

IMPROVING THE DIGITAL LITERACY OF TEACHERS IN SMALL BORDER ISLANDS THROUGH ETHNOPEDAGOGICAL AND DEEP LEARNING-ORIENTED LEARNING

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Abstrak

Pengabdian ini didasari kurangnya keterampilan guru pulau-pulau kecil perbatasan dalam memanfaatkan perkembangan teknologi (AI) serta pembelajaran yang belum terintegrasi dengan budaya lokal dan kurang berkesan yang mengakibatkan pembelajaran menjadi kurang menarik, tidak interaktif dan tidak efektif. Oleh karena itu, tujuan pengabdian ini adalah untuk meningkatkan literasi digital guru pulau-pulau kecil melalui pembelajaran berorientasi etnopedagogi dan deep learning. Subjek dalam kegiatan PKM ini adalah guru-guru SD Gugus Moa Barat yang terdiri atas 6 SD. Metode dalam kegiatan ini meliputi Sosialisasi, Pelatihan, Evaluasi, dan Keberlanjutan Program. Sosialisasi dilakukan untuk mendorong pemahaman guru secara teoritis terhadap Etnopedagogi, Deep Learning, dan AI (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!!, dan Gamma AI). Sedangkan pelatihan dan pendampingan dilakukan untuk peningkatan keterampilan guru dalam menggunakan AI untuk merancang pembelajaran berbasis etnopedagogi dan deep learning. Dalam hasil evaluasi guru memberikan umpan balik positif. Mereka mengatakan pelatihan ini sangat bermanfaat karena memberikan wawasan baru tentang cara memadukan teknologi dengan kearifan lokal dalam proses pembelajaran mendalam. Hasil pendampingan menunjukkan guru telah memiliki pemahaman dan keterampilan dalam mendesain pembelajaran berbasis etnopedagogi dan deep learning berbantuan AI. Pendampingan ini menghasilkan perangkat pembelajaran yang terintegrasi budaya, menarik, interaktif, dan kontekstual, sehingga meningkatkan efektivitas pengajaran. Kegiatan ini juga membantu mengenalkan budaya dan menanamkan rasa cinta budaya kepada guru.

Kata kunci: deep learning; etnopedagogi; literasi digital; pulau-pulau kecil perbatasan.

Abstract

This community service program is based on the lack of skills among teachers on small border islands in utilizing technological developments (AI) and learning that is not yet integrated with local culture and is not memorable, resulting in learning that is less interesting, less interactive, and less effective. Therefore, the objective of this community service program is to improve the digital literacy of teachers on small islands through ethnopedagogical and deep learning-oriented learning. The subjects of this service activity are teachers from the Moa Barat Cluster of Elementary Schools, consisting of 6 elementary schools. The methods used in this activity include socialization, training, evaluation, and program sustainability. Socialization was carried out to encourage teachers' theoretical understanding of ethnopedagogy, deep learning, and AI (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!!, and Gamma AI). Meanwhile, training and mentoring were conducted to improve teachers' skills in using AI to design ethnopedagogy and deep learning-based learning. In the evaluation results, teachers provided positive feedback. They said that this training was very useful because it provided new insights on how to combine technology with local wisdom in the deep learning process. The mentoring results showed that teachers now have an understanding and skills in designing AI-assisted ethnopedagogy and deep learning-based learning. This mentoring produced learning tools that are culturally integrated, interesting, interactive, and contextual, thereby increasing teaching effectiveness. This activity also helped introduce culture and instill a love of culture in teachers.

Keywords: deep learning; digital literacy; ethnopedagogy; small border islands.



1. INTRODUCTION

Technological developments in the era of the Fourth Industrial Revolution have demanded an increase in digital skills, particularly in the field of education (Priyangga et al., 2022). To support this, teachers, as the main agents in the learning process, need to improve their professional competencies to face the challenges of this digital era (Lestari and Kurnia, 2023). However, there is still a gap in teachers' competence in integrating technology into the learning process (Hassan, 2022). Mayuni et al. (2020) expressed a similar opinion, stating that adapting to technology-based learning is a challenge for teachers and schools. This condition is crucial for the Small Border Islands in Maluku, which often experience limitations in technological resources and infrastructure, such as limited internet networks, access to educational facilities, and low digital literacy, which have an impact on the quality of learning (Bandar et al., 2024). This is because technology makes it easier for students to understand the material and provides a more interesting and enjoyable learning experience (Silvester et al., 2022). In addition, student motivation to learn can increase, and their potential and skills can develop optimally (Sugiyarta et al., 2020).

Digital literacy in this study refers to teachers' ability to access, understand, evaluate, and use digital technologies appropriately to support teaching and learning. UNESCO defines digital literacy as the ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital technologies and networked devices (UNESCO, 2024). This concept encompasses several competency areas, including information and data literacy, communication and collaboration, digital content creation, safety, problem-solving, and the use of digital technologies for specific purposes (Mikeladze et al., 2024). Therefore, digital literacy is not limited to the technical ability to operate digital applications but also involves the ability to use digital technologies critically, creatively, safely, and meaningfully in educational contexts.

In the context of this community service program, digital literacy is operationalized more specifically as teachers' ability to use digital and artificial intelligence (AI)-based technologies to develop learning tools. This operationalization includes six aspects: (1) conceptual understanding of digital and AI-based learning technologies; (2) technical skills in operating digital platforms and AI tools; (3) digital content creation for developing learning materials and media; (4) pedagogical utilization of digital and AI technologies in designing learning activities and assessment; (5) critical and responsible use of AI outputs, including verification and consideration of ethical issues; and (6) collaboration and reflection in the use of digital technologies for professional learning. This operationalization aligns with the broader concept of digital literacy while incorporating the specific competencies teachers need to use AI effectively and responsibly in educational practice.

Research on digital literacy in education has been conducted extensively, but studies focusing on border areas remain very limited (Literation and Media, 2024). In addition, most studies on digital literacy do not take into account unique cultural characteristics, especially in border areas, which have their own challenges (Fadhli and Prasetyo, 2022). Ethnopedagogy is an educational approach that refers to local wisdom as a source of innovative knowledge. This approach covers the process of how knowledge is created, applied, managed, and passed on to the next generation (Susilaningtiyas and Falaq, 2021). The application of ethnopedagogy-based learning is very important because Indonesia is a diverse country, consisting of various tribes and ethnic groups with different cultural riches. In addition, globalization and technological advances have the potential to bring changes to Indonesian culture (Oktavianti and Ratnasari, 2018). In elementary schools, the application of ethnopedagogy is still not optimal (Sugara and Sugito, 2022). The lack of effectiveness in the application of ethnopedagogy is due to limited supporting facilities and infrastructure. As a result, students have not studied local culture in depth (Oktavianti and Ratnasari, 2018).

Deep Learning refers to a learning approach that encourages students to explore knowledge in depth, rather than simply memorizing it (Adnyana, 2024). This method emphasizes active, collaborative, and continuous learning, where students are encouraged to understand context, analyze information critically, and develop innovative solutions based on deep conceptual understanding. This method aims to help students understand concepts deeply and relate them to practical contexts. This strategy trains critical thinking, problem solving, and relating material to local culture (Practice et al., 2024).

Moa District is located in Southwest Maluku Regency, bordering Timor Leste, and is included in the border area as defined by Presidential Regulation No. 33 of 2015. In this program, researchers aim to improve the digital literacy of elementary school teachers in Moa Subdistrict. To improve the quality of education in Moa Subdistrict, the research team partnered with the Moa Barat Cluster Principals Working Group (KKKS). The preliminary study identified 100 elementary school teachers from six schools that are members of the KKKS Gugus Moa Barat: SD Negeri Tiakur, SD Negeri 2 Tiakur, SD Negeri Wakarlely, SD Kristen Kaiwatu, SD Kristen Patti, and SD Inpres Werwaru. These teachers constituted the target participants of the community service program.

The main focus of KKKS is to synergize improvements in education quality in the areas of curriculum, infrastructure, human resources, and teacher competence. KKKS encourages collaboration between schools and universities through training and workshops. The availability of adequate human resources provides an opportunity to build a technology-based learning community. Partners have also conducted various training sessions related to KOSP, Woka, QR Code attendance, the Merdeka Mengajar Platform, differentiated learning, and counseling services.

The results of interviews and focus group discussions (FGD) with school principals and elementary school teachers in Moa Subdistrict revealed particular challenges in the use of digital technology. Of the 100 teachers, only 30 (30%) had participated in training on the use of AI in developing learning materials such as LKPD, but not comprehensively in developing learning tools. Fourteen teachers (14%) said they had participated in independent online training, such as developing teaching materials using Canva, and 56 teachers (56%) had not participated in training on technology-assisted learning development. More specifically, the problems faced by partners include: (a) Elementary schools in Moa Subdistrict do not yet have learning tools that integrate ethnopedagogy and deep learning, namely syllabi, teaching modules, teaching materials, LKPD, learning media, and evaluation (b) Low teacher skills in using technology to develop learning tools (c) Teachers and schools have difficulty accessing technology and resources relevant to the concepts of ethnopedagogy and deep learning, which hinders teachers in developing in-depth learning about culture. The lack of training related to the use of technology in the preparation of learning tools has an impact on the low skills of teachers in integrating digitalization into the learning process.

This program utilizes various technologies, such as ChatGPT, Gemini, Canva, Quizizz, Kahoot!, and Gamma AI to support the development of learning tools. ChatGPT, as a conversation-based technology, allows teachers to ask questions and get quick automatic answers, providing relevant information when compiling Learning Objective Flows (Practice et al., 2024). Furthermore, Gemini technology is effective and practical for use in compiling teaching modules (Prasetyo, 2024). In designing student worksheets, Canva is one of the applications that makes it easy for users to create designs without requiring complex skills, with various features to make student worksheets more attractive (Puspitasari et al., 2024). Meanwhile, Gamma App is an AI that is widely used for creating presentations, making it easy to compile material systematically and attractively (Anas, 2024). For interactive quiz-based learning, Quizizz offers a fun learning experience with simple animation and interaction features, which has an impact on learning outcomes (Kurniawan and Huda, 2020). Meanwhile, Kahoot! provides various features such as games, discussions, and surveys, which can be used as learning media to increase student engagement in the learning process (Bahar et al., 2020).

The objective of this program is to improve teachers' digital literacy and the quality of learning tools by enhancing their ability to use digital technologies and AI tools to develop learning objectives, teaching modules, teaching materials, student worksheets, learning media, and assessment instruments that integrate ethnopedagogy and deep learning. Through these competencies, the program seeks to leverage technological advances not only to support effective and innovative learning but also to preserve and develop local cultural values through education (Arifin, 2023).

2. METHOD

This community service activity was conducted over 3 days in person at the Study Programs Outside the Main Campus (PSDKU) Hall, Pattimura University, West Maluku Regency Campus. The participants in this community service program were 100 elementary school teachers from six schools that are members of the KKKS Gugus Moa Barat: SD Negeri Tiakur, SD Negeri 2 Tiakur, SD Negeri Wakarlely, SD Kristen Kaiwatu, SD Kristen Patti, and SD Inpres Werwaru. The methods used to achieve the objectives of this community service activity included Socialization, Training, Evaluation, and Program Sustainability, with the following details:

a. Socialization

On the first day, Tuesday, July 22, 2025, the activity began with socialization. The series of events started with a pre-test to measure the participants' initial understanding of the concepts of ethnopedagogy, deep learning, and the use of digital platforms in learning. After that, participants received a presentation on the concept of ethnopedagogy, which emphasizes the importance of integrating local cultural values that are studied in depth through technology-based learning processes. The presenter explained how this approach can improve students' understanding in a more in-depth and contextual manner.

Then, on the second day, Thursday, July 24, 2025, participants received an orientation on deep learning and the use of various digital platforms for developing learning tools, including Gamma AI, Gemini, ChatGPT, Kahoot!, Canva, and Quizizz. Participants were introduced to the main features of each platform and guided on how to use these tools to support more interactive, innovative, and contextually relevant learning. The activities emphasized the practical application of digital technologies in developing learning tools that integrate ethnopedagogical principles and deep learning.

b. Training

On the third day, Tuesday, July 29, 2025, the training focused on the practice of developing learning tools that integrate ethnopedagogy and deep learning, as well as the use of digital platforms such as ChatGPT, Gemini, Canva, Quizizz, Kahoot!, and Gamma AI in developing learning tools. The activity began by dividing the teachers into working groups to develop various learning tools, such as ATP, Teaching Modules, Teaching Materials, Learning Media, LKPD, and Evaluation. After the drafting process, each group presented their results, received feedback, and improved their tools to make them more mature and applicable.

This training not only aims to improve teachers' digital competencies but also ensures that they are able to independently develop learning tools based on ethnoscience and deep learning. The program ended with a post-test to measure the participants' understanding improvement, ensuring that each teacher acquired skills that could be directly applied in classroom learning.

c. Evaluation

The evaluation was conducted to assess participants' satisfaction with the training, changes in their understanding of the training materials, and their ability to apply digital technologies in developing learning tools based on ethnopedagogy and deep learning. The evaluation consisted of three components: a participant satisfaction questionnaire, and a pre-test and post-test.

The participant satisfaction questionnaire was administered digitally using Google Forms to 100 participating teachers. The questionnaire consisted of 15 items using a five point Likert scale ranging from very less to very good. The questionnaire covered three main indicators: (1) satisfaction with the training materials, (2) satisfaction with the training methods, and (3) perceived benefits of the training in supporting the development of ethnopedagogical and deep learning-based learning tools. The questionnaire responses were analyzed descriptively by calculating the percentage of participants selecting each response category.

The pre-test and post-test were administered to measure changes in participants' understanding before and after the training. Each test consisted of 40 questions in the form of multiple-choice items. The test indicators covered understanding of ethnopedagogy, deep learning, digital literacy, and the use of AI-assisted digital platforms. Each correct answer was assigned 5 points, while an incorrect answer was assigned 0 point. The test items were developed based on the training objectives and materials delivered during the program. Pre-test and post-test scores were compared descriptively to identify changes in participants' understanding following the training.

Finally, video testimonials were collected from selected participants to obtain qualitative information about their experiences during the training, the challenges they encountered, and their expectations for subsequent implementation in their schools. The testimonial data were analyzed using content analysis, by identifying recurring statements and grouping them into relevant themes related to participants' experiences, perceived benefits, challenges, and future needs. The testimonial findings were used to complement the quantitative questionnaire and pre-test/post-test results.

d. Program Sustainability

To ensure the program runs optimally, the community service team provides a Learning Management System (LMS) to distribute training materials to participants and a WhatsApp group for further interaction. In addition, the community service team works closely with partners from the study program where the research team is based. This collaboration is not limited to administration, but also includes periodic evaluations to ensure that the program implementation remains in line with the needs of teachers in the field. Throughout the program, partners play an important role in coordinating participating teachers, ensuring their involvement in each session. In addition, they provide constructive feedback to the community service team regarding the material to be delivered. With this synergy, the program is not only more focused and structured, but also provides maximum benefits for teachers in developing digital literacy through the development of learning tools based on local culture and in-depth learning.

In addition, the community service team also provided follow-up assistance to schools to ensure that teachers understood how to use AI in developing ethnopedagogical and deep learning-based learning tools. Then, the community service team carried out an evaluation of the product assessment (Naen et al., 2024) in the form of ethnopedagogy-based learning tools and deep learning designed by teachers using AI. This evaluation serves as a benchmark for achieving the training objectives, namely, improving teachers' digital literacy in designing ethnopedagogical and deep-learning-based learning tools.

Table 1. Operational Indicators of Teachers' Digital Literacy

Digital Literacy Dimension	Operational Indicator	Evidence/Assessment
Digital and AI	Teachers understand the functions, benefits, limitations, and appropriate applications of digital and AI-based technologies in learning.	Pre-test and post-test
Conceptual	Teachers can use digital platforms and AI tools such as ChatGPT, Gemini, Canva, Quizizz, Kahoot!, and Gamma AI.	Observation and practical performance
Understanding		
Technical Skills		

Digital Literacy Dimension	Operational Indicator	Evidence/Assessment
Digital Content Creation	Teachers are able to use digital and AI tools to create learning materials, learning media, LKPD, and assessment instruments.	Assessment of learning-tool products
Pedagogical Utilization	Teachers are able to integrate digital and AI technologies into learning scenarios based on ethnopedagogy and deep learning.	Assessment of learning-tool products and presentation
Critical and Responsible Use	Teachers are able to evaluate AI-generated information, make appropriate revisions, and consider privacy, copyright, accuracy, and responsible use of AI.	Observation, product assessment, and reflection
Communication, Collaboration, and Professional Learning	Teachers actively collaborate, exchange ideas, solve problems, and reflect on the use of digital technologies to improve their teaching practice.	Observation and questionnaire

The guidelines for evaluating training participants during training and follow-up mentoring are presented in Table 1.

3. RESULT AND DISCUSSION

This community service activity was carried out offline in Southwest Maluku Regency, Moa District, specifically at the PSDKU UNPATTI Hall. The activity began with a speech by the Team Leader. In his speech, the community service team Leader said that this activity was motivated by preliminary studies, which found that Maluku Barat Daya Regency, particularly SD Gugus Moa Barat, did not yet have ethnopedagogical and deep learning-based learning tools, and that the learning process had not been optimally integrated with technology. In addition, this activity was a follow-up to the previous year's community service activity focused on developing AI-assisted LKPD at Tiakur State Elementary School. The main objective of this activity was to improve teachers' understanding and skills in designing AI-assisted ethnopedagogy and deep learning-based learning tools.

This was followed by a speech from the Head of the Moa Barat Cluster Principals' Working Group, as shown in Figure 1, who officially opened the community service activity. In his speech, the Head of the Moa Barat Cluster Principals' Working Group expressed his hope that the participants would follow the activity seriously.



Figure 1. Opening of the Socialization Activity

On the first day of the outreach activity, a pretest was conducted before the presentation of material by the resource persons. The pretest was conducted to collect data on the understanding of elementary school teachers in the West Moa Cluster regarding the topic of community service.

3.1. Socialization

Then, on the first day, the activity continued with a presentation on the Concept of Ethnopedagogy as shown in Figure 2. The socialization began with an explanation of the concept of ethnopedagogy and the steps for developing ethnopedagogy-based learning tools. The essence of this activity was to increase teachers' understanding of the concept of ethnopedagogy, the importance of ethnopedagogy-based learning in terms of motivation, learning outcomes, and the preservation of local culture, as well as teachers' skills in developing AI-assisted ethnopedagogy-based learning tools.



Figure 2. Socialization of Ethnopedagogy

On the second day, the activity continued with a presentation on Deep Learning, as shown in Figure 3. At this stage, the presenter explained the concept of deep learning and its integration into learning. The presenter also emphasized the importance of integrating local culture (ethnopedagogy) into deep learning. The participants appeared enthusiastic in paying attention to the material presented and were active in the question and answer session.



Figure 3. Socialization of Deep Learning

After that, the activity continued with the presentation of material on the Use of AI (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!, and Gamma AI). The material began with an explanation of the importance of utilizing AI in learning, as well as the opportunities and challenges of using AI in small border islands, as shown in Figure 4. Next, there was a presentation on how to access the official website, the advantages and disadvantages, how to use each platform effectively, and the features available on AI. The session concluded with a demonstration of AI

usage (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!, and Gamma AI). At this stage, participants actively participated in the AI usage demonstration process.



Figure 4. Socialization and Demonstration of AI Use

3.2. Training

On the third day, community service activities continued with training or practical use of AI (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!, and Gamma AI) in the development of Learning Tools by training participants as shown in Figure 5. Participants were divided into small groups and accompanied by the community service team. Each group included representatives from each school. During this training process, participants enthusiastically worked in groups to develop Learning Tools based on ethnopedagogy and deep learning.



Figure 5. AI Utilization Practices

After the participants finished designing the Learning Tools, each group presented their results in front of the other participants, as shown in Figure 6. In this presentation, they explained how the concepts of ethnopedagogy and deep learning were integrated into learning and how to use AI to make learning more interesting and interactive. Other participants provided feedback, and discussions were held to improve and refine the Learning Tool designs. The assessment results for the Learning Tools showed that the training participants understood and were able to utilize AI (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!, and Gamma AI) to develop ethnopedagogy and deep learning-based Learning Tools.

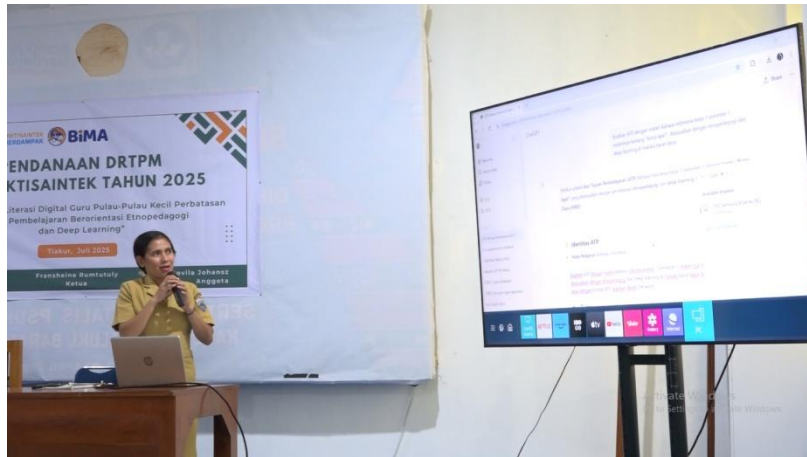


Figure 6. Group Presentation

3.3. Evaluation

At the end of the activity, the community service team conducted an evaluation by distributing digital questionnaires filled out by teachers using Google Forms, and video testimonials from several participants. Through the questionnaire, teachers were able to openly express their opinions about the material, training methods, and the benefits they felt in developing ethnopedagogical and deep learning-based learning tools. The results of the participant questionnaires are presented in Figure 7. Meanwhile, the video testimonials provide a more personal picture of their experiences, the challenges they faced, and their hopes for further implementation in their respective schools. With this evaluation, the community service team can continue to adjust and refine the program, ensuring that the training has a real impact on teachers and classroom learning.

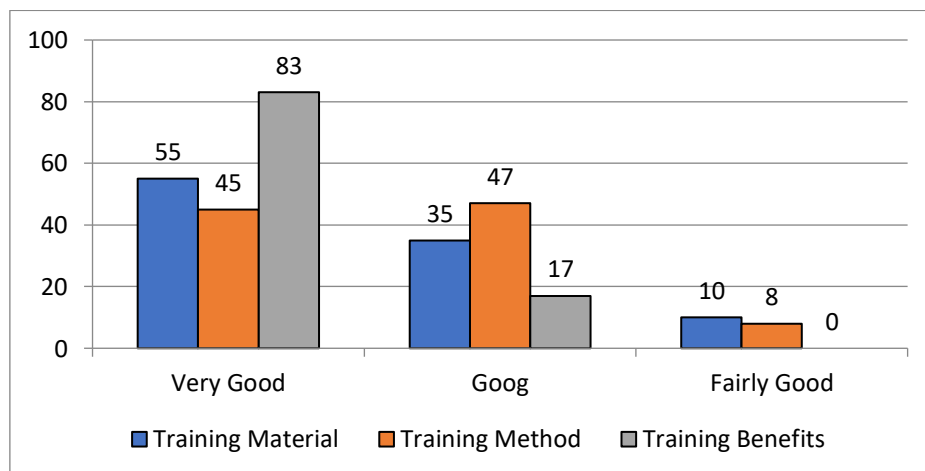


Figure 7. Participant Satisfaction Questionnaire Results

The data presented in Figure 7 shows that 55% of participants rated the material presented as excellent, 35% rated it as good, and 10% rated it as fair. In terms of training methods, 45% rated the methods used as excellent, 47% rated them as good, and 8% rated them as fair. Furthermore, in terms of the benefits of the training, 83% of participants felt that the training was excellent or very beneficial, while 17% of participants felt that the training was beneficial or good.

This community service activity successfully encouraged collaboration among teachers and improved their ability to utilize AI technology to create more engaging and meaningful learning experiences for students. The training activity concluded with a post-test to determine the impact of community service on teacher competence. A comparison of the pre-test and post-test results of community service participants is shown in Figure 8.

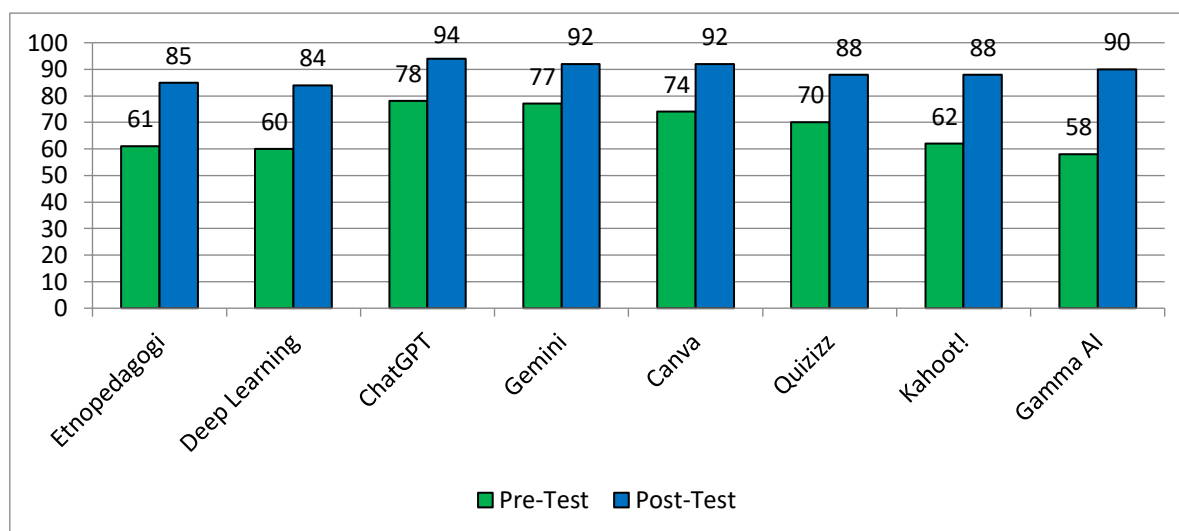


Figure 8. Comparison of Pre-Test and Post-Test Results

The pretest results of community service participants in Figure 8 show that the majority of teachers do not yet have an adequate understanding of ethnopedagogy and deep learning and are not yet able to integrate them into learning tools. This means that teachers have not optimized the environment as a learning resource, resulting in learning that is not contextual (Puspasari *et al.*, 2019). In addition, Siagian *et al.* (2022) explains that the selection of inadequate learning resources can lead to low literacy among students, so learning media that supports literacy skills, such as student worksheets based on ethnoscience, is needed to achieve literacy indicators through appropriate learning facilities. By integrating local wisdom into the curriculum, students can better connect with the learning material and understand it in a more relevant context. This research also provides benefits in introducing cultural heritage to the younger generation and increasing their appreciation of cultural diversity and local traditions (Mataheru *et al.*, 2023). Furthermore Kholidah *et al.* (2023) said that culture-based learning uses culture and local wisdom as learning materials to make the learning process more meaningful.

Furthermore, the data shown in Figure 8 indicates an increase in participants' understanding and skills after participating in the activity. The results of this community service also indicate an increase in participants' knowledge compared to their initial condition before the training. After participating in the training, teachers' skills in using technology have improved. They have become more confident in designing learning tools that are not only based on local wisdom but also supported by interactive modern technology. At the end of the mentoring program, the teachers showed a significant improvement in their skills.

3.4. Program Sustainability

Furthermore, to ensure the sustainability of the program, the community service team distributed community service materials and AI guidebooks (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!, and Gamma AI) on developing ethnopedagogical and deep learning-based learning tools to participants through the Moodle Learning Management System (LMS) platform, so that they could be reviewed after the training activities were completed. Each participant was given a username and password to access the materials on the Moodle platform. In addition, there was also a WhatsApp group that served as a discussion forum for participants and presenters in the Community Service activity.

In addition, the community service team also provided follow-up assistance to schools whose teachers still needed guidance in using AI to develop ethnopedagogical and deep learning-based learning tools. During the implementation process, it was found that there were applications or AI such as Kahoot! that teachers still did not fully understand how to use, thus requiring further explanation. After the follow-up assistance, the teachers were finally able to use all AI platforms properly to develop learning tools and adapt them in the learning process.

Then, the community service team evaluated the learning tools developed by the participants during the training and follow-up assistance. The evaluation aimed to assess teachers' ability to integrate artificial intelligence (AI) into the development of ethnopedagogy- and deep learning-based learning tools. The quantitative results of teachers' performance are presented in Table 2.

Table 2. Quantitative Results of Teachers' AI-Assisted Learning Product Development

No.	Performance Indicator	Teachers Successfully Completing the Task	Total Teachers	Percentage
1	Development of an ethnopedagogy-based ATP using ChatGPT	91	100	91%
2	Development of an ethnopedagogy- and deep learning-based teaching module using Gemini	82	100	82%
3	Development of engaging and innovative LKPD using Canva	90	100	90%
4	Development of engaging interactive quizzes using Quizizz	90	100	90%
5	Implementation of gamification in the learning process using Kahoot!	81	100	81%
6	Development of attractive automated presentations using Gamma AI	90	100	90%
Overall		524	600	87.3%

The quantitative assessment of teachers' performance in developing AI-assisted learning tools is presented in Table 2. The assessment involved 100 elementary school teachers from the six schools participating in the KKKS Gugus Moa Barat program. The results show that 91 teachers (91%) successfully developed an ethnopedagogy-based Learning Objective Flow (ATP) using ChatGPT. Furthermore, 82 teachers (82%) successfully developed teaching modules integrating ethnopedagogy and deep learning using Gemini.

In the development of learning materials, 90 teachers (90%) successfully created engaging and innovative student worksheets (LKPD) using Canva. Similarly, 90 teachers (90%) successfully developed interactive quizzes using Quizizz. The use of Kahoot! showed that 81 teachers (81%) successfully implemented gamification in the learning process, representing the lowest percentage among the six assessed activities. Meanwhile, 90 teachers (90%) successfully developed attractive automated presentations using Gamma AI.

Overall, 524 successful task completions were recorded across the six assessed learning-product activities, equivalent to an average achievement rate of 87.3%. These findings indicate that the majority of participating teachers were able to apply AI-based digital tools to produce or implement learning resources incorporating ethnopedagogical and deep learning principles. The results provide quantitative evidence that the training contributed not only to teachers' understanding of digital and AI technologies but also to their ability to apply these technologies in the development of practical learning tools.

During the mentoring activities, it was found that most teachers were not familiar with and did not use AI (ChatGPT, Gemini AI, Canva, Quizizz, Kahoot!, and Gamma AI) to develop learning tools. This means that most teachers have not been utilizing AI to present more interesting and interactive material and to increase student motivation (Mamudah *et al.*, 2024). The learning tools created by most teachers are still manual and consist only of question sheets and answers. Therefore, according to Herawati *et al.* (2016), a technology convergence-based transformation is needed to optimize LKPD, both in terms of appearance and learning quality. In line with this, Mambu *et al.* (2023), argue that the use of AI technology in the teaching process by teachers is very important to improve the quality of education and student learning outcomes.

4. CONCLUSION

The results of the mentoring program show that elementary school teachers in the Moa Barat Cluster have gained an understanding of and skills in developing ethnopedagogical and deep learning-based teaching materials using AI. This mentoring program has equipped them to produce teaching materials that are integrated with culture, engaging, interactive, and contextual, which are believed to have a positive impact on student achievement. In addition, this activity encourages teachers to utilize technology in teaching, enabling them to produce learning tools that are adaptive and responsive to students' learning needs, as well as improving teaching effectiveness. This activity also helps introduce culture and instill a love of culture among students. With the design of attractive and interactive Learning Tools using AI, students can understand the relationship between science and local culture while actively engaging in a contextual, enjoyable, and meaningful learning process.

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