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Strengthening Teacher Capacity through Artificial Intelligence Management Training to Optimize Technology-Based Learning Processes

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Abstract: This community service activity was implemented in response to teachers' limited understanding and skills in managing artificial intelligence as a supporting tool for technology-based learning. This program aims to strengthen teachers' capacity in understanding basic concepts, management strategies, and the implementation of artificial intelligence in the planning, implementation, and evaluation stages of learning. The training was held in Jakarta in December 2025 with 30 participants. The methods used included systematic material delivery, participatory discussions, hands-on practice, and mentoring in developing technology-based learning tools. The results of the activity demonstrated an increase in participants' conceptual understanding and application skills in integrating artificial intelligence into learning activities. Participants were able to develop learning media, design evaluation instruments, and utilize technology more optimally and productively. Thus, the artificial intelligence management training has been proven to have a positive impact on improving teachers' professional competence in supporting the digital transformation process in the field of education.

Keyword: Artificial Intelligence; Teacher Competency Development; Technology-Based Learning; Digital Transformation; Community Service.

INTRODUCTION

The rapid development of digital technology has brought fundamental changes to the education system (Danuri, 2019). This transformation not only impacts the way material is delivered but also alters the interaction patterns between teachers and students. Learning, previously dominated by conventional methods, is now shifting to a more dynamic, flexible, and technology-based approach. In this context, artificial intelligence presents itself as an innovation with significant potential to support a more effective and adaptive learning process (Jannah & Rosdiana, 2025).

Artificial intelligence enables rapid data processing, the provision of relevant information, and the development of more varied teaching materials. In educational practice, this technology can be utilized to help teachers develop lesson plans, create interactive

teaching materials, develop evaluation instruments, and analyze student learning outcomes. With appropriate use, artificial intelligence not only improves teacher efficiency but also enhances the quality of students' learning experiences through a more personalized and contextual approach (Triyunita, Yana, Bachtiar, & Abdurrahmansyah, 2025).

However, optimizing artificial intelligence in learning depends heavily on the readiness and competence of teachers as the primary implementers of the educational process. The reality on the ground shows that not all teachers have an adequate understanding of the concepts, functions, and strategies for managing artificial intelligence (Rosita, Jumrah, Rahmayani, & Hamdana, 2024). Some teachers are still at the stage of using basic technology, such as presentation applications or searching for information through search engines, without utilizing the broader and more strategic potential of technology. This situation indicates a gap between technological developments and educators' digital competencies (Murniyati, 2025).

This problem is further complicated when available training tends to focus on the technical aspects of using specific applications, rather than a comprehensive managerial approach. However, managing artificial intelligence in learning requires careful planning, organization of digital resources, targeted implementation, and systematic evaluation. Without the right management approach, technology use risks becoming merely a trend without significantly impacting the quality of learning (Anwar, 2024).

The digital transformation of education fundamentally requires teachers to possess strong digital literacy and the ability to adapt to change. Teachers are not only required to master teaching materials but also to be able to integrate technology as part of pedagogical strategies. The role of teachers is evolving into that of facilitators, guiding students in accessing, understanding, and utilizing information critically and responsibly. In this context, strengthening teachers' capacity in artificial intelligence management is an urgent need. (Gresinta & Hidayat, 2024).

The results of needs identification through observation and dialogue with several teachers indicate that there are still limitations in understanding the working principles of artificial intelligence and its application in learning. Teachers acknowledged that they need guidance that not only explains how to use technology but also provides an overview of how to regularly manage and integrate it into teaching and learning activities. Furthermore, concerns arise regarding ethical aspects, the validity of information, and the potential for technology dependency. This underscores the importance of a comprehensive and balanced training approach.

In response to these conditions, this community service activity was designed to provide training in artificial intelligence management for teachers. The program was implemented in Jakarta in December 2025 with 30 participants. The relatively limited number of participants allowed for a more interactive, participatory, and effective learning process. The training focuses not only on technical mastery but also on conceptual and strategic aspects of educational technology management.

The implementation method included structured material delivery, interactive discussions, hands-on practice, and mentoring in developing technology-based learning tools. This approach aims to ensure participants not only understand the theory but also apply it in real-world contexts. Through hands-on practice, teachers are given the opportunity to design learning media, develop technology-based evaluations, and develop learning strategies that optimally utilize artificial intelligence.

The urgency of this activity is increasingly relevant to the characteristics of today's students growing up in a digital environment. The current generation tends to learn more visually, quickly, and interactively. Therefore, learning strategies need to be adapted to remain engaging and meaningful. The use of artificial intelligence can help teachers deliver

more innovative learning experiences, while increasing student motivation and engagement in the learning process.

On the other hand, the high administrative burden and professional demands often present challenges for teachers. Developing learning materials, creating questions, and assessing learning outcomes require significant time and energy. With the support of properly managed artificial intelligence, some of these processes can be carried out more efficiently without compromising quality. This frees up space for teachers to focus more on strengthening pedagogical interactions and fostering student character.

Furthermore, strengthening teacher capacity in artificial intelligence management has a strategic impact on improving the overall quality of education. Teachers with strong digital competencies will be better prepared to face change and able to innovate in learning. This capability is an important asset in building an adaptive, responsive, and competitive education system amidst the dynamics of global technological developments.

The primary objective of this community service activity is to enhance teachers' conceptual understanding of artificial intelligence, develop practical skills in its use, and raise awareness of the importance of ethical and responsible technology management. By achieving these goals, it is hoped that teachers will be able to utilize artificial intelligence as a tool to support learning objectives, rather than as a substitute for the role of educators.

Overall, this activity represents a tangible contribution to supporting the digital transformation of education by strengthening teacher competencies. Artificial intelligence management training is expected to be the first step in building a more structured and sustainable technology-based learning culture. Thus, increasing teacher capacity will not only impact the effectiveness of classroom learning but also the broader quality of education in facing the challenges of the digital era.

METHOD

This community service activity took the form of artificial intelligence management training for teachers, held in December 2025 in Jakarta. Thirty teachers from various educational backgrounds participated in the training. The training involved a team of lecturers, competent in management, educational technology, and digital-based learning development, as resource persons and facilitators.

Activity Approach and Design

The training used a participatory approach through presentations and interactive discussions. This approach was chosen to ensure knowledge transfer and active participant involvement in understanding and applying the material. The presentations conveyed basic concepts, the artificial intelligence management framework, and implementation strategies in learning. Meanwhile, the interactive discussions aimed to explore participants' experiences, identify real-world problems, and formulate applicable solutions.

The training was systematically designed, combining theoretical and practical elements. The material covered a basic understanding of artificial intelligence in education, principles of learning technology management, integration strategies in learning planning, and ethical and responsible aspects of technology use.

Activity Implementation Stages

This community service activity was implemented through several stages, as follows:

Preparation Stage

In this stage, the team of lecturers conducted internal coordination to develop training materials, determine delivery methods, and prepare supporting equipment such as

presentation materials and examples of technology-based learning tools. In addition, communication was conducted with partners to ensure the readiness of the venue, supporting facilities, and the list of training participants.

Implementation Stage

The implementation stage is the core of the community service activity. The activity began with an opening statement and an explanation of the training objectives. Next, the team of lecturers delivered the material through a systematic and structured presentation method. The material focused on:

1. The concept and development of artificial intelligence in education.
2. Management of the use of artificial intelligence in learning planning.
3. Strategies for using technology to develop teaching media and evaluate learning.
4. Ethics and professional responsibility in the use of digital technology.

Following the presentation session, the activity continued with an interactive discussion. In this session, participants were given the opportunity to share questions, share experiences, and share challenges they encountered in using learning technology. The team of lecturers acted as facilitators, directing the discussion to keep it focused on solutions and practical applications. This two-way interaction aims to deepen participants' understanding and build collective awareness of the importance of strategic technology management.

Figure 1 Activity Discussion

Evaluation Stage

The activity was evaluated formatively through participant feedback on the training materials and methods. Assessment was conducted by observing participants' active participation in discussions, their ability to understand the concepts presented, and their responses to case studies presented during the training sessions. This evaluation aimed to measure the level of understanding and effectiveness of the activity's implementation.

The Role of The Lecturer Team

The lecturer team acted as primary resource persons, discussion facilitators, and mentors in the process of understanding the material. The lecturers not only conveyed theory but also provided concrete examples of the application of artificial intelligence in learning. The approach used was collaborative, so participants felt actively involved in the learning process.

Success Indicators

The success of this community service activity was measured based on several indicators, namely:

1. Increased participant understanding of the concept and management of artificial intelligence in education.
2. Active participant participation in interactive discussion sessions.
3. Participants' ability to identify opportunities for applying technology in learning.
4. Positive participant response to the implementation of the training activities.

Through interactive presentations and discussions involving 30 teacher participants, this activity is expected to have a tangible impact on improving teacher capacity and readiness in managing artificial intelligence as part of a technology-based learning strategy. A communicative and participatory approach is key to ensuring the success of this community service program.

RESULTS AND DISCUSSION

A community service activity in the form of artificial intelligence management training for teachers, held in December 2025 in Jakarta, demonstrated significant results in enhancing the capacity of participants. The activity, attended by 30 teachers, was designed using interactive presentation and discussion methods, enabling an active and participatory two-way learning process. Through this approach, participants not only received theoretical material but also engaged in reflective dialogue that enriched their understanding of the concepts and practices of artificial intelligence management in technology-based learning.

In the initial stages of the activity, most participants had a limited understanding of the basic concepts of artificial intelligence and its scope of application in education. Teachers generally utilized technology only as a presentation tool or for information retrieval, without understanding its strategic potential in supporting learning planning, implementation, and evaluation. After attending the presentation session delivered by a team of lecturers, there was a significant increase in conceptual understanding. Participants began to understand that artificial intelligence is a system that can assist in information analysis, development of teaching materials, development of evaluation instruments, and personalization of learning according to student needs. This improvement was evident in the participants' ability to re-explain the concepts learned and relate them to their classroom practices.
In addition to improving conceptual understanding, this training also strengthened teachers' practical skills in managing technology. Through concrete examples and illustrations provided during the presentations, participants gained a clear understanding of how to integrate artificial intelligence into various stages of learning. In interactive discussion sessions, teachers shared various ideas and plans for implementing technology to develop learning tools, develop digital teaching materials, and design more systematic and efficient evaluations. Participants' enthusiasm was evident in the numerous questions and responses received throughout the session. This demonstrated the relevance of the material presented to teachers' professional needs in the digital age

Interactive discussions were crucial in deepening participants' understanding. Through open dialogue, participants were able to share challenges they faced in utilizing technology in schools, such as limited facilities, differing levels of digital literacy, and concerns about the validity of information generated by artificial intelligence systems. The teaching team acted as facilitators, providing clarification, solutions, and strategic direction to ensure technology use remained within ethical and professional boundaries. This process helps participants develop a more balanced perspective, namely viewing artificial intelligence as a tool that supports the role of teachers, not as a substitute for the function of educators.This activity

also had a positive impact on increasing teachers' ethical awareness and professional responsibility in using technology. Participants recognized the importance of verifying the information generated and maintaining integrity in the learning process. This understanding serves as a crucial foundation for ensuring that the integration of artificial intelligence remains aligned with educational values. Teachers understood that technology management must be carried out in a planned, directed, and sustainable manner to provide optimal benefits for students.

From a teacher competency perspective, this training contributed to strengthening professional and pedagogical competencies. Teachers gained new insights into strategies for managing learning technology and how to integrate it into lesson planning and implementation. Efficiency in developing learning tools through the use of artificial intelligence allowed teachers more time for innovation and reflection on learning. Thus, this training not only improved technical skills but also encouraged the development of teachers' strategic capacity to face the challenges of digital transformation in education.

The success of this activity was supported by the team of lecturers' readiness in developing relevant materials, communicative delivery methods, and active participant participation. The limited number of participants allowed for intensive and effective interaction. However, several challenges were identified, such as differences in digital skills among participants and limited technological resources in some schools. These challenges highlight the need for continued mentoring and institutional support to ensure optimal and sustainable implementation of artificial intelligence in learning.

Overall, the results of this community service activity demonstrate that artificial intelligence management training has had a positive impact on improving teachers' capacity to understand, manage, and integrate technology into digital-based learning. This improvement encompasses knowledge, skills, and professional attitudes that are adaptive to technological developments. Therefore, this activity, which will be held in December 2025, represents a concrete step in supporting the strengthening of teacher competencies and encouraging a more effective and sustainable digital transformation in education.

CONCLUSION

The community service activity, implemented in the form of artificial intelligence management training for teachers and held in December 2025 in Jakarta, significantly improved the professional capacity of participants. The program, which involved 30 teachers, was designed using a combination of presentation methods and interactive discussions, enabling a dialogic and participatory learning process. Based on the overall series of activities, it can be confirmed that this training strengthened teachers' understanding, skills, and professional attitudes in managing artificial intelligence as part of a technology-based learning strategy.

From a cognitive perspective, this activity successfully broadened participants' understanding of the concept and scope of artificial intelligence in education. While previously perceived as a simple tool, after the training, participants were able to view artificial intelligence as a support system with strategic potential for increasing the effectiveness of learning planning, implementation, and evaluation. Teachers understood that technology can be utilized to develop teaching materials, develop more varied materials, and assist in more efficient analysis of student learning outcomes. This increased understanding provides a crucial foundation for building teacher readiness for the dynamics of digital transformation.

In addition to increasing knowledge, this activity also strengthened participants' practical skills in designing technology integration strategies in the classroom. Through structured presentations and in-depth discussions, teachers gained a concrete understanding of the managerial steps involved in using artificial intelligence. Participants not only understood how to use the technology but also recognized the importance of planning, control, and evaluation in its implementation. This demonstrates that the training successfully fostered a strategic mindset, positioning technology as an integral part of the learning system, not merely an add-on.

Another important achievement was increased ethical awareness and professional responsibility in the use of artificial intelligence. Participants understood that technology must be used selectively and critically, while upholding academic integrity and educational values. Teachers recognized that the primary role of educators cannot be replaced by technology but rather strengthened through proper management. Thus, the integration of artificial intelligence can be balanced and remain oriented toward educational goals.

The presentation approach combined with interactive discussions proved effective in encouraging active participant engagement. The open dialogue process allowed teachers to share experiences, address challenges, and collectively discuss solutions. The collaborative atmosphere created during the training bolstered participants' confidence in navigating technological change. Furthermore, interactions among participants have the potential to form professional networks that can support the development of future learning innovations.

Although this activity demonstrated positive results, several issues require attention for the program's sustainability. Variations in digital literacy levels among participants indicate the need for more structured and tiered follow-up training. Furthermore, technological infrastructure support within the school environment is a crucial factor in determining successful implementation. Without adequate facilities and policies, optimizing artificial intelligence in learning can be hindered.

Overall, this artificial intelligence management training made a significant contribution to strengthening teachers' professional competencies in facing the demands of education in the digital era. The increased knowledge, skills, and adaptive attitudes acquired by participants are crucial for creating innovative, effective, and relevant learning experiences that meet students' needs. This activity also emphasizes that investing in teacher capacity development is a strategic step in supporting the ongoing digital transformation of education.

Therefore, it can be concluded that this community service activity, implemented in December 2025, has achieved its intended goal: improving teachers' ability to understand and manage artificial intelligence to optimize technology-based learning processes. This program is expected to be the initial step for the development of more comprehensive and sustainable training, so that the use of artificial intelligence in education can be implemented systematically, responsibly, and oriented towards continuously improving the quality of learning.

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