formed and supported by the education unit ecosystem is the key to developing the profile of Pancasila students (Mery, 2022).In Tegal Regency, SMA Negeri 1 Bojong is actively carrying out projects aimed at improving students' abilities through Strengthening Pancasila Student Profiles (P5) activities to implement Pancasila values in everyday life. This school is dedicated to cultivating a generation of globally competent and highly moral individuals who embody the principles of Pancasila.

Unfortunately, implementing P5 in this school faces challenges because students' ability to demonstrate and practice a democratic mindset based on the Pancasila student profile still requires further improvement. By being involved in P5 activities with the theme of democracy and the Diversity Project in selecting student council leaders, it is hoped that schools can effectively incorporate character education into student development. However, schools have not achieved the ultimate goal of P5, namely producing a generation of Pancasila students who have global competence and strong character and are committed to upholding Pancasila values. This can be seen from the students' continued struggle to show a democratic attitude that is in line with the Pancasila student profile.

The Character Education Program is implemented in schools by incorporating character education into subjects, community service projects, school ceremonies, and extracurricular activities. Each learning material contains various learning objectives related to various characteristics that can be developed and implemented in students' daily lives. Diverse character traits cannot be separated from cognitive processes but also involve the individual's long-term internalization and learning in the community. Projects developed by educational institutions and individuals must be contextual and relevant to the current situation and culture of the student community. Therefore, due to differences in environmental conditions, the project measures the profile of students studying in one school, which may be different from another. However, the topic of the project to strengthen the profile of Pancasila must be adapted to the conditions of educational institutions.

Implementation of the Strengthening Pancasila Student Profile initiative has had both positive and negative effects. Some of the positive outcomes of the Pancasila learning profile project include an increased ability to think critically about students. This project allows students to practice democratic values in a contextual way within the community, which can help them develop their unique characteristics. Based on the research results, there is a negative impact of the implementation of P5 on the development of student characteristics at SMA Negeri 1 Bojong, Tegal Regency. Some of them are due to a lack of intense coordination between project coordinators and subject teachers. As a result, students are less than optimal at following the P5 process. Therefore, this research, entitled "Implementation of the Project for Strengthening the Pancasila Student Profile (P5) in Forming Character Education in Students: A Case Study at SMA Negeri 1 Bojong, Tegal Regency," aims to provide insight into the challenges associated with implementing P5 to develop character education, which is implemented through Pancasila student profile activities.

2. Research Methods

This research uses a qualitative method with a case study approach. Researchers saw directly the process of these activities. This research data was taken from observations, questionnaires, and interviews conducted from September 22, 2023, to October 13, 2023. Then, follow-up interviews were conducted from February 22, 2024, to March 22, 2024.

3. Results and Discussion

3.1 Project Planning and Design

Implementing P5 is one of the main strategies for improving character education, especially in schools. The Ministry of Medicine, Culture, Research, and Technology has guided the implementation of P5 and the Independent Teaching Platform. Directly or indirectly, teachers can use or modify existing teaching resources to better suit the needs and circumstances of the school.

The school project collaborates with several teachers who are members of the same team and includes 3 teachers from Phase E and 3 teachers from Phase F. The project will strengthen the profile of Pancasila Students (P5) by raising the theme of Democracy Voice, which carries the theme of harmony in the election of the chairman of the Student Council. The Pancasila Profile Research Project is divided into three different places, most of which are within the SMA N 1 Bojong area. The location consists of the futsal field of SMA N 1 Bojong as a place for socialization and holding elections, a classroom as a place for the OSIS project manager to produce products or obtain materials, and a hall as a place to prepare election boxes.

The plan for implementing the project consists of: (1) Friday, 22 September 2023 is initial preparation aimed at an initial coordination meeting between the project coordinator and the curriculum team, (2) Tuesday, 26 September 2023 is further preparation aimed at further coordination with

members OSIS and MPK, (3) Wednesday, 27 September 2023 is the first coordination with the learning committee team and class September 2023 is the third coordination which aims to compile a daily journal by the project coordinator team and prepare assessments and rubrics, (6) Monday, October 2 2023 is the first introduction through seminar activities and discussions between supervisors and students to get to know democratic culture, (7) Tuesday, October 3 2023 is the second introduction with the aim of finding out how to carry out general elections, (7) Wednesday, October 4 2023 is socialization and planning for making posters for student council chair candidates, (8) Thursday-Friday, October 5-6 2023 is contextualization, namely exploring problems in deviations from democracy, (9) Monday-Friday, 9-13 October 2023, is real action in the form of creating TPS, success teams, and even carrying out the election of the OSIS chairman.

In general, this project has the aim of implementing or providing an enhanced Pancasila education profile, which specifically focuses on YME students' leadership, global citizenship, and cooperation education through several stages, namely: (1) the introductory stage which has important concepts in participating to make decisions, (2) the contextual stage provides students with the opportunity to think creatively about injustice in channeling aspirations or voices and the practice of channeling voices in various democratic channels and means, (3) the action stage aims to ensure that every student participates in class activities and projects which relates to work to analyze and evaluate subjects as a means of expressing appreciation and responsibility for organizational aspirations based on the results of classroom observations and research, where students' opinions are expressed and discussed openly for formal participation.

Meanwhile, the specific objectives for this phase are that students are expected to be able to understand the importance of democracy, know the methods, steps, and tasks involved in carrying out elections, find irregularities that occur in elections, find solutions to problems so that irregularities do not occur, make posters of candidates for student council president, and respect differences of opinion with friends. colleagues in the election of the student council president.

3.2 Project Implementation

In general, the flow of project activities consists of several activities, namely: (1) Introduction: Students are asked to identify the issue of democratic elections and raise awareness about this with the issue of electoral diversity; (2) Contextualization: Students are asked to identify environmental problems related to diversity. in the general election; (3) Activity: Students are directed to formulate roles that can be implemented through real activities in the procedure for making choices; (4) Reflection: Students are asked to complete the election by involving students in determining the choice of OSIS chairman and carrying out evaluation and reflection; (5) Consequences: Students complete their work by making evaluation and reflection reports.

The role of parents and students is also included in the implementation of the project to strengthen the profile of Pancasila students. In meetings with students' parents, they discuss the need to improve student behavior; in this case, parents are involved in the process of character education for their children. However, in reality, the school lacks coordination with parents.

The school provides information only through circulars in hard file and soft file formats. Ironically, some students do not give the circular to their parents, so it is used as an excuse for students not to go to school on holidays or to class. The school was aware of this incident because many students were absent without explanation during the implementation of P5. It was only when the report card was received at the end of the semester that the homeroom teacher confirmed the students' absence to their parents. Some parents explained that they did not know that P5 activities existed and simply believed their children. This proves that the role and implementation of character education are very influential in everyday life. Character education is education that instills character values in students, which

include knowledge, individual awareness, determination, and will, as well as actions to realize good values for God Almighty, oneself, others, the environment, and the nation.

3.3 Project Evaluation

Democrat Voice The implementation of the P5 theme with a two-week block system creates several obstacles for students. The problem is, for example, that students are bored and fed up because all they watch from morning to evening is the debate about the candidates for student council president. In the discussion, it was seen that the candidates for chairman and deputy chairman of the OSIS still had not mastered the discussion material. This causes a lack of substance in communicating ideas. Apart from that, because they were bored, students excused themselves from going in and out because they wanted to go to the bathroom. They not only go to the toilet but also to the canteen. Apart from that, students first receive introductory material in seminars and discussions before actually taking action. The method given by the resource person was very boring and less effective. Therefore, students still do not have an optimal understanding of democratic culture and general election procedures.

The media used to assess the profile of Pancasila students (P5) about democracy during project implementation is the project module. The school principal, as coordinator, created a project module to strengthen the profile of Pancasila students in project implementation. Collaborate with several class teachers. Unfortunately, the project module only uses Google materials and not academic sources such as journals and academic articles. This creates confusion for students regarding the material presented in the P5 implementation process. The evaluation method used to evaluate the implementation is through:

a. Diagnostic evaluation

Diagnostic evaluation functions to find out what problems the student is suffering from or which are bothering him so that he experiences difficulties, obstacles, or disturbances when participating in a particular program. And how to try to solve it. And aims to overcome or assist teaching and learning activities in a field of study or the entire teaching program (Achadah, 2019). This process helps teachers design teaching that suits students' understanding and abilities and provides useful feedback to improve the quality of teaching. Diagnostic assessments allow teachers to identify areas that need improvement and design effective teaching strategies. This assessment is given before project implementation by asking students 14 questions via a Google Form.

b. The next evaluation method uses formative assessment, which is a process where teachers collect and use assessment data to meet individual child needs and other information from various sources, which is then analyzed to produce appropriate teaching to support the individual. Children continue to learn and develop.

The form of assessment used is:

a. Instrument sheet for the development of sub-elements of the Pancasila student profile consisting of (1) faith and devotion to God Almighty and noble morals. This aims to identify common problems and create an attitude of understanding that is useful for expressing feelings or thoughts, evaluating ideas, and considering all risks in implementing ideas using ethics and human values. (2) Global diversity aims to create different attitudes of understanding to express thoughts or feelings and offer alternative solutions to overcome differences by prioritizing humanity. (3) cooperation is cooperation or collaboration to form a team and organize communication to achieve a common goal. Active listening to understand and analyze information, ideas, feelings, skills, and concerns expressed by others.

b. The form of the project implementation evaluation instrument consists of (2) planning: preparation of schedules, objectives, and project work stages; and (2) execution: identification of stages of plan implementation. And know how to implement plans and work adaptively with coordinated and diverse processes. (3) Goal setting: designing solutions or actions that can reach the core of the problem in a correct, realistic way and have a long-term impact.

c. Summative assessment is an assessment carried out to assess student learning outcomes, which is the basis for determining promotion and completion of a learning unit. In the independent curriculum, summative evaluation is carried out at the end of the lesson or simultaneously for two or more learning objectives, by unit policy and the views of educators. Summative assessments carried out in schools include report assessment tools, namely. (1) Content: Conveys ideas or information related to the topic being discussed; (2) Clarity of Information: The literature and words used are related, organized, and create coherence. ideas, (3) aesthetics: packaging the project well and attractively, (4) creativity: originality and creativity presenting unique thoughts and ideas, (5) connection to the topic and subject: written and literary, (6) objective thinking: We design solutions or actions that touch the core of the problem, are realistic, and have a long-term impact.

d. Peer Assessment: Contains a question column that assesses your friend's Strongly Agree, Agree, Disagree, and Disagree answer column choices. The purpose of this instrument is to find out how well students can assess each other.

e. Student reflection assessment tool: The form is filled in according to the student's personality. The response columns indicate Strongly Agree, Agree, Disagree, and Strongly Disagree. The goal is to assess their integrity and the extent to which students personally participate in project activities.

3.4 Evaluation Results

Apart from carrying out debates through P5 activities, which aim to achieve the theme of a democratic voice, many other things can be discussed at the event that can be carried out by schools, including Schools can also carry out tutoring programs. Election of Student Union Chairmen, in the implementation of the election of Union Chairmen. Students can declare their right to choose, and students will realize when their choice is not to be promoted to OSIS President. Another option is that the school can guide its students in conducting research. How to participate. Come to the General Election Commission (KPU). In this way, the formation of students' democratic character is better than just using debates in class.

3.5 Challenges and Lessons Learned: Discuss the challenges faced during project implementation and the lessons learned from these experiences

Based on the P5 implementation process described above, there are **challenges** (1) Lack of intense coordination between project coordinators and teachers, which causes a lack of optimal assistance from teachers to students, (2) The results of implementing P5 are still far from expectations because students still have not demonstrated a democratic attitude by the Pancasila student profile, (3) and a lack of integrating Pancasila values into daily activities. **Learning** (1) Based on this experience, schools can learn lessons about the importance of good coordination between project coordinators and teachers in supporting implementation, (2) From results that do not meet expectations, schools can learn to improve assistance and guidance to students so that they can better apply Pancasila values in their daily lives, (3) Schools can also coordinate well regarding the importance of evaluation and reflection on project implementation to continue to improve and enhance P5 implementation in the future.

4. Conclusion

Implementation of the Project for Strengthening the Profile of Pancasila Students (P5) at SMA Negeri 1 Bojong, Tegal Regency, continues to face challenges in implementing Pancasila values in everyday life. Even though P5 activities carry the theme of the voice of democracy, according to the Pancasila student profile, students' skills still do not show a democratic attitude. Therefore, additional efforts are needed to improve the implementation of student character education optimally according to the objectives of the P5 project.

References

[1]   Achadah, A., 2019. Evaluasi dalam Pendidikan sebagai Alat Ukur Hasil Belajar. *An - Nuha,* p. 2.

[2]   Amalia Dwi Pertiwi, S. A. N. D. A. D. Y. F. F., 2021. Implementasi Nilai Pendidikan Karakter Dalam Mata Pelajaran PKn di Sekolah Dasar. *Basicedu Journal,* p. 3.

[3]   Anon., 2023. Evaluasi Remedial dan Diagnostik Sebagai Penentu Hasil Belajar. *Jurnal Pendidikan dan Ilmu Pengetahuan,* p. 4.

[4]   Mahanum, 2021. Tinjauan Kepustakaan. *Journal of Education,* p. 3.

[5]   Mery, M. S. H. A. H., 2022. Sinergi Peserta Didik dalam Proyek Penguatan Profil Pelajar Pancasila. *Jurnal Basicedu,* p. 1.

[6]   Miza Nina Adlini, A. H. D. S. Y. O. C. S. J. M., 2022. Metode Penelitian Kualitatif Studi Pustaka. *Edumaspul Journal,* p. 3.

[7]   Moralman Gulo, T. T., 2023. Guru dan Peserta Didik: Evaluasi Diagnostik dalam Penerapan Metode Ceramah. *Jubah Raja (Jurnal Bahasa, Sastra, dan Pengajaran),* p. 2.

[8]   Nugraheni Rachmawati, A. M. M. N. I. N., 2022. Projek Penguatan Profil Pelajar Pancasila dalam Implementasi Kurikulum Prototipe di Sekolah Penggerak Jenjang Sekolah Dasar. *Jurnal Basicedu,* p. 3.

[9]   Seni Asiati, U. K., 2022. Implementation of The Project of Strengthening Pancasila Students Profiles in Driving School. *Lingkar Mutu Pendidikan Journal,* p. 4.

[10] Sudrajat, A., 2016. Demokrasi Pancasila dan Perspektif Sejarah. *Mozaik Kajian Ilmu Sejarah,* p. 4.

Advancing Environmental Digital Literacy in High School Biology: A Project-Based Approach to Waste Management

Risma Zulfiah Nur Khifdiah

S1 Kurikulum dan Teknologi Pendidikan, Universitas Negeri Surabaya, Mojokerto, Indonesia

*E-mail:Zulfiahrisma15@gmail.com

Abstract. Within the field of Biology education, the study of living creatures encompasses an examination of their interactions with the environment and the advantages they provide. This inquiry specifically emphasizes the topics of environmental contamination and waste management. Many high school students face difficulties in locating trustworthy resources and adopting efficient techniques for organic waste management, even with the existence of digital technology. This study addresses these problems by utilizing a project-based learning (PJBL) methodology that is augmented with digital technologies to facilitate active learning in the digital age. By incorporating technology, such as online resources and biotechnological procedures, into a Project-Based Learning (PJBL) framework, students are encouraged to autonomously acquire knowledge, analyze data, resolve issues, cooperate, and contemplate. This combination fosters an engaging learning experience by actively immersing students in environmental concerns and improving their digital literacy and proficiency in managing organic waste. This technique greatly enhances pupils' abilities pertaining to the digital age while also addressing important ecological issues.

1. Introduction

The activities and interactions of living things, namely humans, have a significant impact on the surrounding environment in the form of environmental pollution. One of the factors that affect environmental pollution is organic waste that cannot be processed and utilized optimally in Indonesia (Aloysius Hari Kristianto and Pramatatya Resindra Widya, 2020). The National Waste Management Information System (SIPSN) by the Ministry of Environment and Forestry released a graph of waste composition in 2023 with 2 categories, namely the graph of waste composition based on the type and source of waste. A total of 40.7% is a type of food waste that dominates with the largest source of waste 38.4% comes from households. Based on this data, the category of waste with the type of organic waste is still a waste problem that is not maximally processed in Indonesia. People who are in productive age have the highest risk of producing waste and have the greatest responsibility in the role of waste management in the surrounding environment (Maharani, S. E., et all. 2007). Environmental pollution and waste management processes, especially organic waste, have existed in biology learning which focuses on ecology and biotechnology (Suryaningsih, Y., & Arifin, I. 2020). In the application of learning biology subjects at the secondary school level, many students find it difficult because they have not found a reliable source of knowledge and efficient waste treatment techniques even with the existence of digital technology that can be utilized as a learning resource (Sani, R. A. 2019).

Various problems faced in the focus of biology learning above with the development of technology and the digital era can be overcome by applying learning methods that are in accordance with the context of the material to be studied so that students are able to interpret every learning process that has been

passed. In learning biology, a practical process is needed which can be a visual form of the importance of the interaction of living things with their environment. In addition, the process of solving problems in the surrounding environment certainly requires resources, data processing, science and relevant knowledge in order to support reliable literacy and the process of analyzing problems contained in the surrounding environment.

There are common problems in the practice of learning biology with a focus on the field of ecology is the difficulty of students who do not take advantage of technology as a source of literacy in the era of higher digitalization and the application of biotechnology techniques that are less efficiently applied in the school environment. The problems that arise certainly have many factors but in accumulation the problems usually occur from the start of the right way or technique to find relevant and clear sources in biological science, besides not finding the right procedure and composition for the processing of organic waste in the school environment. In its application, the difficulties encountered are not necessarily in the facilities or procedures of the processing but can also be supported by methods or models applied in biology learning that are less in accordance with the supposed learning experience gained by students.

Important problems in the field of ecology are the basis for developing problem solving for researchers, researchers have considered applying a project-based learning model (PJBL) to provide meaningful learning experiences to students in the learning process. In addition to meaningful learning, it is expected to be able to increase students' digital literacy to answer learning challenges in the era of digital technology development to support solving important problems in the field of ecology related to environmental pollution and biotechnology techniques for processing organic waste. This research investigates the possibility of solving problems in the surrounding environment with project-based learning (PJBL) with the help of digital technology as a solution. With this *Project Based Learning* model, students can explore, assess, interpret, synthesize information to produce various forms of learning outcomes (Kemendikbud, 2013). With the application of this learning model, students learn actively to seek information as a form of supporting digital literacy from students, process data and construct problems individually or in groups, interpret a problem solving whose benefits can be felt in real terms and be able to reflect on themselves with the learning obtained.

2. Literature Review

2.1 Project Based Learning

Project-based learning model is learning based on constructivism (Ramos and Pazz in Halimah, 2022). The application of the learning process based on the Project Based Learning Model has a foundation in constructivistic learning theory which focuses students to learn based on their experiences. According to Dewey in Halimah, et al (2022) states that the application of projects in learning is able to direct students to make experiences in learning or *learning by doing* based on the needs of students and refers to the constructivism approach. In this case, reminding teachers of the potential benefits of learning innovations such as *Project Based Learning* can significantly change the way they do their work, and belief in the ability of new methods to achieve the expected educational goals is very important for the method to be widely accepted (Dewi Hidayati et al., 2023).

This study focuses on the syntax developed by the George Lucas Educational Foundation in Nurohman, (2008), namely:

- *Start with the essential question*

    In this case what is meant is that these meaningful questions are given for assignment to learners to carry out activities.

- *Design a plan for the project*

In this process, educators and learners simultaneously plan the project, related to the rules of the game, knowing the equipment or facilities that will be used in learning, determining activities that support answering important questions.

- *Create a schedule*

  Educators and learners collaborate to develop a plan for completing the project.

- *Monitor the students and the progress of the project*

  The process of making projects for educators plays a role in monitoring students to complete projects by facilitating learners in every process.

- *Assess the* outcome

  Assessment of these results is carried out by educators to measure the ability of students by being adjusted based on the expected competency standards.

- *Evaluate the experience*

  In this final section, the educator provides reflection and discussion based on the learning activities that have been carried out.

2.2 Digital Literacy

The ability to use technology appropriately to identify, access, manage, analyze, evaluate, synthesize digital resources to create and make meaning, collaborate and communicate effectively with others is the definition of Digital Literacy according to Polizzi (2020) and Chiu et al. (2021). Digital technology is increasingly having an impact in the world of learners, thus making the impetus for the call to develop literacy not just about reading and writing in the conventional or old way (Maureen et al., 2020). By implementing PBL in an online-based flipped classroom environment, students will be exposed to challenges and projects that require digital literacy skills. They will learn to search, sort, and evaluate information online, as well as use various digital tools to produce creative and collaborative work (Widyaningrum &; Sondari, 2021 in Miftahus surur, et all. 2023).

3. Methodology

3.1 Participants and Research Context

The research process was conducted with a sample of the high school student population at Man 1 Mojokerto with a total of 28 students from the Scientific and Research Skills subject. Students in this study have a vulnerable age of about 16 to 17 years old in high school.

3.2 Research Design

In its application, this research uses quantitative research. In this study using a form of Pre-Experimental Design method that uses an experimental class with no control class as a comparison. The results of the Pretest-Posttest will be used as a differentiating result from the treatment that has been given. The design used is One Group Pretest-Posttest Design This research data will be taken by administering pre-test and post-test questionnaires with the same instrument in the experimental class (Nurul Azmi, et all. 2022). Initial knowledge will be obtained by giving a pre-test with these results will be given treatment or treatment by applying the Project Based Learning learning model with learning syntax that focuses on the center of digital literacy development in the student learning process. In the next stage, a post test will be given as a result of data that will be used as a comparison in the research results and differentiators after treatment or treatment in the experimental class.

3.3 Assessment Instrument

- **Digital Literacy Measures**

In this research, we will consider technical, cognitive and socio-emotional abilities in digital literacy because all three are one set of requirements that meet the criteria for Digital Literacy. The stages used in this research will be adjusted to the needs of students, learning models and digital literacy skills of students. These dimensions are the basis for this research. Creating a meaningful learning atmosphere supported by technology in learning certainly requires technical skills and knowledge and its implementation. The dimensions contained in digital literacy were redeveloped by Ng (2012) in Lilian, A. (2022) who stated that digital literacy has three dimensions as follows:

a. **The Technical Dimension,** in this dimension is associated with the technical and operational skills needed to use technology in learning and daily activities.

b. **The Cognitive Dimension,** relates to the ability to think critically when searching for, evaluating, and creating digital information. Digitally literate individuals will understand legal, ethical and moral issues related to digital resources such as copyright, plagiarism and fraud.

c. **The Social-emotional Dimension,** in this process is the ability to communicate online. Digitally literate individuals can communicate effectively via social networks, for example using appropriate language and images to avoid social misunderstandings, protect their own privacy and the safety of others.

- **Digital Literacy Assessment**

In this research, the questionnaire that will be applied is in the form of a closed questionnaire with descriptions already available so that respondents just have to choose the answers that are already available. The questionnaire used in this research was used to obtain data related to students' digital literacy abilities, namely on the Pre-test and Post-test activities that will be given in the research process. A questionnaire is a data collection method that is carried out by providing a collection of questions or questions in written form for the respondent to answer (Sugiyono, 2017: 142). Aspects of digital literacy in this research focus on three dimensions, namely technical, cognitive and socio-emotional.

3.4 Data Analysis

The data generated in the research process will be analyzed by testing with several tests to produce accurate data as a result of this research, one of which is the Normality Test, Paired Sample T-Test Test, and N-Gain Test (Hesty Bastika Wati et all,.2024). The Normality Test will be used to prove that the data results are normally distributed. In this study, because it uses a small sample of 28 students, it uses the Shapiro-Wilk Normality Test. Next is to use the Paired sample T-test if the data is normally distributed while the N Gain Test is used to test the criteria for improving science process skills and cognitive learning outcomes between before and after learning.

4. Results and Discussion

This study used the Shapiro-Wilk Normality Test because the sample used in this group was a small group of 28 people. The Normality Test on this data shows the results of the numbers in the Normality Test table are the Significant value of the pre test is more than 0.05 and the post test is less than 0.05, so the results are normally distributed values. The T test in this study using the Paired Sample T-test is 0.001 which means less than 0.05 so that based on the consideration of hypothesis decisions in statistics is to reject H0 and accept Ha which means that there is a difference or influence from the application of the project-based learning model to improve the digital literacy of Man 1 Mojokerto students in the Scientific and Research Skills class. Next is the N-Gain Test which is used as proof that there is or is not an increase with the criteria and intervals that have been determined from the results of the application of the learning model to improve students' digital literacy. In data processing for the N-Gain Test, the results of 0.7141 are included in the interval of more than 0.7 with high criteria and it can be said that the increase in digital literacy after being given the application of project-based learning is included in the criteria for high improvement.

5. Conclusion

Based on the various discussions and data analysis presented above, it can be concluded that digital literacy can be improved with the application of project-based learning models for waste management subjects in high schools that have a high influence and improvement. Digital literacy skills with the development of the digital era are increasingly needed to apply digital literacy skills to provide solutions, limitations, basic problem solving to the application for daily life which can be further improved at the senior high school level. The problems contained in the background of this study can also be answered that learning techniques or models for organic waste processing material can be applied with a project-based learning model to support the literacy framework of high school students. Provide a basis for problem solving from ecological issues in the school environment to formulate effective and appropriate solutions for processing organic waste in the high school environment.

References

[1] Suryaningsih, Y., & Aripin, I. (2020). ECOPRENEURSHIP DALAM PEMBELAJARAN BIOLOGI. *Prosiding Seminar Nasional Pendidikan* , *2*, 911-922.

[2] Sani, R. A. (2019). *Pembelajaran berbasis hots edisi revisi: higher order thinking skills* (Vol. 1). Tira Smart.

[3] Kristianto, A. (2020). Pendampingan Dan pelatihan pengelolaan limbah Organik Menjadi Produk Bernilai Ekonomi di SMA negeri 1 bengkayang. *Jurnal Abdimas BSI: Jurnal Pengabdian Kepada Masyarakat*, *3*(2), 190–197. https://doi.org/10.31294/jabdimas.v3i2.8093

[4] Shinta E., M., Suarna, I. W., & Budiarsa Suyasa, I. W. (2007). *KARAKTERISTIK SAMPAH DAN PERSEPSI MASYARAKAT TERHADAP PENGELOLAAN SAMPAH DI KECAMATAN BANYUWANGI KABUPATEN BANYUWANGI PROVINSI JAWA TIMUR* , *VOLUME 2*, 1–8.

[5] Surur, M., Dian Nurtjahjani, S., Agusti, A., & Yana, I. (2023). The Effect of Project Based Learning on Digital Literacy Skills and Conceptual Understanding in an Online-Based Flipped Classroom Environment. *Edumaspul: Jurnal Pendidikan*, *7*(1), 849-856. https://doi.org/10.33487/edumaspul.v7i1.5681

[6] Hidayati, D., Novianti, H., Khansa, M., Slamet, J., & Suryati, N. (2023). Effectiveness project-based learning in ESP class: Viewed from Indonesian students' learning outcomes. *International Journal of Information and Education Technology*, *13*(3), 558–565. https://doi.org/10.18178/ijiet.2023.13.3.1839

[7] Alfaeni, D., Nurkanti, M., & Halimah, M. (2022). Kemampuan kolaborasi siswa melalui model project based learning menggunakan zoom pada materi ekosistem. *BIOEDUKASI: Jurnal Pendidikan Biologi*, *13*(2), 143-149.

[8] Malawati, R., & Sahyar, S. (2016). Development of Science Process Skills Students with Project Based Learning Model-Based Training in Learning Physics. *Jurnal Pendidikan Fisika Unimed*, *5*(1), 58-63.

[9] Batubara, H. H., Sumantri, M. S., & Marini, A. (2022). Examining the Digital Literacy Movement in Higher Education and Its Relationship to Students' Digital literacy.

[10] Azmi, N., Arianto, F., & Maureen, I. Y. (2020). Efektivitas Project Based learning terhadap digital literacy skill mahasiswa pascasarjana Teknologi Pendidikan Pada Mata Kuliah Analisis Jurnal Ilmiah di Universitas negeri Surabaya. *Jurnal Ilmiah Mandala Education*, *8*(2). https://doi.org/10.36312/jime.v8i2.3247

[11] Sistem Informasi Pengelolaan Sampah Nasional (SIPSN) oleh Kementerian Lingkungan Hidup dan Kehutanan merilis grafik komposisi sampah di tahun 2023.

[12] Model Pembelajaran *Project Based Learning (*Kemendikbud,2013).

[13] Wati, H. B., Listyarini, I., Sudiyono, S., & Artharina, F. P. (2024). EFEKTIVITAS model Pembelajaran teams games tournament terhadap Hasil Belajar pendidikan Pancasila Dan Kewarganegaraan. *Jurnal Inovasi, Evaluasi Dan Pengembangan Pembelajaran (JIEPP)*, *4*(1), 105–112. https://doi.org/10.54371/jiepp.v4i1.385

English for Nursing Students: A Need Analysis

Annsia Nurul Ilmi*, Suwarsih Madya and Author Name[1,2]

[1] Pendidikan Bahasa Inggris, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] Magister Pendidikan Bahasa Inggris, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia

*E-mail: annisa.nurul.ilmi@uny.ac.id

Abstract. This study aimed at investigating the needs of English-specific purposes materials for nursing students at Universitas 'Aisyiyah Yogyakarta. It focused on the existing materials used by English lecturers, target and learning needs. This research employed qualitative and quantitative data that involved twenty three nursing students. The data of this research were collected by using a questionnaire, documentation, and interview. The results of the study revealed that the existing materials used by the English teachers were not appropriate as they were related to engineering. In addition, the analysis results of target situation show that the aim of students learn English was ti help them find a good job. The preffered topic to be learnt was parts of body and health problems. the preffered learning materials was in articles about helath. The students language pfofeciency was most at beginner level.

1. Introduction

ASEAN Economic Community (AEC) started in December 2015 and was effective as of 1 January 2016, while APEC will be effective in 2020. The implementation of AEC in the initial stage is prioritized in the 7 sectors of agriculture-based products: automotive, electronics, rubber, textile, fishery, and wood products; and 5 sectors of services: airline, online service, tourism, health and logistics; and 8 sectors of professions: engineering service, nursing service, surveying qualification, medical practitioners, dental practitioners, accounting services and tourism professional. These 12 priority sectors and 8 professions have consequences on the use of English in the workplace specifically as a medium of communication (Abdurrahman in Kun Aniroh Muhrofi and Gunadi, 2017: 85). Therefore, English is considered as one of skills that should be mastered in order to compete in globalization era.

'Universitas 'Aisyiyah Yogyakarta (Unisa) with its former name 'Sekolah Tinggi Kesehatan 'Aisyiyah (Stikes 'Aisyiyah) has responsibility to equip its students with English as this university will produce a lot of nursing graduates who will compete in AEC and APEC. As has been mentioned earlier, nursing service is one of professions in which people working in this field are expected to be able to speak English. The university has a mission that is to create graduated students who can compete in national, regional, and internationa level. Thus, the university requires its students to learn English in whole semesters including nursing students. The students are expected to have not only the skills related to nursing but also the skill to communicate in English so that they can achieve their future careers.

To facilitata the students language learning in an environment that is closely related to the real-life situations they will encounter, there is a acrucial need to do needs analysis (Long, 2005 in Rittapirom, 2017. To know the needs of students, what students know already and what they need to know, teachers should conduct needs analysis. Brindley in Richards (2001:54) states the term needs is sometimes used to refer to wants, demands, expectations, motivations, lacks, constraints, and requirements. Richards (2001:54) says that the meaning of needs can be different depending on whose need it is which is being observed.

Hutchinson and Waters (1987: 54-63) divide needs into target needs and learning needs. Target needs is what learners need to do in the target situation, meanwhile, learning needs is what learners need to do in order to learn. Target needs consist of necessities, lacks, and wants. Necessities refer to what learners have to know in order to function effectively in the target situation. Lacks mean the gap between the target proficiency and the existing proficiency of learners. Wants come from learners view what they think is useful for them.

Some academics have carried out a number of researches on the requirements analysis of ESP materials for nursing students. To begin with, Chetsadanuwat (2018) looked at the English proficiency requirements for Thai nurses employed by International Hospitals in Bangkok, Thailand. Second, Saragih (2014) created ESP materials for nurses at the University of Prima Indonesia after investigating the learning requirements of fifty nursing students. Thirdly, Miyake and Tremarco (2005) talked about the consequences for EFL teachers in Japan as well as the needs of undergraduate, graduate, and professional nurses. Susandi and Krishnawati (2016) created the ESP Syllabus specifically for EFL nursing students in Indonesia. These studies' findings showed that nursing students require English. This study examined the NA of the ESP materials for nursing students with respect to the present situation (the materials that are currently available, the target and learning needs.

2. Method

This study used qualitative and quantitative data. It also used purposive sampling. A nursing class consisting of 23 students participated in the research with 22 women and 1 man. The students were semester five nursing major in Universitas 'Aisyiyah Yogyakarta (Unisa). Data were collected thrugh questionnaire, interview, and documentation. The questionnaires were filled by nursing students. Semi-structured interviews were conducted to the nursing students, the head of nursing department, the nurses of JIH hospital, and nursing lectures. Documentation refers to any books and tasks used during the teaching and learning process.

As mentioned earlier, this study used qualitative and quantitative data. The qualitative data were obtained through the interviews. The interviews were recorded and then transcribed. The opinions and suggestions at the needs analysis stage from the nursing students, the head of nursing department, and the nurses of JIH hospital were analyzed.

The quantitative data were gathered from the questionnaires distributed to the nursing students. The questionnaire was developed based on the grid or points and it had been validated by an expert from English education department. An observation sheet was used to assess the data from the English module and semester lesson plans. The materials used in each unit (English module) and meeting (semester lesson plans) were examined. Subsequently, the contents found in both documents were added to the table analysis. Following that, the analysis's conclusion was reached. Additionally, the interactive data analysis model developed by Miles et al. (2014) was used to qualitatively examine the interview data. Data collecting, data reduction, data display, and conclusion drawing were the steps involved in this process.

3. Findings and Discussions

3.1 The Present English Learning Materilas used by Lectures

It is surprising that the nursing students in Unisa learn English from a book which is specially designed for engineering students. The book was composed for semester 1 -8 with one book in each semester. The title of the book is English for Success with level 1-8 published by NIIT, leading Skills and Talent Development Corporation, that is building a manpower pool for global industry requirements. Students leant materials which did not relate to their major. The following script describes how the lecturer concerned to the materials.

Saya sadar bahwa saya mengajarkan materi yang tidak sesuai dengan jurusan mahasiswa. Tapi, mau bagaimana lagi karena buku yang digunakan merupakan kebijakan kampus yang bekerja sama dengan fakultas teknik UMY. Jadi semua jurusan di Unisa menggunakan buku dan materi yang sama dengan mahasiswa teknik UMY. (Script 1)

Another interview with nursing student was done also to strengthen the data.

Saya tidak pintar bahasa Inggirs tapi saya tau materi yang saya pelajari tidak sejalan dengan jurusan saya. Kami belajar bahasa Inggris sampai semester delapan dan materi yang sudah saya pelajari tidak berhubungan dengan keperawatan. (Script 2)

It is worth noted that the materials that should be taught have been decided by the stakeholder so that the lectures in Unisa were not dare to break the policy. In spite of that, they should teach the materials based on the topics in the book as the evaluation content composing language functions, text, vocabulary, and grammar was taken from the book as well. However, it is crucial to consider the students voices as vocabulary and texts they learnt were far away from the needs of nursing students. In line materials with the students' needs will support the students in mastering English either English for general language or English for specific purposes (Veranita et al., 2017).

Semester five students learnt 12 topics in one semester. The existing materials are presented below.

Figure 1. Presenting English Learning Materials

3.2. The Target Situation Needed by Nursing Students

Some issues were asked in the questinnaire to find the target situation such as the students objective in learning Engslish, the students' perception on the desired topic, the students' perception on the desired text, the students' perception on learning materials, the students' perception on listening activities, the students' perception on speaking activities, the students' perception on reading activities, and the students' perception on writing activities.

3.2.1 The Students' Objectives to Learn English

Knowing the students' objective to learn English is important to motivate them during the teaching and learning process. Most students were encoraged to learn English due to the hope of getting a better job in the future (89%). Then, it is followed by joining international programs (79%) and fulfilling work demands (79%)' and going abroad (68%). Only 1 % says that he wants to learn other

disciplines. This result in line with the study conducted by Pradan et all (2022) saying that the students of Dehasen University of Bengkulu were most motivated by the hope of looking for a job (nurse).

Table 1. The Students' Objectives to Learn English

No.	Question	Student's Choice	
		Number of Students	%
	What is your objective to learn English in relation to your future career? (You can choose more than one option)		
	a. To help me find better jobs	17	89%
	b. To be used abroad	13	68%
	c. To join international programs	15	79%
	d. To fulfill work demands	15	79%
	e. Others, please mention : to improve my knowledge in understanding other disciplines	1	5%

3.2.2 The Students' Perception on the Desired Topic

As mentioned earlier, the students learnt English materials which were not related to English for nurse. In fact, they learnt English for Engineering because of the unwise policy from the university. The following is Table 2 describes students' Perception on the Desired Topic.

Table 2. The Students' Students' Perception on the Desired Topic

No.	Question	Student's Choice		
		Rank	Number of Students	%
	Rank these theme from the most you want to study by giving number 1, 2, 3, and so on in the column provided			
	a. Asking and Showing Rooms in a Hospital	6	10	53%
	b. Nurses' Duties in Wards	4	8	42%
	c. Medical Equipments	3	9	47%
	d. Patient Admission Form	5	9	47%
	e. Parts of the Body and Health Problems	1	7	37%
	f. Diagnosing Diseases	2	7	37%
	g. Others, please mention : Giving counseling to patients	7	1	5%

The students ranked the themes from the most until the least they wanted to study. Parts of the Body and Health Problems were the most preferred theme. This was followed by Diagnosing Diseases (37%), Medical equipment, Nurses' duties in wards, Patient admission form, Asking and Showing Rooms in a Hospital, and Giving Counseling to Patient. The above result is in line with the study by Ariana et all (2022) showing that the topic of parts of the body as a needed topic that should be learnt by nursing students in Dehasen University of Bengkulu.

3.2.3 The Students Perception on the Learning Materials

Relevant learning materials should be used to promote students' learning. It could be in the form of printed text, audio, video, and picture. The following table describes kinds of materials that can promote teaching and learning process. Table 3 shows that any articles about health were most preferred by

the students (89%). This was followed by English videos (84%), picture-cued about health (63%), articles about health from newspaper (37), and doctors' prescriptions (26%). In summary, most of students liked to read any articles about health to support their study. This result implies that the students who used to learn texts about IT and offices needed to be exposed with relevant materials.

Table 3. The Students' Students' Perception on the Desired Topic

No.	Question	Student's Choice	
		Number of Students	%
	What are kinds of materials that can promote the teaching and learning process? (You can choose more than one option)		
	a. Articles about health at newspaper	7	37%
	b. Picture-cued about health	12	63%
	c. Video about health	16	84%
	d. Audio about health	0	0
	e. Doctors' prescriptions	5	26%
	f. Any articles about health	17	89%
	g. Others, please mention…	0	0

3.2.4 The Students' English Proficiency

Table 4 reveals the English proficiency the students have. Most of students were in beginner level (63%). This was followed by Intermediate level (32%), and Advanced level (5%) . Based on the data presented, it was therefore, the lecturer should teach slowly and patiently to help the students understand the materials taught. It is possible for the lecturer to teach from the basic grammar even simple words to make sure they remember some important rules. Nursing students of Unisa had learnt English as compulsory course from semester 1. Yet, the questionnaire result shows that they were confident to put themself as beginner learner. It is implied that the irrelevant materials they learnt did not engage students to comprehend the materials when the materials did not match the students' English proficiency. A study revealed by Hassan (2014) said that most of students in University of Kurdistan would change the content of English learning materials they were studying if they were given opportunity because they were not helpful especially when learners were at low level of learning the language.

Table 4. The Students' English Proficiency

No.	Question	Student' Choice	
		Number of Students	%
	What is your level of English proficiency?		
	a. Beginner Level: Students master very few words and expressions, have limited grammar, and many pronunciations are influenced by mother tongue.	12	63%
	b. Intermediate Level: Students speak fluently in some topics, have sufficient words, grammar, and pronunciation.	6	32%
	c. Advanced Level: Students speak fluently in many topics, have high degree of words, grammar, and pronunciation.	1	5%
	d. Others, please mention…	0	0

To conclude, the overall needs analysis show that the existing materials used by the English teachers was not appropriate as they were related to engineering. In addition, the analysis results of target situation show that the aim of students learn English was ti help them find a good job. The preferred topic to be learnt was parts of body and health problems. the preferred learning materials was in articles about health. The students' language proficiency was most at beginner level. it is important for the future research to involve more participants to produce more reliable data.

References

[1] *Ariana, F. (2020). The need analysis of English for specific purposes (ESP) materials for computer science students of Muhammadiya*h

[2] Chetsadanuwat, K. (2018). Needs of English skills of Thai nurses working in international hospitals accredited by JCI in Bangkok area. LEARN Journal: Language Education and Acquisition Research Network, 11(1), 26–46. https://files.eric.ed.gov/fulltext/EJ1225855.

[3] Hassan, Z. (2014). The Impact of Teaching Materials on Learning English at Universities in Kurdistan, Education 2014, 4(2): 29-34 DOI: 10.5923/j.edu.20140402.03

[4] Hutchinson, T., & Alan, W. (1987). *English for Specific Purposes. A Learning Centred Approach.* Cambridge: Cambridge University Press.

[5] Kun Aniroh Muhrofi & Gunadi. (2017). *Research and Trends of ESP in Indonesia*. Asian EFL Journal, 97, 85-105. m.ac.jp/soc/mw/journal/en/2005-e11-1/03_miyake.pdf

[6] Miles, M. B., Huberman, A. M., & Johnny, S. (2014). Qualitative data analysis: An methods sourcebook (3rd ed.). Sage Publication, Inc

[7] Miyake and Tremarco (2005). Miyake, M., & Tremarco, J. (2005). Needs Analysis for Nursing Students Utilizing Questionnaires and Interviews. Kawasaki Journal of Medical Welfare, 11(1), 23–34. http://www.kawasaki-New York: Cambridge University Press.

[8] Pradana et al (2022). What do nursing students need in learning English?, Journal of Applied Linguistics and Literature, Vol. 7 No. 2, August 2022

[9] Richards, J. C. (2001). *Curriculum Development in Language Teaching.*

[10] Rittapirom, N. (2017*). Development of Task Based Oral Communication Course for EFL Undergraduate Tourism Students*. Asian EFL Journal, 99, 99-135.

[11] Saragih. (2014) Designing ESP materials for nursing students based on needs analysis. International Journal of Linguistics, 6(4), 59–70.

[12] Susandi and Krishnawati (2016) Susandi, N. K., & Krishnawati, N. L. P. (2016). Needs analysis : ESP Syllabus design for Indonesian EFL. The Fourth International Seminar on English Language and Teaching (ISELT-4), 130–140. http://ejournal.unp.ac.id/index.php/selt/issue/view/753

[13] Veranita, D., Syahrial, S., & Koto, I. (2017). English for agriculture vocational school students: A need analysis study at SMK Negeri 2 South Bengkulu. JOALL (Journal of Applied Linguistics & Literature), 2(2), 76–87. https://doi.org/10.33369/joall.v2i2.5956

Science Classroom Interaction: Teacher Questioning and Communicative Approach

Beni Setiawan[1] [*], Elok Sudibyo[1], Wahyu Budi Sabtiawan[1], Mohammad Budiyanto[1], Dhita Ayu Permata Sari[1], Aris Rudi Purnomo[1] and Fikky Dian Roqobih[1]

[1] Science Education Department, Mathematics and Natural Science Faculty, Universitas Negeri Surabaya, Surabaya, Indonesia

[*]E-mail: benisetiawan@unesa.ac.id

Abstract. In the classroom, students' use of "language as a tool for reasoning" during classroom conversations with teacher and other students. The interaction between teacher dan students is the communication two ways or more to create students' engagement with learning opportunity by using the IRE/F concept. This study aims to analyse the teacher questioning and communicative approach in science classroom. In order to analyse the questioning and communicative approach, the video recording of pre-service science teacher practicing in the classroom, and their teaching practices were systematically described and sorted according to the guidelines for developmentally appropriate practices. The analysis of coding scheme was based on ten items of classroom discourses theory, such as move/interaction, types of utterance, the purpose of utterance, cognitive process, metadiscourse, classes, Socratic questioning, verbal jigsaw, semantic tapestry, and framing. The results showed interaction pattern between teacher and students in the main stage, the move or interaction pattern between teacher and students are following I-R-R-R pattern and I-R-F pattern. The I-R-R-R is the interaction between teacher and three students who have idea discuss with students following teacher question about how to identify the synthetic artificial colouring agents. Furthermore, the type of utterance is question-answer (Q&A) and comment-statement (C-S) from teacher. The Q&A is the interaction between teachers could involve group as individual or a group. Another type of utterance is C-S which are come from a teacher after students give the answer. The purpose of this interaction is the teacher are reflection based on students answer. In conclusion, teacher-student interactions play a fundamental role in determining the impact of teachers on student development and learning across wide-ranging countries and cultures.

1. Introduction

Classroom interaction is a pivotal element in the educational process, significantly influencing student engagement and learning outcomes. The research of classroom discourse using the IRE/F methods have strictly investigated during the past 40 years. The initiates pedagogical interaction with students, one or more students respond to that question, and the teacher evaluates or follows up on student response as a known-answer question (e.g., Mehan, 1979; Wells, 1993).

Classroom interaction has the grounded research, since the late 1930s, then change and growing students' diversity in the classroom. It makes the new paradigm about the understanding teaching,

learning, and classroom interaction. Began with the develop observation instruments for measuring teacher behaviours (Green and Dixon 2008), then focused on different phenomena (Simon and Boyer 1970). In terms of classroom discourse, teachers have the ability to develop appropriate management skills to reduce student and teacher authority, especially for pre-service science teachers who have less and limited teaching experience in managing student interactions in the classroom. . Through innovative learning 2 courses, pre-service sciences have the opportunity to practice and dig deeper into learning pedagogy. In fact, professional developers have yet to realize the importance of getting teachers to pay more attention to how they verbally interact with students when teaching science. This research addresses this problem by exploring the effectiveness of classroom interaction in introducing prospective science teachers to the steps of interaction in classroom discourse methods.

2. Method

In the research utilised a qualitative research approach (Bogdan and Biklen 2003; Creswell 2003). As part of the study, descriptive data were systematically collected through open-ended research methods such as video-recordings of professional development activities, also requires multilevel meta-analyses to make visible what is known and remains to be studied about classroom interaction and discourse phenomena.

3. Result and Discussion

The result of the coding scheme of the additive lesson with food test contains the natural additive and synthetic additive. The analysis of coding scheme was based on ten items of classroom discourses theory, such as move/interaction, types of utterance, the purpose of utterance, cognitive process, metadiscourse, classes, Socratic questioning, verbal jigsaw, semantic tapestry, and framing (Chin, 2006; Chin, 2007; Tang, 2017).

Table 1. The Scheme of Teaching and Learning in Science-Chemistry Classroom with Sub Food Test contains Additive, Addictive and Psychotropic Substances

Utterance	Move/inter-actions pattern	Type of utterance	Purpose of utterance	Cognitive process	Metadiscourse	classes	Socratic questioning	Verbal jigsaw	Semantic tapestry	Framing
T: If people don't study or their school doesn't have a laboratory, with what things to test it from synthetic artificial coloring agents?	I	Q	Elicit	-	Topicalizer/ apply knowledge	Interactive - Dialogic	-	-	Stimulating multimodal thinking	-
S1: it can mam, with turmeric	R	A	Reply	Evaluate	-		-	-	-	-
S2: with lime water mam	R	A	Reply	Evaluate	-		-	-	-	-
S3: with soap water mam	R	A	Reply	Evaluate	-		-	-	-	-
T: is there any answers different from Adi group's answers?	I	Q	Elicit	-			Pumping	-	-	-
S: Same	R	A	Reply	Confirm	-		-	-	-	-
T+S: yes, good. So, children, Adi group's answers that"the color of turmeric without soap water is orange, with soap water it changes into the red" "pandan leaves are green in the beginning and it becomes light green with soap water" " In tartazin, the green one and the yellow one don't change in its color"	F - E	C - S	Accept, focus, extend	Evaluate	-		-	-	-	Question-based summary
T: now whose group wants to present its observation from no 5 to 7?	I	Q	Elicit	-	Challenge		Constructive challenge	-	-	-
S: I want mam	R	A	Reply	-	-		-	-	-	-
T: Yes, Agus. Please come	F	C	Accept	-	-		-	-	-	-
S: Analyst from our group: " yellow tofu, in the beginning, is yellow, and with soap water it changes to red", then " Dadar gulung" in the beginning is green and with soapy water it is not changing in colour, still green, and " lapis" cake, in the beginning,	R	A	Reply	Explain	-		-	-	-	-

Utterance	Move/inter-actions pattern	Type of utterance	Purpose of utterance	Cognitive process	Metadiscourse	classes	Socratic questioning	Verbal jigsaw	Semantic tapestry	Framing
is green and with soapy water it is not changing in colour, still green"										
T: yes good Ida. And for addition. Usually food with synthetic artificial coloring agents, its taste is bitter, and the color left in our hand, tongue, and others	F	C - S	Accept, focus	-	Importance/ topicalizer		-	-	-	Question-based outline
S: yes sir, I have experienced like it	R	A	Reply	Evaluate	-		-	-	-	-

T: Teacher; S: Student; I: Initiate; R: Respond; F: Follow-up; Q: Question; A: Answer C: Comment S: Statement

This additive lesson with food test contains the natural additive and the synthetic additive is a part of the compulsory course (Innovative Learning 2 Course) that students in the group arranged the lesson plan and implement in teaching and learning or microteaching in the classroom. The lesson plan is divided into three part such as opening stage, main stage, and closing state. Moreover, the author focused on the main stage/second episode.

In the main stage, the move/interaction pattern between teacher and students are following the I-R-R-R pattern and I-R-F pattern. The I-R-R-R is the interaction between teacher and three students who have a discussion where students following teacher question about how to identify the synthetic artificial coloring agents. For example,

> T: If people don't study or their school doesn't have a laboratory, with what things to test it from synthetic artificial coloring agents?
> S1: it can mam, with turmeric
> S2: with lime water mam
> S3: with soap water mam

In one hand, the I-R-F pattern of interaction is based on teacher initiate by raising the question. For instance,

> T: is there any answers different from Adi group's answers?
> S: Same
> T&S: yes, good. So, children, Adi group's answers that"the color of turmeric without soap water is orange, with soap water it changes into the red"
> "pandan leaves are green in the beginning and it becomes light green with soap water".
> " In tartazin, the green one and the yellow one don't change in its color"
> T: now whose group wants to present its observation from no 5 to 7?
> S: I want mam
> T: Yes, Agus. Please come

Furthermore, the type of utterance is question-answer (Q&A) and comment-statement (C-S) from the teacher. The Q&A is the interaction among teachers could involve group as an individual or in a group. In addition, another type of utterance is C-S which is students giving the answer then follow by teacher use comments. The purpose of this interaction is the teacher's reflection based on students' answer, for instance, "yes", "good". So, Adi group's answers that "the colour of turmeric without soap water is orange, with soap water it changes into the red"; "pandan leaves are green in the beginning and it becomes light green with soap water"; " In tartazin, the green one and the yellow one don't change in its colour" and "yes good Ida". The teacher is adding the statement, "usually food with synthetic artificial coloring agents, its taste is bitter, and the color left in our hand, tongue, and others".

According to the purpose of utterance, the coding scheme explains that student's interaction as a reply from teacher question. There is good interaction between teacher and students because students replied toward teacher elicitation. Besides, elicit and reply, on the other hand, the purpose of utterance is to accept, focus, and extend about the other ideas from another group. For instance, "yes", "good". So, children, Adi group's answers that "the colour of turmeric without soap water is orange, with soap water it changes into the red"; "pandan leaves are green in the beginning and it becomes light green with soap water"; " In tartazin, the green one and the yellow one doesn't change the colour". It means that teacher accepted the group idea about "the change of color" and focus on how the color is changed toward the food which was given an indicator to know the food contains the natural substance or synthetic substance. Moreover, there are three of the cognitive process such as evaluate, confirm, and explain (Chin, 2006). To gain the knowledge, students are evaluated by their thinking about food test by several indicators to understand which one the food is safe and not safe or dangerous. In addition, students are confirming the teacher's question about the alternative ideas about food test.

The teacher is trying to construct students' knowledge by using metadiscourse. The challenge category of metadiscourse was used by the teacher to construct students' knowledge to encourage students the way to think, make an idea from another group in the science classroom (Tang, 2017). Furthermore, the communicative approach in the science classroom with additive substance is interactive-dialogic because the teacher has communication with the small and large group, with one-by-one students or teacher with student 1, student 2, and student 3 (Scott, 2006).

The author also discussed about teacher questioning approach that stimulates productive thinking. According to the coding table, there are five approaches such as stimulating multimodal thinking, Pumping, Question-based summary, Constructive challenge, question-based outline (Chin, 2007).

> T: If people don't study or their school doesn't have a laboratory, with what things to test it from synthetic artificial coloring agents?

4. Conclusion

Based on the dialogue above, the type of teacher questioning in the science classroom is stimulating multimodal thinking. The teacher encouraged students to think in a variety that if people or community doesn't have a laboratory to test the addictive substance in the food, so, how they can test it. Students must think deeply to find the alternative way to test the food which predicts contain synthetics coloring agents.

References

[1] Bogdan, R. C., & Biklen, S. K. (2003). Qualitative research for education: An introduction to theory and methods (4th ed.). Boston, MA: Allyn and Bacon.

[2] Chin C. 2006. Classroom Interaction in Science: Teacher Questioning in Feedback to Students' Responses. International Journal of Science Education. Vol. 28, No. 11 PP. 1315-1346.

[3] Chin C. 2007. Teacher Questioning in Science Classroom: Approaches that Stimulate Productive Thinking. Journal of Research in Science Teaching. Vol. 44, No. 6 PP. 815-843.

[4] Creswell, J. W. (2003). Research design: Qualitative, quantitative, and mixed methods approach. Thousand Oaks, CA: Sage Publications

[5] Green, J.l. and Dixon, C.N. (2008) Classroom interaction, situated learning, in Encyclopedia of Language and Education (eds M. Martin-Jones, A.M. de Mejia and N.H. Hornberger), 2ⁿᵈ edn, vol. 3: Discourse and Education, Springer Science and Business Media llC, Birmingham UK, pp. 3–14.

[6] Mehan, H. (1979). "What time is it, Denise?": Asking known information questions in classroom discourse. Theory into Practice, 18, 285–294

[7] Scott, P.H., Mortimer, E.F., Aguiar, O.G. 2006. The Tension Between Authoritative and Dialogic Discourse: A Fundamental Characteristic of Meaning Making Interaction in High School Science Lesson. © 2006 Wiley Periodicals, Inc. Sci Ed 90:605–631.

[8] Simon, A. and Boyer, E.G. (eds) (1970) Mirrors for Behavior: An Anthology of Observation Instruments Continued. Research for better schools, Philadelphia, PA.

[9] Tang K-S. 2017. Analysing Teachers' Use of Metadiscourse: The Missing Element in Classroom Discourse analysis. © 2006 Wiley Periodicals, Inc. Sci Ed. Science Education, Vol 101, No. 4, PP. 548-583.

[10] Wells, C. G. (1993). Reevaluating the IRF sequence: A proposal for the articulation of theories of activity and discourse for the analysis of teaching and learning in the classroom. Linguistics and Education, 5, 1–37.

Exploring Preservice Science Teacher Proficiency in Developing Assessment Instruments

Fikky Dian Roqobih[1*], Dhita Ayu Permata Sari[1], Elok Sudibyo[1], Aris Rudi Purnomo[1], Wahyu Budi Sabtiawan[1], Beni Setiawan[1], Mohammad Budiyanto

[1] Natural Science Education Department, State University of Surabaya, Surabaya, Indonesia

*E-mail: fikkyroqobih@unesa.ac.id

Abstract. Assessment is an important aspect of education. Assessment also influences teaching practices, curriculum development, and student learning outcomes. The ability to create effective assessment instruments is required by teachers. This research aims to explore the proficiency of preservice science teachers in developing assessment instruments. This study employed a quantitative descriptive approach, utilizing an assessment to gather data from a sample amount of 24 university students enrolled in science education department. The research assessed preservice science teacher's ability in designing assessment instruments that is valid and reliable. The validity of instrument was assessed with construct validity with biserial point correlation while reliability of the instrument was assessed through Kuder-Richardson Formula 20 (KR-20). This result shows that 37% instruments which created by preservice science teachers were stated as valid but unreliable. This indicates that over half of the instruments adequately measured the intended theoretical constructs or learning objectives. Furthermore, 8% of the assessment instruments were found to be reliable but invalid. This suggests that a quarter of the instruments exhibited consistent and stable measurement outcomes, implying a high degree of internal consistency among the items. 37% of their instrument also stated as invalid and unreliable. However, only 17% of the assessment instruments demonstrated both validity and reliability. This means that no more than a half of instruments developed valid and reliable. It can be concluded that only a minority of preservice science teachers demonstrated proficiency in developing assessment instruments.

1. Introduction

Assessment in education refers to the process of gathering and interpreting evidence of student learning [1]. It serves multiple purposes within the educational context, providing valuable information to educators, students, parents, and stakeholders about the extent to which learning goals and objectives are being met [2]. Assessment can take various forms and occur at different points throughout the learning process, each serving specific purposes and informing instructional decisions [3].

Within the field of education, learning assessment is a crucial process that influences teaching methods as well as student performance. The assessment of learning is a crucial component of the work that educators and institutions do to guarantee that education is effective while also catering to the various needs of students[3]. Assessment can be carried out through 3 perspectives, including: assessment of learning, assessment for learning, and assessment as learning. The results of the assessment are useful as a basis for teachers to design and implement subsequent learning, namely the assessment for learning perspective [4]

Assessment for learning is carried out throughout the learning process and is usually used as a basis for making improvements to the learning process. Assessment for learning functions as a tool to

determine student learning outcomes and reflect on learning. This will be a reflection to design improvements to the learning process, and to see students' learning strengths and weaknesses. In this way, Assessment for learning can also be used by teachers to improve performance in facilitating students. Formative assessment can be in the form of written or non-written tests [5].

Assessment and assessment instruments are two concepts that are closely related to each other in the world of education. Assessment refers to the process of collecting and analyzing information about students, learning processes, and learning outcomes. Assessment instruments, on the other hand, are tools used to collect such information [6]. So, assessment and instrument in the context of education is integral and interconnected. A good and effective assessment instrument is essential for accurately measuring student learning and providing meaningful feedback to both students and teachers. An instrument can be stated as effective instrument when it is valid and realible. Validity refers to the extent to which an assessment instrument measures what it intends to measure. In other words, a valid instrument accurately captures the targeted learning outcomes or constructs while reliability refers to the consistency and stability of assessment results over time and across different conditions [7]. To realize the assessment perspective for learning, teachers must have expertise in developing valid and reliable assessment instruments [8]. Therefore, preservice science teachers must have expertise in developing assessment instruments so that when they become teachers they can carry out the assessment process appropriately [9]. Thus, this research aims to explore the proficiency of preservice science teachers in developing assessment instruments.

2. Method

This study employed a quantitative descriptive approach, utilizing an assessment to gather data from a sample amount of 24 university students enrolled in science education department. The research assessed preservice science teacher's ability in designing assessment instruments that is valid and reliable. Content validity had been done before through peer assessment. The instruments that had been through the content validity were then tested on 15 junior high school students in various schools. After the trial data was obtained, the validity of the question instrument was measured using biserial point correlation technique. Index number correlation (r_{pbis}) was found with the help of Microsoft Excel software. If r_{pbis} or $r_{count} \geq r_{table}$, the items was stated as valid while reliability (examines the consistency of the instrument) was calculated through Kuder-Richardson 20 (KR-20) Formula. The test reliability coefficient can be said to be good if it has a coefficient above 0.70.

3. Result and Discussion

In this study, each preservice science teacher developed an assessment instrument that consisted of 5-item of multiple choices question to measure junior high school student's cognitive ability in understanding a topic of science subject. Those data collected then its validity and reliability were measured to determine the ability of preservice science teacher in developing assessment instrument. The measured validity is construct validity. There are various categories of validity, such as construct, criteria, and content validity. When assessing an instrument's suitability and appropriateness for a given task, as well as the level of confidence that can be placed in the conclusions drawn from it, construct validity should be taken into consideration. Therefore, the validity pertains to the instrument's scores and interpretations rather than being a feature of the instrument itself [10]. From the 5 question items created, the Index number correlation (r_{pbis}) was calculated. If rpbis or $r_{count} \geq r_{table}$, the items were stated as valid. When there are more than 3 valid questions then it is declared that the instrument is valid. Kuder-Richardson 20 (KR-20) formula is used to found its reliability. Result of instrument validity and reliability can be seen in Table 1.

Table 1. Result of Instrument Validity and Realibility which Made Preservice Science Teacher

	Item valid	Item invalid	Validity	Reliability
1	2	3	NV	R
2	5	0	V	R
3	4	1	V	NR
4	4	1	V	NR
5	4	1	V	NR
6	2	3	NV	NR
7	2	3	NV	NR
8	4	1	V	NR
9	3	2	V	R
10	5	0	V	NR
11	1	4	NV	NR
12	2	3	NV	NR
13	0	5	NV	NR
14	2	3	NV	R
15	3	2	V	NR
16	2	3	NV	NR
17	4	1	V	R
18	1	4	NV	NR
19	4	1	V	NR
20	3	2	V	R
21	4	1	V	NR
22	4	1	V	NR
23	2	3	NV	NR
24	0	5	NV	NR

V   : Valid   R   : Reliable
NV : Invalid   NR : Unreliable

From the data above, it can be briefly seen in Figure 1. That Venn diagram indicates each student's ability to develop assessment instruments that are valid, reliable and both valid and reliable.
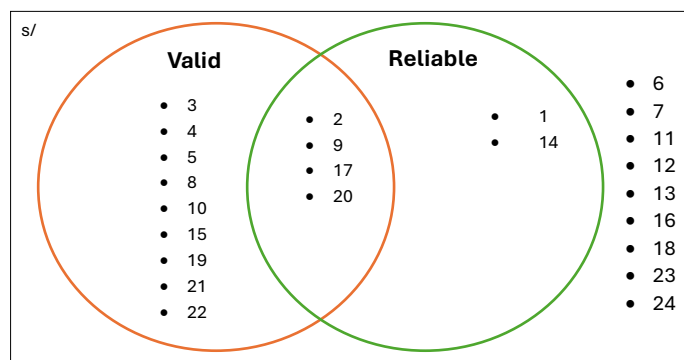
Figure 1. Validity and Reliability of Each Preservice Science Teacher's Instrument

Figure 1 explains that 9 or 37% of preservice science teachers were able to develop assessment instruments that were valid but unreliable. There are 2 or 8% of individual who develop reliable but invalid instruments and as many as 9 or 37% person cannot develop valid and reliable assessment instruments so that only 4 people or 17% of them can develop valid and reliable assessment instruments. Thus, only 17% of preservice science teachers are able to develop good assessment instruments.
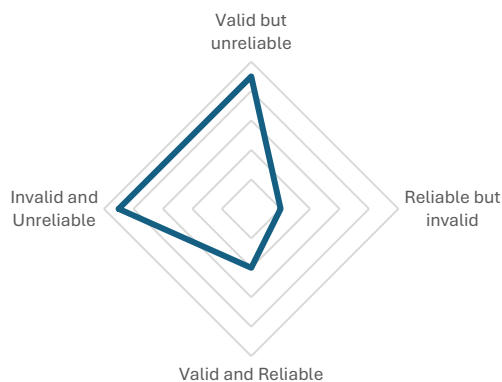
Figure 2. Distribution of Instrument that Reflect Preservice Science Teacher's Ability

Figure 2 shows the distribution of preservice science teacher abilities in developing instruments where no more than half of preservice science teachers are able to develop good assessment instruments. This proves that there are still very few preservice science teachers who are skilled in making assessment instruments, in this case good written test instruments. Even though this ability is really needed for teacher [9]. Several previous studies also stated that teachers still experience obstacles in creating valid and reliable assessment instruments. The questions created cannot be 100% valid and reliable. This was stated that teachers have difficulty in making HOTS questions and the differences in the cognitive level of the quextions [11]. Another also stated that of the 10 question items tested there were around 30% invalid questions[12]. Teachers must be given training and experience related to making assessment instruments so that their abilities can improve. More experienced teachers have been proven to be able to create items in assessment instruments that are more valid and reliable compared to inexperienced teachers [13]. Therefore, this also applies to preservice science teachers.

4. Conclusion

Based on the data collected, no more than a half of instruments developed that stated as valid and reliable. It can be concluded that only a minority of preservice science teachers demonstrated proficiency in developing assessment instruments.

References

[1] H. Y. Chang *et al.*, "A systematic review of trends and findings in research employing drawing assessment in science education," *Stud. Sci. Educ.*, vol. 56, no. 1, pp. 77–110, 2020, doi: 10.1080/03057267.2020.1735822.

[2] H. R. Goss, C. Shearer, Z. R. Knowles, L. M. Boddy, E. J. Durden-Myers, and L. Foweather, "Stakeholder perceptions of physical literacy assessment in primary school children," *Phys. Educ. Sport Pedagog.*, vol. 27, no. 5, pp. 515–530, 2022, doi: 10.1080/17408989.2021.1911979.

[3] L. H. Schellekens, H. G. J. Bok, L. H. de Jong, M. F. van der Schaaf, W. D. J. Kremer, and C. P. M. van der Vleuten, "A scoping review on the notions of Assessment as Learning (AaL), Assessment for Learning (AfL), and Assessment of Learning (AoL)," *Stud. Educ. Eval.*, vol. 71, no. July, p. 101094, 2021, doi: 10.1016/j.stueduc.2021.101094.

[4] R. L. M. Yogi Anggraena, Dion Ginanto, Nisa Felicia, Ardanti Andiarti, Indriyati Herutami, Leli Alhapip, Setiyo Iswoyo, Yayuk Hartini, *Panduan Pembelajaran dan Asesmen*. 2022.

[5] K. M. Quinlan and E. Pitt, "Towards signature assessment and feedback practices: a taxonomy of discipline-specific elements of assessment for learning," *Assess. Educ. Princ. Policy Pract.*, vol. 28, no. 2, pp. 191–207, 2021, doi: 10.1080/0969594X.2021.1930447.

[6] S. Supriyadi, R. M. Lia, A. Rusilowati, W. Isnaeni, E. Susilaningsih, and S. Suraji, "Penyusunan Instrumen Asesmen Diagnostik untuk Persiapan Kurikulum Merdeka," *J. Community Empower.*, vol. 2, no. 2, pp. 67–73, 2022, doi: 10.15294/jce.v2i2.61886.

[7] A. W. Wilsa, A. Rusilowati, E. Susilaningsih, J. Jaja, and V. Nurpadillah, "Validity, reliability, and item characteristics of cell material science literacy assessment instruments," *J. Penelit. dan Eval. Pendidik.*, vol. 27, no. 2, pp. 177–188, 2023, doi: 10.21831/pep.v27i2.61577.

[8] D. M. Wilson and S. Narasuman, "Investigating teachers' implementation and strategies on higher order thinking skills in school based assessment instruments," *Asian J. Univ. Educ.*, vol. 16, no. 1, pp. 70–84, 2020, doi: 10.24191/ajue.v16i1.8991.

[9] Y. D. Saputri*, B. S. Adi, W. S. Hastuti, and R. C. Murti, "Peningkatan Kemampuan Mahasiswa Pendidikan Guru Dalam Menyusun Perangkat Pembelajaran Melalui Refleksi Diri Pada Mata Kuliah Pendidikan IPA Sekolah Dasar," *J. Pendidik. Sains Indones.*, vol. 11, no. 1, pp. 40–49, 2023, doi: 10.24815/jpsi.v11i1.26571.

[10] E. Almanasreh, R. Moles, and T. F. Chen, "Evaluation of methods used for estimating content validity," *Res. Soc. Adm. Pharm.*, vol. 15, no. 2, pp. 214–221, 2019, doi: 10.1016/j.sapharm.2018.03.066.

[11] W. Winarti, H. Hairida, I. L.-J. I. WAHANA, and undefined 2021, "Deskripsi Kemampuan Guru Membuat Soal Berdasarkan Pada Kurikulum 2013 di Sekolah Menengah Atas Kabupaten Landak," *Jurnal.Unibrah.Ac.Id*, vol. 7, no. 2, pp. 108–115, 2021, doi: 10.5281/zenodo.4659018.

[12] Sudaryono, U. Rahardja, Q. Aini, Y. Isma Graha, and N. Lutfiani, "Validity of Test Instruments," *J. Phys. Conf. Ser.*, vol. 1364, no. 1, 2019, doi: 10.1088/1742-6596/1364/1/012050.

[13] Lukke, "ERIC - EJ1216886 - Validity and Reliability of Teacher-Made Tests: Case Study of Year 11 Physics in Nyahururu District of Kenya, African Educational Research Journal, 2014-May," *2014*, vol. 2, no. 2, pp. 61–71, 2014, [Online]. Available: https://eric.ed.gov/?id=EJ1216886

A Corpus-based Analysis on the Realization of Ideational Meaning in Short Stories "Snow White" and "the Selfish Giant"

Avicenna Al Qodr[1*], Shendy Destiani[2] and Lilia Indrini[1,2]

[1] Universitas Tidar, Magelang, Indonesia (Avicenna.Al.Qodr@students.untidar.ac.id)
[2] Universitas Tidar, Magelang, Indonesia (shendy.destiani@students.untidar.ac.id)
[3] Universitas Tidar, Magelang, Indonesia (Indriani@untidar.ac.id)

Abstract. Meaning is really important in smoothing communication especially using EFL. English as a Foreign Language. Reading short stories is the easiest way to learn it. Systemic Functional Linguistics (SFL) divides meaning into ideational, interpersonal and textual. Ideational meaning has a function to express perception about the world. It is realized through processes, participants, and circumstances. Therefore, this research aims to analyze processes, participants, and circumstances that were realized in two short stories from different generations, namely in the 18th century entitled "The Selfish Giant"by Oscar Wilde and the 19th century entitled "Snow White"by Brothers Grimm. The method is qualitative using NER (Named Entity Recognition). The result shows that "The Selfish Giant" contains various activities carried out by the characters and depictions of the environment in the story. Meanwhile, "Snow White" tends to have a lot of communication between characters and emotional feelings in the story. It reveals the importance of SFL in providing meaning and context and how language functions conveyed the messages in a literary work.

Keywords: Ideational meaning, short story, SFL

1. Introduction

Corpus data functions to identify patterns of language use such as common collocations, grammar structures, communicative functions, and keywords, among others, that can be included in language teaching materials. (Friginal, 2018; Perez–Paredes, 2021). In this paper, explain about initial experiences in developing the first function of a theory-based corpus. Complete the project of creating a linguistic corpus, which will provide a valuable opportunity to gain experience. The corpus is built using comparisons between two narrative texts. To find out the differences in the use of ideational meaning in short stories used by short story authors in the 18th and 19th centuries. In a semester-long study discussing Systemic Functional Linguistics, to understand that language, a fundamental component of interpersonal communication, has gained significant importance due to its integration with various disciplines. Many communication products are in English, which may make it difficult to understand or interpret the meaning due to language variation. SFL can effectively bridge the gap between meaning and context, a challenge that translators frequently encounter. Therefore, the author decided to use the SFL approach method on the linguistic corpus this time.

"Snow White" and "The Selfish Giant" are classic tales that have captivated audiences for generations. The 19th century saw the publication of "Snow White," a German fairy tale. Numerous retellings and adaptations across various media have underscored its profound cultural resonance. It

follows the journey of a young princess whose beauty sparks her stepmother's jealousy, leading to a series of trials and ultimately triumph. In contrast, Oscar Wilde's "The Selfish Giant" is a touching story published in the 18th century. It is about the redemptive and transformative power of love and generosity. It tells the story of a giant who, after initially forbidding children from playing in his garden, experiences a change of heart that brings about a miraculous transformation. Differences in publication years result in differences in the classes of words used to reach target readers in that century. Therefore, we conducted a corpus analysis to identify the variations in word classes.

2. Review of the Literature

According to Halliday & Matthiessen (2004: 29), ideational meaning is language as reflection, language provides a theory of human experience. Ideational Meaning is one of the main metafunctions in systemic functional linguistics which is useful for representing the meaning of experiences or events. Based on Gerot & Wignell (1994) realized through a transitivity system, that consists of process, participants and circumstance in a text. Participant is a specific person has a name or a certain group who carries out the action in the text, participants are divided into twelve, namely, actor, range, token, value, senser, phenomenon, behaver, sayer, existent, and verbiage.

Circumstances answer questions about when, when, why, how, how much, and as what. The following are the types of circumstance, frequency, duration, location, cause, manner, accompaniment, and angle (Gerot & Wignell). Gerot and Wignell (1994: 54), explain that the centre of transitivity is the process realized by the verb not only 'doing words' but also being and having. Therefore, Participant and Circumstance are obligatory for actions, events, feelings, and beings. The various kinds of events that occur certainly involve various types of participants in various circumstances. There are seven types of processes outlined below:

2.1. Process
Process is giving expression to an action, incident or circumstance by words in the sentence. There are six type of process, as follows:

2.1.1. Material Process
This process means physical activity or action, carried out by humans or non-humans. The participant is the doer who takes action.

He	built	a high wall
Doer	Material	Goal

2.1.2. Mental Process
Processes related to feelings, thoughts or perceptions experienced by participants. The participants are feelings and phenomena.

They	did not like	hard stone
Senser	Affect	Phenomenon

2.1.3. Behaviour Process

Processes that show actions usually carried out by participants directly, such as speak, watch, read, etc. The participants are behaver and range.

She	cried	loudly
Behaver	Behavioral	Manner

2.1.4. Verbal Process

Processes related to the use of words to exchange meaning. The participants are sayer, receiver, target and verbiage.

The queen	asked	her	the mirror
Sayer	Verbal process	receiver	Verbiage

2.1.5. Existential Process

A process that shows the existence or continuity of some object, human or non-human. The participant existent and circumstance.

There	was	the most beautiful garden
	Existential	place

2.1.6. Relational Process

A process that has a relationship between identity and attributives to develop identity. There are two types of participants in relational process;

    1. Intensive Attributive Process the participants are carrier, attribute and attributive.
    2. Intensive Identifying Processes, the participants are token, identifying and value.

She	was	a beautiful princess
Carrier	Intensive	Attribute

2.1.7. Meteorological Process

This process usually uses the word "it" to show what is related to the word, such as circumstances, weather or the environment.

It	's the snow
	Meteorological Process

3. Methodology

There are many methods for creating a corpus. After we read both texts, we determined a strategy for creating a corpus. Annotation is our preferred method for creating a corpus. Annotation is a method carried out by providing additional annotations such as POS (part-of-speech) tagging, named entity recognition (NER), or syntactic parsing. Annotation is one branch of preprocessing methods. There are many ways to use annotations by themselves. The method we use to create a corpus is named entity recognition (NER). We use Named Entity Recognition (NER) to identify and classify named entities in text, including names of people, organizations, locations, dates, etc. This method is very efficient in helping us find word classes, as well as very helpful in using the SFL approach.

This method has advantages and disadvantages. The advantage of this method is that it can improve our understanding of the text. This is because we can discover layers of information when reading and analyzing sentences. The second is to have good validation and evaluation. Using this method requires high precision, which can make this method have good validation. The disadvantage of this method is that it takes time. Manual annotation requires a lot of time and human resources, which can increase development costs. The second issue pertains to the quantity of reads. Manually annotating large datasets is challenging and difficult to manage, especially for very large enterprises. The final challenge pertains to the limitations associated with automatic annotation. This is a challenge for annotators not to rely on AI and other technological advances.

4. Result and Discussion

Using method and get the corpus in these two texts. If you want to see all the corpus, you can get it in the references. Based on the analysis results listed in the table, it can be concluded that the linguistic process that is often used in the two texts is a material process. It reaches 175 of material processes , followed by Behaviour process 130, Verbal Process 70, Mental process 55, Relational Process 25 words, Existential Process 16 and Meteorological 16 words. The cause of using material processes in the two texts is the many activities or events that occur with the actors in the two texts.

Types Of Process	Teks 1	Teks 2
Material	120	55
Mental	34	21
Behaviour	88	42
Verbal	21	49
Relational	10	15
Existential	10	6
Meteorological	11	5

More processing materials are used in text one than in text two. "The Selfish Giant" in this text, often uses activities or actions carried out by children and the Giant, such as children coloring on trees, building walls and inviting them to play together. Meanwhile, in "Snow White" this text carries out

many actions that have happened to the actors in the story. Such as cooking food, cleaning the house and the incident where Snow White was taken to the forest.

The second process that is often used in both texts is the mental process. Mental processes are activities that show actions that can be seen by other people and can be measured objectively. In text one it is more dominant to describe the character's reactions in various situations to provide atmosphere than in text two. The third number of processes is verbal processes. Verbal processes are actions related to interactions between characters verbally. In the text 2 there is more dialogue between characters to develop the character traits in the story. whereas in text 1 between characters the focus is more on the activities played out in the story. The fourth process is the mental process, actions related to feelings, thinking and the way the character understands things. This process is used more dominantly in text one because the characters show more feelings and emotional descriptions. Next is the relational process which is more dominantly used in text 2 than text 1. Text two focuses more on describing the relationship between characters and the environment to clarify the conditions of the story. In the text one existential process is used more often because it often mentions the existence of objects or phenomena to build the setting. The last one is the meteorological process which is mentioned more often in text 1 because it shows weather conditions or other natural phenomena to develop the atmosphere of the story. So it can be concluded that both texts use a lot of activities or physical actions which aim to help in creating a plot to deepen the relationships between the characters in the text. In the material process, actors have an important role in developing the storyline. Actors don't always portray characters but can also do other things, such as wind, snow and others. Like there's text on one "What are you doing here?" in the text it is mentioned using "you" as a child and "what is meant is in the garden of the Cornish Ogre.

4.1. The Participant

From the results of the table provided, it can be concluded that the type of participant most often used in the two texts is "Token," with totals as follows: Token (105), Senser (55), Verbiage (66), Existent (47), Range (33), Recipient (38), Actor (29), Sayer (31), Receiver (17), Value (30), Behaver (19), and Phenomenon (12).

Participant	Teks 1	Teks 2
Actor	17	12
Range	17	16
Token	98	7
Value	15	15
Senser	41	14
Phenomenon	8	4
Behaver	14	5
Sayer	15	16
Existent	40	7
Verbiage	40	26
Receiver	11	6
Recipient	37	1

In Text 1, the "Token" appears frequently and is central to the content, reflecting a high degree of descriptive and explanatory language. The text involves numerous definitions and classifications, such as identifying various entities and their characteristics. This usage makes the text informative and structured, as it frequently describes what things are, their properties, and their relationships. Examples include sentences where items or concepts are defined or detailed, creating a clear and educational narrative.

In Text 2, while the "Token" is also used, it is less frequent compared to Text 1. Instead, other participants such as "Range," "Sayer," and "Verbiage" play significant roles. The actions and dialogues carried out by these participants help drive the narrative forward. For instance, dialogues and verbal expressions (Sayer and Verbiage) between characters like Snow White, the evil queen, and the prince help build the storyline and develop the plot.

From the analysis of both texts, it is evident that the use of participants varies significantly. In Text 1, the heavy use of "Token" participants creates a descriptive and informative narrative that focuses on defining and explaining concepts. This approach helps readers understand the material clearly and in detail. In contrast, Text 2 employs a variety of participants to create a dynamic and engaging storyline, where actions and interactions among characters are crucial. This mix helps readers become more involved in the story and actively engage with the characters and their actions.

4.2. The Circumstance

The most dominant circumstances used in both texts are location (57), Manner (41), Cause (31), Angle (20), Accompaniment (17), Duration (16), and Frequency (13).

Circumstance	Teks 1	Teks 2
Frequency	8	5
Duration	8	8
Location	30	27
Cause	12	19
Manner	16	25
Accompaniment	11	6
Angle	14	6

Location circumstance in text one serves to provide readers with a clear picture of the setting of the story. The atmosphere created in the text will give readers a different sensation, about how happy the children are when playing in the park, the tense atmosphere when the giant becomes selfish, and how the giant lives in the story. Provides temporal context and describes the temporal context and characteristics of the characters in the story. Explanation of the motivations behind the characters' actions, especially why the children play in the park. In the text 2, location is used so that the reader understands the movement of the plot that takes the characters from the palace to the forest, then to the hut of the seven dwarves, and finally back to the palace. Bringing readers to follow Snow White's journey which faces various challenges. Location time is used to sequence events and the duration of Snow White's journey. Manner circumstances in text 2 are used more often than in text one. In the text

2 describes how the characters act and shows the qualities possessed by the roles in the story. Like how beautiful Snow White is, the queen's cruelty and so on.

The third frequently used circumstance is cause to provide an explanation or cause of an event that occurred. In the second text it is used more often because it shows more cause and effect of events in the storyline, such as why the evil queen is jealous of Snow White. Angle is a condition that shows the point of view of an event. "The Selfish Giant" often uses changing points of view to show the different feelings each character experiences. compared to "Snow White" which focuses more on one point of view in one story. Accompaniment is a situation that describes with whom or what event occurs. In the text one "Selfish Giant" Giants often do activities together with children. like children playing with giants in the park. Duration is a condition in a story that shows how long the event lasts. Both texts have the same duration to tell readers how long an event lasted. For example After seven years with the Cornish ogre, the Giant returned or all night snow white entire night spend wandering in the forest. Lastly, frequency in the story shows how often an event occurs. Text one "The Selfish Giant" uses frequency more often because there are many recurring events such as changing seasons and children's visits to the park. whereas in text two "Snow White" only focuses on a straight storyline that uses little repetition. The differences that appear in the two texts illustrate the different narrative focus and story style between the two texts. "The Selfish Giant" uses more settings and feelings in the story. Meanwhile, in the story "Snow White" the focus is on the storyline and interactions between characters. It can be concluded that the use of this situation helps develop the narrative and gives the reader more depth or feeling about the storyline being created.

5. Conclusion

Based on the results of the analysis of ideational meaning in two short stories of different genres, "Snow White" and "The Selfish Giant". There are significant differences in meaning in applying linguistic processes between the two texts. The dominant use of material processes in the two texts is 175, while the types of participant tokens that are widely used are 105, and finally the more dominant use of circumstance is location (57). In the story "The Selfish Giant" the use of material processes is greater in the story, because it tells of various actions carried out by the characters, such as a giant playing with children in the park. Meanwhile, the type of participant that is often used is token with the aim of improving character depiction and identifying roles, traits or relationships between characters in the story. Then, the use of circumstance location which is often used in text one makes it easier for readers to describe the atmosphere, place or time in the story. Just like text one, text two of the story "Snow White" also focuses on the use of material processes in developing relationships between characters to create a more interesting storyline. However, the use of participants is different from text one. In this story, the dominant participant used is verbiage because many actions and active interactions between characters often occur to help the plot develop. Circumstance location aims to show a clear background story and provide an overview of Snow White's journey of struggle. The difference between the two texts is the use of various writing styles and narrative approaches from two different centuries. In the 18th century, the story "The Selfish Giant" described more characters and focused on the physical actions that occurred in the story. Meanwhile, in the 19th century the story "Snow White" focused more on interaction and depth between characters.

It can be concluded that this research aims to provide knowledge about how corpus identification can explain differences in language use and narrative structure in classical literary texts. The use of the SFL approach states how language functions in conveying ideational meaning in different contexts. This analysis helps to understand the development of writing styles and language use in literature from various eras.

References

[1]   Gusnawaty Gusnawaty, & Abdul Hakim Yassi, G. Y. (2017). Ideational Meaning of Butonese Folklore: A Systemic . *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 0975-2935.

[2]   Saputra, G. B. (2024, February 1). *Cerita Snow White dalam Bahasa Inggris, Singkat dengan* Terjemahannya. From sonora.id: https://www.sonora.id/read/424007129/cerita-snow-white-dalam-bahasa-inggris-singkat-dengan-terjemahannya

[3]   Wild, O. (2024, May 27). *The Selfish Giant*. From wilde-online.info: https://www.wilde-online.info/the-selfish-giant.html

[4]   Friginal, E. (2018). *Corpus Linguistics for English Teachers: New Tools, Online Resources, and Classroom* . New York: Routledge.

Supplementary File

[1]   Al Qodr, A. (2024, May 31). The Result of Corpus Linguistics in "SNOW WHITE" Short Story. https://docs.google.com/spreadsheets/d/1uGOA91inW6yJSHlUhhsdAQSQGAaahuGU8eQB5w5qgbM/edit?usp=sharing

[2]   Destiani, S. (2024, June 1). The Result of Corpus Linguistics in "THE SELFISH GIANT" Short Story. https://docs.google.com/spreadsheets/d/1e7YU1t8tuJ6vKAIsOOmkacCHZ0PpvanAsgXjtPMd7GI/edit?usp=sharing

Can Loose Part and STEAM Improve Critical Thinking?: A Study Experiment in Early Childhood

Ika Budi Maryatun[1] Martha Christianti[2] Nurcholimah[3] Eka Sapti Cahya Ningrum[4]

[1]Universitas Negeri Yogyakarta, Yogyakarta, Indonesia email: ika_budimaryatun@uny.ac.id
[2]Universitas Negeri Yogyakarta, Yogyakarta, Indonesia email: marthachristianti@uny.ac.id
[3]Universitas Negeri Yogyakarta, Yogyakarta, Indonesia email: nurcholimah@uny.ac.id
[4]Universitas Negeri Yogyakarta, Yogyakarta, Indonesia email: eka_sapticn@uny.ac.id

Abstract. Loose parts are play materials for early childhood that are easy to obtain from the environment, manipulated, moved, changed and controlled according to the child's imagination in the activity. This research aims to find out the influence of loose parts media and STEAM learning on the critical thinking abilities of children aged 5-6 years. So a quantitative approach was used to conduct this research with an ex post facto type . The research population was 205 children spread across nine Kindergartens in the Boyolali area . The sampling technique used the Slovin formula with a precision of 5% and a sample of 137 children was obtained . The sampling technique uses probability sampling, cluster random sampling technique. The data collection technique uses a questionnaire, the results of which are analyzed using one-sample t test analysis. This research shows that learning using loose parts media and STEAM learning is effective on children's critical thinking abilities. With a p-value 0.007 < 0.05.

1. Introduction

Early childhood is a period in the process of rapid development, or often called the golden age. The age range at this time is 0-6 years old. Early childhood is called the golden age, a period that can determine development and growth in the future, because early childhood is the basis for the development of all aspects (Hasiana, 2020) . Basic abilities that develop in early childhood include physical, language, social-emotional, moral-religious arts, and one important aspect, namely cognitive, which will continue in the next phase. Cognitive development is an aspect of thinking ability or intelligence that children can use in remembering, creating creatively, being able to solve problems and interpreting or analyzing a problem.

This is in line with future challenges and the 21st century learning system that learning must be able to develop children's thinking skills (Raja & Katrina, 2023). The skills intended are in accordance with the 4C characteristics (Communication, collaboration, critical thinking and problem solving, creativity and innovation). So, it is important to provide appropriate stimulation in PAUD so that development in early childhood can continue into adulthood (Lailan, 2017). Developing the potential of all aspects of early childhood development can be done by playing (Rahmatia, Pajarianto, Kadir, Ulpi, & Yusuf, 2022).

Instinctively at an early age they will know and discover their experiences through playing, and in their daily lives young children will spend more time playing. The play approach to learning in PAUD can provide learning without coercion, so that children can enjoy fun learning in the process of exploring their potential. This is in accordance with the statement written by (Zuhra, Astawa, Takasun, & Maharani., 2023) about play as a characteristic of early childhood. The play approach to learning can

be supported by the existence of learning media as a means to develop imagination and opportunities for self-exploration in solving problems using critical thinking. One of the learning media with a play model that can be used is loose parts media.

Loose Parts Learning Media
Media is something that is used to stimulate thinking in conveying intended information and can support the learning process so that it can achieve goals (Maghfiroh & Suryana, 2021). Learning media is an intermediary tool used to convey information from informants to recipients of information to stimulate ideas and attract attention so that they can focus on the learning being carried out and learning objectives can be achieved (Syukri, 2021). In several previous definitions, it can be interpreted that learning media is an intermediary tool used to stimulate students' minds to be able to develop, convey ideas, and provide motivation to be able to attract focus during the learning process so that learning objectives can be achieved.

In the 1970s, Simon Nicholas, who was an architect, in his work "The Theory of Loose Parts" introduced the term loose parts for the first time (England, 2019). Loose parts are defined as media in the form of pieces of objects that are freely played with by children and it cannot be predicted that these pieces of objects when combined will become a work of art. Gibson states that loose parts is a learning medium that uses tools and materials that can be moved, combined, separated to be redesigned (Gibson, Cornell, & Gil, 2017). This allows children to be creative without limits in exploring various aspects of problem solving, creativity, concentration, motor skills, science, language development, art, logical thinking, mathematics, engineering, technology or STEAM. In some of these definitions, it can be seen that loose parts are media in the form of pieces that can be disassembled and assembled freely in accordance with the ideas expressed in the media. Thus, with lose parts media which utilizes objects in the surrounding environment, it can be used to play creatively by arranging, removing and reassembling according to creativity and imagination in thinking to explore and solve problems..

Benefits of Loose Parts
*Loose parts as a learning medium have various benefits for young children.*usia dini. The use of loose parts media in early childhood when used for playing while learning can have several positive impacts, including being able to foster a sense of enjoyment when learning, being able to hone children's creativity, and being able to hone high-level thinking skills in children (England, 2019). Loose parts can be useful for raising children's enthusiasm for learning through playing, so that they can provide new energy for learning. Learning using loose parts can create a learning environment that can foster children's creativity to innovate using tools from the surrounding environment that are easy to modify (Rohmatun, et al., 2021). This is in accordance with the theory of The Reggio-Emilia Aprpoach learning method that learning activities by exploring, children can increase knowledge by discovering it themselves (Prameswari & Lestariningrum, 2020).

The advantages of loose parts media (Daly & Beloglovsky, 2015) are: (1) Economical, where the objects obtained are nearby objects that can be obtained at low prices and some are even free. (2) can be used repeatedly by children. (3) can be used in all kinds of games. (4) reflect various ideas in real things that can be changed, removed and reassembled. (5) provides an attraction to develop children's skills. (6) supports children to be able to play with peers and social.

STEAM-based learning using loose parts media can provide several benefits, including increasing children's motivation to learn by using objects in the surrounding environment, to be shaped, removed and reassembled according to the child's imagination. This allows children to develop creativity and imagination when expressing ideas in loose parts media. When assembling and disassembling, children's physical-motor abilities can increase because they will be more actively stimulated. Having direct learning experiences using loose parts media can improve children's thinking abilities, namely in

generating innovation to be able to create a form according to imagination. So in this case, children's high order thinking skills are better trained by solving problems and thinking critically to achieve goalsThis thinking ability is stimulated when children explore using loose parts media. The learning process using loose parts media provides the concept of exploratory play, namely by giving children the opportunity to explore, so that it can be useful for optimizing all their senses.

Characteristics of Loose Parts Learning Media
The learning media used to mediate the delivery of information in learning requires characteristics that are appropriate to the learning targets, so that learning can be right on target, effective and create meaningful learning. The characteristics of learning media used for early childhood include (Zaman & Eliyawati, 2010): (1) Learning media for early childhood is adapted to children's needs so that they can achieve learning goals. (2) Learning media must provide benefits or be meaningful for young children (educational). (3) Learning media must be appropriate to the child's world, that is, it can provide an attraction for using it, for example, it is colorful, simple, and can support play activities. (4) Learning media of good quality and appropriate to the child's development phase, so it is safe to use for early childhood and can support the achievement of the range of aspects that will be developed. (5) Media selection considers the balance of the collection (well rounded collection) to suit the curriculum. (6) When procuring media, it is necessary to strengthen study sources, so that they can add information related to improving the learning process.

The characteristics of loose parts that can be used as learning media for early childhood are (Sabrina, 2021): (1) It is interesting for children, so it can encourage children to want to know and explore it; (2) Media has an open nature, so there are no restrictions or fixed rules when children use media; (3) It is flexible, that is, it can be moved and changed according to the child's creative ideas. . Loose parts media can have characteristics that can include natural objects around them (Daly & Beloglovsky, 2015).

Furthermore, it can be said that the characteristics of loose parts for early childhood need to be adapted to the developmental phase and be interesting, flexible, that is, easy to modify according to the child's imagination and flexible to move, easy to reach, in the form of objects in the surrounding environment that are small or large. Loose parts media obtained from the surrounding environment are in the category of natural objects (such as grains, twigs or sticks, stones, water, leaves and sand) or recycled materials (such as cardboard boxes, ropes, cloth, long pipes, hoses or straws). The various characteristics of loose parts media can support all aspects of development optimally, various types of objects are flexible and attractive to children so that when children use this media they can hone their thinking skills to be able to combine various kinds of objects to make things come true from their imagination with critical thinking.

Media Loose Parts in STEAM Expansion
STEAM is learning that includes several fields of knowledge, namely science, technology, engineering, arts and mathematics. STEAM is defined as a learning method that contains things that are close and often encountered in children's daily lives. (Hakim & Nirwana, 2021). The concept of learning using the STEAM method is learning that is carried out by exploring and experimenting with the surrounding environment, so that it is in accordance with the characteristics of early childhood. Applying STEAM learning by carrying out these activities can develop all aspects of children, namely in terms of problem-solving skills, creativity, critical thinking, independent thinking, digital literacy, communication, initiative and group activities (Rawanti, Utoyo, & Ardini, 2023). To implement STEAM learning in early childhood it is necessary to pay attention to several aspects including:: (1) questioning; (2) explore and observe; (3) cultivate and develop skills and processes; (4) communicate; and (5) play.

The explanation of the STEAM learning concept can be seen that the aspects of STEAM learning for early childhood are in accordance with the characteristics of early childhood. Furthermore, in its application it can develop several skills, and can encourage children to learn various fields of science. The application of STEAM learning provides opportunities for children to explore and experiment with the surrounding environment. This learning is learning that can use loose parts media which uses objects in the surrounding environment as teaching materials and educational play tools. The STEAM learning concept which gives children the opportunity to explore and experiment using loose parts media can stimulate children to develop their intelligence potential. The potential in question is primarily the ability to think critically, collaborate, communicate, innovate. This learning is also to improve various kinds of skills that children have, such as creativity, concentration, hand coordination, fine motor development, gross motor development, language and vocabulary mastery, mathematical thinking, scientific thinking, emotional and social development of children (Muryaningsih, 2021)

Early Childhood Critical Thinking Abilities
Critical thinking is the ability to think in making decisions maturely and carefully by considering various points of view (Trinanda & Yaswinda, 2022). Ennis (1996) states that there are 5 activities that demonstrate critical thinking skills, namely someone who can think critically, namely: (1) able to formulate the main problems; (2) can show facts used in solving problems; (3) Able to make critical, relevant and accurate argument choices; (4) able to provide the right ideas or solutions from various different points of view; (5) and finally, someone who is able to think critically can determine the consequences of a statement taken as a decision (Mulyani, 2022). From the definition of critical thinking, it can be concluded that critical thinking is the ability to think to be able to analyze, recognize, combine, in solving a problem to be able to conclude and evaluate related problems critically.

Critical thinking for early childhood based on the understanding above can enable children to have many creative and innovative ideas in solving problems reflexively. This happens because children are able to solve problems by thinking critically. Children can have the ability to think critically in facing global developments and the 21st century learning system. Learning must be able to develop children's thinking skills. Activities that can improve critical thinking skills that can be carried out are the scaffolding method, teaching methods that focus on creative problem solving learning, and problem based learning methods (Mulyani, 2022). Efforts to improve critical thinking with this method are contained in STEAM-based learning which uses loose parts media in the learning process. In STEAM-based learning, namely analyzing, recognizing, combining, solving problems creatively and innovatively using loose parts as media that can be combined and removed to be put back together. Thus, the aim of this research is to see the impact of using loose parts and STEAM in learning on the critical thinking abilities of children aged 5-6 years.

2. Method

Research Desain
In this research, the approach used is a quantitative approach with the type of research, namely the ex post facto research method. Research with a quantitative approach is defined as empirical research in which the data is in the form of numbers. To obtain the results of this research, an ex post facto research method was used, namely research carried out by studying events that have occurred and then by analyzing events that have passed, it is used to determine the factors that caused the existence of a case (Syahrizal & Jailani, 2023).

Data is presented in the form of reports about what happened to be able to find out the cause of a case, namely changes in behavior and assessing the relationship between variables. Based on the aim of this research, to determine the influence of loose parts media on STEAM-based learning on critical

thinking in early childhood aged 5-6 years. The variables in this research are X1 is loose parts media, X2 is the STEAM approach and Y is critical thinking. Media loose parts as X1 is an intermediary tool used to help convey messages from teachers to students, these tools include objects that can be assembled, separated, easily carried, or have flexible properties to be assembled, changed and carried or moved. The STEAM approach as X2 is a STEAM-based learning approach with reference to the field of science to be able to improve all aspects of child development, especially in children's critical thinking skills. Critical thinking as Y which is the ability of children to think to analyze a problem and look for various creative ideas that can be a solution to the problem.

Partisipan

The data subjects of this study were kindergartens in Boyolali. There are 3 sub-districts and 6 villages in the sub-district with 53 kindergartens that are private. Population as a generalization area chosen by the researcher has the same qualities and characteristics in accordance with the conditions set by the researcher. The data subjects in this study are early childhood aged 5-6 years who are in schools that apply loose parts media with STEAM-based learning systems. The total number of children with these criteria is 205 children. The sample was determined using the Solvin formula and obtained a sample of 136 children from the population. The results of determining the sample size are then randomly selected.

No	Name of School	Number of Children	Sample Calculation	Number of Samples
1	TK Bima Putra I	19	(19/205) x 136	13
2	TKIT Nurul Jannah	19	(19/205) x 136	13
3	TK Pertiwi I Kiringan	36	(36/205) x 136	25
4	TK Pertiwi I Penggung	30	(30/205) x 136	20
5	TKIU Al Khoir	23	(23/205) x 136	15
6	TK Darrur Muhajirin	35	(35/205) x 136	23
7	TKN Pembina	17	(17/205) x 136	11
8	TK Permatasari Kids	21	(21/205) x 136	14
9	TK Pertiwi IV	5	(5/205) x 136	3
	Total	205	Total	137

Data Collection

The data collection techniques used in this study to obtain the data needed for research are questionnaires and documentation. Data collection techniques by filling out questionnaires by respondents. The questionnaire is filled in the form of questions related to the research variable, namely measuring the ability of critical thinking in children aged 5-6 years. In this study, in filling out the questionnaire, a Likert scale was used with four answer options consisting of: a) very suitable, b) suitable, c) less suitable, and d) not suitable. The measuring scale used for scoring uses a Likert scale, so that the answer score is a = 4, b = 3, c = 2, and d = 1, if the item is favorable while for unfavorable items given a score of a = 1, b = 2, c = 3, and d = 4. This measurement activity is carried out after children play using loose parts in STEAM learning for one semester.   The data collection technique with documentation is carried out in the form of collecting information in the form of child data, school data, and photographs related to the research directly, namely school facilities to loose parts media.

The data collection tool used to test the hypothesis in this study used to collect data while in the field is a research instrument. The research instruments used were prepared by loading variables about loose parts media, STEAM approach, and critical thinking skills. The research instrument was developed referring to the indicators: (1) speed in completing calculations, (2) curiosity and frequent questions, (3) love constructive and pattern games, (4) categorization or classification, (5) enjoy doing experiments, (6) critical thinking, and (7) conceptual thinking.

The maximum score for critical thinking skills in children is 32. The target for critical thinking skills in this study is a minimum score of 26, which is 80 percent. The validity of this instrument is content validity which is adjusted to the characteristics of the variables, with the following stages: (1) the research instrument is adjusted to the aspects and characteristics of the variables and accompanied by consultation by the supervisor; (2) conduct validity testing by expert judgment with a validation value for each item 1 to 8 averaging 0.7 which means valid with the description of item 1 (0. 791), item 2 (0.804), item 3 (0.738), item 4 (0.798), item 5 (0.778), item 6 (0.751), item 7 (0.781), item 8 (0.782) (3) instrument reliability test, namely the Alpha Cronbach reliability coefficient with the help of SPSS 22 software with a reliability result of 0.8 (reliable).

Data Analysis
The determination of the value category on each variable is as follows:

The formula	Category
X>M+1,5 SD	Very high
M+0,5 SD < X ≤ M + 1,5 SD	High
M – 0,5 SD < X ≤ M – 0,5 SD	Simply
M- 1,5 SD < X ≤ M – 0,5 SD	Low
X ≤ M – 1,5 SD	Vey low

In this study, the data analysis technique used was hypothesis testing with t-test. The hypothesis in this study is that the use of loose part media and STEAM learning is effective in terms of critical thinking skills in early childhood. The hypothesis $H0 : \mu = 26$, and $H1 : \mu \neq 26$. At the significance level 95% or $\alpha = 5\% = 0,05$, shows that H0 accepted or not. Acceptance criteria H0 when p-value > α, rejected H0 when p-value < α.

3. Results and Discussion

Result
Learning using loose parts in STEAM learning has a significant effect on children's critical thinking skills. P-value = 0.007 the criteria used $\alpha = 0.05$. Thus the p-value <0.05 so that H0 is rejected. This means that the use of loose parts and STEAM learning is effective in terms of early childhood critical thinking skills.

One-Sample Test

	Test Value = 26					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Berpikir Kritis	2.724	136	.007	.73723	.2021	1.2724

Descriptively, children's critical thinking ability shows that children's ability to think critically is high in accordance with the target of 80 percent of 26 scores.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Berpikir Kritis	137	26.7372	3.16755	.27062

The results of this study show that children who use loose parts and learn with STEAM learning forms have an effect on their critical thinking skills.

Discussion

The Effect of Learning Using Loose Parts Media on Critical Thinking Ability
The regression coefficient of learning using loose parts media (X1) results in a number of 0.081 which is a positive number. This shows that the learning variable using loose parts media (X1) on critical thinking ability (Y) has a positive effect. So in this case, if the learning score using loose parts media is high, the critical thinking ability will also increase. On the effect of learning using loose parts media on children's critical thinking skills with the t test results obtained that the calculated t value is 2.219 with a significance value of 0.028 <0.05. In this calculation, it can be seen that learning using loose parts media has a positive and significant effect on children's critical thinking skills.

These results show the important role of learning media in the learning process. The learning media can be used as an intermediary to deliver learning materials in achieving learning objectives by teachers to students. The implementation of learning using learning media with loose parts can help children develop critical thinking skills. This is shown when children can provide a variety of ideas when doing activities, children can recognize the concept of many and few, children can provide reasons for the classification of objects, and can provide an explanation of the ideas expressed in the work presented with loose parts media.

Loose parts media can be used by teachers to plan learning activities that are carried out by playing, namely exploring to find answers to their curiosity by building, analyzing, evaluating, providing various ideas to modify the construction. Learning with loose parts media can provide opportunities for children to play by combining, moving, separating, and redesigning with the media, because the nature of loose parts media is flexible. So that loose parts media can improve children's cognitive abilities, namely for skills to think critically.

The Effect of STEAM-Based Learning on Children's Critical Thinking Ability
The STEAM-based learning regression coefficient (X2) shows a positive number, which is 0.265. This means that STEAM-based learning as variable X2 on children's critical thinking ability (Y) shows a positive influence. So in this case, if the STEAM-based learning score is high, the critical thinking ability will also increase. The calculation with the t-count result is 13.712 with a significance value of 0.000 <0.05. In this calculation, it is known that this value shows the effect of STEAM-based learning that affects critical thinking skills, which has a positive and significant effect on critical thinking skills.

Learning activities that are applied with STEAM-based, namely using loose part media, can provide opportunities for children to create works by playing. So that in these activities children feel free to play, can solve problems, can build curiosity, and can bring up various ideas as a solution to problem solving. STEAM-based learning can stimulate children's critical thinking skills from an early age which are expected as the next generation who can become people who have the ability to create innovations in various problems, namely being able to be more productive in innovating, being a pioneer in activities to improve the economy, science and technological development. Other learning skills that can be possessed are creative, flexible in communication skills, collaboration, initiative, and have leadership skills and responsibility. So that in this case with STEAM-based learning can encourage children to have 21st century abilities.

The Effect of STEAM-Based Learning Using Looseparts Media on Critical Thinking Ability
The sum of the F value = 202.471 with a significance of 0.000 <0.05. This simultaneously shows that learning variables using loose parts media, as well as STEAM-based learning can have a significant influence on children's critical thinking skills. The coefficient R2 (Adjusted R square) obtained results

of 0.749 or 74.9%. So with this, the magnitude of the effect of learning using loose parts media and STEAM-based is 74.9% which affects the variable. The remaining results, which are influenced by other variables and are not internalized in the regression model, are 25.1%.

Aspects of children's cognitive development in terms of critical thinking skills can be stimulated through learning approaches and media that are presented. STEAM learning using loose parts media can be used as a way to stimulate children's development. Through learning with the STEAM approach, it can provide opportunities for children to gain various fields of knowledge by exploring with loose parts media, so that it can stimulate children's minds and attention to be able to focus on learning and the ideas they develop in solving problems. In learning implemented with the STEAM approach using loose parts media can familiarize children to be able to think critically and be responsive to the problems faced. Children can find various ideas in trying to solve problems from the answers to the questions that are in their minds. The ability to think critically can be obtained and improved in the STEAM learning culture that uses loose parts media, namely when learning children are active to find out by asking questions, looking for cause and effect, finding various assumptions from the results of socializing with others, finding various ideas from various points of view and perspectives of others after interacting with others and with various loose parts media available.

4. Conclusion

The results of the research and discussion discussed earlier can be concluded that learning loose parts can influence and significantly affect children's critical thinking skills positively. Children's critical thinking ability will increase if the learning score with loose parts media increases. This can be seen from the t test which shows the effect between learning using loose parts media and children's critical thinking ability, namely the t value of 2.219 with a significance value of 0.028 <0.05.

Learning with the STEAM approach has a positive and significant impact on children's critical thinking skills (Y). If the STEAM-based learning score is high, the critical thinking ability will also increase. The calculation with the t-count result is 13.712 with a significance value of 0.000 <0.05.

Learning with the STEAM approach (X2) and using loose parts media (X1) together as learning variables can significantly affect children's critical thinking skills (Y). This is shown in the total value of F = 202.471 with a significance of 0.000 <0.05. So with this, the magnitude of the effect of learning using loose parts and STEAM-based media is 74.9% which affects the variable. The remaining results, which are influenced by other variables and are not internalized in the regression model, are 25.1%.

References

[1] Daly, L., & Beloglovsky, M. (2016). *Loose Parts 2: Inspiring Play With Infants and Toodlers*. Redelaf Press.

[2] England, L. (2019). *Looking for Learning: Loose Parts*. Bloomsbury Publishing.

[3] Fransiska, Y., & Yenita, R. (2021). Penggunaan Media Looseparts dalam Pembelajaran di Masa Pandemi. *Jurnal Pendidikan Tambusai*, *5*(1), 5454–5462.

[4] Gibson, E. L., & Cooke, L. 2017. Understanding Food Fussiness and Its Implications for Food Choice, Health, Weight and Interventions in Young Children: The Impact of Professor Jane Wardle. Current Obesity Reports, 6(1), 46–56. https://doi.org/10.1007/s13679-017-0248-9

[5] Hakim Naba, A., & Nirwana. (2021). Implementasi Metode STEAM Berbasis Media Audio Visual dalam Meningkatkan Aspek Kognitif pada Pendidikan Anak Usia Dini Abstark. Implementation of Audio Visual Media-Based STEAM Method in Improving Cognitive. *Algazali International Journal Of Educational Research*, *4*(1), 78–90.

[6] Hasiana, I. (2020). Peran Orangtua Dalam Pendidikan Seksual Anak Usia Dini. *Wahana*, *72*(2), 118–125. https://doi.org/10.36456/wahana.v72i2.2725

[7] Hayati, S. N., & Putro, K. Z. (2021). Bermain dan permainan anak usia dini. *Generasi emas : Jurnal Pendidikan Islam Anak Usia Dini*, *4*(1), 52.

[8] Lailan, A. (2017). Model Pembelajaran Sentra Pendidikan Anak Usia Dini. *An- Nahdhah*, *10*(20), 191–202. https://www.jurnal.staidarululumkandangan.ac.id/index.php/annahdhah/article/do wnload/52/32/

[9]   Lailan, A. (2017). Model Pembelajaran Sentra Pendidikan Anak Usia Dini. *An- Nahdhah*, *10*(20), 191–202. https://www.jurnal.staidarululumkandangan.ac.id/index.php/annahdhah/article/do wnload/52/32/

[10] Maghfiroh, S., & Suryana, D. (2021). Media Pembelajaran untuk Anak Usia Dini di Pendidikan Anak Usia Dini. *Jurnal Pendidikan Tambusai*, *5*(1), 1560–1566.

[11] Maghfiroh, S., & Suryana, D. (2021). Media Pembelajaran untuk Anak Usia Dini di Pendidikan Anak Usia Dini. *Jurnal Pendidikan Tambusai*, *5*(1), 1560–1566.

[12] Muryaningsih, S. (2021). Media Pembelajaran Berbahan Loosepart dalam Pembelajaran Eksak di MI Kedungwuluh Lor. *Khazanah Pendidikan: Jurnal Ilmiah Kependidikan*, *15*(1), 84–91

[13] Muryaningsih, S. (2021). Media Pembelajaran Berbahan Loosepart dalam Pembelajaran Eksak di MI Kedungwuluh Lor. *Khazanah Pendidikan: Jurnal Ilmiah Kependidikan*, *15*(1), 84–91

[14] Prameswari, T., & Anik Lestariningrum. (2020). Steam Based Learning Strategies By Playing Loose Parts For The Achievement Of 4c Skills In Children 4-5 Years. Efektor, 7(1), 24–34. Https://Doi.Org/10.29407/E.V7i2.14387

[15] Rahmatia, r., pajarianto, h., kadir, a., ulpi, w., & yusuf, m. (2021). Pengembangan model bermain konstruktif dengan media balok untuk meningkatkan visualspasial anak. Jurnal obsesi : jurnal pendidikan anak usia dini, 6(1), 47–57. Https://doi.org/10.31004/obsesi.v6i1.1185

[16] Rawanti, S., Utoyo, S., & Ardini, P. P. (2023). Steam Learning Training Through Loose Part Media in The Coastal Area. *Pedagogika*, *14*(Nomor 01), 112–129. https://doi.org/10.37411/pedagogika.v14i1.2194

[17] Sabrina, M. (2021). Pengaruh Media Loose Parts terhadap Pengembangan Kreativitas Anak di Kelompok B2 TK Bina Anak Bangsa Palu. Universitas Tadulako.

[18] Syukri. (2021). Peran Media Pembelajaran untuk Anak Usia Dini. *Jurnal Al Abyadh*, *4*(1), 16–23.

[19] Syahrizal, H., & Jailani, M. S. (2023). Jenis-Jenis Penelitian Dalam Penelitian Kuantitatif dan Kualitatif. *Jurnal QOSIM : Jurnal Pendidikan, Sosial & Humaniora*, *1*(1), 13–23. https://doi.org/10.61104/jq.v1i1.49

[20] Trinanda, M. A., & Yaswinda, Y. (2022). The Effect of Using Loose Parts Media on Critical Thinking Ability in Children Aged 5-6 Years in Learning in Kindergarten. *Proceedings of the 6th International Conference of Early Childhood Education (ICECE-6 2021)*, *668*, 46–49. https://doi.org/10.2991/assehr.k.220602.010

   a.   Mulyani, 2022

[21] Zaman, B., & Eliyawati, C. (2010). *Media Pembelajaran Anak Usia Dini*. PG-PAUD Universitas Pendidikan Indoesia.

[22] Zuhra, H., Astawa, I. Ma. S., Takasun, & Maharani. (2023). Pembelajaran Indonesia Jurnal Literasi dan Pembelajaran Indonesia. *Jurnal Literasi Dan Pembelajaran Indonesia*, *3*(2), 161–168. https://jurnalfkip.samawa-university.ac.id/JLPI/article/view/1/43

Teachers' Perceptions in the Use of Technology in ELT and Learning

Mokhamad Faris[1*], Author Name[2] and Author Name[1,2]

[1] Faculty of Language, Arts and Culture , Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[2] Department, Institution, City, Country

[*]E-mail: mokhamadfaris1@gmail.com

Abstract. The integration of Information and Communication Technology (ICT) in English Language Teaching (ELT) has become increasingly important in modern education. This study explores the dynamics influencing vocational high school teachers' perceptions and use of technology in ELT, aiming to examine these perceptions, understand their impact on ICT implementation, and identify the primary challenges faced by teachers. Data collected through observations and interviews reveal that while many teachers recognize the benefits of ICT for enhancing student engagement and learning outcomes, several barriers hinder its effective use. Key challenges include limited access to resources, inadequate training, insufficient institutional support, resistance to change, and time constraints. The findings underline the necessity for extensive training programs, robust support systems, and improved technological infrastructure to facilitate ICT integration. By responding to these challenges, policymakers and educators can enhance the efficacy of technology-enhanced ELT, leading to improved educational outcomes. This study contributes to the ongoing discourse on ICT in education, offering actionable insights for fostering a more effective and engaging language learning environment.

Keywords:
ICT integration; English Language Teaching; vocational high school; teacher perceptions; educational technology.

1. Background

Learning is a process of getting knowledge. It needs effort and takes the learner frustrated, get bored and lose their attention to a lesson (Nkengbeza et al., 2022). Thus, the teacher uses some methodologies and strategies in the teaching and learning processes. They might help the teacher to make the students' consciousness/concentration still in touch with the lesson.

Technology is an extensive factor influencing education today. Schools are expected to use technology to boost the education of the students' achievement, yet challenges have been identified to it. There are many factors externally to teachers such as availability of equipment, access to resources, training, and support (Winter et al., 2021). It takes the importance role in English Language Learning at school since Indonesia is an archipelago. Those factors cannot be neglected. Based on (Citrohn & Svensson, 2022) Technology education today builds on both practical and theoretical knowledge. In many countries the subject of technology has emerged from being a craft-oriented subject towards

becoming a more concept-based subject. Both can be used side by side to complete the missing link of the English Language Teaching.

It is suggested by (Rahmati et al., 2021) the application of educational technology in English language teaching includes any possible means and information that can be used in English Language Teaching. Put contrary, the use of educational technology in language instruction follows the same general concept as the usage of computer keyboards, monitors, and audiovisual equipment. The hardware and the software make up the two separate components of its audiovisual equipment that are in the public domain. Projectors, sound recorders, TV sets, and other visible devices are covered in the hardware section, whereas the software section covers a wide range of products used in combination with these devices and equipment, such as slides, computer program audio and videotapes, written languages, and more.

It is said by (Ifinedo & Kankaanranta, 2021) the understanding of this knowledge and how teachers construct it will be beneficial for designing suitable pedagogical practices that leverage on Information Communication Technology (ICT) usage. It might be the best way to conduct the practice in the classroom. In technology, modeling is related to problem-solving and employs models as a language to express design concepts and recommendations for solutions. It draws on theoretical and practical knowledge.

Teachers' perceptions of technology, media and information spread in Indonesia fast. It can be vice versa by teachers' perception in facing it. This paper shows the widespread recognition of the significance of digital, media, and information in English Language Teaching. They are firmly established and still expanding. The effort made by instructors to use technology in ELT is conceptualized in this study. It focuses on understanding how teachers' views, beliefs, and practices are influenced by the causes of the digital transition. Although we relate this to a vocational school in the setting of this conceptual study, we argue that it may be conceptually applied to any type of educational environment. Our investigation of the phenomena has led us to the conclusion that instructors' related behavior and practices occur along a continuum and are impacted by both human and technology elements. Perception and attitudes are also dynamic and flexible, developing cyclically.

The primary obstacles identified stem from insufficient ICT resources in schools and a lack of adequate skills and training in technological applications. It is imperative for policymakers to prioritize the enhancement of educational standards and implement comprehensive training programs. These initiatives are essential to equip teachers with the necessary knowledge and expertise, ensuring they fully understand their roles and responsibilities in the integration of technology into the classroom.

This article addresses the significance of cultivating digital, media, and information literacies among young individuals. It draws upon existing literature that underscores the importance of these literacies in contemporary society. The study's outcomes contribute to bridging the knowledge gap and provide valuable insights into perception differences and the disparities between perceptions and abilities. These insights can inform policymakers, educators, and researchers in formulating effective strategies.

2. Introduction

Enhancing language learning experiences need potential integration of Information and Communication Technology (ICT) in English Language Teaching (ELT) has become essential in modern education. It is in line with (Vereijken et al., 2018) research indicates that teachers' focus on explaining current disciplinary research in class can foster student motivation for research which stimulates student learning. It is supported by Positive student behaviour, encompassing cognitive engagement, plays a pivotal role in student engagement, and the use of varied learning techniques can stimulate different types of thought processes (Kaed et al., 2023).

Moreover, educational technology, as an adaptive methodology, supports diversity in education and fosters the development of students through increased use of related technologies (Rodríguez-Cano et al., 2022). Interactive technologies such as computers, mobile phones, and tablets hold importance for digitalizing work and education, fostering creativity and immersion (Atanasova, 2024). Like (Kado & Dem, 2020) statement that integration of educational technology has been found to create a conceptually rich learning environment, enhancing students' understanding of complex subjects like definite integrals. This context underscores the importance of examining the dynamics influencing teachers' perceptions and technology usage in ELT.

Despite the recognized benefits of in educational technology, teachers often face significant challenges in their teaching practices about integrating ICT. The primary hypothesis guiding this study concludes that teachers have difficulty using technology effectively. Data collected from both observations and interviews reveal that while positive perceptions of technology facilitate effective integration, several barriers hinder its adoption.

Key challenges identified include limited access to resources, inadequate training, insufficient institutional support, resistance to change, and time constraints. The challenge supported by (Shrestha, 2011) teacher education institutions have faced numerous new problems, challenges, and uncertainties. In developing countries, ICTs are often seen as empowering tools that provide people with access to opportunities and choices that were not available. However, (Dwiono et al., 2018) in his research stated that the practical application of ICT integration in classroom teaching processes presents significant obstacles.

Some studies about classroom settings have explored the difficulties or obstacles faced by teachers while integrating ICT tools. These studies have investigated problems faced by teachers in English language teaching while integrating ICT, both in Indonesia (Aminullah et al., 2019). Addressing these issues requires a multifaceted approach. This includes enhancing access to technological resources, providing comprehensive training programs for teachers, and developing robust institutional support systems. By addressing these barriers, educators can better leverage technology to improve the quality and engagement of language instruction.

The specific needs of teachers the challenges of ICT integration in ELT, research highlights the necessity of comprehensive training programs tailored to (Griffin & Howard, 2017) emphasize that training should encompass not only the technical aspects of using educational technology but also pedagogical strategies for effective implementation. Furthermore, maintaining an informal context and promptly responding to student preferences can enrich the understanding of students' experiences and boost engagement (Samir et al., 2021).

The development of robust support systems within educational institutions is also crucial. (Amerstorfer & Freiin von Münster-Kistner, 2021) suggest that engaging teaching methodologies, authentic tasks, and a motivating learning atmosphere can enhance academic engagement. Additionally, monitoring student engagement through methods like facial expression recognition and utilizing computer vision for behaviour, emotion, and cognition detection can offer insights into student engagement levels, thereby informing and improving teaching practices (Vanneste et al., 2021).

Finally, increased funding to improve technological infrastructure in schools is essential. The work of (Tacoma et al., 2021) demonstrates that interactive technologies can significantly enhance learning outcomes, particularly through the provision of immediate feedback. This immediate feedback allows learners and teachers to adjust the learning process effectively, thus enhancing overall educational outcomes. This highlights the need for policymakers and educators to prioritize investments in technology education to provide that all students have access to the benefits of an enhanced technology

learning environment. By doing so, we can create a more adaptive and responsive educational system that supports both between teaching and learning in meaningful ways.

Despite the extensive research on the benefits of technological education, there is a gap in understanding how teachers' perceptions of technology affect their implementation of ICT in ELT. Previous studies have predominantly focused on aspects the technical and logistical of ICT integration, with less emphasis on the subjective experiences and attitudes of teachers (Boateng et al., 2019).

Moreover, while studies have explored various strategies to improve students' engagement and learning outcomes, there is limited research on teaching practices with the specific challenges vocational high school teachers face in integrating technology. This gap is significant because vocational education often requires specialized approaches to technology integration, given its unique focus on practical and skill-based learning.

This study aims to explore the dynamics influencing vocational high school teachers' perceptions and the use of technology in English Language Teaching (ELT). The objectives are threefold: to examine teachers' perceptions of technology, to understand how these perceptions affect their implementation of ICT in ELT, and to identify the primary challenges faced by teachers in integrating technology.

The novelty of this research focus on in its vocational high school teachers, a group that has been underrepresented in the literature on educational technology. It provides valuable insights By addressing this gap into the specific needs and challenges of these educators, thereby contributing to the broader discourse on ICT in education. The findings are expected to inform policy and practice, offering actionable recommendations for enhancing the effectiveness of technology-enhanced ELT.

3. Literature Review

The Information and Communication Technology (ICT) integration in English Language Teaching (ELT) has been widely researched, reflecting its significance in modern educational practices. Teachers' perceptions of technology play a crucial role in its implementation, influencing not only the extent of its use but also the integration of teaching and learning processes effectiveness.

Studies have shown that teachers' attitudes and beliefs about ICT are pivotal in determining how technology is incorporated into the classroom. According to (Mahdum et al., 2019), teachers with positive perceptions and high motivation towards ICT are more likely to implement it effectively in their teaching practices. These perceptions are often shaped by their previous experiences with technology, their confidence in using it, and their understanding of its potential benefits for student engagement and learning outcomes (Aivazidi & Michalakelis, 2023).

Research has also highlighted the importance in shaping these perceptions of teacher training. (Kusuma, 2021) found that training programs focusing on Technological Pedagogical Content Knowledge (TPACK) significantly enhance teachers' ability to integrate ICT into ELT. Such training helps teachers develop a comprehensive understanding of how to use technology not just as a teaching tool, but as a means to facilitate deeper learning and engagement among students.

However, despite the positive perceptions, several challenges hinder the effective implementation of ICT in ELT. Limited access to resources is a primary barrier, as highlighted by (Hafifah & Sulistyo). Schools often lack the necessary technological infrastructure, which restricts teachers' ability to use ICT tools effectively. Inadequate training and support further exacerbate this issue, leaving teachers underprepared and hesitant to adopt new technologies (Bhandari, 2020).

Institutional support is another critical factor influencing ICT teachers' perceptions and usage. (Nogaibayeva, 2023) emphasized the need for strong institutional policies that promote and support technology integration in education. Without sufficient support, teachers may feel isolated and overwhelmed, leading to resistance and using ICT of a lack of confidence.

Moreover, teachers' perceptions of ICT are influenced by the perceived ease of use and usefulness of the technology. As noted by (Singh Saud, 2023), if teachers find technology cumbersome or irrelevant to their teaching needs, they are less likely to integrate it into their practices. This underscores the importance of designing user-friendly and pedagogically sound technological tools that align with teachers' instructional goals. Resistance to change is a significant barrier, often rooted in a lack of familiarity and confidence with new technologies. This resistance can be mitigated through continuous professional development and a supportive learning community that encourages experimentation and sharing of best practices (Achamrah, 2022).

In understanding these dynamics, it is essential to consider the broader educational context. (Dewi et al., 2024) stressed the importance of teachers' and students' perceptions understanding of ICT integration. This dual perspective can provide a more comprehensive understanding of the challenges and opportunities in integrating technology into ELT, particularly in vocational high schools where practical skills are paramount.

The literature suggests that while teachers' perceptions of ICT are generally positive, several barriers impede its effective implementation. Addressing these challenges requires a multifaceted approach, including comprehensive training, robust institutional support, and the development of user-friendly technologies. By understanding and addressing the factors that influence of ICT teachers' perceptions and usage, educational stakeholders can enhance the integration of technology in ELT, leading to improved educational outcomes.

4. Method

4.1. Research Design

This study employs micro-ethnographic research to explore vocational high school teachers' perceptions and of technology usage in English Language Teaching (ELT). Micro-ethnography, with its focus on in-depth, context-specific investigation, is well-suited for examining the nuanced dynamics within a particular educational setting. This approach allows for a detailed understanding of teachers' experiences, attitudes, and practices related to ICT integration.

The materials used in this study include interview guides, observation checklists, audio recording devices, and data analysis software. The interview guides and observation checklists were meticulously designed to gather comprehensive data on teachers' perceptions, the implementation of ICT, and the challenges they face. Audio recording devices were used to ensure accurate capture of interview and observational data, which were later transcribed for analysis. Data analysis software facilitated the systematic coding and analysis of qualitative data.

4.2. Participants

The study was conducted at SMK Walisongo Pecangaan, a vocational high school. Participants were purposively sampled to include English teachers with varying levels of experience and familiarity with ICT. Thera are 3 teachers participated in the study, providing a diverse range of insights into the use of technology in ELT. Participants were informed about the objectives of study and procedures, and informed consent was obtained prior to data collection.

4.3. Procedures

Data collection spanned from the end of March to the end of May. The procedures involved the combination of in-depth interviews, classroom observations, and document analysis:

    a. **Interviews**: conducted by Semi-structured interviews with each teacher. These interviews covered for flexibility in exploring specific issues while ensuring that key topics. Questions focused on teachers' perceptions of ICT, their experiences with technology integration, and the challenges they encountered.

    b. **Observations**: Classroom observations were carried out to get contextual data on the actual ICT usage in teaching practices. Observations focused on how technology was integrated into lessons, teacher-student interactions, and any challenges encountered during the process.

    c. **Analysis of Document**: Relevant documents, such as lesson plans and institutional policies on ICT, were analysed to provide additional context and support the findings from interviews and observations.

4.4. Data Analysis

Analysing data using thematic analysis, a method suitable for identifying, analysing, and reporting patterns (themes) within qualitative data. The steps as follows:

    a. **Transcription**: interviews Audio recordings and observations were transcribed verbatim.

    b. **Coding**: Transcripts were systematically coded using data analysis software. Codes were assigned to significant statements and observations, capturing key themes related to teachers' perceptions, ICT implementation, and challenges.

    c. **Theme Identification**: Codes were grouped into broader themes that represented recurring patterns across the data.

    d. **Interpretation**: Themes were interpreted in the research objectives relationship, providing a comprehensive understanding of the factors influencing ICT integration in ELT.

4.5. Validity and Reliability

Validity and reliability of the findings are to ensure the several strategies were employed:

    a. **Triangulation**: Data were collected from multiple sources (interviews, observations, and documents) to corroborate findings and enhance the robustness of the results.

    b. **Member Checking**: To ensure accuracy and authenticity participants were given the opportunity to review and provide feedback on their interview transcripts and the preliminary findings.

    c. **Peer Debriefing**: Regular discussions with colleagues and experts in the field were conducted to review the coding process, themes, and interpretations, ensuring the credibility of the analysis.

    d. **Audit Trail**: During the Study, a detailed record of all research activities, decisions, and changes made was maintained to provide transparency and allow for replication of the study.

This study aims to provide a detailed and reliable examination of vocational high school teachers' perceptions and use of technology in ELT By employing these methods and rigorously adhering to procedures for data collection and analysis,.

4.6. Ethical Considerations

From all participants the ethical standards were rigorously followed throughout the study. Informed consent was obtained, ensuring they were aware of the study's purpose and their right to withdraw at any time. The confidentiality and anonymity of participants were maintained, with all identifying

information removed from the data. Ethical approval was also gotten from the relevant institutional review board.

The primary consideration is any piece of ethical of research to take place at all. This involves evaluating the ethical implications of what to do, how to do it, with whom, and what constitutes good practice (Head, 2020). The research design and implementation were guided by these ethical considerations, ensuring that the study was conducted responsibly and ethically at every stage. This comprehensive approach to ethic well-being and commitment to maintaining high ethical standards in research, protecting participants' rights and well-being, and adhering to best practices in research ethics.

4.7. Limitations

The micro-ethnographic design, while providing deep and context-specific insights, has certain limitations. The small sample size and the focus on vocational schools in SMK Walisongo Pecangaan may limit the findings of the generalizability to other contexts. Additionally, the researcher's presence during observations may influence participants' behaviour.

5. Findings and Discussions

5.1. Findings

The study explored vocational high school teachers' perceptions and technology usage in English Language Teaching (ELT). The findings, based on interviews, observations, and document analysis, reveal a complex interplay of positive attitudes towards technology and significant practical challenges.

5.2. Teachers' Perceptions of Technology

All three teachers—Ms. Anita, Mr. Budi, and Ms. Sari—expressed positive perceptions of technology in ELT, acknowledging its potential to enhance student engagement and learning outcomes. Ms. Anita noted that technology significantly enhances student engagement and motivation, particularly using mobile phones and interactive apps. She observed that students are more interested and active in their learning when using digital tools.

> "I believe technology can significantly enhance language learning. It makes lessons more engaging and interactive. For example, using apps like Duolingo helps students practice outside the classroom."
> "I find smart boards and tablets particularly effective. They allow for interactive lessons where students can participate actively."
> "Technology has allowed me to provide immediate feedback, which is crucial for language learning. Students seem more motivated when they use tablets for activities compared to traditional methods."
>
> Ms. Anita's transcript interview, May 15, 2024

Mr. Budi echoed similar sentiments, highlighting the use of multimedia resources and Learning Management Systems (LMS) like Google Classroom to make lessons more engaging and organized.

> "Technology is a double-edged sword. It can make lessons more interesting but can also be distracting if not used properly."
> "I use Learning Management Systems (LMS) like Google Classroom to organize assignments and provide resources. It's been helpful for both me and the students."

> "Students are more engaged when I use multimedia resources like videos and interactive games. It breaks the monotony of traditional teaching."
>
> Mr. Budi's transcript interview, May 15, 2024

Ms. Sari emphasized the benefits of interactive tools like Kahoot! and Padlet, which boost student motivation and participation.

> "Technology has revolutionized my teaching. It opens up new ways to present information and engage students."
> "I use various tools such as Kahoot! for quizzes, and Padlet for collaborative activities. These tools make lessons more interactive and enjoyable."
> "Students are more responsive and motivated. Technology allows them to learn at their own pace and revisit materials as needed."
>
> Ms. Sari's transcript interview, May 15, 2024

5.3. Implementation of ICT in ELT

The factors lead ICT in the classroom to the successful usage are components that include, developing technological infrastructure, and educator accessibility, technical support, human resources (teachers, principals, and IT team existence) and their beliefs in ICT and institutional vision (Chai et al., 2011). Ms. Anita's use of technology allowed for immediate feedback, crucial for language learning. During observations, she used mobile phones to give real-time feedback on students' assignments, which enhanced their learning experience. Mr. Budi's integration of multimedia presentations and Google Classroom facilitated efficient organization and active participation, reflecting the positive impact of technology on teaching practices. Ms. Sari's interactive quizzes and collaborative assignments on Padlet demonstrated how technology could foster a dynamic and engaging learning environment.

5.4. Challenges in Integrating ICT

Despite positive perceptions, significant challenges hinder effective ICT integration in vocational education. Integrating ICT is crucial for enhancing academic procedures (Aryani & Siahaan, 2020). However, all three teachers reported limited access to resources as a major barrier. Ms. Anita highlighted the outdated computer lab and insufficient devices, which disrupted her ability to integrate technology fully.

> "Our school has limited resources. We have a computer lab, but it's outdated, and not all classrooms have smart boards. This makes it challenging to integrate technology fully into my lessons."
> "I've attended a few training sessions, but they were basic. I feel there's a gap in training that focuses on practical, classroom-specific uses of technology."
> "The school tries to support us, but the technical support is often slow. If there's an issue with the computers, it can take days to fix, which disrupts my lesson plans."
> "Initially, I was hesitant to use new technology because I wasn't confident. Over time, I've learned to adapt, but it required a lot of self-initiative."
> "Preparing technology-based lessons takes more time. Balancing this with my regular workload is difficult, but I manage by planning well in advance."
>
> Ms. Anita's transcript interview, May 15, 2024

Similarly, Mr. Budi faced issues with students having to share computers, slowing down the learning process.

> "Our school lacks sufficient devices. Students often have to share tablets or computers, which isn't ideal."
> "Training is sporadic and often not tailored to our needs. We need more hands-on workshops that address specific classroom challenges."
> "Support from the administration is there in theory, but in practice, we often have to solve technical problems on our own."
> "Some of my colleagues are resistant to change, preferring traditional methods. I've embraced technology because I see its potential, but it's a personal choice."
> "Using technology adds to my preparation time. I often find myself working late to prepare digital resources and assignments"
>
> Mr. Budi's transcript interview, May 15, 2024

Ms. Sari mentioned frequent internet connectivity issues that disrupted lessons. These challenges are consistent with findings that inadequate infrastructure and financial constraints in schools impede ICT integration (Rana et al., 2020).

> "While our school has some technology, it's not always reliable. Internet connectivity issues are frequent, which can disrupt lessons."
> "Most of the training we get is theoretical. We need more practical, hands-on training that shows us how to apply technology in our specific contexts."
> "Technical support is minimal. Often, I have to troubleshoot problems myself or rely on more tech-savvy colleagues."
> "Initially, I was skeptical about using technology, but after seeing the positive effects on students' engagement, I've become an advocate. Some colleagues are still resistant, but I try to share my positive experiences with them."
> "It's challenging to balance technology preparation with other teaching duties. However, once the resources are created, they can be reused, which saves time in the long run."
>
> Ms. Sari's transcript interview, May 15, 2024

Inadequate training and technical support were also significant obstacles. Ms. Anita and Ms. Sari both pointed out that most of the training they received was theoretical and lacked practical application, making it difficult to maximize the use of available technology. Mr. Budi felt that training was sporadic and not tailored to teachers' specific needs, leading to independent problem-solving during technical issues. The lack of practical training and tailored support aligns with the observations that effective ICT use in English Language Teaching (ELT) depends on several factors, including the availability of resources and the level of technical support provided by educational institutions (Poudel, 2022).

Additionally, integrating ICT in ELT aims to enhance students' English language competency, and since technology can aid language learners, it should play a significant role in their academic pursuits (Irzawati & Hasibuan, 2020). However, some teachers face difficulty in keeping students on the right track during the use of ICTs. Technology can

sometimes restrict students' thinking potential, leading to distractions and misuse (Pazilah et al., 2019). Therefore, while the integration of ICT in education holds promise, addressing these challenges is essential for its effective implementation.

5.5. Implications for Practice

The findings underscore the necessity for comprehensive training programs that address both the technical and pedagogical aspects of technology integration. Such programs should enhance teachers' attitudes and perceptions towards ICT is a very important factor that educators ought to consider in implementing mobile learning in classroom and it is a major predictor for future ICT use in the classroom, as suggested by (Teo, 2008). Additionally, improving technological infrastructure and providing robust institutional support are crucial for facilitating seamless ICT adoption in schools. Understanding and addressing teachers' perceptions and challenges are essential for effective ICT integration in ELT. By fostering a supportive and resource-rich environment, educational institutions can encourage teachers to embrace technology, thereby improving teaching practices and student outcomes. This approach aligns with the broader goal of enhancing educational quality through the strategic use of technology, ultimately contributing to a more engaging and effective learning experience for students.

These findings provide actionable insights for policymakers and educational leaders, emphasizing the need for targeted interventions to support teachers in teaching practices with integrating technology. Future research should continue to explore the ICT integration dynamically in diverse educational settings and develop strategies to overcome the identified barriers, ultimately enhancing the efficacy of technology-enhanced ELT. The study's impact of the result in improved learning outcomes and higher student engagement might encourage educators to adopt student-cantered teaching approaches that empower learners to take an active role in their education.

Pointing at educational inequities through digital education technology can support school management and help bridge the digital divide (Lay et al., 2020). Effective classroom management supports and facilitates both academic and socio-emotional learning and is successful student learning necessary component (Nkhata et al., 2020). Furthermore, to ensure whether teachers will utilize technological devices in their teaching in understanding the link between teachers' beliefs and practices is key. Educational institutions such as schools and universities have been investing significantly in technological devices to enhance teaching and learning. However, without teachers utilizing these resources, they will offer no value and have no impact on student learning (Gillespy, 2020).

6. Discussion

6.1. Discussion

This study findings reveal a multifaceted landscape where vocational high school teachers' perceptions play a pivotal role in English Language Teaching (ELT) implementation of Information and Communication Technology (ICT). Based on (Angers & Machtmes, 2015) claimed that in using technology, the effective use of ICT in teaching and learning activities is influenced by teachers'

personal belief and concern. Therefore, instructional activities to increase teachers' motivation in using ICT in instructional activities, teachers need to have technical skills and pedagogical knowledge to integrate ICT. This study provides a nuanced understanding of these dynamics, examining how teachers' positive attitudes towards technology contrast with the practical challenges they face.

6.2. Positive Perceptions and Their Impact

The positive perceptions of ICT among teachers, as highlighted by Ms. Anita, Mr. Budi, and Ms. Sari, align with existing literature which suggests that teachers' attitudes towards technology are critical for its successful integration. In line with (Bandura, 1997) beliefs about self and beliefs about ICT. The first category, beliefs about self, refers to self-efficacy beliefs or beliefs that teachers have about their skills at carrying out tasks. Similarly, (Fitri et al., 2021) found that EFL teachers generally have positive perceptions of ICT, recognizing its potential to enhance educational outcomes.

In this study, all three teachers expressed strong positive perceptions of ICT's ability to enhance student engagement and learning outcomes. Ms. Anita, for example, noted the significant increase in student motivation and engagement when using interactive technologies like mobile phones. Mr. Budi highlighted the organizational benefits and increased engagement through multimedia resources, while Ms. Sari emphasized the enhanced student participation and motivation facilitated by interactive tools like Kahoot! and Padlet.

6.3. Challenges to ICT Implementation

Despite these positive perceptions, significant challenges hinder the effective integration of ICT in ELT. These challenges include limited access to resources, inadequate training, insufficient institutional support, and technical issues, all of which are consistent with findings from previous studies. (Almerich et al., 2011) emphasized that the teachers' training needs in ICT were one of the key aspects for the integration of ICT into daily educational practice, along with competencies in ICT and teachers' technological resources usage. The current study corroborates this, as all three teachers reported insufficient and theoretical training that did not adequately prepare them for practical classroom applications.

Resource limitations were another major barrier identified. Ms. Anita's and Mr. Budi's experiences with outdated or insufficient devices highlight the critical need for improved technological infrastructure. This aligns with findings identified physical infrastructure and resource availability as significant barriers to ICT integration in ELT.

Furthermore, level of technical support provided by educational institutions was found to be inadequate. Ms. Anita and Ms. Sari both expressed frustration with the slow response to technical issues, which often disrupted their lesson plans. This reflects the findings, who stressed the importance of examining teachers' views on the changing educational environment to enhance the integration of technology.

6.4. Addressing the Challenges

To overcome these challenges, it is essential to address the factors that hinder effective ICT integration. In order to develop a successful teaching unit comprehensive training programs focusing on the Technological Pedagogical Content Knowledge emphasizes the types of knowledge teachers need to

know. According to (Peled & Perzon, 2022) TPACK teachers' familiarity with their subject matter and their pedagogical know-how areas meaningful as their readiness to deal with technology capabilities. These programs should be practical and context-specific, addressing the unique challenges faced by vocational high school teachers.

Additionally, improving resource availability and providing robust technical support are crucial. This includes ensuring that schools are equipped with up-to-date technological infrastructure and that teachers have access to sufficient devices for all students. Institutional policies should also be strengthened to offer continuous support and address technical issues promptly. It is stated by (Finger et al., 2010) ICTs should be integrated into the early stages of teacher education so that all components of TPACK are developed concurrently.

Understanding students' perceptions regarding ICT integration is also vital. The importance of considering students' views, particularly in vocational schools, cannot be overstated, as their perceptions can significantly influence the success of ICT implementation. (Peeraer & Petegem, n.d.) found that while learning transfer was efficient, the overall impact of the training program was limited. A significant part of the variance in the application of ICT for teaching and supporting student learning was explained by additional engagement in action research and communities of practice.

By fostering a supportive and resource-rich environment that addresses both teachers' and students' needs, educational institutions can enhance the effectiveness of technology-enhanced ELT. This approach ensures that ICT integration is not only technically feasible but also pedagogically sound and responsive to the needs of all stakeholders involved.

In short, while vocational high school teachers hold positive perceptions of ICT and its potential to enhance ELT, significant barriers hinder its effective integration. Addressing these challenges through comprehensive training, improved resources, and robust institutional support is essential. By understanding and addressing the factors that teachers' influence of perceptions and use of ICT, educational stakeholders can enhance the integration of technology in ELT, leading to improved educational outcomes. This study contributes to the ongoing discourse on ICT in education, providing actionable insights for fostering with more effective and engaging language learning environment.

7. Conclusion

This study explored vocational high school teachers' technology and the factors influencing their use of Information and Communication Technology (ICT) perceptions in English Language Teaching (ELT). The findings indicate that while teachers generally hold positive ICT perceptions, to enhance student engagement and learning outcomes recognizing its potential, they face significant barriers that impede effective integration.

Teachers' positive attitudes towards technology, as noted by Ms. Anita, Mr. Budi, and Ms. Sari, align with the broader literature which highlights the teachers' perceptions importance of in the successful implementation of ICT. These positive perceptions are crucial as they foster a willingness to integrate technology into teaching practices, thereby enhancing educational outcomes (Fitri et al., 2021; Mahdum et al., 2019).

However, the study also identified substantial challenges, including limited access to resources, inadequate training, insufficient institutional support, and technical issues. These barriers are consistent with previous research findings, which emphasize the need for comprehensive training programs, improved technological infrastructure, and robust support systems to facilitate effective ICT integration (Bhandari, 2020; Nur Hafifah & Harry Sulistyo, 2020).

Addressing these challenges requires a multifaceted approach. Comprehensive, practical training programs focusing on having the effectiveness integrating Information and Communication Technology (ICT) into their teaching practice the Technological Pedagogical Content Knowledge (TPACK)

framework as a means of conceptualizing the knowledge required by teachers (Patalinghug & Arnado, 2021). Additionally, educational institutions need to invest in up-to-date technological infrastructure and provide consistent technical support to ensure that teachers can seamlessly integrate technology into their teaching practices.

In conclusion, while vocational high school teachers recognize the benefits of ICT in ELT, significant barriers need to be addressed to fully realize its potential. By implementing targeted interventions and providing the necessary support and resources, educational institutions can enhance the integration of technology in ELT, leading to improved educational outcomes. This study contributes valuable insights into the ongoing educational discourse on ICT and offers actionable recommendations for fostering more effective and engaging language learning environment.

References

[1]   Aivazidi, M., & Michalakelis, C. (2023). Information and Communication Technologies in Primary Education: Teachers' Perceptions in Greece. *Informatics*, *10*(3). https://doi.org/10.3390/informatics10030057

[2]   Almerich, G. ;, Suárez-Rodríguez, J. M. ;, Belloch, C. &, Bo, & Rosa, M. (2011). *Las necesidades formativas del profesorado en TIC: perfiles formativos y elementos de complejidad.* http://www.uv.es/RELIEVE/v17n2/RELIEVEv17n2_1.htmwww.uv.es/RELIEVE]pag.1

[3]   Amerstorfer, C. M., & Freiin von Münster-Kistner, C. (2021). Student Perceptions of Academic Engagement and Student-Teacher Relationships in Problem-Based Learning. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.713057

[4]   Aminullah, A., Loeneto, B. A., & Vianty, M. (2019). TEACHERS� ATTITUDES AND PROBLEMS OF USING ICT IN TEACHING EFL. *English Review: Journal of English Education*, *8*(1), 147. https://doi.org/10.25134/erjee.v8i1.2324

[5]   Angers, J., & Machtmes, K. (2015). An Ethnographic-Case Study of Beliefs, Context Factors, and Practices of Teachers Integrating Technology. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2005.1832

[6]   Aryani, R., & Siahaan, L. H. (2020). INFORMATION TECHNOLOGY-BASED MANAGEMENT EDUCATION IN VOCATIONAL HIGH SCHOOLS. *Sosiohumaniora*, *22*(3), 267. https://doi.org/10.24198/sosiohumaniora.v22i3.28377

[7]   Atanasova, A. (2024). THE ROLE OF GAMES IN CONTEMPORARY EDUCATION: CHALLENGES FOR THE TEACHERS AND STUDENTS IN THE ERA OF BLENDED LEARNING – CORRELATION BETWEEN GRADES AND GAMES PERFORMANCE. *SCIENCE International Journal*, *3*(1), 127–132. https://doi.org/10.35120/sciencej0301127a

[8]   Bandura, A. (1997). *Self-efficacy in Changing Societies.*

[9]   Bhandari, B. L. (2020). ENGLISH TEACHERS' PERCEPTIONS AND PRACTICES OF INTEGRATING ICT IN ELT. In *Research Management Cell* (Vol. 3, Issue 1).

[10] Boateng, W., Boateng, C., & Boateng, J. (2019). Graduate students' preferences in technology usage in student-faculty interactions at the University of Cape Coast, Ghana. *AFRREV STECH: An International Journal of Science and Technology*, *8*(2), 31–44. https://doi.org/10.4314/stech.v8i2.3

[11] Chai, C. S., Ling Koh, J. H., Tsai, C. C., & Lee Wee Tan, L. (2011). Modeling primary school pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) for meaningful learning with information and communication technology (ICT). *Computers and Education*, *57*(1), 1184–1193. https://doi.org/10.1016/j.compedu.2011.01.007

[12] Citrohn, B., & Svensson, M. (2022). Technology teacher's perceptions of model functions in technology education. *International Journal of Technology and Design Education*, *32*(2), 805–823. https://doi.org/10.1007/s10798-020-09632-8

[13] Dewi, V. K., Degeng, P. D. D., & Razali, K. A. (2024). Exploring the students' perceptions of the integration of web-based and non-web-based ICT in ELT at the vocational high school in Indonesia. *Journal on English as a Foreign Language*, *14*(1), 285–315. https://doi.org/10.23971/jefl.v14i1.7818

[14] Dwiono, R., Rochsantiningsih, D., & Suparno, S. (2018). Investigating the Integration Level of Information and Communication Technology (ICT) in the English Language Teaching. *International Journal of Language Teaching and Education*, *2*(3), 259–274. https://doi.org/10.22437/ijolte.v2i3.5752

[15] Finger, G., Jamieson-Proctor, R., & Albion, P. (2010). Beyond Pedagogical Content Knowledge: The Importance of TPACK for Informing Preservice Teacher Education in Australia. In *IFIP AICT* (Vol. 324).

[16] Fitri, Y., Hidayanto, N., & Putro, P. S. (2021). *EFL Teachers' Perception of the Effectiveness of ICT-ELT Integration During the COVID-19 Pandemic.*

[17] Gillespy, G. R. (2020). *TEACHER SELF-PERCEPTIONS OF SKILLS AND BELIEFS USING TECHNOLOGY IN CLASSROOM PRACTICE.*

[18] Griffin, C. P., & Howard, S. (2017). Restructuring the College Classroom: A Critical Reflection on the Use of Collaborative Strategies to Target Student Engagement in Higher Education. *Psychology Learning and Teaching*, *16*(3), 375–392. https://doi.org/10.1177/1475725717692681

[19] Head, G. (2020). Ethics in educational research: Review boards, ethical issues and researcher development. *European Educational Research Journal*, *19*(1), 72–83. https://doi.org/10.1177/1474904118796315

[20] Ifinedo, E., & Kankaanranta, M. (2021). Understanding the influence of context in technology integration from teacher educators' perspective. *Technology, Pedagogy and Education*, *30*(2), 201–215. https://doi.org/10.1080/1475939X.2020.1867231

[21] Irzawati, I., & Hasibuan, A. R. (2020). *Students' Perceptions of the Utilization of ICT in English Learning: Way or Barrier?*

[22] Kado, ., & Dem, N. (2020). Effectiveness of GeoGebra in Developing the Conceptual Understanding of Definite Integral at Gongzim Ugyen Dorji Central School, in Haa Bhutan. *Asian Journal of Education and Social Studies*, 60–65. https://doi.org/10.9734/ajess/2020/v10i430276

[23] Kaed, E., Saany, S. I. A., Alhazmi, A. K., & Saif, J. (2023). A Model of Student Engagement in Online Learning. *Journal of Science and Technology*, *28*(1), 38–52. https://doi.org/10.20428/jst.v28i1.2149

[24] Kusuma, I. P. I. (2021). Tpack-related programs for pre-service english teachers: An in-depth analysis on efforts and issues of ict integration. *Cakrawala Pendidikan*, *40*(1), 183–195. https://doi.org/10.21831/cp.v40i1.28820

[25] Lay, C. D., Allman, B., Cutri, R. M., & Kimmons, R. (2020). Examining a Decade of Research in Online Teacher Professional Development. In *Frontiers in Education* (Vol. 5). Frontiers Media S.A. https://doi.org/10.3389/feduc.2020.573129

[26] Mahdum, M., Hadriana, H., & Safriyanti, M. (2019). Exploring teacher perceptions and motivations to ICT use in learning activities in Indonesia. *Journal of Information Technology Education: Research*, *18*, 293–317. https://doi.org/10.28945/4366

[27] Mohamed ACHAMRAH. (2022). Understanding's barriers of implementing ICTs in Moroccan High Schools from teachers' perspectives. *World Journal of Advanced Research and Reviews*, *13*(2), 460–475. https://doi.org/10.30574/wjarr.2022.13.2.0044

[28] Nkengbeza, D., Mbuzi, D., & Chainda, A. M. (2022). Challenges Faced by Primary School English Teachers in Integrating Media Technology in the Teaching and Learning of English. *Creative Education*, *13*(04), 1139–1153. https://doi.org/10.4236/ce.2022.134071

[29] Nkhata, L., Banda, A., Chituta, D., Jumbe, J., & Choobe, B. (2020). Mentors Views on Mathematics and Science Student Teachers School Experience. *Education Quarterly Reviews*, *3*(3). https://doi.org/10.31014/aior.1993.03.03.140

[30] Nogaibayeva, A. (2023). Exploring the use of ICT by language instructors at a university in Kazakhstan: Expectations, realities, and factors influencing adoption. *Teaching English as a Foreign Language Journal*, *2*(2), 110–123. https://doi.org/10.12928/tefl.v2i2.528

[31] Nur Hafifah, G., & Harry Sulistyo, G. (2020). *TEACHERS' ICT LITERACY AND ICT INTEGRATION IN ELT IN THE INDONESIAN HIGHER EDUCATION SETTING*. http://www.mendeley.com/docu-

[32] Patalinghug, J. S., & Arnado, A. A. (2021). Mathematics Teachers' Technological Pedagogical and Content Knowledge and their Capacity for Differentiated Instruction. *International Journal of Multidisciplinary: Applied Business and Education Research*, *2*(7), 574–586. https://doi.org/10.11594/ijmaber.02.07.05

[33] Pazilah, F. N. P., Hashim, H., & Yunus, M. Md. (2019). Using Technology in ESL Classroom: Highlights and Challenges. *Creative Education*, *10*(12), 3205–3212. https://doi.org/10.4236/ce.2019.1012244

[34] Peeraer, J., & Petegem, P. Van. (n.d.). The limits of programmed professional development on integration of information and communication technology in education. In *Australasian Journal of Educational Technology* (Vol. 2012, Issue 6).

[35] Peled, Y., & Perzon, S. (2022). Systemic model for technology integration in teaching. *Education and Information Technologies*, *27*(2), 2661–2675. https://doi.org/10.1007/s10639-021-10694-x

[36] Poudel, A. P. (2022). Information and Communication TechnologY in English Language Teaching: Some Opportunities and Challenges. *Journal of Comparative & International Higher Education*, *14*(4). https://doi.org/10.32674/jcihe.v14i4.3874

[37] Rahmati, J., Izadpanah, S., & Shahnavaz, A. (2021). A meta-analysis on educational technology in English language teaching. *Language Testing in Asia*, *11*(1). https://doi.org/10.1186/s40468-021-00121-w

[38] Rana, K., Greenwood, J., & Fox-Turnbull, W. (2020). Implementation of Nepal's education policy in ICT: Examining current practice through an ecological model. *Electronic Journal of Information Systems in Developing Countries*, *86*(2). https://doi.org/10.1002/isd2.12118

[39] Rodríguez-Cano, S., Cuesta-Gómez, J. L., Delgado-Benito, V., & de la Fuente-Anuncibay, R. (2022). Educational Technology as a Support Tool for Students with Specific Learning Difficulties—Future Education Professionals' Perspective. *Sustainability (Switzerland)*, *14*(10). https://doi.org/10.3390/su14106177

[40] Samir, N., Diaz, A. M., Hodgins, M., Matic, S., Bawden, S., Khoury, J., Eapen, V., & Lingam, R. (2021). Speaking softly and listening hard: The process of involving young voices from a culturally and linguistically diverse school in child

health research. *International Journal of Environmental Research and Public Health*, *18*(11). https://doi.org/10.3390/ijerph18115808

[41] Shrestha, P. (2011). The Potential of Mobile Technologies for (English) Language Learning in Nepal. In *Journal of NELTA* (Vol. 16, Issue 2). www.eiabd.com/eia/

[42] Singh Saud, D. (2023). Teachers and Students' Perceptions towards Using ICT in ELT in Model Schools. *Journal of Tikapur Multiple Campus*, *6*.

[43] Tacoma, S., Drijvers, P., & Jeuring, J. (2021). Combined inner and outer loop feedback in an intelligent tutoring system for statistics in higher education. *Journal of Computer Assisted Learning*, *37*(2), 319–332. https://doi.org/10.1111/jcal.12491

[44] Teo, T. (2008). Pre-service teachers' attitudes towards computer use: A Singapore survey. In *Australasian Journal of Educational Technology* (Vol. 24, Issue 4).

[45] Vanneste, P., Oramas, J., Verelst, T., Tuytelaars, T., Raes, A., Depaepe, F., Van Den Noortgate, W., Hooshyar, D., Koh, K. H., & Voskoglou, M. (2021). *mathematics Computer Vision and Human Behaviour, Emotion and Cognition Detection: A Use Case on Student Engagement*. https://doi.org/10.3390/math

[46] Vereijken, M. W. C., van der Rijst, R. M., de Beaufort, A. J., van Driel, J. H., & Dekker, F. W. (2018). Fostering first-year student learning through research integration into teaching: Student perceptions, beliefs about the value of research and student achievement. *Innovations in Education and Teaching International*, *55*(4), 425–432. https://doi.org/10.1080/14703297.2016.1260490

[47] Winter, E., Costello, A., O'Brien, M., & Hickey, G. (2021). Teachers' use of technology and the impact of Covid-19. *Irish Educational Studies*, *40*(2), 235–246. https://doi.org/10.1080/03323315.2021.1916559

Harnessing AI for Policy and Documentation Standardization in Education: Benefits and Mitigation of Drawbacks

Pratama Ahdi¹*

¹ Language Training Center Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

*E-mail: www.pratamaahdi.com@gmail.com

Abstract. AI software has been used in educational institutions to digitalize and transform the policy and documentation process, which served as a change for the better in making the process more efficient, exact, and standardized. This paper aims to discuss the implementation of some generative AI tools associated with producing job descriptions and SOPs related to the functions of a Language Center. However, it points to the benefits of using AI in drafting such essential papers, such as saving time, maintaining consistency, and bringing out clarity. In the same vein, it points out the usual pitfall's characteristic of AI-generated content—the need for revision, review, and human control over the appropriateness of context and observance of institutional standards. Employing real examples and a close analysis of the part played by AI in standardizing documentation, this paper will bring to the foreground the importance of a hybrid approach using the capabilities of both AI and the human mind. The results indicate that while AI makes the draft process significantly more efficient when it comes to concluding documents for educational institutions, there is a significant requirement for human intervention. The paper concludes with recommendations to better leverage the AI of educational documentation, emphasizing continuous training, work ethics, and the importance of maintaining a balance between the efficiency of AI and human judgment.

1. Introduction

Artificial Intelligence has been integrated into almost every sector in the last decade, with education being one of the critical areas. AI technologies promise to revolutionize educational practices, from personalized learning to administrative efficiency. One area where AI shows substantial potential is in policy and documentation standardization within academic institutions. Consistency will distinguish between well-documented job descriptions and Standard Operating Procedures (SOPs) across an organization. For a language center, due to the diversity of roles and operational protocols, the relevance of precise and standardized documentation is even more pronounced.

The Language Training Center at Universitas Muhammadiyah Yogyakarta is a prime example of an institution that can make a strong advance with the integration of AI into its processes related to documents. It has 22 administrative staff and over 30 freelance instructors, offering language training, translation, and testing services both for the university itself and to the public at large. Such an operation needs the use of a wide range of documentation that is made clear and well-organized. There has to be well-drafted documentation such as job descriptions for positions such as the head of divisions or persons in charge (PICs), as well as SOPs for different processes such as the organization of language courses with conformance to ISO 9001:2015 quality standards.

1.1 Formulated Issue

While AI holds high potential, incorporating these technologies in educational documentation is not so smooth. The most vital problem for our language center has been the ineffectiveness and inconsistency in job descriptions and SOPs. The conventional ways of both developing and updating the documents are time-consuming and prone to errors. AI has partly addressed this problem, mainly through generative AI tools like ChatGPT, to provide rough drafts within a relatively short amount of time that people can revise and elaborate on. However, most documents that are generated with the help of AI still require lots of human input to address errors, issues in contextualization, and noncompliance elements, among others. This paper, therefore, posits that even though AI is instrumental in the drive toward greater efficiency in different documentation procedures, there is a basic need for human intervention to reduce its weaknesses in delivering quality results.

For instance, the free version of the generative AI tool, ChatGPT 3.5, has supported the Language Training Center at Universitas Muhammadiyah Yogyakarta. While this tool has accelerated the process of how to create SOPs and job descriptions, challenges remain. For example, it is not always the case that the AI-generated reports turn out accurately since many commands are not detailed, which then requires further human revision. Nevertheless, there are undoubtedly some successes, including the rapid production of SOPs when some elements are supplied, and complete instructions are given. This nearly always involves human intervention: further refining the commands to the AI, specific items that need correction in AI-created content, and more general conformance with the institution's standards on formatting and templates. This iterative process highlights the need for a hybrid approach that leverages the strengths of AI while compensating for its weaknesses through human oversight.

1.2 Literature Review

Recent studies have dealt with the application of AI in educational policy and documentation. For instance, Seldon and Abidoye (2018) articulate the potential for transformation in the automation of administrative functions, pinpointing the efficiencies and consistencies that AI can bring to institutions of education. The way AI supports the administration of education by handling repetitive parts, thus freeing educators to undertake more strategic types of work, was similarly shown by Luckin et al. (2016). However, its harmful use in documentation processes has been sufficiently revealed. One is Johnson (2020) who shows how AI content cannot provide context or specific requirements needed in an institution on a nuanced level.

Moreover, the ethical concerns relate to the biases in AI algorithms that render their output biased if not well handled. The case studies of the implementation of AI solutions in educational setups are a practical source of insight into these benefits and challenges. For example, a study by Holmes et al. (2019) on the use of AI in curriculum development found that even though AI tools dramatically reduce the time taken to develop a new curriculum, the first drafts generated by AI require so much human input to refine them to conform to the set academic standards and contextually appropriate.

2. Research Method

2.1 Research Design

The study's design is qualitative, and the formulation of the research has been prepared to establish the effectiveness of AI in generating standard documentation for a language center. The level of precision achieved in the process of generating documents using AI justifies the need for the qualitative approach in this research due to the iterative process of human intervention involved.

2.2 Data Collection Tools

The key data-gathering instruments are standardized templates for ISO 9001:2015 documents, composed of job descriptions for various positions and examples of standardized SOPs. Generative AI, in the form of ChatGPT 3.5, helps in the drafting process. These AI-generated documents result from the process.

2.3 Participants

The study has no relation to human participants in terms of their common understanding. The researcher itself runs the whole process of document creation, experimenting with AI-created content according to the needs of the institution. It revolves around the question of ascertaining the effectiveness of AI in generating standardized documentation without directly involving human subjects in the interaction process.

3. Discussion

3.1 Implementation and Benefits of AI in the Language Center for Documentation

It begins at the preparation stage by getting a hold of standardized document samples, such as job descriptions and SOPs. The samples provide a reference outline for writing content that matches the standards expected by the institution. The author then devises specific commands and feeds the information into ChatGPT 3.5. The commands should be as precise as possible to provide an actual lead

1. Tujuan Prosedur	Memberikan panduan dalam penyelenggaraan kursus bahasa di LTC UMY dengan tujuan memberikan pengalaman pembelajaran yang optimal kepada peserta kursus.
2. Luas Lingkup Prosedur dan Penggunaannya	Meliputi semua aktivitas terkait penyelenggaraan kursus bahasa di LTC UMY, termasuk perencanaan, pendaftaran peserta, penjadwalan, pelaksanaan, evaluasi, dan pelaporan kursus.
3. Standar	a. Materi kursus harus sesuai dengan kebutuhan dan tingkat kemampuan peserta. b. Instruktur harus berkualifikasi dan berpengalaman dalam mengajar bahasa yang diajarkan. c. Lingkungan belajar harus kondusif dan memenuhi kebutuhan peserta. d. Evaluasi kursus harus dilakukan secara teratur untuk meningkatkan kualitas pembelajaran.
4. Definisi Istilah	a. Kursus: Program pembelajaran bahasa yang diselenggarakan di LTC UMY. b. Peserta: Individu yang mendaftar dan mengikuti kursus bahasa di LTC UMY. c. *Tambahkan yang perlu*
5. Prosedur	a. Perencanaan Kursus: i) Menentukan tujuan, durasi, dan kurikulum kursus. ii) Menyusun materi pembelajaran dan sumber daya yang diperlukan.

Figure 1. Standardized document sample should be provided as one of the requirements for the preparation stage.

to the AI to generate the right content.

This includes an elaborate review of the outputted drafts to ensure everything is contextual. There is a need to point out any inaccuracy or contextual mismatch that the AI's weaknesses might have facilitated. If there is a necessity, therefore, refinement of commands is done, and the content is regenerated to fit the required quality. Once the content can be said to be accurate and context-relevant,

it is integrated into the standardized document templates used by the institution. This phase ensures that the documents are correct in content and consistent in format and presentation.

The final drafts will then be reviewed and discussed with the PICs. It is through this mechanism that all documentation conformed to the institution's requirements and was set for implementation. This iterative process, therefore also highlights the need for human-in-the-loop oversight in the AI-assisted documentation process. Some outstanding benefits have resulted from using ChatGPT 3.5 in documenting processes. The most crucial benefit realized is the increased efficiency when creating drafts. Creation of drafts through traditional methods for job descriptions and SOPs often proves time- and labor-consuming. ChatGPT drastically reduces the length of time taken to create these documents and hence provides the workforce with free time to attend to other essential tasks. This way, employees can achieve more within a given period (Seldon & Abidoye, 2018). Besides that, there is consistency in the format and language that AI applies throughout all documents. This is equally very important for a

Figure 2. Example of refined prompt after trained using targeted role and several conversations. This will lead to a better and more accurate response.

professional look and ease with which all documents are read by staff and stakeholders. AI handles repetitive tasks, thus maintaining consistency (Luckin et al., 2016).

Also, a high level of improvement in the documentation quality at the Language Training Center was noted due to the implementation of AI-based practice. For example, the SOP on conducting language courses that needed to comply with the principles of ISO 9001:2015 was completed timely and with precision. There are details AI can provide and incorporate that; it often results in a systematic and explicit SOP. White et al. (2008) outlined the importance of good quality and coherent documentation to manage language teaching institutions; in this context, AI can lend a hand to the managerial processes regarding the provision of a general method.

3.2 Mitigation Strategies

However, the infusion of AI into the documentation process is not without its difficulties. Firstly, there could be inaccuracies in the content provided by AI in some cases. With no exact commands, the produced outputs can come out off-topic or irrelevant. Secondly, AI usually does not understand the

context as intricately as an average human drafter. In some cases, it might not be able to come up with the best content that would suit the institution.

Examples of these are AI-generated job descriptions made in broad terms and fail to consider the unique attributes required for many positions in the language center; most had to undergo considerable revision with much human intervention.

These measures were thus provided to reduce and overcome the limitations associated with AI-generated content. They therefore aimed at minimizing the disadvantages while whole taking advantage of AI. This relates to AI-aided documentation. At this level of revision and review, the rough commands given to ChatGPT are polished up, and some features of the drafts are rectified. The result is that a final document has to follow the standards of the institution and exact content as required for a specific document. Johnson (2020) notes that when the process is applied iteratively over time, the quality of content produced by the AI is improved. This underscores the need to have a human check on all operations carried out at all levels. They are giving ChatGPT high-quality samples and templates results in quality content generation. It thus delivers highly relevant drafts by providing detailed and specific templates. In their work, Holmes et al. (2019) argue that the ability to apply AI effectively is a product of good training data. A well-structured template guides AI and assures that the produced content from the onset meets the institution's expectations. This was supported by White et al. (2008), in which they posited that completeness of templates and clear guidelines are essential in making documents effective in educational management.

Providing feedback iteratively is the mainstay to enhance performance in AI. There must be periodic reviews and refinement based on the former output for the AI to learn from mistakes and, hence, be able to provide better drafts in the next iteration. Binns (2018) argues that this iterative process does not only enhance the immediate outputs but also the overall capabilities of AI to undertake future tasks. It is, in essence, a feedback loop to ensure that while AI handles monotonous and time-consuming tasks, human expertise maintains the accuracy and contextual relevance of the content.

Balance has to be kept between efficiency in the use of artificial intelligence and human supervision. While AI can undoubtedly be used for repetitious tasks, the quality of content and contextual relevance would need human involvement to ensure correctness. In this hybrid model, one could mix the best of both AI with the input from humans to reach a high level of documentation quality required by institutions. This is where AI-generated efficiency is balanced with human review and refinement toward the best possible results in the documentation on a large scale for the language center. In this process, the language center could be optimal in its results in documentation (Brynjolfsson & McAfee, 2014)..

A critical consideration concerning the use of AI for documentation is how to deal with biases in the content that AI generates. When not appropriately managed, AI algorithms can potentially provide biased outputs, even inadvertently. Ensuring the proper diversity and data representation during training are the foremost methods of reducing such biases. The argument raised by Binns (2018) is laden with ethical solid concerns regarding bias in AI algorithms; it concludes that, in general, proper management could prevent biased outputs. Incorporating AI in the documentation processes also necessitates the observation of transparency and accountability. The incorporation of AI in institutions should be transparent, with accountability being taken for the generated content. This includes transparent documentation of its role in the drafting process and of the reviews of steps taken for refinement of outputs (Eubanks, 2018). Holmes et al. (2019) also highlight the importance of documenting the role AI has in the process of drafting and being clear at what point in the process review and tailoring come into play to attain transparency and accountability.

The future is, therefore, very promising regarding AI in educational documentation. With advancements, thus, AI technologies will result in more exact and contextually based content

generation. AI technologies make it possible for improvements in Natural Language Processing techniques so that a better understanding of the contexts results in a better quality of drafts. This process is possible only when there is constant research and development in AI technologies. Long-term strategies for integrating AI with human expertise include the development of solid frameworks that harness the power of AI yet, at the same time, offer protection through human intervention (Noble, 2018). The institutions should design and develop complete training programs for their staff to properly use AI tools and be knowledgeable regarding their shortcomings. This would ensure maximization in the application of AI, though keeping appropriate human intervention such that good quality documentation is produced (Luckin et al. 2016).

4. Conclusion

The integration of AI into the process of documentation for educational institutions, specifically the Language Training Center at Universitas Muhammadiyah Yogyakarta, can yield significant benefits in terms of efficiency, accuracy, and standardization. Nevertheless, human oversight to redress AI's limitations remains critical. In this manner, educational institutions can use AI power to enhance processes. The present paper will focus on these dynamics in detail and henceforth give practical insights and recommendations for the most effective integration of AI in educational documentation.

References

[1] Binns, R. (2018). Fairness in Machine Learning: Lessons from Political Philosophy. *Proceedings of the 2018 Conference on Fairness, Accountability, and Transparency*, 149-159. doi:10.1145/3287560.3287587.

[2] Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Center for Curriculum Redesign.

[3] Johnson, K. A. (2020). Addressing the Limitations of AI in Educational Policy Documentation. *Journal of Educational Administration and History*, 52(3), 223-237. doi:10.1080/00220620.2020.1737917.

[4] Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education*. Pearson.

[5] Seldon, A., & Abidoye, R. (2018). *The Fourth Education Revolution: Will Artificial Intelligence Liberate or Infantilise Humanity?* University of Buckingham Press.

[6] Anderson, J., & Rainie, L. (2018). *The Future of Well-Being in a Tech-Saturated World*. Pew Research Center.

[7] Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company.

[8] Eubanks, V. (2018). *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*. St. Martin's Press.

[9] Mayer-Schönberger, V., & Cukier, K. (2013). *Big Data: A Revolution That Will Transform How We Live, Work, and Think*. Houghton Mifflin Harcourt.

[10] Noble, S. U. (2018). *Algorithms of Oppression: How Search Engines Reinforce Racism*. NYU Press.

[11] White, R., Hockley, A., Jansen, J. v., & Laughner, M. S. (2008). *From Teacher to Manager: Managing Language Teaching Organizations*. Cambridge: Cambridge University Press.

The Effect of Self-Efficacy on The Academic Resilience of Students at PKBM Al-Fattah

Sindi Novianti[1*], Febri Rahmanto[2]

[1] Non-Formal Education, Universitas Negeri Yogyakarta, DIY, Indonesia
[2] Civic Education, Universitas Negeri Yogyakarta, DIY, Indonesia

*E-mail: sindinovianti.2023@student.uny.ac.id, febrirahmanto.2022@student.uny.ac.id

Abstract. This research aims to analyze the effect of self-efficacy on the academic resilience of students at PKBM Al-Fattah. The research method used the quantitative approach method. The sampling technique used stratified random sampling and sample calculation using the Harry King nomogram graph so that the results of the research sample were 59 students. The instrument used a questionnaire and research data declared to meet the classical assumption test, then continued with simple linear regression analysis hypothesis testing and determination analysis (R-Square) with the results showing the probability value < 0.05 alpha value, so the conclusion that H_0 rejected. Thus, self-efficacy has a significant effect on the academic resilience of students at PKBM Al-Fattah. the contribution of the self-efficacy variable to the academic resilience variable is 89.4% while the remaining 10.6% is the contribution of other variables

Keywords: Students, Self-Efficacy, Academic Resilience.

1. Introduction

Education is the root of a nation's civilization. Education has a very important role in shaping humans into quality human beings. The quality of human resources is determined by the role of education (Sudarsana, 2016). Through education, existing human resources are then honed so that they can be empowered. A series of processes of changing attitudes and behaviors experienced by humans through teaching and training efforts are part of education (Pasuhuk, 2018). Law No. 20/2003 article 13 paragraph (1) states that the education path consists of three paths, namely, formal education, non-formal education, and informal education.

In the implementation of non-formal education, there is one program that can be used as a substitute for formal education, namely the equivalency education program. Equivalency education is a non-formal education program that organizes package A education equivalent to grade school, package B (national senior high school equivalency), and package C (national senior high school equivalency). In the context of education, not only formal education but also non-formal education has the demand to undergo the same learning process. Students are required to be able to go through the learning and learning process to achieve educational goals and learning objectives. In the implementation of the learning process, students are faced with the challenge of completing learning demands related to academic interests and academic activities that can support the development of the potential of students. However, in addition to the learning load and learning demands that must be completed by students at PKBM Al-Fattah, the fact is that students have differences in their academic resilience.

The academic resilience is the ability to adapt well to the academic pressures and demands imposed on them, to rise from the difficulties that exist so that they are able to adapt well to their academic pressures and demands. Academic resilience is very important in supporting the development of self-potential and improving the academic achievement of students.

The fact of differences in academic resilience is reinforced by the complaints of students identified during the initial observation. Students who cannot complete learning tasks and demands choose not to complete assignments by not participating in learning activities. This situation occurs because the students feel unsure of their abilities, while the tutor assesses that the students are actually able to complete the assignment so that the researcher considers that the students have problems with their self-efficacy. This fact is in line with social cognitive theory which emphasizes that when students have a low level of academic self-efficacy, they will feel anxiety and avoid activities that they think are difficult to carry out and difficult to complete, especially in the pressure of academic activities (Makaria et al., 2020).

Self-efficacy is one of the factors that can affect the resilience of students. The self-efficacy that individual shave can make individuals able to deal with various situations. According to (Bandura, 1986, in Rahma, 2011) said when someone has confidence in himself in completing an assignment, it is said to be self-efficacy. According to (Makaria et al., 2020) academic self-efficacy is a feeling of confidence in one's potential to complete assignments and overcome challenges in academic activities.

According to (Gafoor & Ashraf, 2012) When faced with doubts about their potential, it is likely that they will perceive academic demands as a difficult burden that will hinder the development of their potential. Self-efficacy is considered important because it affects students incompleting their academic demands. Students with high self-confidence when doing academic activities are expected to be more eager to do assignments and actively participate inacademic activities. However, if students who have low self-confidence in completing academic demands are vulnerable to doing other activities that can make students not complete assignments so that this can reduce the academic achievement of students (Mukti & Tentama, 2019). Based on this explanation, it is known that self-efficacy has a very important role in determining the academic resilienceability of students. For this reason, researchers want to know how self-efficacy affects the academic resilience of students at PKBM Al-Fattah.

2. Research Methods

This research was conducted at PKBM Al-Fattah using a correlational method with a quantitative approach. The focus of this research is to analyze the effect of self-efficacy on the academic resilience of students of the equivalency program at PKBM Al-Fattah. There are 2 variables used in this study, namely the dependent variable and the independent variable. In this research, academic resilience is the dependent variable and self-efficacy is the independent variable. The population in this research were students of the equivalency program at PKBM Al-Fattah as many as 285 students. The sampling technique used *stratified random sampling. Stratified random sampling* is a sampling technique based on certain levels (Arfan et al., 2019). Because the target of this research is the students of the equivalency program, the respondent strata level in question is from the package A, B, and equivalency programs C.

Research respondents are students from the package A, B or C equivalency program which acts as a sample to represent the character of all elements of the population. In determining the sample size, the Harry *King nomogram is* used with an error rate of 10% (meaning a degree of confidence of 90%). If drawn straight in the *Harry King Nomogram* graph, the percentage of the population taken as a sample is 20% so that the final result is a sample of 59 students. The data collection technique used is a questionnaire.

According to Sugiyono (2019, p. 219) a questionnaire is a set of instruments in the form of statements that will be responded to by respondents, in this case students. The scale used is the likert scale, this scale is considered appropriate for use because the likert scale can measure a person's attitudes, views, perceptions of existing phenomena (Sugiyono, 2019, p. 152). The instruments used in the study went through the validity and reliability test stages first so that the instruments used were reliable and did not produce deviant data (Amanda et al., 2019). Furthermore, when the instrument has been declared valid and reliable, the research can proceed. Existing data is tested for classical assumptions and hypothesis testing through SPSS 23.0 *for windows*

3. Result and Discussion

3.1 Descriptive Statistical Analysis of Respondent Data

In this study, the majority of respondents were dominated by students aged 12 years to 15 years with the youngest age being 12 years old and the oldest being 49 years old.
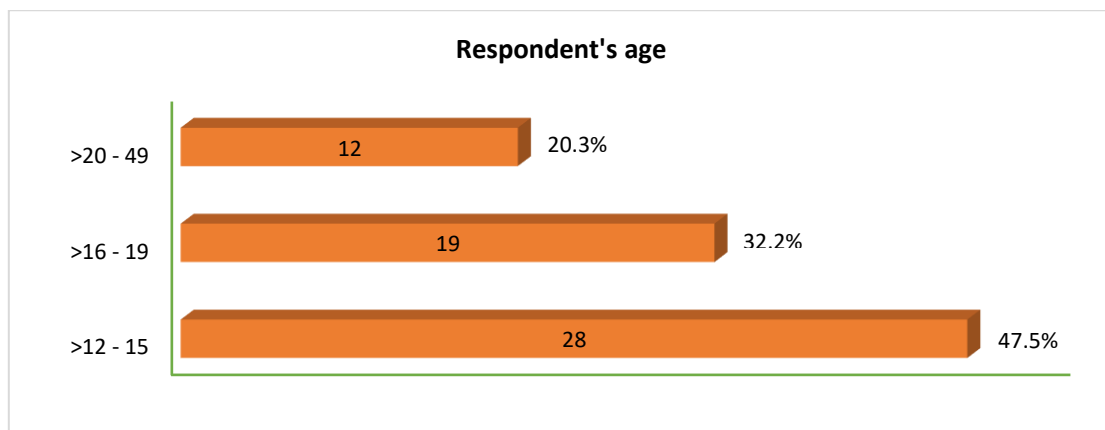
Figure 1 : Age of respondents

In this study, the types of work of students at PKBM Al-Fattah in this case the research respondents are shown in the following diagram.
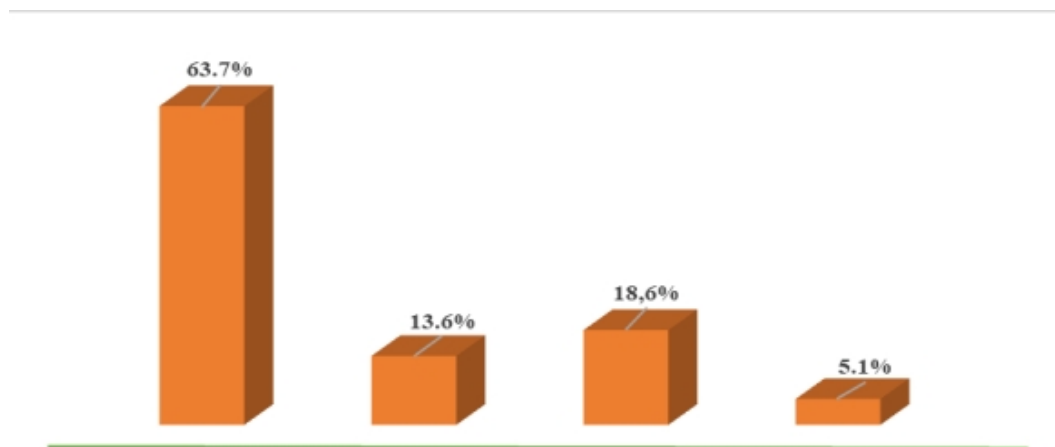
Figure 2 : Occupation of Respondents

Respondents in this study were mostly students with a percentage of 63.7%, then for respondents with a labor profession with a percentage of 13.6%. and learning citizens with jobs as self-employed at 18.6%, then the lowest percentage was in the job as a housewife, with a percentage of 5.1%.

3.2 Descriptive Statistical Analysis of Research Data

Most of the respondents in the academic resilience variable were in the high category, namely 47 study residents with a percentage of 79%, then as manyas 8 study residents were in the medium category with a percentage of 14%, and the remaining 4 study residents were in the low category with a percentage of 7%. Thus it can be seen from the respondents' responses that most of the study residents have high academic resilience.

No	Academic Resilience	F	Percentage
1	High	47	79%
2	Medium	8	14%
3	Low	4	7%
	Total	59	100%

Then, most of the students are in the high category, namely 47 students with a percentage of 76%, then asmany as 11 students are in the medium category with a percentage of 19% and as many as 3 students are in the low category with a percentage of 5%. Thus, judging from the respondents' answers, it can be concluded that overall the students at PKBM Al-Fattah have high self-efficacy.

No	Self-Efficacy	F	Presentages
1	High	45	76%
2	Medium	11	19%
3	Low	3	5%
	Total	59	100%

3.3 Inferential Statistical Analysis

Based on the curve image, it can beconcluded that the image is known to have a normal curve and tends to make a symmetrical pattern. Thus the residualsare declared to spread normally.
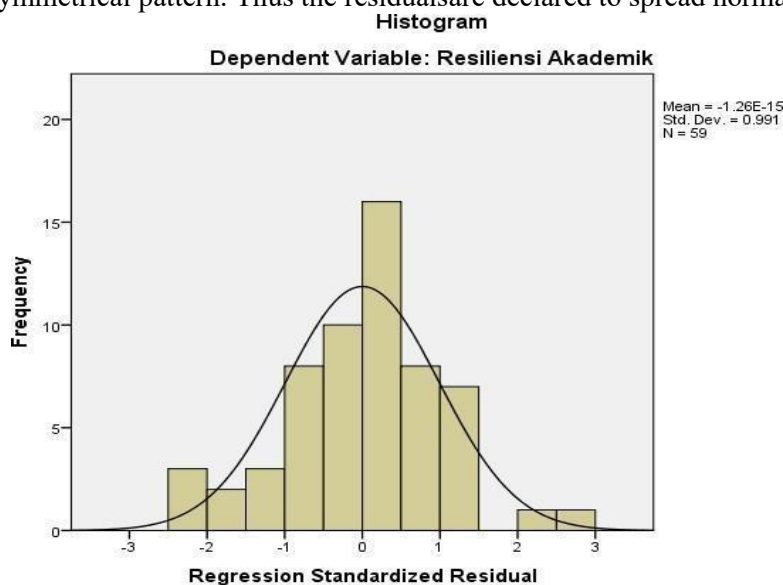
Figure 3 : Histogram

In this figure shows that the residual points tend to spread between the diagonal lines, it shows that the residuals spread normally. Then seen from the results of the assumption test using the *Kolmogorov-Smirnov* method, the analysis *output shows* that the value of Asymp. Sig. (2- tailed) of 0.200 > 0.05 (5%) confidence level. Based on these results, the residual value is interpreted as spreading normally so that the normality assumption has been met.
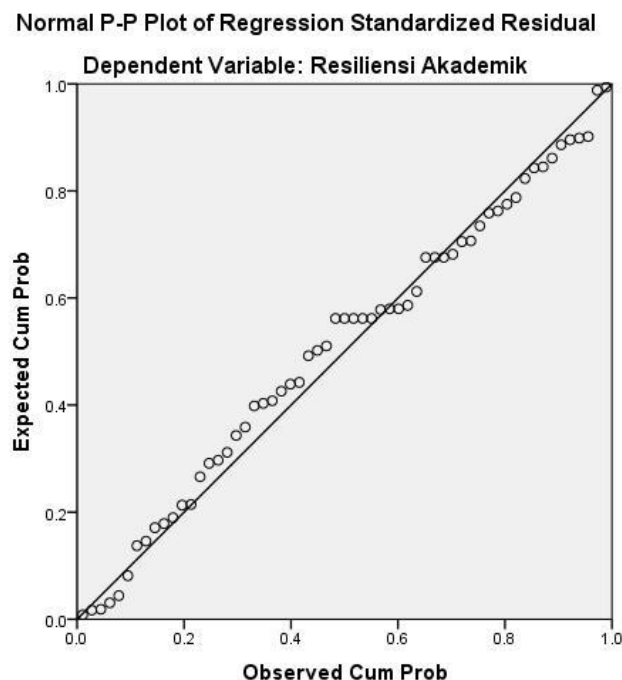

Figure 4 : Probability Graph

Furthermore, hypothesis testing is carried out, the analysis results show that the t value on the self-efficacy variable has a value of 21.907. while the probability value is < 0.05 alpha value (5%) so it can be concluded that H_0 is rejected. Thus self-efficacy has a significant effect on the academic resilience of students at PKBM Al-Fattah

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	9.092	5.523		1.646	.105
Efikasi Diri	2.322	.106	.945	21.907	.000

Determination analysis test (R Square) is intended to determine the contribution of the self-efficacy variable (X) to the academic resilience variable(Y). This analysis can be used to determine the percentage of the influence of the independent variable on the dependent variable. The following are the results obtained from the determinationtest (R square):

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	.945a	.894	.892	7.73116

Based on the results of the R square determination test analysis, a value of 892 was obtained, thus the contribution of the self-efficacy variable (X) to the academic resilience variable (Y) was 89.2%

while the remaining 10.8% was the contribution of other variables that were not included in the model in this study. In addition, the analysis results obtained a correlation value of 0.945. This value shows a very high or very strong correlation or relationship between the self-efficacy variable and the academic resilience variable.

3.4 Discussion

Based on the findings of the research that has been carried out, self-efficacy has a significant influence on the academic resilience of students of the equivalency program at PKBM Al-Fattah. Interpretation of data analysis shows that the contribution of the self-efficacy variable (X) to the academic resilience variable (Y) is 89.2% and the remaining 10.8% is the contribution of other variables that are not included in the model.

This study shows the strong influence of self-efficacy on academic resilience. In addition, the results of the analysis obtained a correlation value of 0.945. This value shows a very high or very strong correlation or relationship between the self-efficacy variable and the academic resilience variable. The results of research on students at PKBM Al-Fattah show that self-efficacy is in the high category with a percentage of 76% and academic resilience is in the high category with a percentage of 79%. A high percentage means that the level of self-efficacy and academic resilience possessed by students of the equivalency program at PKBM Al-Fattah is high. Besides the high level of self-efficacy and academic resilience has an impact on the percentage of the influence of self-efficacy on the academic resilience of students and results in a high correlation value resulting in a strong relationship between self-efficacy and academic resilience.

Compared to previous studies that obtained research results with a percentage that resulted in a moderate level of academic resilience and self-efficacy, research conducted on students at PKBM Al-Fattah has a high percentage, this is influenced by several factors, both external and internal factors. supported by existing literature studies PKBM Al-Fattah students show resilience and can face difficulties and pressures from their academic demands seen in the responses of students in questionnairestatements which show the majority of students have high spirits and do not easily despair in completing learning demands.

Then another thing that affects the high academic resilience of PKBM Al-Fattah students is external protective factors which come from stable and supportive relationships in the environment. The results of respondents answers lead to a strong sense of confidence in completing academic demands so that it affects their level of academic resilience. Students who have a high level of resilience tend to be calm in dealing with situations that they think are difficult, seen in the answers of students in answering the statements of students who do not feel anxious about the answers when taking exams in this case the exam is considered an academic demand and pressure.

Furthermore, according to (Wijaya & Pratitis, 2012) the high self-efficacy possessed by students is indicated to be based on several factors. sources that can cause high self-efficacy include, among others, *perfomamance accomplishment* where the results achieved have given a real impression of individual self-confidence so that it can become the most influential efficacy information, then *vicarious experience is an* activity carried out to observe the success of others so that this success canbecome a model for other individuals who can encourage an increase in self- efficacy, self-efficacy can also be strengthened by *social persuasion*, namely an individual's emotional state where the individual participates in an activity and is affected by his self- efficacy.

Another finding that underlies the high level of self-efficacy and academic resilience of students at PKBM Al- Fattah is caused by the majority of respondents being at a young age as evidenced by the results of the analysis of research data, the majority of respondents are at the age of 12 years to 15 years, at which age the process of rapid self-development occurs both in *IQ (Intelligence Quotient), SQ (Spiritual Quotient),* and *EQ (Emotional Quotient)*. In addition, the majority of respondents are students

so that their daily activities and main activities are related to academic activities and at that age the enthusiasm for learning is at a high level, which can certainly affect the level of self-efficacy and academic resilience of students.

The results showed the suitability of the theory to the facts in the field, one of the things that affects the level of academic resilience is self-efficacy. Self-efficacy is defined as the belief that individuals have in their potential so that they can complete the academic demands placed on them. Self-efficacy affects academic resilience, supported by a literature review which states that someone with high self-efficacy is able to solve academic demands imposed on them.

When a person has low self-efficacy, he will be active in doing assignments so that he can fulfill academic demands. But on the other hand, when someone with low self-efficacy will doubt his abilitiesso that he tends to avoid assignments (Mukti & Tentama, 2019). Based on the explanation above, the results of research that show the effect of self-efficacy on academic resilience with significant results, the results of this study have compatibility between facts in the field with literature review and previous research. There are several other things that have not been reviewed by researchers related to other factors thatcause high levels of efficacy and high academic resilience so that they need tobe studied more deeply in further research.

4. Conclussions

Based on the results of the research, it shows that the effect of self-efficacy on the academic resilience of students of the equivalency program at PKBM Al-Fattah is stated to have a significant effect. The contribution of the self-efficacy variable to the academic resilience variable is 89.2% while the remaining 10,8% is the contribution of other variables that are not included in the model in this study. obtained a correlation value of 0.945. This value shows a very strong correlation or relationship between the self-efficacy variable and the academic resilience variable. The results of descriptive data analysis show that the level of academic resilience and self-efficacy of students at PKBM Al-Fattah are both in the high category with a percentage of 79% for academic resilience and for self-efficacy with a percentage of 76%. For further researchers it is recommended to examine other factors that can affect the high self- efficacy and academic resilience of students.

References

[1] Sugiyono. (2019). *Quantitative Research Methods*. Bandung: Alfabelta

[2] Amanda, L., Yanuar, F., & Devianto, D. (2019). Validity and ReliabilityTest of Political Participation Level of Padang City Community. *UNAND Journal of Mathematics*,*8*(1), 179. https://doi.org/10.25077/jmu.8.1.179-188.2019

[3] Arfan, M., Asnawi, A., & Oetor, E. I.(2019). *Debriefing and Mentoring Community Service with the Title "Sampling Sampling Using Stratified Random Sampling,Kish Grid Respondents and DataTabulation in Legislative Electionsfor Surveyors at the SurabayaSurvey Center*. 1-24.

[4] Gafoor, A., & Ashraf, M. (2012). Influence of School-Image onAcademic Self-Efficacy Belief.*Paper Knowledge. Toward a Media History of Documents*, *2*, 51-58.

[5] Makaria, E. C., Rachman, A., & Rachmayanie, R. (2020). Correlation of Self-Confidence andAcademic Self-Efficacy Guidance and Counseling StudyProgram Students Class of 2018. *JKI: Indonesian Counseling Journal*, *5*(1), 1-5. https://doi.org/10.21067/jki.v5i1.2979

[6] Mukti, B., & Tentama, F. (2019).Factors Affecting Academic Self-Efficacy.*Proceedings otheNational Seminar on Master ofPsychology*, *Ahmad Dahlan University, 0*(0), 341-347. http://seminar.uad.ac.id/index.php/snmpuad/article/view/3442

[7] Pasuhuk, D. S. N. (2018). EffectiveFamily Education. *Kurios*, *2*(1), 70-81. https://doi.org/10.30995/kur.v2i1.2 3 Sudarsana, I. K. (2016). Improving the Quality of Out-of-SchoolEducation in Human Resource Development Efforts. *Journal*

Fostering Metacognitive Development in Geography Students via Technology-Enhanced PBL in Regional Mapping

Siti Kholifah[1], Irena Yolanita Maureen[2]

[1] Department Education Technology, Surabaya State University, Surabaya, Indonesia
[2] Department Education Technology, Surabaya State University, Surabaya, Indonesia

[*]E-mail: siti.21058@mhs.unesa.ac.id, irenamaureen@unesa.ac.id

Abstract. Regional mapping plays a vital role in geography education as it enables a comprehensive understanding of land use and facilitates the mitigation of adverse effects on social and natural systems. Advanced metacognitive abilities are essential for high school students who want to explore fields in geography and mapping. These skills have a substantial impact on their competency and academic accomplishment. Nevertheless, students in secondary school frequently encounter obstacles such as insufficient resources, low levels of monitoring and self-regulation, and restricted availability of adaptable learning materials. This study addresses these concerns by employing a problem-based learning (PBL) methodology that is augmented with digital technologies, such as online resources, Google apps, and multimedia presentations. The problem-based learning (PBL) approach promotes active participation and cooperative learning among students, cultivating their sense of accountability and enhancing their ability to make informed decisions. Combining project-based learning (PBL) with educational technology fosters a captivating educational setting, providing students with vital competencies necessary for thriving in the digital era. This technique has the capacity to greatly improve students' metacognitive skills in the fields of geography and regional mapping instruction.

1. Introduction

Learning activities, specifically material that has procedural characteristics, require metacognitive skills because they are useful to support the learning process (Yoannes et al., 2022). Metacognitive skills can be taught and are an important aspect because they allow students to find the best way to learn, specifically self-learning, can make improvements when making mistakes, and can find solutions when confronted with a problem (Alt and Raichel, 2020; Makipaa et al., 2021). However, in its implementation, many students from various levels of academic ability have low metacognitive abilities. The reason is that students' metacognitive skills are lacking or even deliberately not trained in learning activities. In addition, another cause is the busyness of educators to take care of learning administration, compile, manage, implement, and evaluate try-out results, and encourage the acquisition of good test scores only based on the lecture method (Nurmalia, 2009; Basith, 2012). Students with low metacognitive conditions often also have difficulty with monitoring and self-regulation, even though these are metacognitive strategies that can be taught with the goal of improving student learning outcomes (Schraw & Moshman, 1995; Syal & Praveen, 2024).

To overcome the above conditions, the application of suitable strategies, models, and methods in learning needs to be explored so that students with low metacognitive abilities can be developed. In this context, geography learning, especially regional mapping material in high schools, has the potential or

has even been proven to empower students' metacognitive abilities. In geography learning, especially regional mapping material contains how to identify the type of area, the process of mapping the area, and the utilization of the regional mapping. There is a common problem with regional mapping material, namely that areas that are too large will take a long time to be mapped directly. Therefore, regional mapping can be done quickly and practically with the help of supporting applications that can be accessed online (Kasim et al., 2021). In high school geography learning, regional mapping can be done in two ways, namely digitally and conventionally. In the process of applying both, it consists of the planning stage, the implementation stage, and the analysis stage.

In consideration of the above concerns, researchers are motivated to apply a simple teaching method through conventional area mapping to improve students' metacognitive skills using digitally-assisted problem-based learning. Problem-based learning can provide a lot of new knowledge to students because it is related to their ability to solve real-life problems (Aslan, 2021; Ariyani et al., 2021). Problem-based learning can improve students' ability to design, identify, interpret, and solve problems because its application focuses on students' active participation (Andriyani and Suniasih, 2021; Ariyani et al., 2021). In this case, problem-based learning can be an alternative to improving the metacognitive skills of high school students because its application is in accordance with the ability of students to collect and integrate new knowledge so that they can understand and manage things with their thinking skills, not just learning from teachers and books; it can overcome the problem of the ability to work in groups (Haerullah and Hasan, 2017).

2. Literature Review

2.1 Metacognitive

Metacognition is an individual's awareness of the development of the cognitive process of the student himself. The level of metacognitive skills is an important aspect because it contributes significantly and has an impact on student competence and academic achievement (García et al., 2016; Poveda, 2022). In problem-based learning, metacognitive skills are needed because it is an appropriate process to support the problem-solving process (Georghiades, 2004; Poveda, 2022). The process includes planning, monitoring, and evaluating, which is a complex process that requires controlling the thought process, emotions, and motivation to make adjustments independently to solve a problem through decision-making (Poveda, 2022).

2.2 Problem-based Learning

Problem-based learning is a learning model that presents a variety of authentic problems as a springboard for conducting research (Arends, 2012). In its implementation, PBL can improve critical thinking skills and students' ability to solve problems using investigative skills (Silvi et al., 2020; Aminulloh et al., 2022). In this model, students will solve real problems related to everyday life so that they can produce good intellectual abilities and development (Zulfa et al., 2022; Rohmatin et al., 2022). PBL has the characteristics of encouraging students to investigate independently through interaction and the collaborative exchange of ideas to build knowledge, while the teacher acts as a facilitator, supervisor, and motivator (Barrow). In its implementation, the PBL learning model must be implemented by the steps (syntax) of learning so that learning objectives can be achieved. The PBL syntax developed by Arends (2012) is as follows:

1. Orientation of students to problems
   The first step taken by the teacher is to explain the learning objectives, explain the needs and equipment needed during learning activities, and motivate students to be actively involved in problem-solving activities.
2. Organize students to learn

Then, the teacher will help students define and organize learning tasks related to the problem.

3. Guiding individual and group investigations

At this stage, the teacher encourages students to gather appropriate information and conduct experiments to find explanations regarding the solution to the problem.

4. Develop and present the work

The teacher will assist students in planning and preparing appropriate work products, such as reports and others, as well as presenting them to other students.

5. Analyze and evaluate the problem-solving process

Finally, the teacher facilitates the students in evaluating the learning outcomes regarding the material that has been learned, as well as reflecting on the students' process when solving the problem.

3. Methodology

3.1 Participants and Research

Context In this research, the respondents consisted of 60 students, with details of 30 students (control class) and 30 students (experimental class). Students were in their second semesters; all students were from Indonesia and aged 17 to 18 years old.

3.2 Research Design

This research is experimental. Experimental research is a research method conducted by means of experiments. Experimental research is a method used in quantitative type research, applied to determine the effect of independent variables (treatment) on dependent variables (results) under controlled conditions (Sugiyono, 2019: 111; Zyra, S. N., et al., 2022). Experimental research is the only type of research that can test hypotheses correctly and is bound by cause-and-effect relationships (Gay, 1981: 207–208; Ratminingsih, 2010). This research uses a quasi experiment research design, commonly called pseudo-experimental. A quasi-experiment requires a control class that is used as a comparison (Creswell, 2003: 168–170; Ratminingsih, 2010). The data for this research is collected through pre-test and post-tests, which will be given in the form of a questionnaire instrument. This type of research is suitable for researchers who will apply a particular learning model, approach, strategy, or method. This type of research has the goal of developing certain student competencies (Isnawan, 2020: 7-8).

3.3 Teaching Materials

The control class consisted of 30 students. During the learning process, students can use their respective gadgets. Learning activities on regional mapping material will use the syntax of the problem-based learning (PBL) model with pre-designed activities. The regional mapping material will be explained as briefly as possible, with key points. Students can determine the type of area to be mapped, then identify the process and evaluation of making a map of the area. During the problem-based learning process, students can express opinions, have discussions, and use their respective gadgets to carry out the following activities:

Syntax	Learning Activities
Apperception and motivation	- Students and teacher exchange opinions about students' experiences when traveling (e.g., about travel tracking). - The teacher emphasizes that the previous activity is a form of analysis of the region.
Orientation of students to problems	Students will be given various examples of the results of regional mapping, such as:

Syntax	Learning Activities
	• Critical land map (overlay of slope map, soil solum map, land cover map); • Social/economic facility location map (overlay of population density map, road access map, population income map); • Health facility development map (overlay of road access map, population density map, population mortality map); and others
Organize students to learn	Students will form groups based on the number they get when taking the paper. One group consists of five members. (adjusted to the total number of students in the class). Each group prepares equipment and materials used for regional mapping learning activities.
Guiding individual and group investigations	Students begin to look for causes, solutions, and supporting data that can be used to map the area. The teacher will act as a supervisor and help students when they have difficulties.
Develop and present the work	The teacher and each group will discuss it to exchange opinions, ask questions, and make sure the solution findings are correct.
Analyze and evaluate the problem-solving process	Teachers and students can be evaluators of each other. Every expression of opinion expressed by students will be proven by supporting data and the results of the area mapping that has been created.
Closing	The teacher will point out common mistakes made by students during the discussion.

3.4 Assessment Instrument
Metacognitive skill measures
Metacognitive skills contain three aspects (Kyriakides et al., 2020; Vries et al., 2022), including:
1. Planning Aspect
   In this aspect, students plan learning strategies (including how, what, and when to act) in the learning process so that learning objectives can be achieved (Desoete and De Craene, 2019; Vries et. al., 2022). Choosing the right learning strategy to solve a problem can be done by connecting prior knowledge and current knowledge (Shilo and Kramarski, 2019; Vries et al., 2022).
2. Monitoring Aspect
   In this aspect, students have found and determined the learning strategy that will be used to do the task, start doing the task, and then try to achieve the learning objectives. Students' efforts in this regard will be monitored. The results of the monitoring can be used to identify the difficulties and capacity of students to complete the task. Students can identify correctly if they have prior knowledge of the task, so that the difficulties faced can be distinguished properly (Desoete and De Craene, 2019; Vries et al., 2022).
3. Evaluation Aspect

Once students have completed the task, they can evaluate the effectiveness of the learning strategy they have previously determined. Students can diagnose errors in the task so that conclusions can be drawn about whether they should rework the task or change their alternative learning strategies. In this aspect, the knowledge that has been gained from completing the task can be used to improve mastery of the material for students (Shilo and Kramarski, 2019; Vries et al., 2022).

Assessment of Metacognitive Skills

The data for this study were collected through pre-test and post-test. Pre-test and post-test will be given in the form of questionnaire instruments as well as questions and answers during the area mapping process so that students' metacognitive skills can be measured. This questionnaire instrument is used to measure students' beginning and end abilities in planning, implementing, and analyzing efforts during area mapping learning activities in the experimental class. There are three components used to measure students' metacognitive abilities (Mahamde et al., 2021). Meanwhile, in this study, there is a scale used to fill in the assessment component, with a description of the rating scale as follows:

No.	Aspect	Scores			
		1	2	3	4
	Planning; their learning activities according to their ability to understand the material				
1.	I know how well I understand the subject matter I have just studied				
2.	I will more easily understand topics or subject matter that I am interested in				
3.	I really know how to remember the knowledge, understanding, or concept in biology that I have finished studying				
4.	When I look at a problem, I am confident that I can solve it				
5.	I set learning goals or targets before I start studying a topic or subject matter				
6.	Before I use a method to solve a problem, I try to find several alternative methods				
7.	I believe that there are many problem-solving strategies or ways that I can choose from that are convenient for me				
8.	I focus my attention on the data of the problem I need to solve or resolve				
	Monitoring; Self-monitoring of learning activities				
9.	I use several ways to learn a topic or subject matter that are appropriate to the material				
10.	In order to solve a problem, I try to remember the methods I have used to solve other similar problems				
11.	In order to understand a topic or subject matter better, I use examples that I make up myself				
12.	If I don't understand a topic or subject matter, I ask other friends or the teacher for help				
13.	If I find difficulties in problem solving, I read or look at the problem again. Evaluation				
	Evaluating; the results of his work				
14.	I gain more knowledge if I already have prior knowledge about a topic				

No.	Aspect	Scores			
		1	2	3	4
15.	I understand a topic or subject matter better if I use pictures or diagrams				
16.	I understand a problem better if I rewrite the data in this problem				
17.	I test my own success when I study subject matter that is new to me				
18.	When I am solving a problem, I try to look at aspects or parts of the problem that I do not understand				
19.	After I finish a job or solve a problem, I think about whether I really gained any new benefits or lessons that are important				
20.	After I finish my work or solve my problem, I know how well I succeeded in my work				

3.5 Data Analysis

As written, the experimental and control classes each consisted of 30 students. Normality and homogeneity variants were used to distribute the pre-test and post-test. The data normality test uses the Shapiro-Wilk normality test. The Shapiro-Wilk normality test is a test that has the aim of knowing the distribution of random data in small samples used to simulate data with no more than 50 samples (Sugiyono; Agustin & Permatasari, 2020: 179). The basis for making the Shapiro-Wilk normality test decision is based on probability (asymptotic significant), namely that if the probability value (stated) > 0.05, then the distribution of the population distribution is normal, whereas if the probability value <0.05, then the distribution of the population distribution is not normal (Singgih Santoso; Agustin & Permatasari, 2020: 179–180).

The data analysis in this study also used a homogeneity test. The homogeneity test is a test conducted to determine whether the variations in two or more distributions are declared "the same". The homogeneity test is actually not an absolute requirement in the independent sample t-test; even though the assumptions in the homogeneity test are not met, the independent sample t-test can still be carried out if the data used is normally distributed (Sudjana, 2005). The basis for making homogeneity test decisions is based on the following statement: if the significant value (stated) > 0.05, the variants of two or more population groups are the same, while if the significant value (stated) < 0.05, the variants of two or more population groups are not the same (Agustin & Permatasari, 2020: 180).

Hypothesis testing in this study used a partial hypothesis test (T-test). A partial hypothesis test (T-test) is a statistical technique that has the aim of testing the average difference between two samples or groups. The T-test can be used on data that has the same and not same variance, in other words, data that is normally distributed-homogeneous and normally distributed-not homogeneous. The data in this study were processed using the independent sample t'-test method, which aims to compare the results of the pre-test and post-test on the not same group of students. The basis for making T'-test decisions is based on the following statement: the alternative hypothesis is accepted if the p-value resulting from the test is smaller than the specified significance level ($a = 0.05$), while if the p-value is smaller than the significance value, it can be concluded that there is a significant difference between the two groups.

4. Results

Development of Metacognitive Skills

Metacognitive skills consisting of several components were tested both in the pre-test and post-test. The experimental or comparison group test results using Shapiro-Wilk normality were 0.162. That is, the results are greater than the probability value (say) > 0.05. The homogeneity test was carried out on the

Levene test, which obtained a result of 0.041. The homogeneity test was conducted to determine the equality of the tested groups. If the result is smaller than the significant value (say) < 0.05, it means that the two groups are not the same (not homogeneous). If the data from the two classes are normally distributed and have an inhomogeneous population, then the next test uses the t'-test or independent sample t'-test. Based on the results of the T'-test, the Sig. (two-tailed) of 0.000. This value is smaller than the specified significance level (0.05). The level of significance shown has a statistically significant difference. These results mean that the application of digital problem-based learning has a significant difference between the average pre-test and post-test scores in the control class and experimental class tests regarding metacognitive abilities.

5. Conclusion

Learning activities designed using certain approaches can make the classroom atmosphere diverse and can be utilized to improve students' metacognitive skills because learning is the closest container for them. Fostering students' metacognitive skills cannot only use conventional approaches that focus on understanding concepts or solving problems directly, but requires a more structured method, allowing students to be more aware of their thinking processes and how to organize and evaluate their own learning strategies. Problem-based learning can be one of the appropriate approaches because its application encourages students to think critically when solving real problems that require the ability to plan, monitor, and evaluate the learning strategies that have been used (de Vries et al., 2022). This is in line with the advantages of problem-based learning, which encourages students to take responsibility for their independent learning (Hmelo-Silver, 2004). In addition, through teacher guidance and problem identification in the activities of determining the types of areas that can be mapped, the mapping process, and the utilization of the mapping, students can develop a deep understanding of the regional mapping material and build sustainable problem-solving skills (Fournier, 2002).

Each activity in problem-based learning has an influence on students' metacognitive development, so overall, this research shows that digital problem-based learning design can be a promising alternative to improve students' metacognitive skills, especially in secondary schools (Mahdalena and Mayasari, 2019). Given that metacognition is a skill that can be taught to students because it has an important function to encourage learning activities (Alt and Raichel, 2020; Makipaa et al., 2021). The use of technology in PBL not only enriches students' learning experiences but also supports their critical development towards a more comprehensive understanding and application of geography. Thus, the implementation of technology-enhanced PBL can be considered an effective strategy for stimulating metacognition and preparing students for intellectual challenges in geography. In addition, the digital problem-based learning design also allows learning activities to be implemented optimally.

References

[1] Agustin, P., & Permatasari, R. I. (2020). PENGARUH PENDIDIKAN DAN KOMPENSASI TERHADAP KINERJA DIVISI NEW PRODUCT DEVELOPMENT (NPD) PADA PT. MAYORA INDAH Tbk. Jurnal Ilmiah M-Progress, 10(2).

[2] Arends, R. I. (2014). I am learning to teach. McGraw-Hill.

[3] A. Ariyani and F. Kristin, "Model Pembelajaran Problem-Based Learning Untuk Meningkatkan Hasil Belajar IPS Siswa SD," Jurnal Imiah Pendidikan dan Pembelajaran, vol. 5, no. 3, p. 353, Aug. 2021, doi: 10.23887/jipp.v5i3.36230.

[4] Basith, A. (2012). Potensi strategi reciprocal teaching untuk memberdayakan keterampilan metakognitif siswa sekolah menengah berkemampuan akademik rendah pada pembelajaran biologi. In Prosiding Seminar Biologi (Vol. 9, No. 1).

[5] E. J. Fournier, "World Regional Geography and Problem-Based Learning: Using Collaborative Learning Groups in an Introductory-Level World Geography Course," 2002. [Online]. Available: https://www.jstor.org/stable/27797930

[6] Haerullah, A. H., & Hasan, S. (2017). Model dan Pendekatan Pembelajaran Inovatif (Teori dan Aplikasi).

[7] Hmelo-Silver, C. E. & Barrows, H. S. 2006. Goals and Strategies of a Problem-Based Learning Facilitator. The Interdiciplinary Journal of Problem-Based Learning, (online), 1 (1):21–39, (http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1004& context=ijpbl).

[8] I. A. Rohmatin, A. Racmayani, and J. Jumadi, "Development of an E-Module Based on Flipbook Learning Model Problem-Based Learning (PBL) to Improve Critical Thinking Ability," Berkala Ilmiah Pendidikan Fisika, vol. 10, no. 3, p. 342, Dec. 2022, doi: 10.20527/bipf.v10i3.13655.

[9] I. L. Poveda, "Incidence of the use of metacognitive thinking skills in problem solving: Case of mechanical physics students for engineering," Investigacoes em Ensino de Ciencias, vol. 27, no. 2, pp. 57–77, Aug. 2022, doi: 10.22600/1518-8795.ienci2022v27n2p57.

[10] Isnawan, M. G. (2020). Kuasi-Eksperimen (1st ed.). Nashir Al-Kutub Indonesia,

[11] J. A. de Vries, A. Dimosthenous, K. Schildkamp, and A. J. Visscher, "The impact of an assessment for a learning teacher professional development program on students' metacognition," School Effectiveness and School Improvement, vol. 34, no. 1, pp. 109–129, 2023, doi: 10.1080/09243453.2022.2116461.

[12] Kasim, M. R., & Anies, M. K. (2021). Identifikasi Potensi Dan Masalah Dalam Pembuatan Peta Desa Berbasis Sistem Informasi Geografis (SIG) (Studi Kasus: Desa Paddinging, Kecamatan Sanrobone, Kabupaten Takalar). Geo-Spatial Proceeding.

[13] Krisdianata, Y. Y., & Kuswandono, P. (2022). INVESTIGATING EFL HIGH SCHOOL STUDENTS'METACOGNITIVE AWARENESS IN WRITING. Jurnal Basis, 9(1), 185–196.

[14] Mahdalena, M., & Mayasari, R. (2019, December). Pengaruh Model Problem-Based Learning (Pbl) Terhadap Keterampilan Metakognitifsma Negeri 8 Banjarmasin. In Prosiding Seminar Nasional SIMBIOSIS (Vol. 4),

[15] T. Mäkipää, M. Kallio, and R. Hotulainen, "Finnish general upper secondary students' metacognitive awareness in foreign language learning," Reflective Practice, vol. 22, no. 4, pp. 446–458, 2021, doi: 10.1080/14623943.2021.1913720.

[16] Ratminingsih, N. M. (2010). Penelitian eksperimental dalam pembelajaran bahasa kedua. Prasi, 6(11).

[17] R. D. Mahamde, F. A. Darmawan, and J. D. Malago, "Metacognitive skill assessment model through the blended learning management system in vocational education," Jurnal Pendidikan Vokasi, vol. 11, no. 1, Mar. 2021, doi: 10.21831/jpv.v11i1.36912.

[18] Sudjana, N. (2005). Metode Statistika Edisi keenam. *Bandung: PT. Tarsito*.

[19] Syal, U., & Praveen, S. (2024). Relationship between Metacognition and Academic Success. Educational Administration: Theory and Practice, 30(4), 9081–9085.

[20] W. R. Aminulloh and H. Suryaman, "Application of the Learning Model: Problem-Based Learning to Increase Learning Outcomes in Budget Plan Subjects," Education and Human Development Journal Tahun, vol. 7, no. 2, 2022, doi: 10.33086/ehdj.v7i2.

[21] Zyra, S. N., Alamsyah, T. P., & Yuliana, R. (2022). Penggunaan E-Learning Berbasis Edmodo Terhadap Hasil Belajar Kelas 4 Sekolah Dasar. Jurnal PGSD: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar, 15(2), 97–106.

Implementation of Construction and Training (Binlat) Noken Polri Teaching Year 2020 using the Method of Experiential Learning

Robbyanto Seahaan[1*] and Entoh Tohani[2]

[1,2] Universitas Negeri Yogyakarta

*E-mail: robbyantoseahan.2023@student.uny.ac.id, tohani@uny.ac.id

Abstract. Personal Polri recruitment aimed at Native people of Papua or Noken should be done in an exclusive way, one of them using the Method of Experiential Learning. The various cases of social disparity that occurred are the cause that to shape Papua Character is not only by forming physical strength but also the need to utilize Experiential learning that forms a sense of unity of the Republic of Indonesia through psychological approach. The aim of this research is to conduct an analysis of the use of Experiential learning on the Blinlat noken Polri school year 2020 which has gone well and effectively. The research was carried out using descriptive qualitative techniques to describe the process of Binlat activities of Polri members in Polda Papua which utilizes experiential learning when implementing Binlat so that it is possible to express a sense of unity in the hearts of the participants. The kind of research that is used is by doing observations, interviews, and documentation. The subject of this research is the construction and training activities of Noken Polri in 2020. The results of the research show that the use of Experiential Learning in Binlat Polri Year 2020 proved effective demonstrated by the success of the participants completing the qualification and being able to survive and perform after three years as a Polri member.

1. Introduction

The social problems that occur in Indonesia are becoming more complex in the era of Industry 4.0 towards Society 5.0 which relates to the Union and Union of Nations in particular in Papua. The complexity that occurs in Papua society is greater as the social and educational disparities that exist in Papua indigenous societies. The social disparity that occurred as a result of the increasing isolation of Papua Indigenous people in various economic, political, social and cultural competition when compared with the existence of non-Papuan societies that dominate various aspects of life in Papúa. Such discontent could potentially become dissatisfaction that ended in riots of some societies who feel that the Papua land as the heritage rights of the Papua people, but in fact the result of Papua land wealth has not made the Papua native people as a group enjoying the meaning of true well-being. Keywords: National Character Education, Recruitment, Polri Personnel

Most Papua indigenous people still live in retardation and cannot be categorized as a prosperous society. Although the people of Papua obtained a special autonomy fund – the decus granted to the Papua province is 2% of the ceiling of the Government's 25-year National Grants Fund starting in 2001 to accelerate the removal of the Papua people from poverty through the Act No.21 of 2001 as last amended by Law No.2 of 2021 and also the current Act No.1 of 2022 on the Financial Relationship of the Central Government and the Regional Government, officials in Papua still have constraints to

distribute and utilize the aid funds optimally, so that the relatively large annual funds become less optimal for use by the entire Papua community, especially the Papua Native people.

Polri as one of the leading guards of the State Institution in support of the strongness of NKRI initiated recruitment of 274 youths of Papua indigenous who were specifically recruited from various tribes both those who live on the coast and the tribes who live in the mountains. Teenagers aged 18 to 27 were recruited with all kinds of facilities to become candidates for the Caba Noken Polri abbreviation without having to compete with Non-Papuan teenagers who are usually relatively superior and dominate the recruitment of TNI/Polri members. Being a member of the TNI/Police is an ideal of Papua youth in addition to the choice to be a footballer, but the fact in 2015 Polri recruited 1500 youths of Papua native and educated in 15 SPN (School of State Police) spread throughout Indonesia, after Education Establishment (DIKTACBA), a total of 1200 people of 1500 recruits have done dissertation (out of the Police) either resigned or dismissed with disrespect (PTDH). The results of an interview with AKP ED, on 15/11/2020 at 12.00 PM at SPN Polda Papua in Jayapura about the dismissal of former students of Bintara OAP during the Polri Dictukba in various SPNs during the past year of 2015 from SPN-SPN where they performed Polri dictukba and after they served.

Mr. Kapolri General Idham Azis through the Human Resources (SDM) Capolri Assistant, Irjen Pol. Dr. Eko Indra Heri M.M. was in office last year 2019 to carry out special recruitment (Reference: Law No. 2 of 2002 on the State Police of the Republic of Indonesia; Decision No. kapolri: Cap/ 2513/XII/ 2019 dated 23rd in the Recruitment of the Chief of State Police Polri in the Budget Year 2020; Letter of duty of the chief of state police of Indonesia No. Sgas/ 14/I/DIK.2.1/2020 dated 22nd January 2020 on the Formation Team of the Module Binlat Prabintara Noken Polri for the Reception of the Polri Chief in the Fiscal Year 2020) and made a breakthrough in giving opportunities to the children of Chiefs of the Tribe and large families as well as the communities in Papua coastal and mountainous areas to be recruited as candidates for Polri by means of the routing system and Polres and Polsek local. In addition, the Teams of Instructors and Nurses from Polda Papua and West Papua were prepared through the Train of Trainer to join the Team of SDM experts Mabes Polri to educate the native people of Papua before conducting the DITUKBA Polri of the pupils (united) of the Native Bintara candidates of Papua, later called CaBa Noken. The Bintaras Noken candidates were given the National Character Building and Education which was centralized in implementation at SPN Jayapura. The Nation's Character Building and Training is based on curriculum, curricula, instructions and teaching materials based on Experiential Learning Methods (Reflective Experience) and NLP (Neuro Linguistic Programming) prepared by the Performing Team (Task Letter No. Sgas/ 7/ I/ DIK.2.1/ 2020 coordinated by the SDM Assistant Mabes Polri through the FGD process, preparation of curriculums/silabus/ modules/ instructions/ materials and various limited meetings until the visit of Karo SDM Mabes POLRI and the representative of the composing team to the SPN Polda Papua to prepare the location of the Bintara Pra Binata Noken Polri TA 2020 past.

In accordance with the mandate of UUD NRI in 1945, in order for the National Perspective to touch the feelings, feelings and creations of every citizen, it is necessary to renew the teaching of national insights that touch the sense and soul, starting with the uniqueness of faith and humanity as the identity of the Indonesian nation through the curriculum/module/instructions and teaching materials compiled by the Team of Formulars using the Methods of Experiential Learning – Reflective Experience and NLP – Neuro Linguistic Programming as the basis of learning and instruction CaBa Noken Polri TA 2020 is incorporated in the 45th Army Bintara.

Seeing the poleksosbudhankam situation in Papua and the development of groups that have not understood the Indonesian that are inherent in the Papua society both coastal communities and Papua mountain communities, in the form of resistance KKB (Armed Criminal Group) or OPM (Papua Merdeka Organization) then it is felt the importance of curriculum / curricula / modules / instructions /

teaching and teaching materials to include the material of National Perspective in line with the pupils who are the generation of millennials and generation Z with the method that invites pupils to learn through games and simulations that provide enlightenment and discovery of himself humanistically that position the whole unit as the subject and actor of learners who play a role in this new learning process. Experiential Learning is a method developed by David A. Kolb who is Chairman of the Experience Based Learning System (EBLS), an organization initiated by him in the 1980s that carries out research and practice of this reflecting experience method. Prof.David A. kolb is known in his research – experiential learning experience as the source of learning and development which was then the reference book of Experientials learning practitioners for more than 30 years. (David A. Kolb – Experiential Learning, Experience as the Source of Learning and Development, 2015 Pearson Education, Inc.)

Experiential learning is a process where by knowledge is created by the transformation of experience. Basically, the two-month Noken Binlat at the Papua Polda SPN in Jayapura triggered a Nation Character Education that is based on the Indonesian Nation's Self-Essence that reinforces the militantism towards Indonesians and the love of the homeland of Indonesia from the OAP teenagers who are at the crossroads, where their parents are relatively inclined to support the separation of Papua from the NKRI, while the younger generation is divided in some positive and negative views against the NKII. Those who disagree assume that the 1969 PEPERA, which the United Nations has approved, is not completed. One of PEPERA's historical perpetrators, Ramses Ohee (son of Abner Ohee who was present at the Youth Swear Congress on October 28, 1928) is also presented as a living witness that Papua is part of the Tidore kingdom which submitted to the Majapahit kingdom that united Nusantara.

Furthermore, your National Character Education, taught for this young generation is very effective through the method of adult learning / Experiential Learning (EL) - Reflective Experience and NLP-Neuro Linguistic Programming that focuses on the learning process rather than the learning outcome. According to Simon Priest (1984;...) the EL learning process is divided into four categories: Recreational (Change Feeling), Educational (change thinking), Developmental (change attitude and behaviour) and Theurapeutic. (Re-Directional).

The effectiveness of NLP to enhance the character of learning citizens has been done before and has proven to be effective both directly and indirectly. Turistiati, (2021:1) researched on character development training using NLP in learning. The results of the study mentioned that with NLP, participants were able to improve knowledge and communication used to meet everyday needs. Especially in role-play activities. Besides, this research also discusses the collaboration of the use of NLP and gatdet technology that is currently starting to be used for learning activities. NLP is seen to play an important role in reducing mismanagement between individuals or groups of one with another. With NLP, the focus of learning is no longer the ultimate value, but the meaning of every process carried out. Continue with the journal Sriyanti Dwi Astuti, (2023:1) which states that the use of NLP in learning can change the negative patterns of behavior of pupils in a more positive direction. As for behavior that stands out in behavioral change in terms of emotional management, respect, and mutual respect. It can be concluded that NLP is needed in the activities of Binlat Pra Bintara Noken Polri to improve character education especially in terms of enhancing positive character, appreciation, respect, and emotional management. Those three characters are basic values. NLP or Neuro Linguistic Programming is able to shape the attitude and personality of students in sharing problems with language patterns that correspond to the character of students that will then shape life and behavior (Iryani, (2023:247).

Simangunsong (2022:59) is a writer who cares about the formation and training of the West Papua Police Youth Intelligence and has conducted previous research. The results suggest that Polri needs to make a transformation in the process of selection of superior seeds especially in the West Papua region. The results of Simangunsong's study of national behavior with the experience learning approach have a significant correlation and are able to cultivate a positive character, i.e. have the initiative to invite

others to behave according to their own identity and have a national soul. There are shortcomings in this study, namely that there is no evaluation of the research related to the success of the NOKEN Polri T.A. 2020 Programme. With this research, it is expected that all the deficiencies can be corrected and those related to development of NOKen Binlat for teenagers, the OAP is able to refine and add research references related to evaluation and training using the Methods of Experiential Learning - Reflective Experience and NLP.

2. Literatures

2.1. Non-formal education

Non-formal education is a learning process that is not bound by a formal structure such as a school or university. PNFs can include a variety of programmes such as courses, training, workshops and other activities outside the formal environment. The purpose of non-formal education is to provide learning opportunities to individuals outside the context of formal education. Non-formal education can be aimed at a wide range of groups, from children, adolescents, adults to workers who want to improve their skills. Learning methods in Nonformal Education can vary widely including online courses, workshops, mentoring, internships or even community-based learning. Non-formal education often plays an important role in community development. It can help improve community members' skills, encourage entrepreneurship or promote awareness of specific issues.

There are a number of challenges in organizing non-formal education including funding, recognition and evaluation of learning outcomes. But there are also opportunities for innovation and flexibility in providing education that meets the needs of individuals and societies.

Comb and Ahmed (1985) explained that non-formal education is a variety of educational activities organized and held outside the formal system, both carried out alone and part of a wide range of activities aimed at serving education to a particular learner in gaining access to the hope of learning outcomes.

2.3. Eksperiential Learning

It is a learning process involving each participant in a new and challenging activity designed on the basis of a training program in which the participant will be actively involved in order to acquire values, inspiration and even a breakthrough in a structured program whose objective is:
a. Provide practical, immediate and "bottom up" experience of self-experience (not listening and only seeing, but experiencing it) that enables the individual to be able to apply values and inspirations and even breakthroughs into his personal life.
b. Create a reflection of learning from practical experience experienced.
c. Connect the relevance of values, inspiration and breakdown acquired from the above reflection process.
d. d. Apply learning from the thinking process into concepts connected with the theory (if any) by stimulating the development of the ability to think together creatively and comprehensively.

David A. Kolb (2008:13) argues that Experiential Learning translated as reflecting experience is a process in which knowledge is created through a transformation of an experience. Asia Works, a self-development and character training institution based in Kowloon, Hong Kong through its founder Chris Gentry in 1997, stated that reflective experiences are a process in which participants gain values, inspiration and breakthrough through the active participation of their participants in a structured program.

Simon Priest (2013:23) categorizes experience-based learning into four categories: Recreational that changes a person's feelings, Educational that can change the way a person thinks, Developmental

that changes an attitude and behavior and Teurapeutic that can re-directional something that is already deviant, for example, in the attitudes and behaviour of a drug addict or victim of KDRT/Bullying/Prejudice/Discrimination.

Robby Seahan through the Bangun Insan Nusantara (Act No.... year) and the Pancasila Ideological Observer Foundation (Akt No.... year) from the experience of providing training for the candidate Air Navigators Garuda Indonesia (2008-2018 a total of 554 troops from the 254 Army and Citilink (2013-2017) a total Of 73 troops, BCA (2023-current) a whole of 46 troops with a duration of training 4-11 days, Binlat Caba Noken Polri (TA 2020-274 people), Binlat Barekpro Polri from Aceh to Papua (TA2021,TA2022 and TA2023, respectively, 8001200 and 1500 people, binlat BaOtsus Polri for the West Papua province 1500 people and a number of 2000 people (TA 2023) program is designed based on curriculum, syllabus/modules and teaching materials specially made to suit the needs of Bintara Noken for OAP, Rekpro and for the whole of Indonesia Special Decisions of Khomi for Polynesia in West Papua and Papua. The conclusion is that the training in each stage (Conditioning and Monitoring Sessions) is based on a reflective experience method that ends in the participant's self-transformation of attitude and behavior changes that are monitored in the logbook of each participant during the training which contains 4 stages of behavioral change as follows:

a. level one when the level of understanding of something only for himself, has not applied to himself even.
b. level two, when the stage of understanding a participant understands and does for himself.
c. level three, when a level understanding one participant knows / understands, do what he understands as well as invites others to know / understand and do for the concerned self.
d. level four, when level of knowledge one does for herself, do for him, invites other people to do for each other and be an example for others (Role Model).
e. level five, when stage four is done and able to contribute to its environment, society, nation and country.

The Reflective Experience Method has been implemented in the Lemdiklat Precision Curriculum of Polri since the revision of the Polri's Precision curriculum based on the completion of the Precisioncurriculum at Hotel Kristal Pondok Indah, South Jakarta in 2022.

Wikanengsih, (2013:181) summarizes learning activities using character oriented NLP learning model (MPNLPBK) with five phases of learning activities namely preparation, acquisition, elaboration, formation, and integration. In line with the stages of character education set out by Lickona (2004) through moral knowing, moral feeling, and moral action.

The first stage is the preparation of learning, the educator conveys the current material connection with the previous material so that the student can understand the importance of learning according to the logical thinking. There is a continuity between learning now and before. The second stage is the acquisition or acceptance, the educator gives a sheet of information and science following his instructions to do. The third stage is elaboration, the student discusses to explore knowledge with other friends so that there are principles to help each other in acquiring knowledge. The fourth stage is formation. Students apply learning methods and techniques that can enhance memory and burial. Give compliments if the student is able to understand and conform to what the educator expects. The final stage is integration, by composing a work.

As for the principles of NLP-based learning, step-by-step (pacing) and lead (leading). Stepping or pacing begins by giving the student the form of a pancake with questions related to the theory of science. Next in the leading stage the teacher gives the course to the pupils so that there is a pleasant interaction and harmonious emotional connection. The harmonious relationship between the educator and the student can produce the hormones of happiness that encourage the student to behave well in accordance

with the instructions of the teacher. Other relationships formed by NLP are the embrace of signs of understanding, applause as a form of physical touch, smiles, and compliments.

NLP is capable of providing a harmonious closeness that enhances the passion for learning. It's very useful for students to be able to volunteer. The classroom atmosphere became warm, discussions learned well, criticism and advice delivered voluntarily.

3. Method

The research was carried out using descriptive qualitative techniques to describe the process of Binlat activities of Polri members in Polda Papua which utilizes experiential learning when implementing Binlat so that it is possible to express a sense of unity in the hearts of the participants. The kind of research that is used is by doing observations, interviews, and documentation. The subject of this research is the construction and training activities of Noken Polri in 2020.

4. Result

4.1. Learning Process
The learning process with the reflexive EL-Experience method refers to active learning through a process known as the Kolb Cycle (Kolb-1984 & 2015) which begins with Concrete Experience, continues with Reflective Observation through an imaginative process that continues into Abstract Conceptualization and continues to Active Examination. (Active Experimentation).

4.1.1. Real experience
This phase occurs when an individual is directly involved in an experience or activity of a direct experience through both participation and observation. The focus is actively involved in a experience, whether it is a new situation, a problem or an opportunity.

4.1.2. Reflective Observation
After the concrete experience, the individual reflects on what happened. This reflection involves thinking about feelings, reactions and observations during the experience. This stage involves a step back from experience to analyze and understand it. Student might ask, "What am I watching?" or "What do I feel?"

4.1.3. Abstract Conceptualization
At this stage, one tries to understand experience by forming an abstract summary, theory or generalization. This process involves the integration of observations, the reflection of previous stages into a broader understanding. Student might ask, "What does this experience tell me about the subject?"

4.1.4. Active Experimentation
Students apply what they have learned to a new situation or context, and this can involve testing the theory, trying a new approach, or experimenting with different solutions. The focus is on applying new understanding into practice and seeing how things work in real-world situations. Student may ask, "How can I use this knowledge in the future?" This Kolb cycle forms a continuous pattern where each stage affects and is influenced by the other stages. Students move through this cycle repeatedly as they engage in new experiences and continue to learn and develop.

4.2. Kompetensi Lulusan

Values	Kompetensi
Keimanan	To have understanding, understanding and consciousness in practicing religious teachings and beliefs in accordance with

Values	Kompetensi
	their respective religious beliefs and in line with the basic values of Pancasila.
Faith	Having understanding, appreciation and awareness in behavior that depicts noble morality and living with love and affection according to the values of Pancasila.
	Having a sense of concern for one another as part of humanity in accordance with the identity of the Indonesian nation.
	Having the desire to help each other around the community in dealing with social problems in the shadow of the NKRI and the world
Integrity	Having the habits, understanding and consciousness to behave and behave honestly, behaving according to what is spoken driven by the soul of the nation's self.
	Self-reliance and full responsibility in carrying out duties and duties.
Modesty	Being arrogant, greedy in everyday life in society.
	Having an attitude of mutual respect as living creatures of the Creation of the One God.
Tolerance	Have tolerance between religious embrace and belief in the One God as well as between tribes, cultures and other differences in the existence of Bhinneka Tunggal Ika
	Having a sense of love and solidarity among fellow citizens in strengthening the unity and brotherhood and integrity of the NKRI
Persaudaraan	Having a strong sense of self-reliance and struggle for the nation and the homeland of Indonesia.
	Having the determination and desire to unite as an Indonesian nation.
Tanpa Pamrih	Having a consciousness of history, love, pride and sincere sacrifice for the nation and country
	Having an attitude that prioritizes the general interest over the personal interest within the framework of Pancasila's core values.
Disiplin	Has a work ethos, is tough, does not give up easily, is competitive and professional.
	Aware of his potential, tough to cope with the stresses of work, able to work efficiently, efficiently and productively and beneficial to the work environment/society/nation and country.
Gotong Royong	Have a spirit of cooperation and shoulder-bowing to complete the work/environmental issues of work/society/nation and country.

Values	Kompetensi
Berprestasi	Have an attitude and behavior that forms a common consciousness. Have a hard-working and diligent attitude in carrying out tasks. Have an attitude and behavior to give the best to the people, the nation and the country.
Inovatif	Have the ability to find and produce innovative ideas, methods, works that are valuable and useful to solve a variety of problems. Have the ability to find and produce innovative ideas, methods, works that are valuable and useful to solve a variety of problems. Have a behavioral attitude of creativity as a citizen of the community and humanity in the surrounding environment intelligently and well.
Komunikatif	Have a sharpness in thinking positively and constructively in assessing the situation of potential problems arising in society. Has literacy reading and writing in the Indonesian language in accordance with the spirit of youth. Has the ability to communicate verbally and in writing using technology for the public interest.

4.3. Binlat Noken Polri

The program is based on the curriculum Binlat PraBa Noken Polri T.A. 2020 prepared by the team where the researchers are in it, the preparation of curricula/silabus/module and teaching materials based on National Character Education that is sourced on the self-reliance of the Nation of Indonesia consisting of several stages: Conditioning stages, National Perspective Provision Stages and Identification of the Police Professions as well as Self-Development Stages, and Monitoring Stages such as Shopping Activities Problems and Social Respect. The researchers' experience as Operational Manager of Binlat Pre Bintara N.N.T. Polri in 2020 interacted directly with the pupils, trainers and nurses for 2 months of the duration of National Chars Education or precisely Binlat Time 58 days (372 JP @ 45 minutes) divided into 4 BinLat parts, i.e.:

a. Conditioning Stage a

Are a 10-day Formation and Personality phase and a 35-day observation session filled with National Perspective and Police Professions Introduction, a 5-day self-development and observation phase of 8 days and the completion of training with a total duration of 2 months. Further on the stage of Formation of Fundamentals and Personalities is the cultivation of noble values and character embodied in attitudes, sports, thinking and behavior through a change of mentality. (Mind Set). Personality is the stage of self-identification as an individual of the Creation of the One God and as part of Indonesian society. This phase is also a process of discovery of self-concept that will be part of the family, Polri and society as well as the Indonesian nation and its environment that advances relations and interaction with others as part of Indonesians society based on Pancasila and the Constitution of the Republic of Indonesia of 1945.

b. The stages of national awareness and recognition of the police profession are:

1) The stage of cultivation of the values of the national insight that are found in Pancasila, the Basic Law of the Republic of Indonesia of 1945, Bhinneka Tunggal Ika and NKRI. Besides, discussed the meaning of the Text of the Proclamation of Independence of the Nation of Indonesia, the Red White Flag, the Indonesian Language as a Language of the Union, the State Emblem, the National Song that every nation must have in order to love the homeland of Indonesia which is inspired by the self-reliance of the nation and become the superior SDM in the era of globalization and the revolution of industry 4.0 towards society 5.0. 2) The level of recognition of the basic tasks of Polri, Polri organization, the performance of public duties of the police, History of the polri, the Code of Ethics of the Polri profession and the Law No. 2 of 2002 on the State Police of the Republik of Indonesia.
2) Self-development stage is the stage of providing participants to have interpersonal skills, creative and innovative understanding of social media and the Internet and how to use them for the service of the community.
3) Observation stage is the stage of giving learning experience in the form of practical practice in the community by doing troubleshooting or finding problems that occur in the nearest environment and doing social devotion as well as provision lectures which is a summary of all subjects that have been studied before.

c. Self-development stages
It is a stage of provision of participants to have Interpersonal Skill, creative and innovative understanding of social media and the Internet and how to use it for the service of the community. A stage of giving motivation and inspiration so that the whole Student has confidence to be a wise citizen in living daily life.

a. Monitoring Stage
It is the stage of giving learning experience in the form of training/practice work in the community by doing spending problems or searching for problems that exist in the society around SPN Polda Papua and doing social activities as well as obtaining lectures supplies from the Deputy Governor of Papua and Kapolda Papua which is a summary of all subjects that have been studied before.

5. Conclusion

a. Learning process with the EL-Experience Reflective Method refers to active student learning through a process known as the Kolb Cycle (Kolb-1984 & 2015) which begins with the Concrete Experience of a Student continued with the Reflexive Observation through an imaginative process that continues into the Abstract Conceptualization and continues to the Active Examination. (Active Experimentation).
b. With regard to the competences of the graduates that Noken Polri must possess: Faith, Humanity, Integrity, Humility, Brotherly Tolerance, Disrespectlessness, Discipline, Gotong Royong, Performance, Innovative, and Communicative. These aspects are given material experientially learning during the process of design.
c. The Binlat session is divided into four stages: codification, provision of national insight, self-development, and observation.

Advice

The participants of Binlat Noken Polri in 2020 are expected to be able to maintain and continue the application of this Experiential learning in institutions or advanced institutions throughout Indonesia. Papua as a region rich in natural resource potential would be better if its human resources were educated and treated accordingly to the region to become a territory of strong money and worship the good name of the Indonesian nation

References

[1] Vadis Fungsi Kepolisian dalam Penanganan Penyebaran Paham Radikalisme dan Intoleransi. *JUSTISI*, *7*(2), 137–154. https://doi.org/10.33506/js.v7i2.1365

[2] Astuti, S., & Siregar, M. (2023). Neurolinguistik Programming (NLP) Pada Anak dengan Diversitas Budaya di Lembaga Pendidikan Islam Anak Usia Dini di Bangka Belitung. *ICEJ : Islamic Childhood Education Journal*, *2*(1), 1-7. Retrieved from https://jurnal.lp2msasbabel.ac.id/index.php/ICEJ/article/view/3461

[3] Dahiya, S., & Jha, A. (2011). Review of Training Evaluation. International Jounal of Computer Science and Communication, SAGE Journals, 2(1), 11-16.

[4] Fakhruddin. (2011). Evaluasi Program Pendidikan Nonformal. Semarang: UNNES Press

[5] Faulkner, B. (1997). A Model for the Evaluation of National Tourism Destination Marketing Programs (Rev.ed). Journals of Travel Research, SAGE Journals, 35(3), 23-32. Retrieved from http://scihub.tw/10.1177/004728759703500304.

[6] Imah, T., & Purwoko, Budi. Studi Kepustakaan Penerapan Konseling Neuro Linguistic Programming (NLP) Dalam Lingkup Pendidikan. *Jurnal Mahasiswa Universitas Negeri Surabaya. No 11-19*

[7] International Crisis Group (2012). *Dinamika Kekerasan Di Papua.* Jakarta/Brussels: JSTOR https://www.jstor.org/stable/resrep32234.3

[8] Iryani, E., Mar'atun Shaliha, & Salman Jufri. (2023). Neuro Linguistic Program: Konseling Dalam Proses Penyelesaian Tugas Akhir Mahasiswa Program Studi Pendidikan Bahasa Arab Universitas Jambi. *Jurnal Mu'allim*, *5*(2), 346-354. https://doi.org/10.35891/muallim.v5i2.4054

[9] Jahanian, R. (2012). Educational Evaluation: Functions and Applications in Educational Contexts. International Journal of Academic Research in Economics and Management Sciences, SAGE Journals, 1(2), 253-269. Retrieved from https://www.academia.edu/32452165/EVALUASI_PROSES_DAN_EVALUASI_HASIL_PEMBELAJARAN

[10] Lickona Thomas. (2012). *Mendidik untuk membentuk karakter bagaimana sekolah dapat memberikan pendidikan tentang sikap hormat dan bertanggung jawab.* Jakarta: Bumi Aksara.

[11] Lickona Thomas. (2012). *Mendidik untuk membentuk karakter bagaimana sekolah dapat memberikan pendidikan tentang sikap hormat dan bertanggung jawab.* Jakarta: Bumi Aksara.

[12] Lickona, T. 2004. Character Matters. New York: Touchstone Rockefeller.

[13] Mehrens, W.A., & Lehmann, I.J. (1973). Measurement and evaluation in education and psychology. New York: Holt, Rinehart and Winston. Inc.

[14] Muento, P., Wuniyu, F., & Betaubun, W. (2020). *Politik Keamanan Dalam Penyelesaian Konflik Sosial Di Papua.* Noken Vol. 6 (No. 1) Halaman: 36-48

[15] Nasution, M. N. (2005). *Manajemen Mutu Terpadu: Total Quality Management, Edisi Kedua,* Jakarta: Ghalia Indonesia

[16] Nugraheny, D. C., & Kusuma, A. P. (2018). Neurolinguistik Programing Dalam Bidang Pendidikan. *Buana Pendidikan: Jurnal Fakultas Keguruan Dan Ilmu Pendidikan Unipa Surabaya*, *14*(26), 167–174. https://doi.org/10.36456/bp.vol14.no26.a1682

[17] Nugroho, Yudianto. Implementasi Pendidikan Karakter Kebangsaan DalamKegiatan Prarekruitmen dan Seleksi Personel Polri Di Polda Papua. *Journal Of Public Policy and Applied Administration Vol 4 No 2 2022*

[18] Purwati, Eni, dkk. (2015). *Pendidikan Kewargaan Berbasis Masyarakat.* Surabaya: UIN Sunan Ampel

[19] Qomaruzzaman, Bambang. (2017). *Penididkan Karakter Berbasis Pancasila Pendekatan NLP.* Bandung: Simbiosa Rekatama Media

[20] Simangunsong, Junus. Penguatan perilaku kebangsaan melalui pembinaan dan pelatihan Bintara remaja Kepolisian daerah Papua Barat Jurnal Penelitian Pendidikan, April, 22 (1), 2022, hal. 59-73 DOI: https://doi.org/10.17509/jpp.v22i1.45216

The Impact of implementing TPACK in English Language Learning for High School Students of SMAN 1 Wates in the Era of Globalization

Reti Sudarsih

SMAN 1 Wates Kulon Progo, DIY, Indonesia

retisudarsih12@guru.sma.belajar.id

Abstract. This study searched the impact of TPACK (Technological Pedagogical Content Knowledge) on student perceptions, motivation, and achievement in English language learning. In the era of globalization, English proficiency is crucial for accessing information and career advancement. The Indonesian government addresses this need by implementing English language curriculum in high schools. However, effective instruction requires both appropriate pedagogy and technology integration. TPACK offers a framework for integrating these elements to create student-centred learning. Previous research suggests TPACK can support teachers in designing engaging and effective lessons, fostering active student learning. This study explores student perceptions of TPACK implementation in English language learning at SMAN 1 Wates, Indonesia. A qualitative descriptive method was used, utilizing questionnaires given to 45 students in classes X-C and X-D. The analysis showed that a majority of students understood TPACK and agreed that it contributed to a more engaging learning environment. Students mentioned increased motivation and independent learning due to TPACK use in the classroom. These findings suggest that TPACK has the potential to positively impact student learning experiences in English language classrooms. Further research is needed to explore the long-term effects of TPACK implementation on student achievement.

Keywords: TPACK, English language learning, student motivation

1. Introduction

English is a significant and important language to be mastered in this globalization era. The ability to communicate in English opens chances to access global information, communicate with people from different countries, and enhance the career prospects. Recognizing its importance, the Indonesian government has implemented English language curriculum in schools, including high schools, to equip students with the necessary English proficiency. (Kementerian Pendidikan dan Kebudayaan, 2020)

This study research aims to find out the perceptions of high school students on the implementation of TPACK in English language learning, analyze the impact of TPACK-based instruction on their motivation and achievement. The bojectives of the research are: 1). To identify SMAN 1 Wates class X-C and X-D srudents perceptions on the impact of TPACK integration in English language learning, 2). To examine the influence of TPACK-based instruction on EFL students' motivation and achievement.

This study research is hoped to provide understanding on: 1) SMAN 1 Wates students of X-C and X-D perceptions on the impact of implementing TPACK in English language learning. 2) The impact of implementing TPACK the students of X-C and X-D' motivation and achievement.

The findings of this study research will contribute to the understanding of TPACK implementation in English language learning and its impact on student outcomes. The developed TPACK-integrated English language teaching model will provide a valuable tool for teachers to improve the effectiveness of their instruction and promote student engagement and achievement.

1.1 Theoretical Review

TPACK stands for Technological Pedagogical Content Knowledge, which is a framework that describes the knowledge and skills that teachers need to effectively integrate technology into teaching. Technological Pedagogical Content Knowledge (TPACK) is a framework for describing the knowledge and skills that teachers need to effectively integrate technology into their teaching. TPACK consists of three main components: Content Knowledge (CK): The teacher's understanding of the subject matter to be taught. Pedagogical Knowledge (PK): The teacher's understanding of effective teaching methods and strategies. Technological Knowledge (TK): The teacher's understanding of information and communication technology (ICT) and how to use it in teaching. It was first introduced by Mishra and Koehler in 2006. The effective instruction to teach and learn English requires the appropriate pedagogical implementation and the utilization of technology optimally. PACK (Technological Pedagogical Content Knowledge) serves as a valuable pedagogical framework that integrates knowledge of technology, pedagogy, and subject matter content to create student-centred and technology-based learning (Mishra & Koehler, 2006).

Research on TPACK implementation in English language classroom has brought positive outcomes. Studies have shown that TPACK support teachers to design and implement more engaging, interactive, and effective lessons, and it can continuously make the students learn more actively and independently. (Akbulut & Bulut, 2016).

The effective English language instruction during the learning process does not only depends on the pedagogical practices but also on the capability to attract and motivate students. So, TPACK (Technological Pedagogical Content Knowledge) becomes a great framework which combines pedagogy, technology and content knowledge to create students' environment which is interesting and attracting (Mishra & Koehler, 2006). Research has consistently shown the positive correlation between implementing TPACK and students learning motivation, which can invite the chance to change the students experiences in learning English (Cheng & Wang, 2013).

In the 21st century, English language has enormously broadened its crucial role in many fields that are inclusive of business. It has become a world language that most people use to speak even though some people as not speaking 'good English' or 'proper English' but these are social judgments that are made about the language that these people possess (Foley, 2013:9 in Marcos Taec Abi). The fact remains that whatever we may think about the kind of language that some people speak, they still have a language. They use their abilities to communicate socially even though there are dominant languages everywhere.

In second language learning, motivation is a complex phenomenon which can be defined in terms of learners' attitudes towards the second language community, and their communicative needs (Lightbown & Spada, 1993 in Marcos Taec Abi). These two factors tend to show that if learners need to speak the L2 to fulfil their ambitions of professionalism or in a wide range of the situations socially, the communicative value of the second language will be perceived and will therefore be motivated to acquire proficiency in it.

Based on previous research, it is stated that TPACK framework can improve the students' performance in learning English, give many benefits to the students, especially the students motivation in learning English. The teacher intends to get the students perception about the impact of implementing TPACK in the English classroom. The students who become the respondents are the students of class X-C and X-D SMAN 1 Wates, Kulon Progo, DIY. The research was done in the early of June 2024. The amount of the students of X-C and X-D are 72.

1.2 Research Methodology

This research applies qualitative research design, specifically a descriptive case study. This approach allows for an in-depth exploration of SMAN 1 Wates class X-C and X-D students perceptions about the impact of using TPACK in learning English. In this research, the researcher becomes a neutral observer, and observes directly in the classroom the process of filling the questionaries.

Questionnaires were administered to all students in two English language classes (Grade 10) at SMAN 1 Wates, Kulon Progo, DIY, Indonesia, where TPACK is actively integrated. Participation was voluntary, and informed consent was obtained from both students and parents/guardians before data collection. Participating in the research was entirely optional for the students. There were 46 from 72 students who participated filling the questionnaires which was done on 11th June 2024 through google form.

2. Finding and Discussion

The research was done on 11th June 2024 in class X-C and X-D SMAN 1 Wates Kulon progo using google form. The time to fill the questionnaiers was two days from 11th – 12 th June 2024. The result of the questionnaires are as followed, there were 73,9% female paticipants and 21,1% male participants. From those participants, 43,5% learnt English at the age of 5-10 years old, while the rest learnt at the age of 11-15 years old, at the age before 5 and at the age of 16-18 years old.
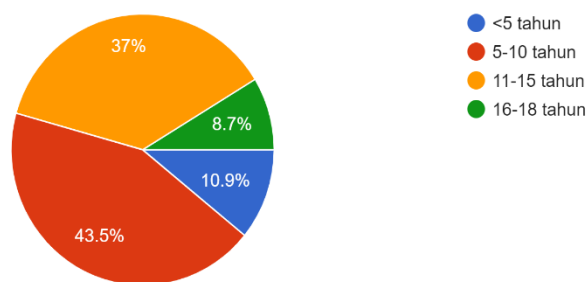

Figure 1. The data of students age they began to study English

The data showed that most of the paticipants or students understood what TPACK was, more than 50% asnwered that they understood what TPACK was. The majority of participants or students (>50%) indicated understanding the concept of TPACK, suggesting some familiarity with the teaching approach.

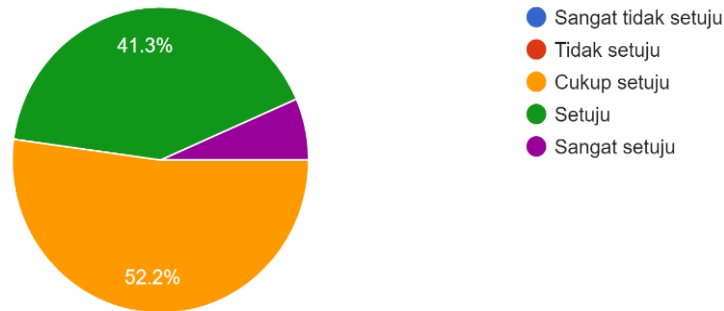B. Persepsi Terhadap TPACK   Saya memahami apa itu TPACK .
46 responses

Figure 2. The students understanding on TPACK

To find out whether the teacher implemented TPACK in the classroom during teaching English, the data also tried to get the information about how often the English teacher implemented TPACK, and more than 50% participants or students answered that the teachers implemented TPACK.

Guru saya sering menggunakan TPACK dalam pembelajaran bahasa Inggris
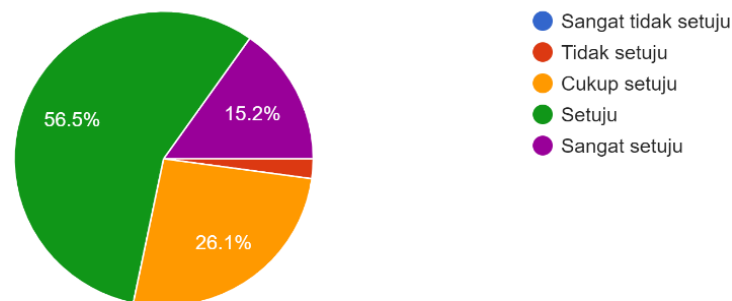46 responses

Figure 3. The frequency of implementig TPACK in teching English.

The data also showed that the use of TPACK motivated the students to learn English. They had bigger motivation to learn English when the teacher implemented TPACK during teaching learning processes. 50% students agreed that implementing TPACK made them have bigger motivation to learn English, 8% students totally agreed that TPACK motivated them to learn English, meanwhile there was few students who did not agree that TPACK motivated them to learn English. A significant portion (58%) of students reported feeling more motivated to learn English when teachers implemented TPACK strategies. This suggests a positive impact on student engagement.

C. Motivasi Belajar Bahasa Inggris Saya memiliki motivasi yang tinggi untuk belajar bahasa Inggris ketika terdapat penggunaan TPACK
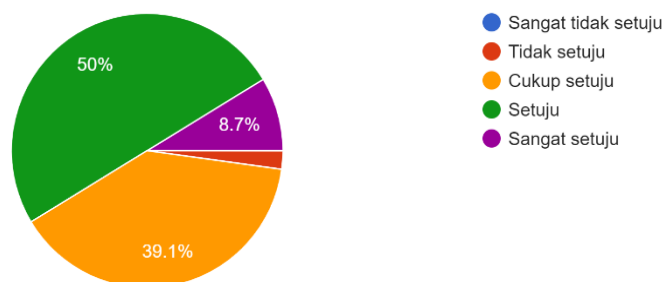
46 responses

Figure 4. The influence of implementing TPACK

The data suggests a positive correlation between teacher implementation of TPACK and student motivation in learning English. Over half (more than 50%) of the participants reported experiencing increased motivation when teachers used TPACK strategies. This aligns with the understanding of TPACK itself, which focuses on integrating technology and effective teaching practices to enhance content learning. While the majority found TPACK motivating, some students (few) did not experience this benefit. This highlights the need for further research into individual learning styles and how TPACK can be adapted for optimal impact on all students.

3. Conclusion

This research investigated the impact of implementing the Technological, Pedagogical, and Content Knowledge (TPACK) framework on the motivation of high school students learning English at SMAN 1 Wates in the era of globalization. Data collected through Google Forms from students in classes X-C and X-D suggests a positive correlation between TPACK implementation and student motivation.

These findings align with the core principles of TPACK, which promote the integration of technology and effective pedagogy to enhance content learning. Increased student motivation suggests a more engaging and dynamic learning environment fostered by TPACK strategies. However, the presence of students who did not experience this benefit highlights the need for further research into individual learning styles and how TPACK can be adapted to cater to diverse student needs.

4. Suggestion

This research provided promising evidence that implementing the Technological, Pedagogical, and Content Knowledge (TPACK) framework can motivate high school students at SMAN 1 Wates to learn English. However, to maximize the impact of TPACK and ensure its effectiveness for all learners, some key areas warrant further exploration and development.

Equipping teachers with the necessary knowledge and skills is crucial for successful TPACK implementation. Professional development opportunities focused on deepening teachers' understanding of TPACK principles and exploring various strategies for integrating technology into the English language curriculum are essential. Workshops and training sessions could equip teachers with the ability to identify and utilize a diverse range of technology tools, fostering a more dynamic and engaging learning environment.

Creating a feedback loop is vital for continuous improvement. Implementing mechanisms to gather regular feedback from students about their experiences with TPACK-based learning is crucial. This feedback can be collected through surveys, focus groups, or informal discussions. By actively listening to their students' perspectives, teachers can identify areas for improvement and ensure that the TPACK strategies implemented are truly engaging and cater to the students' needs.

Building a community of learning and innovation within SMAN 1 Wates can significantly enhance the effectiveness of TPACK implementation. Encouraging collaboration among English language teachers allows them to share best practices, successful TPACK implementation strategies, and troubleshoot challenges collaboratively. This knowledge exchange can lead to the development of a more refined and effective approach to TPACK within the school.

References

[1] Akbulut, M., & Bulut, S. (2016). *The effect of TPACK-based professional development on EFL teachers' pedagogical practices and student achievement.* Journal of Language and Education. 2(2), 54-66

[2] Agustina Tyarakanita, Joko Nurkamto , & Nur Arifah Drajati. (2021). *The Indonesian EFL Teachers' TPACK Development in the Online Community of Practice.* Pedagogy: Journal of English Language Teaching. Institut Agama Islam Negeri Metro. Volume 9, Number 2, December 2021

[3] Cheng, C. C., & Wang, C. C. (2013). *The effects of TPACK-based instruction on EFL learners' vocabulary achievement and motivation*. International Journal of Learning and Teaching in Higher Education, 12(2), 11-28.

[4] Kementerian Pendidikan dan Kebudayaan, Republik Indonesia. (2020). *Peraturan/Kebijakan tentang Kurikulum Bahasa Inggris di Sekolah*

[5] Marcos Taec Abi. (2019). *A Study on Factors Affecting Students' English Language Learning Motivation in a Multilingual Context at a Private University in East Timor*. Asian Journal of Literature, Culture and Society.p.5-6

[6] Mishra, P., & Koehler, M. (2006). *Technological pedagogical content knowledge: A framework for teacher education in the digital age*. In D. M. Keirstead, J. S. Mishra, & J. F. Moss (Eds.), Handbook of research on teacher education (pp. 1017-1029). Mahwah, NJ: Lawrence Erlbaum Associates.

[7] Muhammad Rijal Fadli.(2021). *Memahami desain metode penelitian kualitatif*. Humanika, Kajian Ilmiah Mata Kuliah Umum, ISSN: 1412-1271 (p); 2579-4248 (e). Vol. 21. No. 1

[8] Virsa Aulia, Lukman Hakim, Khresna Bayu Sangka. (2022). *Dampak TPACK pada Pengembangan profesionalisme Guru dalam Praktik Integrasi Teknologi*. Prosiding SinaMu Universitas Muhammadiyah Tangerang. Volume 4.

[9] *Virsa Auliya, Lukman Hakim, Khresna Bayu Sangka.(2023). Influences of Technological Pedagogical Content Knowledge and Self-Efficacy on Technology Integration Practices of Economics Teachers*. International Journal Multicultural and Multireligious Understanding. Volume 10. No. 1

[10] *Yilmaz, K. (2012). The impact of TPACK-based professional development on Turkish EFL teachers' pedagogical practices and student learning outcomes. International Journal of Social Sciences and Education, 2(2), 11-22.*

[11] https://tutorblog.cambly.com/2022/11/12/how-to-motivate-esl-students/visited *Thursday, 20th 2024*

Developing the Professionalism of Early Childhood Teachers in the Digital Era

Destri Fitriana[1], M Muamar Kafani[2], Naufal Bani Fauzan[3], Nur Fatih Khanifah[4], Childa Azizah[5]

Univeristas Islam Negeri Sunan Kalijaga Yogyakarta, Indonesia.[1,2,3,4,5]
[1]Pendidikan Islam Anak Usia Dini, 21104030071@student.uin-suka.ac.id
[2]Ilmu Hadis, 21105050077@student.uin-suka.ac.id
[3]Pendidikan Agama Islam, 21104010074@student.uin-suka.ac.id
[4]Hukum Ekonomi Syariah, 21103080070@student.uin-suka.ac.id
[5]Manajemen Dakwah, 21102040060@student.uin-suka.ac.id

Abstract. Early childhood is a group that is in the process of growth and development, intelligence, social-emotional, language, and communication specifically in accordance with the level of growth and development of children. The Pre-school period is a golden period for children with a range of 0-6 years to learn and develop, so Pre-school teachers are involved and play an important role for the future of children. Pre-school teachers must also be competent and professional in adapting to changes in the digital era. This paper examines the development of early childhood education teacher professionalism in the digital era using the literature review research method, with library research data collection techniques and reinforced by articles, scientific journals, books, and so on. This research focuses on the requirements of professional early childhoon education teachers in the digital era including pedagogical, professional, social and digital literacy competencies and the use of technology in learning. Continuous professional development of early childhood teachers is key in realizing quality early childhood education in the digital era.
Keywords : Teacher professionalism, Early childhood, Digital era, Education.

1. Introduction

The digital age is a time when everyone is tech-savvy and everything is connected. The digital era is a time when all humans can communicate with each other so closely even though they are far away from each other. We can quickly find out certain information even in real time. The digital era can also be called globalization.(Akbar 2022)

Globalization is a process of globalizing society and does not recognize regional boundaries, globalization is essentially a process of ideas that are raised, then offered to be followed by other nations which finally reach a point of mutual agreement and become common to nations throughout the world. The process of globalization takes place through two dimensions, namely the dimensions of space and time. Globalization takes place in all areas of life such as the fields of ideology, politics, economics, and especially in the field of education. Advances in science and technology are the main supporting factors in globalization. Currently, technology, information and communication are developing rapidly with various forms and interests can be widely spread throughout the world. Therefore, globalization cannot be avoided, especially in the field of education. (Amini et al. 2020)

With the rapid progress in this digital era or globalization, it requires teachers in PAUD or Early Childhood Education institutions to meet the requirements of professional early childhood teachers in the digital era which includes pedagogic, professional, social competencies, and digital literacy skills in the use of learning technology.

According to Priyanto, Aris (2014; 42) the definition of early childhood put forward by NAEYC (National Association of Education for Young Children) is a group of individuals who are in the age range between 0-8 years. Early childhood is a group of humans who are in the process of growth and development. At this age, experts call it a golden age that only occurs once in the development of human life. Early childhood growth and development needs to be directed at balanced physical, cognitive, socio-emotional, language, and creativity as the right foundation for the formation of a complete person. It can be concluded that digital media can support early childhood learning. Because since the golden age, which is the time when early childhood learns a lot of new things and can attract children's interest, so that teachers can prepare digital-based media well.(Kurniasih 2019)

In this explanation, a red thread can be drawn that it is time to develop the professionalism of early childhood teachers in facing the digital era, because technology is a bridge to open up the world of knowledge and increase learning motivation and enrich learning materials by providing a more interactive learning experience.

2. Materials and Methods

This research is based on a literature study by collecting as much information as possible from valid sources such as articles, analyzing books, and other sources to understand the research topic. The literature study method is a series of activities related to library data collection methods, reading and recording, and processing writing materials. (M. Zed 2004). The systematic steps in writing a literature review are described in a chart like the following :

Literature study ⟩ data collection ⟩ concept researched ⟩ data analysis ⟩ results and discussion
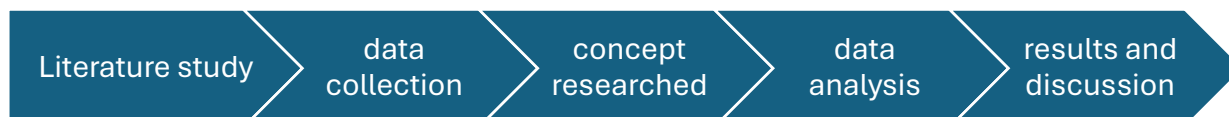
Picture 1.0 Materials and Methods

Conducting a literature review by collecting literature relevant to the research topic. This literature was then analyzed by :

- Identifying key information such as the researcher's name, year of publication, study design, research objectives, sample, instruments used, and research results.
- Rereading and examining the content of the literature thoroughly.
- Analyzing the content of the literature, including findings, conclusions, and expert opinions.

3. Result and Discussion

Based on the results and discussion of the literature analysis, it can be found early childhood teacher professionalism, challenges for early childhood teachers in the digital era, developing the professionalism of pre-school teachers in digital era, as described ad follows :

a. Early Childhood Teacher Professionalism

Teachers are professional educators who primarily educate, guide, direct, train, assess and evaluate students in early childhood education, formal education pathways, primary education and secondary education. As professionals, teachers must have academic qualifications, competencies, teaching certificates, be physically and mentally healthy, and have the ability to realize national education goals. These competencies include pedagogic competence, personality competence, social competence and professional competence. (Akbar 2022)

According to Permendiknas RI Number 16 of 2007 concerning Teacher Qualification Standards, it states that "the professional competence of teachers are: (1) mastering the material, structure, concepts, and scientific patterns that support the subjects taught, (2) mastering the competency standards and basic competencies of the subjects taught, (3) developing learning materials that are taught creatively, (4) developing professionalism on an ongoing basis by taking reflective action, and (5) utilizing information and communication technology to develop themselves".

In connection with these qualifications, the professional skills of teachers have a fundamental focus, in the world of education skills and competencies are not simply transferred. Without professional teachers the world of education will not progress, so the role of professional teachers is needed. Simply put, professional work means work that can only be done by people who are specifically prepared and trained to do it, and not work done by people who cannot or do not want to find another job. Teachers themselves must have professional abilities so that professionalism based on openness and renewal policies can support the existence of schools. Good leadership is required from teachers, the ability to manage all stages of work and the learning process with good leadership as a result of which the necessary learning objectives can be achieved using satisfactory results.(Saerang et al. n.d.)

Based on the description above, it can be underlined that the task of an early childhood education teacher is more than just teaching and providing teaching materials. Being a professional PAUD teacher has become a mandate that is carried out in creating a golden generation in order to realize the goals of national education. PAUD teachers are also educators of basic foundations in pre-school age children, therefore a PAUD teacher should be professional in carrying out his obligations. The professionalism is that a teacher has the ability to explain the material clearly and comprehensively, and answer students' questions accurately, an early childhood teacher should also design effective and measurable learning to achieve the learning objectives that have been set, can design and develop creative and interesting learning materials for children, teachers who have a professional spirit can follow the development of science and technology relevant to their scientific field, and are skilled in using information and communication technology to improve the learning process, as well as a more interesting learning experience for students.

b. Challenges for Early Childhood Teachers in The Digital Era

The development of technology in the 21ˢᵗ century is very rapid (Halim, 2022: Notnubun, 2019). The development of globalized technology has affected various aspects of human activities as well as the world of education (Marits, Salsabila, Wafiq, Anindya, & Ma'shum, 2021; Sugiyanti, Ahyani & Kesumawati, 2021). In the world of education, teachers make a major contribution to the success of the teaching and learning process at school. Being a teacher is a position or profession that requires special skills. No one can do this teacher's job without teacher expertise. (S Munianti 2022)

In the 21st century, education is also progressing so that it is necessary to convert from conventional education to modern education. In addition to being in the 21st century, the world of education is currently also entering the era of society 5.0 complementing era 4.0 The era of society 5.0 is an era whose main component is humans who utilize technological support for human and social progress. (Alfaeni et al., (2022)

Society 5.0 can be defined as a concept of a human-centered and technology-based society developed by Japan. The concept of Society 5.0 was born as a development of the industrial revolution 4.0 which is considered to have the potential to degrade the role of humans. So through Society 5.0, artificial intelligence will transform big data collected through the internet in all fields of life (the Internet of Things) into a new wisdom, which will be dedicated to improving human ability to open opportunities for humanity. This transformation will help humans to live a more meaningful life. Through society 5.0, artificial intelligence that pays attention to humanity will transform millions of data collected through the internet in all fields of life. Of course, it is expected that it will become a new wisdom in the social order. Inevitably, this transformation will help humans to live a more meaningful life. (S Munianti 2022)

According to Smaldino, et al (2010) the emergence of the information society is characterized by four basic characteristics: First, there are technologies that act on information. Second, because information is part of all human activities, these technologies have a pervasive effect. Third, all systems that use information technologies are defined by a 'network logic' that allows them to affect a wide variety of processes and organisms. Fourth, new technologies are highly flexible, allowing them to adapt and change continuously. Finally, the specific technologies associated with information are merging into a highly integrated system in an effort to improve and develop teacher competence.(Notanubun n.d.)

Teachers in this century and the next are challenged to accelerate the development of information and communication. Classroom learning and classroom management in this century must be adapted to the standards of advances in information and communication technology. According to (Susanto 2010), there are 7 challenges for teachers in the digital era, namely:

1) Teaching in multicultural society, mengajar di masyarakat yang memiliki beragam budaya dengan kompetensi multi bahasa.
2) Teaching for the construction of meaning, mengajar untuk mengkonstruksi makna (konsep).
3) Teaching for active learning, mengajar untuk pembelajaran aktif.
4) Teaching and technology, mengajar dan teknologi
5) Teaching with new view about abilities, mengajar dengan pandangan baru mengenai kemampuan.
6) Teaching and choice, mengajar dan pilihan.
7) Teaching and accountability, mengajar dan akuntabilitas.

Based on this explanation, it can be observed that a teacher is required to master technology, because considering that there are challenges for an early childhood teacher in the digital era is very complicated, the challenges are in the form of:

1) Lack of digital skills
There are still many PAUD teachers who still do not have adequate digital skills to use technology in learning. This can hinder them in implementing innovative and interesting learning methods for early childhood.
2) Difficulty accessing technology
In some areas, there are still obstacles in accessing technology and the internet. This makes it difficult for PAUD teachers to utilize technology in learning.
3) Limited learning content
Quality learning content for early childhood in the digital era is still limited. PAUD teachers need to be creative in developing their own learning content to suit students' needs.
4) Negative impact of technology

Excessive use of technology can have negative impacts on young children, such as gadget addiction, lack of social interaction, and exposure to inappropriate content. PAUD teachers need to guide their students in using technology wisely.

5) Competition with technology

Technology can be a competitor for PAUD teachers in attracting students' attention. PAUD teachers need to improve their abilities so they can provide more interesting and meaningful learning for students compared to technology.

Even though there are challenges faced, professional PAUD teachers are required to be able to improve the quality of learning and utilize learning through technology. The solutions for PAUD teachers to face challenges in the digital era are as follows:

1) Improve digital skills

PAUD teachers need to take part in training and workshops to improve their digital skills. Many institutions provide training and workshops on the use of technology in education.

2) Maximize existing technology

PAUD teachers can utilize the technology around them, such as cellphones, laptops and the internet, to develop innovative learning.

3) Develop learning content

PAUD teachers can develop their own learning content using various applications and digital platforms.

4) Guiding the use of technology

There needs to be regular guidance for students in using technology wisely. PAUD teachers can make rules about the use of technology in the classroom and educate students about content that is safe for their age.

5) Improve the quality of learning

PAUD teachers need to continue to improve the quality of their learning so they can provide more interesting and meaningful learning for students. PAUD teachers can use various innovative learning methods and utilize technology to support learning.

c. *Developing the Professionalism of Pre-School Teachers in Digital Era*

As for the following requiments for developing the professionalism of pres-school teachers in digital era :

1) *Pedagogical Competence*

a) *Pedagogical competence is the teacher's ability to manage student learning, including:*
- Planning for learning: Teachers must be able to prepare clear, structured lesson plans (RPP) in accordance with learning objectives. This lesson plan is a guide for teachers in carrying out learning.
- Implementing learning: Teachers must be able to carry out learning in accordance with the lesson plans that have been prepared. This includes choosing the right learning methods and media, as well as creating a conducive learning atmosphere.
- Assessing learning: Teachers must be able to assess students' learning outcomes objectively and thoroughly. This assessment is used to determine the extent to which students have achieved the learning objectives.

b) *Pedagogical competence is important for teachers because:*
- Improve the quality of learning: Teachers who have good pedagogical competence are able to implement effective and learner-centered learning. This can improve the quality of learning and student learning outcomes.

- Developing learners' potential: Teachers with good pedagogical competence are able to understand learners' characteristics and learning needs. This enables teachers to optimally develop learners' potential.
- Improving teacher professionalism: Teachers who have good pedagogical competence are professional teachers. They always strive to improve the quality of learning and develop themselves as teachers.

c) here are several ways to develop pedagogical competence, including:
- Participating in training and seminars: Many institutions offer training and seminars on pedagogical competence.
- Reading books and journals: There are many books and journals that discuss pedagogical competence.
- Observing learning: Teachers can observe learning done by other teachers who have good pedagogical competence.
- Joining a teacher community: Sharing experiences and discussing with fellow teachers can add insight and bring up creative ideas to improve pedagogical competence.

d) Progressional
The world of early childhood education (ECE) continues to evolve. In this digital era, ECD teachers are required to not only have good teaching skills, but also the ability to adapt to change. Progressive early childhood teachers are early childhood educators who have the following characteristics:
- Adaptive to technology: Progressive early childhood education teachers are able to utilize educational technology effectively in learning. They are willing to learn and keep up with the latest technological developments relevant to the world of early childhood education.
- Lifelong learner: Professional early childhood education teachers realize the importance of continuous learning and self-development. They actively seek new knowledge and better teaching methods.
- Promoting holistic development: Professional early childhood education teachers understand that early childhood requires stimulation for cognitive, social-emotional, physical and moral development. They design varied learning activities to stimulate all these aspects.
- Creating an interesting learning environment: Progressive early childhood education teachers are able to create classrooms that are comfortable, safe and encourage children's curiosity. They use a variety of media and educational play tools to make learning fun.
- Collaborating effectively: Professional early childhood education teachers understand the importance of working together with parents, fell teachers and other professionals to support optimal child development.

2) Social
Preschool teachers need to have the ability to adapt to rapidly chaning technology. They must always learn and keep up with the latest developments in educational technology in order to use it effectively in the teaching and learning prosess.

3) Digital Literacy Skills
- Digital literacy involves the ability to effectively consume and evaluate information obtained fromvarious digital media sources. This includes understanding how to assess the creadibility and reliability of online information.

- Digital literacy involves the ability to think critically and evaluate information in a digital context. This includes analyzing and interpreting digital content, identifying biases and misinformation, and making informed decisions based on digital information.
- Digital literacy includes the ability to use digital tools and platforms to create and innovate.

4) Utilization of Technology in Learning

Creativity contributes to self-development, decision making and problem solving abilities (Chan & Yuen,2014.). Teacher teaching creativity is one part of teacher pedagogical competence (Gardier,2017) . Teaching creativity refers to the use of teaching techniques that can make the class fun and interesting (Samira, et al.,2014). The characteristics of a creative teacher are that they can help solve students' problems, analyze, provide ideas from various knowledge (Huang & Lee,2015.) Apart from that, creative teachers also use creative strategies in teaching in class (Chan & Yuen,2014.).

Teacher creativity in early childhood learning is currently a very important part because it can make learning more interesting for children, children's attention becomes more focused, and teachers can maximize the use of children's gadgets.(Hidayat et al. 2021) . Therefore, based on the search results, we have found two examples of learning that utilizes digital technology that can be carried out by early childhood teachers, including:

- Learning using the metaverse

  In this digital era, many print-based learning media are slowly switching to digital-based media, one of which is Metaverse. Metaverse is a three-dimensional virtual space technology innovation that is currently developing. If metaverse is involved with learning media at this time, there are many things that will benefit the learning and education process in Indonesia. Metaverse is an interconnected social network, an immersive networked environment within a platform with many persistent users. This allows seamless communication between users to occur in real-time and dynamic interactions using digital technology. The main implementations are virtual worlds in social and immersive VR platforms compatible with online video games, open virtual worlds, and AR collaborative spaces.(Santosa, Wahyudin, and Febriansyah 2023).

  Of course, learning using the metaverse is the latest innovation in using technology in early childhood learning. The use of metaverse media is assisted by VR or Virtual Reality glasses which are connected to the teacher's and students' smartphones. Metaverse is a positive new hope in the introduction of technology for early childhood, this is because it can stimulate children's imaginations effectively and efficiently.

- Learning using YouTube

  Digital technology, particularly YouTube, can be a source of learning motivation for children, encouraging their interest in learning. YouTube provides benefits in increasing students' motivation to learn and incentivizes teachers to deliver more engaging learning. (Anggraini, 2018).

  YouTube is an online video platform that allows users to upload, watch, and share videos online. YouTube offers various types of video content, including music videos, personal vlogs, tutorials, short films, TV shows, news, and more YouTube has become a major source of information, entertainment, and education for millions of people around the world. The platform has a great influence in the form of communication, entertainment, and sharing of knowledge and culture through videos. Most content is uploaded by individuals, known as content creators or YouTubers. They often even create teams to manage, edit and generate new content ideas. In addition, YouTube has strict regulations regarding offensive content. Users under the age of 18 cannot access offensive content, in order to protect teenagers and children

from inappropriate content. YouTube Kids is an app available for users under 13 years old. (Rangkuti and Malem Skd n.d.)

Using YouTube media in early childhood education institutions can enrich learning strategies, develop teacher creativity in creating videos and uploading them, and become motivation for early childhood education teachers to apply what they have learned into students' daily lives.

4. Conclusions

Technology will continue to advance and develop in line with the increasingly complex needs of humans. It is not uncommon for humans to continue to be involved in the flow of globalization, because globalization takes place in two directions, namely space and time. The main factor in the progress of globalization is the advancement of science and technology. This is the strong fundamental reason why globalization cannot be denied, especially in education.

In this case, it is often associated with the digital era, an era marked by rapid technological progress that has an impact on learning.

Therefore, the role of teachers, especially early childhood education (PAUD) teachers, requires professional skills in facing the digital era. However, there are challenges faced by PAUD teachers, including a lack of digital skills, difficulty accessing technology and the internet, limited early childhood education content, negative impacts, and competition with technology in attracting the attention of students.

These were some of the challenges faced by PAUD educators in the digital era. However, challenges are not an obstacle but a motivator to develop professional competence for teachers. Opportunities or solutions that exist must be utilized properly, such as improving digital skills by attending training and workshops, teachers can utilize the technology around them such as mobile phones, laptops and the internet to develop innovative learning, PAUD teachers can also develop learning content using various applications and digital platforms, in the use of technology, there needs to be regular guidance for students in using technology wisely, PAUD teachers can make rules about the use of technology in the classroom and educate students about content that is appropriate for early childhood, and finally, PAUD teachers must continue to improve the quality of learning so that they can provide more interesting and meaningful learning for students and can use various innovative learning methods and utilize technology to support learning so that it provides valuable experiences for early childhood.

References

[1] Akbar, Faisal. 2022. *Strategi Guru Profesional Menghadapi Era Digital*.

[2] Amini, Qonita, Khofifah Rizkyah, Siti Nuralviah, and Nurvia Urfany. 2020. 2 Jurnal Pendidikan dan Dakwah *PENGARUH GLOBALISASI TERHADAP SISWA SEKOLAH DASAR*. https://ejournal.stitpn.ac.id/index.php/pandawa.

[3] Hidayat, Heri, Agis Nurfadilah, Eli Khoerussaadah, Nabilah Fauziyyah, Jurusan Pendidikan Islam Anak Usia Dini, Fakultas Tarbiyah dan Keguruan, Universitas Islam Negeri Sunan Gunung Djati Bandung Jl Soekarno Hatta Kel Cimincrang Kec Gedebage Kota Bandung, and Jawa Barat. 2021. "Meningkatkan Kreativitas Guru Dalam Pembelajaran Anak Usia Dini Di Era Digital ARTICLE INFO ABSTRACT." *Jurnal Pendidikan Anak* 10(2): 97–103.

[4] Kurniasih, Eem. 2019. 9 Jurnal Kreatif *MEDIA DIGITAL PADA ANAK USIA DINI*.

[5] Notanubun, Zainuddin. "Pengembangan Kompetensi Profesionalisme Guru Di Era Digital (Abad 21)." *Jurnal Bimbingan dan Konseling Terapan* 03: 2019. http://ojs.unpatti.ac.id/index.php/bkt.

[6] Pengembangan Kompetensi Guru, Pentingnya, and Sri MI Munianti Al-Islam Alebo. 2022. "Pentingnya Pengembangan Kompetensi Guru Di Era Digital." *JSG: Jurnal Sang Guru* 1: 230–34. https://ejournal.uinib.ac.id/jurnal/index.php/jsg/index.

[7]   Rangkuti, Hanifah, and Seroja Malem Skd. *Pemanfaatan Media Youtube Dalam Pembelajaran Anak Usia Dini Di TK Al Kahiriyah Delitua*.

[8]   Saerang, Hetwi Marselina, Jelly Maria Lembong, Shelty Deity, Meity Sumual, Roos Marie, and Stella Tuerah. "Strategi Pengembangan Profesionalisme Guru Di Era Digital: Tantangan Dan Peluang." http://jurnal.radenfatah.ac.id/index.php/El-idare.

[9]   Santosa, Alfarez, Achmad Yudi Wahyudin, and Rido Febriansyah. 2023. "Penerapan Teknologi Virtual Reality Metaverse Pada Pendidikan Usia Dini." *Journal of Social Sciences and Technology for Community Service* 4(2). doi:10.33365/jsstcs.v4i1.3340.

[10] Priyanto, A. (2014). pengembangan kreativitas pada anak usia dini melalui aktivitas bermain. *Jurnal Ilmiah Guru Caraka Olah Pikir Edukatif* , (2).

[11] M. Zed, Metode peneletian kepustakaan, Yogyakarta: Yayasan Obor Indonesia, 2004.

[12] Munianti, S. (2022). Pentingnya Pengembangan Kompetensi Guru Di Era Digital. *JSG: Jurnal Sang Guru*, *1*(3), 230-234.

[13] Alfaeni, D., Nurkanti, M., & Halimah, M. (2022). Kemampuan kolaborasi siswa melalui model project based learning menggunakan zoom pada materi ekosistem. *BIOEDUKASI: Jurnal Pendidikan Biologi*, *13*(2), 143-149.

Policy Program Guru Penggerak (PGP) towards Professional Development of Primary School Teachers : Systematic Literature Review

Novi Yarmanetti[1*], Sujarwo[2], Herwin[3], Bambang Saptono[4]

noviyarmanetti.2023@student.uny.ac.id[1*], sujarwo@uny.ac.id[2], herwin89@uny.ac.id[3], bambang_saptono@uny.ac.id[4]
Pendidikan Dasar, Universitas Negeri Yogyakarta[1,2,3,4]

Abstract. The purpose of this study is to analyze the policy of Program Guru Penggerak on the professional development of elementary school teachers through a systematic literature review. Qualitative research method with systematic literature review. The source of data in this study is scientific journals published online in the period 2020 to 2024, by conducting SLR (Systematic Literature Review) on articles that have similar topics of teacher programs and teacher performance. Data was obtained from the Scopus and Google Scholar databases. The results of the study show that the Program Guru Penggerak (PGP) has a positive influence on the professional development of elementary school teachers, including: 1) improving teacher competence and skills, 2) encouraging learning innovation, 3) forming teacher learning communities, and 4) creating a culture of cooperation in schools. However, the implementation of the Program Guru Penggerak (PGP) also faces several challenges, such as: 1) resistance to change from senior teachers, 2) limited infrastructure and resources, and 3) obstacles to coordination between stakeholders. The conclusion of this study is that the Program Guru Penggerak (PGP) has great potential in improving the quality of education through professional development of elementary school teachers, but requires policy support and adequate resources to be implemented effectively.
Keywords: policy, program guru penggerak, teacher performance

1. Introduction

Education is an important foundation in the development of society and future generations in the process of providing facilities through the transformation of knowledge, skills, values, morals, beliefs, and habits that are packaged in the learning process (Rasmani et al., 2023). Education is very important for the progress of a nation and is very important for improving human resources (Lubis et al., 2023). A good education system and get an evaluation every time the implementation of policies is needed to achieve national education goals. The quality of education can be influenced by various factors, including teacher competence, school facilities and infrastructure, and relevant curriculum Among these factors, teachers are considered the main element in ensuring the success of education.

Teachers are the main pillar of the education system, which is expected to implement all existing education policies (Aisam et al., 2022). The problem found by previous researchers is that the results of the 2022 teacher competency exam (UKG) score mapping are still below the minimum set standard, 55, with the national average reaching 54.05 (Hilmiatussadiah et al., 2024). Based on official data released by the Indonesian Ministry of Education and Culture (see :

https://npd.kemdikbud.go.id/?appid=ukg). The same fact is also found in the achievement of students both in *The Trending topic in International Mathematics and Science Study* (TIMSS) dan *the Program for Internasional Student Assessment (PISA).* Indonesian student achievement is on a downward trend and average international score (Lestari Pratiwi & Akbar, 2022). TIMSS is an international assessment that focuses on evaluating students' math and science skills in grades 4 and 8 which is held every four years. In addition, the 2022 PISA results in all three subjects (reading, mathematics, and science) are among the lowest in the history of PISA measurement (OECD, 2023). The low competence of teachers and the quality of student learning outcomes are a problem because of the low quality in various educational institutions (Surahman et al., 2022). In addition, the quality of education is not completely evenly distributed throughout Indonesia, various efforts have been made to ensure the quality of education through accreditation of schools or educational institutions, and to improve the quality of teachers on an ongoing basis.

Teachers must be able to master learning materials in independent learning, and to be able to develop them in depth into interesting and fun materials and use technology as a learning medium (Surahman et al., 2022). Since teachers are essential to improving the quality of education, the professional development of teachers is essential to the progress of the country's education system (Wuryaningsih, 2023). In the international literature, teacher professional development is referred to as Teacher Professional Development (TPD) or Continuing Professional Development (CPD) as a means to improve the quality of teachers (Alzhrani, 2023; Andersson et al., 2022; Kamil & Erni Munastiwi, 2023; Macheng, 2014) such as teacher competency development with the use of Digital Tecnoogy in physical education PE4MOVE program in Italy (Carraro et al., 2022) and a rigorous teacher recruitment process in Singapore in an effort to obtain quality education (Wulandari, 2021). The government has made efforts to improve the capacity and quality of teachers in Indonesia through the Ministry of Education, Culture, Research and Technology (Kemendikbudristek) with the Priority Program for Teachers from 2007 to 2022 (Indartiningsih, 2023).

The Ministry of Education and Culture of the Republic of Indonesia improves and develops the teaching profession. Through the Independent Learning Episode 5 policy, the Minister of Education and Culture pays great attention to improving teacher competence through the Teacher Driving program (Kemendikbudristek, 2022). One of the directions of the program focuses on the development of learning leadership and teachers' independence in their professional development. Teachers are given the opportunity to participate in training that prioritizes coaching and on-the-job-training to ensure that the learning theories obtained in the training room can be transformed into learning in the classroom and have an impact on improving the quality of learning outcomes (Kemdikbud, 2021). Guru penggerak is a learning leader who encourages the growth and development of students holistically, actively, and proactively in developing education to implement student-centered learning and become an example and agent of transformation of the education ecosystem to realize the Pancasila student profile (Qulsum, 2022). Through Program Guru Penggerak (PGP), teachers are placed as agents of renewal who play an important role in transforming school culture to be more innovative.

Based on this background, there has been no study that discusses the same topic in the form of a systematic liturgical review, so this study has the goal of how effective the Program Guru Penggerak (PGP) is in improving the teaching profession, especially in elementary schools, as revealed in research published in the last 3 years, the database comes from Google Scholar.

2. Research Methods

This study uses Library Research with the Systematic Literature Review (SLR) method. Systematic Literature Review is a research method that re-discusses certain topics that emphasize a single problem

that has been systematically identified, assessed and concluded according to pre-determined criteria based on quality and relevant research evidence (Latifah & Ritonga, 2020; Triandini et al., 2019). The procedures of the SLR method include Develop Research Question, Construct Selection Question, Develop Search Strategy, Select Studies Using Selection Criteria, Assess the Quality of Studies, Synthesis Results of Research Question (Zawacki-Richter et al., 2019)**.**

Develop Research Question
Research Question (RQ) are developed according to the selected topic. The research question in the study is what is the effect of how effective the Program Guru Penggerak (PGP) is on the improvement of the teaching profession, especially in elementary schools.

Construct Selection Question
Researchers must make a decision whether the data obtained can be used in the study or not. Therefore, it is necessary to have inclusion and exclusion criteria presented in the table 1.

Table 1. Inclusion and Exclusion criteria

Inclusion	Exclusion
Articles related to topics	Articles are not relevant to the topic
Articles published in 2022-2024	Articles published before 2021
Research subjects of elementary school teachers	The subject of the study is not an elementary school teacher

Develop Search Strategy
The Harzing's Publish or Perish application is used in the article search process. The database selected on the application is Google Scholar Keywords are needed to detect accurate and relevant articles only on the selected topic. The search keywords in this study are the Program Guru Penggerak (PGP), the influence of the Program Guru Penggerak (PGP).

Select Studies Using Selection Criteria
At this stage, the researcher uses the inclusion and exclusion criteria that have been set to sort the articles that have been obtained. To ascertain whether the article is relevant to the research topic or not, a title and abstract check is carried out first. Next, the full text of the article is checked to complete the article screening process (Zawacki-Richter et al., 2019).

Assess the Quality of Studies,
Data obtained from the previous stage will be evaluated using Quality Assessment (QA) criteria, such as QA1. Are research articles indexed by SINTA? Q2. Does the article write a research problem that is relevant to the topic of the Program Guru Penggerak (PGP)? From each QA, the answer will be yes or no.
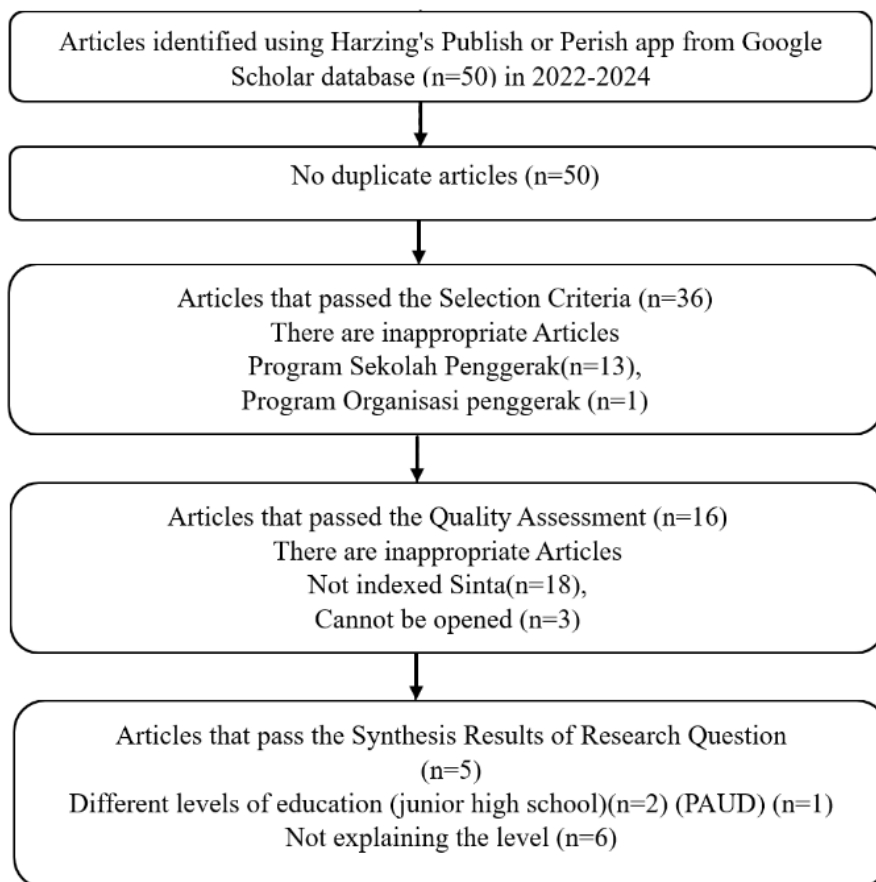
Synthesis Results of Research Question
The last stage is the synthesis of data that has been collected to get answers to research questions (RQ).

3. Results and Discussion

The review process of the articles included in the results of this study is illustrated in the following diagram.

Based on the results of the screening of articles in accordance with the research questions, there are 5 articles that meet the requirements for further study.

Author	Journal	Index	Results
Novita, E	Jurnal Pendidikan dan Pembelajaran Indonesia (JPPI)	4	Improving students' literacy skills with blended learning
Yaprianti, M., Dafit, F	Journal of Social Science Research	5	Implementation of Panjasila student profiles with teacher phenomology methods as student role models
Masau, D. Arismunandar, A	Jurnal Riset dan Inovasi pembelajaran	4	Providing an understanding to teachers related to the vision of the curriculum and the character of students, literature review methods
Yulianaji, BR	Al-Ishlah Jurnal Pendidikan	2	Examining the influence of driving teachers on student education Quantitative and descriptive methods. Learning outcomes will have a greater impact by using technology
Nafiah, D A., Dafit, F	Journal of Social Science Research	5	Qualitative methods, with data collection in the form of observations and interviews, it is proven that driving teachers play a very important role in implementing the Independent curriculum

Based on the RQ how effective the driving teacher program is in improving the teaching profession, especially in elementary schools, the results of the Systematic Literature Review (SLR) method carried out prove that the driving teacher program implemented by the government and currently has entered

Batch 9, has been proven to be able to improve the quality of learning that occurs in the classrooms. In addition, driving teachers have also been able to become a catalyst for the teachers around them.

4. Conclusion

The driving teacher program implemented by the Ministry of Education and Culture has been able to have a great influence on improving the quality of learning. Because the driving teacher has been proven to have been able to improve the quality of learning that occurs in the classrooms. In addition, driving teachers have also been able to become a catalyst for the teachers around them.

5. References

[1] Alzhrani, N. (2023). Liberating an EFL teacher as an activist teacher professional identity in MA TESOL classrooms. *Asian-Pacific Journal of Second and Foreign Language Education*, *8*(1). https://doi.org/10.1186/s40862-022-00172-3

[2] Andersson, K., Sandgren, O., Rosqvist, I., Lyberg Åhlander, V., Hansson, K., & Sahlén, B. (2022). Enhancing teachers' classroom communication skills – Measuring the effect of a continued professional development programme for mainstream school teachers. *Child Language Teaching and Therapy*, *38*(2), 166–179. https://doi.org/10.1177/02656590211070997

[3] Carraro, A., Colangelo, A., Santi, G., Conti, C., Petrini, M., & Gobbi, E. (2022). An Internet-Supported Continuing Professional Development Training with Secondary School Physical Education Teachers: Protocol for the Physical Education for Moving (PE4MOVE) Trial. *Sustainability (Switzerland)*, *14*(18). https://doi.org/10.3390/su141811579

[4] Hilmiatussadiah, K. G., Ahman, E., & Disman, D. (2024). Teacher competency: Descriptive study of Guru Penggerak. *Inovasi Kurikulum*, *21*(1), 149–162. https://doi.org/10.17509/jik.v21i1.63482

[5] Indartiningsih, D. (2023). Kualitas Guru di Indonesia dan Korea Selatan. *Edukatif : Jurnal Ilmu Pendidikan*, *5*(5), 2019–2030. https://doi.org/10.31004/edukatif.v5i5.5409

[6] Kamil, N., & Erni Munastiwi. (2023). Continuing Professionalisme Development (CPD) sebagai Upaya Mengembangkan Kompetensi Guru PAUD. *Indonesian Journal of Early Childhood: Jurnal Dunia Anak Usia Dini*, *5*(2), 261–269. https://doi.org/10.35473/ijec.v5i1.2359

[7] Kemendikbudristek. (2022). Permendikbudristek No 26 Tahun 2022 tentang Pendidikan Guru Penggerak. *Kemendikbudristek*, 1–11.

[8] Latifah, L., & Ritonga, I. (2020). Systematic Literature Review (SLR): Kompetensi Sumber Daya Insani Bagi Perkembangan Perbankan Syariah Di Indonesia. *Al Maal: Journal of Islamic Economics and Banking*, *2*(1), 63. https://doi.org/10.31000/almaal.v2i1.2763

[9] Lestari Pratiwi, G., & Akbar, B. (2022). Pengaruh Model Problem Based Learning Terhadap Keterampilan Computational Thinking Matemats Siswa Kelas Iv Sdn Kebon Bawang 03 Jakarta. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *8*(1), 375–385. https://doi.org/10.36989/didaktik.v8i1.302

[10] Macheng, P. (2014). Continuing Professional Development of Teachers in Junior Secondary Schools in Northern Botswana. *Unpublished Doctoral Dissertation. Potchefstroom: Northwest University.*, *2*(3), 18–25.

[11] OECD. (2023). *PISA 2022 Results Factsheets Indonesia PUBE*. https://oecdch.art/a40de1dbaf/C108.

[12] Qulsum, D. U. (2022). Peran Guru Penggerak Dalam Penguatan Profil Pelajar Pancasila Sebagai Ketahanan Pendidikan Karakter Abad 21. *Jurnal Ketahanan Nasional*, *28*(3), 315–330. https://doi.org/10.22146/jkn.71741

[13] Riowati, N. H. Y. (2022). PERAN GURU PENGGERAK PADA MERDEKA BELAJAR UNTUK MEMPERBAIKI MUTU PENDIDIKAN DI INDONESIA. *JOEAI*, *5*(8.5.2017), 2003–2005.

[14] Surahman, S., Rahmani, R., & ... (2022). Peran Guru Penggerak dalam Pendidikan Merdeka Belajar di Kubu Raya. *Jurnal Pendidikan ...*. https://japendi.publikasiindonesia.id/index.php/japendi/article/view/667

[15] Triandini, E., Jayanatha, S., Indrawan, A., Werla Putra, G., & Iswara, B. (2019). Metode Systematic Literature Review untuk Identifikasi Platform dan Metode Pengembangan Sistem Informasi di Indonesia. *Indonesian Journal of Information Systems*, *1*(2), 63. https://doi.org/10.24002/ijis.v1i2.1916

[16] Wulandari, V. E. (2021). Bagaimana Singapura Menghasilkan Guru Berkualitas Tinggi. *Kementrian Pendidikan, Kebudayaan, Riset Dan Teknologi Republik Indonesia*.

[17] Zawacki-Richter, O., Kerres, M., Bedenlier, S., Bond, M., & Buntins, K. (2019). Systematic Reviews in Educational Research: Methodology, Perspectives and Application. In *Systematic Reviews in Educational Research: Methodology, Perspectives and Application* (Issue November). https://doi.org/10.1007/978-3-658-27602-7

The Use of ELSA-Speak Application in Practicing Student's Speaking Skills

Rizka Amin Setiawan, Muhammad Tsaqufal Jaliliy,

1 English Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
2 English Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

rizkaamin.2023@student.uny.ac.id
muhammadtsaqufal.2023@student.uny.ac.id

Abstract. The rapid growth of technology offers new opportunities for English language learning. Achieving proficiency in speaking accurately and fluently is crucial in English learning. ELSA Speak (English Language Speech Assistant) is a mobile application designed to help users improve their English pronunciation and speaking skills. This application is available for free, with some features accessible through a premium account. ELSA was developed with artificial intelligence that provides feedback. Numerous studies have explored the effectiveness of the ELSA Speak application in enhancing students' speaking abilities. This study involves a systematic review of the literature, methodically collecting, analyzing, and summarizing academic publications and previous research on the topic. The findings can serve as a valuable resource for educators and teachers who are interested in leveraging ELSA Speak's features to enhance the learning process and provide students with new learning experiences. By utilizing ELSA Speak, educators can offer more personalized and engaging language practice, which may lead to improved pronunciation and overall speaking proficiency among learners. This paper aims to present a comprehensive evaluation of the application's impact, providing insights and practical recommendations for its effective integration into English language teaching. As technology continues to evolve, tools like ELSA Speak represent promising advancements in the field of language education, potentially transforming traditional learning methods and outcomes.

Keywords: ELSA, Interactive tool, Speak Application, speaking skills

1. Introduction

In the digital age, practical communication skills are crucial, and language acquisition proficiency is essential. Technology has transformed language learning, introduced new challenges and enhanced its use in education. Technology involves systematic use of technological processes to achieve educational objectives, providing access to digital tools and resources for language learning. Technology is an organized utilization of technical processes, techniques, or information to accomplish educational goals, according to Shadiev et al. (2020). With the speed at which technology is developing, it is clear that language acquisition has improved greatly. As a result, a variety of digital tools and resources are now available for language acquisition.

Speaking English fluently is considered vital as it is increasingly used internationally in a variety of real-life application scenarios, such as international communications, business, and higher education. Nevertheless, Indonesian students still struggle with their speech deficiencies and have trouble expressing themselves accurately (Batang, 2016). One major issue that remains is the lack of time and chances that students have to participate in conversational skills in real life. Furthermore, the majority of Indonesians still struggle with pronouncing words correctly in English since they are not fluent in the language and have little access to native speakers. As a result, with the support of technology, it becomes clear that effective oral communication is not only a matter of language but also a transferable ability with wide effects. This greatly increases the amount of digital communication tools available to language learners so they may practice speaking (SoHee, 2018).

In order to close the gap between the urgent need for effective oral communication skills and the difficulties Indonesian students encounter in becoming fluent speakers of the language for practical use, this study presents techniques for improving oral proficiency through technology-mediated learning, specifically using ELSA Speak. The ELSA Speak platform is one of the great resources for learning English. A technology instrument called ELSA (English Language Speech Assistant) was developed to help students improve their English-speaking skills in this context (Sari et al., 2023). Using artificial intelligence (AI), this platform can recognize pronunciation errors and provide improvement through detailed comments and recommendations. Similar to this, a recent study by Sari et al. (2023) that used the ELSA program as an instructional tool has the potential for ongoing improvements in students' speaking abilities and give teachers beneficial knowledge about how well the application enhances students' oral proficiency. According to Akhmad and Munawir (2022), students had a favorable perception of and interest in utilizing the ELSA Speak App.

The main aim of this study is to investigate the efficacy of the ELSA Speak App in improving English speaking skills and provide strategies to improve it based on previous research

2. ICT

Information and communication technologies (ICT) are of key importance at all levels of the educational system. At each stage of cognitive activity, research and practical applications in all branches of knowledge ICT perform both the functions of tools and objects of knowledge. Consequently, ICT innovations not only provide a revolutionary development in this branch of knowledge, but also have a direct impact on the scientific and technological progress in all areas of society.(Bilyalova 2017) Information and communication technologies (ICTs) are affecting education at all levels, including higher education and most economic sectors. New learning and teaching tools have been developed and students are now learning in Internet-enabled environments. Thus, the learning environment is undergoing several transformations. (Youssef, Dahmani, and Ragni 2022).

ICT (Information and Communication Technology) tools can be immensely helpful in teaching and learning speaking. The proliferation of technological devices has made it easier to create applications designed for English language teaching purposes, including educational games. Many students learning English as a second language often struggle to find authentic contexts to practice using the language and have limited opportunities for English practice (Lan, 2015). This lack of real-world application can result in feelings of anxiety and demotivation.(Chen 2022). In recent years, extensive research has explored the advantages of Technology-Enhanced Language Learning (TELL) (Chen, Fan, Chang, Chang, 2018; Chen, 2014; Fu, Lin, Hwang, & Zhang, 2019; Hwang et al., 2016; Lan, 2015; Lin et al., 2018; Lin & Hwang, 2018; Makoe & Shandu, 2018; Rosell-Aguilar, 2018; Wang, 2018; Zhang & Liu, 2018).

For example, Hwang et al. (2016) developed a computer game aimed at improving students' English listening skills, resulting in more effective learning outcomes. Similarly, Chen et al. (2018)

created a situational comic learning game to assist primary school students in acquiring English knowledge while engaging in scriptwriting. Their game not only enhanced young learners' vocabulary and sentence construction abilities but also fostered critical thinking regarding the relationship between context and vocabulary. Language skills encompass listening, speaking, reading, and writing, all of which are vital for learners (Liu &

3. ELSA-Speak Application

Syabina et al., (2024) found in their research that the use of ELSA in teaching speaking is interesting. The students actively participate. The students are interested in studying speaking by using ELSA as a digital platform. It also adopted gamification in ELT. The users can track the scores, leaderboard, and achievement. This would give students motivation to be engaged in oral speaking practice. ELSA Speak provides engaging learning activities that enhance enjoyment in developing speaking skills. When students use the ELSA application to learn English, they respond effectively, particularly in speaking. The study shows that students successfully follow directions and perform well in direct speaking practice. ELSA Speak not only improves speaking skills but also boosts students' confidence in speaking English, as evidenced by their enthusiasm and ability to achieve perfect scores in speaking exercises. The app offers a secure and supportive environment for practicing speaking skills.

Research conducted by Elsani et al., (2023) found that the effectiveness of the ELSA Speak App in enhancing students' oral proficiency, particularly their pronunciation skills. Through a pre-test and post-test evaluation, students showed significant improvement after using the app, which provides instant feedback and allows for self-paced learning. This improvement aligns with previous studies highlighting the app's positive impact on pronunciation and overall speaking fluency. The ELSA Speak App's features, such as conversational simulations and pronunciation lessons, offer comprehensive support for learners, fostering confidence and autonomy in language learning. The application helps the students to improve their pronunciation which is beneficial in oral communication. The ELSA Speak App also provides immediate feedback which is very useful for students' learning autonomy. The gamification also applied in this app, giving scores, leaderboard and feedback. Overall, the study confirms the app's valuable role in developing spoken language skills for EFL students and non-English majors.

Mahmudah et al., (2024) found that ELSA Speak app is very useful for high school students in learning speaking. The app provides features that help the student practice their pronunciation. It gives examples from native speakers on how to pronounce the words. the students can practice themselves and the app will give feedback. The immediate feedback gives students a chance to improve their pronunciation. In this app, the student can monitor their progress, whether they are in beginner level, intermediate or advanced. The app is powered with AI which has sensor recognition of difference in vowel and consonant sounds. It also can display and distinguish grammatical and semantic intonation patterns. Overall the ELSA speak app can be used as a media for studying speaking and motivates the students to be more autonomous learners.

According Anggraini (2022) the use of the ELSA Speak application in pronunciation classes has proven highly beneficial, with students reporting significant improvements in their pronunciation skills and increased engagement and motivation. The application provides ease of use, immediate correction and feedback, and supports independent learning, allowing students to practice and learn at their own pace. Additionally, the app's features, such as grading students from beginner to advanced levels, make it a valuable tool for teachers to integrate into their pedagogical design, further supporting classroom learning.

A study conducted by Yoshinta and Rekha (2022) found that students had positive attitudes towards the application, acknowledging its role in enhancing flexibility, autonomy, and engagement in the

learning process. The study aimed to understand students' perceptions of using Elsa Speak for online pronunciation learning. However, to maximize the benefits of Elsa Speak, the study suggests integrating additional pronunciation materials, increasing lecturer involvement, and promoting collaborative learning. Recommendations for future applications of technology in online learning include investing in lecturer professional development to improve pedagogical competencies, improving positive attitudes towards online learning through better communication and understanding, and encouraging students to develop self-regulation skills for managing their learning process effectively

4. Conclusion

Speaking skills, especially pronunciation, can be effectively and entertainingly taught using the ELSA Speak app. Features like achievements, leaderboards, and scores are incorporated, encouraging students to take part actively and improving their oral practice engagement. Students can monitor their progress and get better at pronouncing words correctly by using examples from native speakers in this self-paced learning software that offers immediate feedback. Students gain self-assurance and independence in their language learning thanks to this prompt feedback. For EFL students and non-English majors, ELSA Speak is a valuable resource as the study demonstrates that it greatly improves students' oral skills and overall speaking fluency. With the use of artificial intelligence (AI), the app supports students' learning process by assisting them in differentiating between vowel and consonant sounds as well as grammatical and semantic inflection patterns.

References

[1] Bilyalova, Albina. 2017. "ICT in Teaching a Foreign Language in High School." *Procedia - Social and Behavioral Sciences* 237(June 2016): 175–81. doi:10.1016/j.sbspro.2017.02.060.

[2] Chen, Chi Wei. 2022. "Comment on 'Long Noncoding RNA UCA1 Promotes Glutamine-Driven Anaplerosis of Bladder Cancer by Interacting with HnRNP I/L to Upregulate GPT2 Expression' by Chen Et Al.'"." *Translational Oncology* 18: 101372. doi:10.1016/j.tranon.2022.101372.

[3] Elsani, E., Salsabila, R., Indika Putra, M. F., Nabila, N. K., & Nahartini, D. (2023). The Effect of Using Elsa Speak App for First-Semester Students' English Speaking Proficiency. *Edukatif : Jurnal Ilmu Pendidikan*, *5*(6), 2644–2655. https://doi.org/10.31004/edukatif.v5i6.5976

[4] Hwang, Eric S. et al. 2018. "Distinguishing Highly Asymmetric Keratoconus Eyes Using Combined Scheimpflug and Spectral-Domain OCT Analysis." *Ophthalmology* 125(12): 1862–71. doi:10.1016/J.OPHTHA.2018.06.020.

[5] Lin, Chi Jen, Gwo Jen Hwang, Qing Ke Fu, and Ya Han Cao. 2020. "Facilitating EFL Students' English Grammar Learning Performance and Behaviors: A Contextual Gaming Approach." Computers and Education 152(March): 103876. doi:10.1016/j.compedu.2020.103876.

[6] Mahmudah, R., Daulay, S. H., Islam, U., & Sumatera, N. (2024). Elsa Speak Application as an Innovation to Improve English Pronunciations of Speaking Skills: Student's Perception. *Journal International Proceeding on Language Teaching*, *1*(1), 154–164. https://ancolt-pekanbahasa.unkafa.ac.id/index.php/proceeding/article/view/20.

[7] Syabina, Alicia, Benni Ichsanda, and Rahman Hz. 2024. "ELSA Speak Application as a Learning Media in Practicing Student ' s Speaking Skills : Students ' Voices." 02: 288–95.

[8] Yosintha, Rolisda, and Agnira Rekha. 2022. "'Elsa Speak' in an Online Pronunciation Class: Students' Voices." *IJEE (*Indonesian *Journal of English Education)* 9(1): 160–75. doi:10.15408/ijee.v9i1.23033.

[9] Youssef, Adel Ben, Mounir Dahmani, and Ludovic Ragni. 2022. "ICT Use, Digital Skills and Students' Academic Performance: Exploring the Digital Divide." *Information (Switzerland)* 13(3): 1–19. doi:10.3390/info13030129.

The 5th InCoTEPD

"Teacher Professional Development in the Age of AI"
https://incotepd.uny.ac.id/