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Empowering PGMI Students to Develop AI-Integrated Teaching Materials: Building Ethical and Innovative Future Leaders

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Abstract:
The rapid advancement of Artificial Intelligence (AI) has brought significant transformation to the field of education, including Islamic elementary teacher education (PGMI). This study aims to explore how PGMI students can be empowered to develop AI-integrated teaching materials that promote innovation, ethical awareness, and leadership readiness for the future. This research employed a qualitative descriptive method involving PGMI students at Universitas Muhammadiyah Riau as the participants. Data were collected through observation, interviews, and documentation of the process of designing, implementing, and evaluating AI-assisted learning media, and analyzed through data reduction, data display, and conclusion drawing. The results reveal that students are able to integrate AI creatively and ethically in developing teaching materials. The use of AI enhances students' technological competence, critical thinking, and creativity while fostering ethical responsibility in technology utilization. Thus, integrating AI into learning media development serves as a strategic effort to prepare PGMI students as innovative and ethical future educators and leaders in Islamic education.

Keywords: *artificial intelligence, PGMI, AI-integrated teaching materials, technological competence, Islamic educational ethics, educational leadership*

1. Introduction

The rapid development of Artificial Intelligence (AI) has revolutionized various sectors, including education (Schwab, 2016). In the era of Education 5.0, the integration of AI in learning represents not only a technological evolution but also a profound pedagogical transformation that promotes creativity, personalization, and ethical reflection in the learning process (Popenici & Kerr, 2017). Through AI-driven tools such as adaptive learning systems, automated feedback platforms, and generative media creators, educators can design learning experiences that are more interactive, student-centered, and responsive to individual learning needs. However, these opportunities also bring new ethical and pedagogical challenges that require careful attention, especially in contexts

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where education is deeply rooted in moral and religious values.

Within Islamic Elementary Teacher Education (PGMI), the role of AI extends beyond technical integration; it becomes a medium to cultivate digital literacy that aligns with Islamic ethics. PGMI students are future educators who carry the dual responsibility of being both facilitators of knowledge and role models of moral conduct. Therefore, their ability to integrate AI tools into the development of learning materials must be grounded in adab (proper conduct), amanah (trustworthiness), and ihsan (excellence in doing good), core principles in Islamic education (Yusuf & Kamarudin, 2021; Aiyetoro, 2025). This alignment ensures that technological innovation does not detach from spiritual and ethical considerations, but rather reinforces them within educational practices.

The challenge in PGMI education lies not only in preparing future teachers to master pedagogy but also in equipping them with technological literacy and moral integrity (Zainuddin, 2022; Afifi, 2025). Many students entering teacher education programs in Indonesia, particularly in Islamic universities, still face limited exposure to advanced educational technology. Consequently, the inclusion of AI-related competencies becomes urgent to bridge the gap between traditional pedagogy and modern digital learning. This urgency is intensified by the increasing presence of AI tools such as ChatGPT, Canva AI, and other generative platforms, which are now widely accessible to students and educators alike. These tools have the potential to enhance learning creativity, yet their misuse (such as overreliance, plagiarism, or ethical neglect) can undermine educational values (Nurhayati, 2023).

Given these dynamics, the integration of AI in PGMI programs must be approached holistically, balancing technological empowerment with ethical consciousness. Educators must provide a framework that enables students to understand not only how to use AI effectively, but also why and when its use aligns with the ethical objectives of Islamic education (Eliza et al., 2024). By embedding AI literacy within Islamic pedagogical values, students can develop a sense of critical awareness, recognizing both the benefits and moral implications of technology in education.

Therefore, this study aims to explore how PGMI students can be empowered to design AI-integrated teaching materials that foster innovation, ethical awareness, and leadership readiness for the future. It emphasizes the importance of preparing future Islamic educators who are not only technologically competent but also ethically grounded and visionary, capable of navigating the complexities of education in the AI-driven era while upholding Islamic moral principles.

2. Method

This study uses a qualitative descriptive approach with the aim of deeply understanding the processes, experiences, and meanings that emerge in the development of integrated artificial intelligence (AI) teaching materials by PGMI students (Creswell, 2014). This approach was chosen because it is able to describe the phenomenon in a contextual, naturalistic, and holistic manner, and provides a comprehensive understanding of how AI integration can shape the pedagogical competence, creativity, and ethical awareness of prospective elementary madrasa teachers.

The study participants consisted of 25 students of the Elementary Madrasah Teacher Education (PGMI) Study Program at the Faculty of Islamic Studies, University of Muhammadiyah Riau, who were taking the Media and Teaching Materials Development course in the 2024–2025 academic year. Participants were selected using a purposive sampling technique, based on the consideration that the students were studying topics relevant to teaching materials development and had direct experience in using AI-based tools such as Canva AI, ChatGPT, or PowerPoint Designer in lecture projects.

Student participation was voluntary, with informed consent. To maintain confidentiality, participant identities were disguised using codes (e.g., M1, M2, and so on). Data were collected through observation, interviews, and documentation of student project assignments involving the use of AI-based tools (Miles & Huberman, 1994). The research instruments included observation sheets, interview guidelines, and project assessment rubrics.

Data analysis was conducted using the Miles and Huberman model, which includes three stages: data reduction, data presentation, and conclusion drawing. Data validity was maintained through triangulation of data sources and peer validation (Sugiyono, 2019).

With this approach, the research is expected to produce an accurate and in-depth picture of how PGMI students are empowered to develop AI-based teaching materials that are not only technologically

innovative but also ethical and based on Islamic educational values.

3. Discussion

Based on the results of observations, interviews, and documentation of learning projects, three main themes were found that describe how students of the Elementary Madrasah Teacher Education Study Program (PGMI) empower Artificial Intelligence (AI) technology ethically and creatively in developing teaching materials. The three themes include: (1) internalization of Islamic values in the use of AI, (2) increasing AI literacy and ethical reflection, and (3) the formation of innovative leadership based on spirituality.

These findings indicate that the integration of AI in the context of Islamic education not only improves students' technological competence but also strengthens the moral, spiritual, and ethical leadership dimensions in learning practices. Thus, the development of AI-based teaching materials in the Islamic Teachers' Association (PGMI) can be understood as a holistic process that integrates technological innovation with the values of adab (good character), amanah (trustworthiness), and ihsan (good character), the primary foundations of Islamic education.

3.1. AI and Islamic educational values

In the context of teacher education at PGMI (Indonesian Teacher Training College), the application of artificial intelligence technologies such as ChatGPT, Canva AI, and Quizizz AI is not solely focused on improving learning efficiency but also aimed at strengthening Islamic spiritual and moral values. Based on observations and interviews, most students demonstrated caution in using AI-generated content. They tended to review the accuracy of sources, edit wording to align with Islamic ethics, and ensure that the resulting material did not deviate from the principles of faith and morality.

These findings indicate that the values of trust and ihsan are beginning to be internalized in the practice of developing AI-based teaching materials. This is in line with the view (Rahman, 2021) dan (Nasution, 2020) which emphasizes that technology in Islamic education should be positioned as a means to strengthen students' spiritual character, not as the primary goal. Thus, the PGMI students' experience utilizing AI not only demonstrates technological capabilities but also affirms the ethical awareness that every innovation must be a form of worship.

Reflections on these findings reinforce the theory that the integration of AI and Islamic values can go hand in hand when students are guided by the principles of etiquette, trustworthiness, and scientific responsibility. Therefore, the education of prospective teachers must place AI literacy within the framework of Islamic values so that technological progress consistently benefits the community.

3.2. Empowering PGMI students in AI literacy

AI literacy is not just about the technical ability to use technology, but also includes a critical understanding of how AI works, how it affects the learning process, and how its use can be directed towards moral educational goals (Long & Magerko, 2020). In the context of PGMI, AI literacy is a crucial competency that must be developed so that students are not merely passive users but creators capable of integrating technology into values-based learning strategies.

AI literacy empowerment is carried out through a project-based learning model that positions students as designers of interactive teaching materials. For example, students were asked to develop thematic digital modules that combine AI-generated text with interactive visualizations from Canva AI. Based on interviews and project documentation, students demonstrated improved ability to independently operate various AI-based tools. They were able to combine the results from ChatGPT, Canva AI, and PowerPoint Designer with original ideas to create thematic learning media contextualized with Islamic values. The use of AI not only accelerated the design process but also fostered students' confidence and independence in producing creative teaching materials relevant to the needs of elementary school students.

Through a process of ethical reflection throughout the project, students learn to recognize the boundaries between creativity and academic honesty. They recognize that AI can be a partner in critical thinking and innovation, but still requires adherence to Islamic values such as trustworthiness, responsibility, and scientific honesty. This reflective process also encourages students to evaluate the impact of each decision in the learning design, whether it has brought benefits or has led to over-reliance on technology.

Thus, AI literacy within the PGMI environment not only develops digital skills but also emphasizes the spiritual and moral dimensions of educational innovation. Students are not only trained to become savvy technology users but also future educators

capable of integrating technological advancements within Islamic ethics and the responsibilities of the teaching profession.

3.3. Ethical and innovative leadership in education

Artificial intelligence, even though algorithm-based, still requires human leadership to guide its use toward progress and blessings. Therefore, developing ethical and innovative leadership is a key aspect of empowering PGMI students. According to Al-Khateeb (2022), future Islamic education leaders must have three main competencies: innovative mindset, ethical integrity, and digital consciousness.

In this context, the AI-based teaching materials development project became a concrete leadership training tool. Students were trained to collaborate, make decisions, solve problems, and evaluate work results while considering aspects of utility and ethics. Based on collaborative observations and reflective interviews, it was clear that students not only developed their technological skills but also demonstrated ethical leadership skills in the process of designing AI-based teaching materials. Within each project group, diverse leadership roles emerged, from discussion facilitators and decision-makers to instructional design strategists. Students learned to manage differences of opinion through deliberation and to consider aspects of the collective good before making final decisions.

Islamic values such as responsibility, fairness, and trustworthiness are evident in the dynamics of group work. For example, when dividing up tasks for using AI tools like ChatGPT and Canva AI, students strive to ensure that each member has an equal opportunity to learn and is not dependent on a single party. This process demonstrates the application of ethical principles in collaboration, where technology is used not for personal gain but to strengthen collective outcomes and benefit others.

These findings confirm that ethical leadership in Islamic education is not formed solely through theory, but rather grows through reflective and collaborative practice that balances spiritual and digital dimensions. The integration of AI into PGMI learning projects has provided a platform for students to practice values-based leadership, critical thinking, and a focus on the common good, while simultaneously preparing them to become educators capable of navigating the moral challenges of the smart technology era.

These findings also reinforce the view that AI integration in Islamic education must be positioned within a human-centered technology framework, where technology serves as a means, not an end. Thus, the development of AI-based teaching materials can serve as a modern educational medium that continues to foster good manners, trustworthiness, and ihsan (good character) in prospective PGMI teachers.

4. Result

The research results show that the integration of artificial intelligence (AI) in the development of teaching materials has a significant positive impact on increasing creativity, technological competence, and ethical awareness of PGMI students at the University of Muhammadiyah Riau. Through project-based implementation and reflective guidance, students are able to integrate modern technology and Islamic values in educational practices. The research findings can be summarized as follows:

4.1. Improving students' creativity and technological competence

The results of observations and project analysis indicate that students experienced significant improvements in their ability to produce innovative and interactive digital teaching materials. Students utilized various AI-based applications such as Canva AI and ChatGPT to create learning media in the form of interactive modules, automated learning videos, educational illustrations, and adaptive learning-based quizzes. These findings indicate that the use of AI not only accelerated the process of producing teaching materials but also stimulated student creativity in selecting visual designs, interactive narratives, and content presentation strategies that suited the characteristics of elementary school students. As emphasized by Putri, Aulia, and Fadhilah (2024), the ability to use generative technology effectively reflects an advanced form of digital literacy that is a primary need for 21st-century teachers.

4.2. Strengthening ethical awareness and Islamic values in the use of AI

Through reflection sessions and in-depth interviews, it was found that students demonstrated an increased understanding of the ethics of technology use, particularly regarding issues of plagiarism, academic honesty, and respect for copyright and originality. Most students recognized that while AI can facilitate the learning process, its

use must be accompanied by sound intentions (ikhlas) and moral responsibility (amanah) to ensure it does not deviate from Islamic values (Muhammad et al., 2025). Some students even included reflective notes in their project reports, emphasizing the importance of tabayyun (verification of source accuracy) in producing AI-based materials. This aligns with the view (Ismail, 2023), which emphasizes that digital ethical literacy based on Islamic values is the main foundation for prospective teachers in facing technological disruption.

4.3. Ethical and innovative leadership readiness

The third finding indicates the development of leadership attitudes among students through collaborative practice in AI projects. Students demonstrated the ability to collaborate effectively, share ideas, and take initiative in designing and testing the teaching materials they created. In this context, students acted not only as technology users but also as innovators and mini-project leaders, guiding their teams to produce quality learning products (Eliza et al., 2024). Field observations indicated that the group work dynamics involving participatory leadership roles fostered the values of responsibility, justice, and deliberation, which are key principles of leadership in Islam. This reinforces the findings (Husna & Rahmah, 2024) that project-based experiences with an AI approach can shape innovative leadership competencies that are integrated with spiritual and social values.

4.4. Synergy between technological innovation and moral integrity

Overall, the results of this study indicate that the development of AI-based teaching materials not only improves students' technological capabilities but also strengthens their ethical awareness and moral responsibility as prospective Islamic educators. This project proves that when technology is linked to Islamic values such as amanah, ihsan, and honesty, the innovation process will not lose its moral direction. Thus, PGMI students are not only prepared to become creative and adaptive teachers in the digital era but also become educational leaders with integrity, in accordance with the demands of Education 5.0, which emphasizes the balance between intelligence, ethics, and humanity.

Overall, the development of AI-based teaching materials helps students connect technology with Islamic values, so that innovation can go hand in hand with integrity, two key traits necessary for future educational leaders.

5. Conclusion

This study concludes that empowering PGMI students to develop AI-integrated teaching materials can strengthen their innovation skills, ethical awareness, and leadership potential. AI plays a role not only as a learning tool but also as a medium for instilling digital ethics and creative thinking in Islamic education.

Suggestion:

- Lecturers should integrate AI literacy modules into courses related to technology and learning media development.
- Students need to be provided with training in the ethical use of AI to remain in line with Islamic values.
- Further research can be conducted by comparing the effectiveness of AI-based and non-AI-based media development on student learning outcomes and motivation.

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