

AI-LITERACY AND PEDAGOGICAL UTILIZATION AMONG LECTURERS IN ISLAMIC EARLY CHILDHOOD EDUCATION PROGRAM

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 **Abstract:** Artificial Intelligence (AI) has increasingly influenced higher education practices, including the Islamic Early Childhood Education (PIAUD) program. This study aims to analyze AI literacy levels, patterns of AI use, perceived challenges, and policy needs among lecturers in the PIAUD study program at several State Islamic Universities in Central Java. This research employed a qualitative, exploratory approach, using semi-structured interviews with five PIAUD lecturers selected through snowball sampling. Data validity was ensured through source triangulation, member checking, and repeated interpretation of interview transcripts. Data were analyzed through data reduction, data display, and conclusion drawing. The findings reveal that lecturers generally possess functional, practical AI literacy, particularly in using ChatGPT, Canva, and other AI applications to support teaching preparation, academic writing, and the development of learning media. AI is perceived as improving learning effectiveness, efficiency, creativity, and interactivity. Nevertheless, lecturers also expressed concerns regarding dependency, misinformation, declining critical thinking, academic integrity, and ethical issues related to privacy and data protection. The study identifies four typologies of AI users among lecturers: instrumental-functional, creative, critical, and normative. This study contributes to the discourse on AI integration in Islamic higher education by highlighting the need for ethical values in Islamic education.

Keywords: Artificial Intelligence, Islamic Higher Education, Learning Innovation, PIAUD

A. Introduction

The presence of artificial intelligence (AI) in the educational landscape is inevitable. The integration of AI into education is bringing about changes in personalized, more adaptive learning (Nelson, 2024). Teachers and students are utilizing AI effectively (Lytras *et al.*, 2024), for example, to create content like images, text, and videos (Hashmi and Bal, 2024), or to help provide fast and objective automated assessments (Oktavianus *et al.*, 2023).

Artificial Intelligence (AI) was first introduced by John McCarthy at a conference at Dartmouth College in 1956, marking the advancement and development of AI research (Xu *et al.*, 2021). AI technology is created by imitating human cognitive functions in problem-solving and decision-making (Rashid and Kausik, 2024). AI technology is a disruptive technique that can customize learning experiences for various groups of learners, teachers, and lecturers (Aswin *et al.*, 2022).

The use of AI has the potential to enhance traditional educational approaches through *E-Learning*. AI technology can be utilized to improve the teaching quality of class facilitators and students through innovations in learning methods, classroom management, and learning environments, thereby increasing student creativity and initiative (Huang *et al.*, 2021).

In subsequent developments, AI began to be applied across various fields, such as commerce, science, art, and education, as it was deemed capable of increasing efficiency and creating new opportunities. (Ng *et al.*, 2021). AI literacy then became a concern for various parties, aiming to understand the AI better conceptually, practically, and evaluatively. Indeed, AI has become a part of everyday life, such as through smart home devices, smartphones, Google, and other computer applications (Burgsteiner *et al.*, 2016). In the world of education, AI is introduced to students with various goals, especially to prepare them for the world of work, including in early childhood Islamic education study programs.

Several studies have reported findings on the use of AI in early childhood education. Kisno *et al.* (2023) demonstrated that AI provides benefits in task management and increases readiness for digital transformation. Riana *et al.* (2025) found that early childhood education teachers viewed the use of AI in learning positively, including Khan Academy Kids, ABC Mouse, Google

Assistant, and Alexa. Meanwhile, Aisyah et al. (2024) found that the use of AI tools such as Canva, Kahoot, and TikTok helps teachers create engaging and interactive learning content. Meanwhile, Afiana et al. (2021) emphasized the role of AI, such as Forward Chaining and Talens, in assisting teachers in designing learning for early childhood.

From an Islamic perspective, the use of AI is not prohibited in human life as long as it is based on religious, ethical, and civilizational values (Agil and Alkhiri, 2022). The introduction of AI concepts and technology must be grounded in Islamic values to maintain human dignity and prioritize honesty, privacy, justice, and social responsibility in the development of civilization and science. However, excessive reliance on AI has the potential to weaken the role of teachers as primary educators, especially in the aspects of forming values, ethics, and spirituality (Fauziyati, 2023). Therefore, a balance is needed between traditional approaches and technological innovation, accompanied by synergy between the government, educational institutions, educators, and the community to create a relevant, inclusive, and sustainable Islamic education system (Nugraha *et al.*, 2023). Thus, integrating AI must be carried out wisely and humanely to enhance learning effectiveness without neglecting teachers' primary role in shaping students' character and values. (Zaharah *et al.*, 2024). The application of AI is directed as a tool that supports, not replaces, the role of humans (Fadlillah *et al.*, 2024).

Based on previous research findings and phenomena, this study explores the use of AI in learning within the Early Childhood Islamic Education study program. As a program that produces graduates as early childhood teachers, learning designs that integrate AI can be implemented as learning support that engages children's interest in understanding and exploring their fundamental and natural potential. This research is expected to add to the body of research integrating AI into learning, addressing the challenges, and the need for regulation for the healthy and responsible use of AI.

B. Method

This research is qualitative research with a field *research approach*. This type of research is an exploratory study, namely,

research that aims to investigate phenomena or topics that are still not widely understood (Edgar and Manz, 2017). The informants of this research are several lecturers of the Early Childhood Islamic Education (PIAUD) study program at several PTKIN in Central Java who are willing to be interviewed. The informants or sources in this study are lecturers, and the study uses a snowball sampling technique. The snowball sampling technique is commonly used in qualitative social research to study behavior in a population that is difficult to reach (Etikan, 2016). The number of informants is determined until the data and information are declared complete for the research period determined by the researcher.

The data source was primary data collected through semi-structured interviews. According to Mashuri (2011) semi-structured interviews are effective in qualitative research because they provide researchers with the opportunity to obtain and explore information in depth, flexibly, and with greater focus. This approach also provides researchers with the autonomy to explore relevant ideas that emerge during the interviews (Adeoye-Olatunde and Olenik, 2021). Data were analyzed using descriptive methods, including data reduction, data presentation, and conclusion drawing.

To ensure data credibility, this study employed source triangulation, member checking, and repeated transcript interpretation. Source triangulation was conducted by comparing responses among informants, while member checking was used to confirm the accuracy of interview interpretations. The data were analyzed using interactive qualitative analysis techniques: data reduction, data display, and conclusion drawing.

C. Result and Discussion

AI Literacy Level Among PIAUD Lecturers

Based on responses from five informants regarding their knowledge of AI, the majority understood AI as a technology that mimics human intelligence to assist with work, simplify tasks, or provide solutions. Informants also described it simply as a machine, robot, or application that facilitates information retrieval and learning. In general, informants had good AI literacy and a practical understanding of its role in supporting learning.

The findings indicate that lecturers generally possess functional

and practical AI literacy. Most informants understood AI as a technology capable of imitating human intelligence to simplify academic and learning activities.

Informant 2 stated:

“AI helps lecturers prepare learning materials faster, especially when searching for references, designing presentations, and creating teaching media.”

Informant 4 explained:

“I use ChatGPT mainly to develop teaching ideas and improve writing efficiency, but lecturers still need to verify the information critically.”

This pattern demonstrates that most PIAUD lecturers already possess a functional and conceptual understanding of AI, that there is no AI literacy gap, and that the majority are aware of AI's practical role. PIAUD lecturers range from the functional to the conceptual level, understanding AI as a technology that mimics human intelligence to facilitate activities, develop lesson plans, and assist in preparing engaging learning materials.

The depth of knowledge indicates that PIAUD lecturers' AI literacy is quite homogeneous, and practical awareness has been developed for using AI in learning. These results support the view of Sharples (2023) who sees educational interactions involving humans and AI as a social process, grounded in continuous dialogue with AI language models in a dynamic computational medium comprising various internet tools and resources. The majority of PIAUD lecturers are in the technical or instrumental user category, utilizing AI for routine academic tasks such as searching for references, compiling materials, checking language, and even writing books or manuscripts. AI excels in accuracy and responsiveness, thereby increasing functional benefits and creating user acceptance (Yuan *et al.*, 2022). AI is considered functional, reliable, and provides data protection, which are important factors driving the innovative use of chatbots in organizations (Wang *et al.*, 2023).

Advantages and Challenges of Utilizing AI

Most emphasized the benefits of AI in learning, such as making the process more effective, efficient, engaging, interactive, inspiring, and motivating. Some also highlighted practical uses

such as streamlining formats, assisting with the development of teaching materials, finding ideas, and managing references and literature. Meanwhile, only a small number explicitly mentioned the challenges of using AI, such as limited understanding by lecturers, the risk of dependency, the potential for misinformation, and ethical and data privacy issues. The use of AI is still focused on practical and pedagogical benefits such as accelerating academic work, enriching materials, increasing classroom interactivity, and simplifying reference management. This indicates that the majority of lecturers view AI as a positive tool for learning effectiveness and innovation.

Informant 1 noted:

“AI applications like Canva and ChatGPT make classroom preparation more interactive and less time-consuming.”

Informant 5 described:

“Students may become too dependent on AI and stop thinking critically if there are no clear rules.”

The findings in this study are in line with the opinion of Wang *et al.* (Wang *et al.*, 2023) who assessed that AI plays a crucial role in driving innovative use. Knowledge support and work-life balance can increase this level of trust, thereby facilitating the transformation of work practices through the use of chatbots. Therefore, building multidimensional trust in chatbots is key for organizations to implement AI effectively and innovatively in their daily activities.

These results also align with the view of Jarrahi *et al.* (2023), who emphasized that artificial intelligence plays a crucial role as a catalyst in knowledge management, accelerating the creation, storage, and sharing of information and complementing human decision-making capabilities. AI is positioned not as a replacement but as a partner that strengthens human strengths, excelling in data and pattern analysis. In contrast, humans remain dominant in context, creativity, intuition, and ethical considerations. The success of this partnership depends on the organization's readiness to organize human resources through new roles such as *knowledge scientists*, strengthen its digital infrastructure, adapt its work processes, and implement ethical, transparent governance. Thus, the future of knowledge management.

At the next level, creative user groups are emerging, where

lecturers are not only using AI as a technical tool but also integrating it more strategically into the learning process. They are using AI to create animations, design lessons, chatbots, analyze, and even increase student engagement. This group reflects higher digital literacy and demonstrates the potential for pedagogical transformation at PTKIN through AI. The presence of this group is important because it opens up opportunities to make AI a more interactive, collaborative, and creative learning innovation tool, rather than simply accelerating routine tasks; however, Bolia et al (2015) believe that the role of humans as evaluators or gatekeepers of creativity is crucial, but their assessments are often influenced by bias based on who created them. The study found that products known to be created by AI tended to be judged as less creative than products created by humans, although this was not always the case. One of the main reasons for this bias was the perception that AI put less effort into producing the work than humans. These findings emphasize the importance of understanding human-AI interactions in the context of creativity and innovation, and how human perceptions of AI can influence the acceptance of technology-based products.

Selected AI applications in learning

The most popular AI application used was ChatGPT, followed by Canva, Gemini, Google Scholar AI, and Quiziz. These results indicate that ChatGPT is the most dominant AI application used by PAIUD lecturers and reflect the diversification of AI use for both academic productivity and creativity, learning design, and scientific article writing.

These findings support Shoufan's (2023) research, which found that ChatGPT is an engaging, motivating, and helpful AI application for learning and work, though its negative impacts still need to be considered. According to Liébana-Cabanillas et al. (2022), *generative artificial intelligence (GenAI) is increasingly permeating various social sectors, thereby driving a strong need to teach AI literacy to the younger generation*. While many efforts have been made to teach AI literacy and utilize AI to facilitate learning, few studies provide empirical accounts of the nuanced processes students experience when using GenAI for learning. In this study, a group of high school students used ChatGPT to support their knowledge-building efforts. Based on the teacher's pedagogical

design, the students used ChatGPT for various purposes.

Ali et al. (2024) In their research, they recommend using AI tools such as ChatGPT as a complementary learning and teaching tool. Lünich et al. (2024) see the positive side of using AI to improve educational outcomes, but it also presents threats related to data privacy, potential bias, and other socio-technical impacts. Kumar et al. (2024) explore the impact and potential of generative AI, specifically ChatGPT, on higher education. Adopting a qualitative research approach, the study provides a holistic perspective on the importance of methodological strengthening, pedagogical innovation, and academic integrity as AI's use in higher education increases. Meanwhile, Chan and Tsi (2024) evaluate the potential of generative AI in higher education as an assistant or substitute for human teaching systems. A survey of lecturers and students found that some respondents believe generative AI might replace teachers. However, some respondents believe that teachers are humans with unique qualities, including critical thinking and emotions, that make them irreplaceable. These findings emphasize the importance of socio-emotional competencies in human interactions, which AI cannot replicate.

Another study by Bhullar et al. (2024) related to the *Chat Generative Pre-Trained Transformer* (ChatGPT), which has become a trend in higher education teaching and learning practices. The study reviewed articles and bibliometric analysis of publications and citations related to ChatGPT. This study confirmed findings from other studies on aspects of academic integrity and plagiarism in ChatGPT use that require attention. The use of ChatGPT is considered to reduce students' ability to produce imaginative and original thinking materials and other higher education products.

Ray (2023) examines the role of artificial intelligence (AI) and machine learning in transforming scientific research, with ChatGPT as a prominent AI language model. ChatGPT has rapidly evolved and been applied across sectors such as customer service, healthcare, education, and scientific research, spanning data processing and hypothesis generation to collaboration and public outreach. A key consideration is striking a balance between AI-based innovation and human expertise to ensure the responsible and effective application of this technology. Furthermore, despite controversies and limitations, ChatGPT

has attracted significant attention from academia, industry, and research due to its ability to enhance efficiency, creativity, and interaction in the research process.

Wardat et al. (2023) examined the perspectives of various stakeholders, such as students and educators, regarding the use of artificial intelligence in mathematics teaching, particularly after the launch of ChatGPT. The results showed that ChatGPT was recognized for its improved mathematical capabilities and its ability to support learning, particularly in geometry. However, it still had limitations in deep conceptual understanding and in correcting misconceptions. Its accuracy and effectiveness depended on the complexity of the problems, input data, and instructions provided. This study emphasized the need for further research to ensure the safe, effective, and responsible integration of ChatGPT into mathematics education. Meanwhile, Su and Yang (2023) examined the potential of ChatGPT and educational AI in education, focusing on benefits such as more personalized and efficient learning and rapid feedback for teachers, while also highlighting challenges related to technology effectiveness, data quality, and ethical and security issues. The results showed that using ChatGPT can improve students' learning experiences and simplify teachers' work. However, its effectiveness still needs further testing, and AI applications must also consider security and data quality; however, Zhai et al. (2024) assessed the impact of excessive reliance on AI on students' cognitive abilities, particularly regarding the use of generative AI. The study found that AI impacts cognitive abilities because users choose quick solutions over natural solutions that sometimes don't align with the realities of life.

AI Usage Policy

Data mining results indicate that almost all informants emphasized the need for a policy on the use of AI in learning. Such a policy is crucial for maintaining academic ethics, protecting data privacy, and ensuring that AI is used only as an aid, not as a substitute for educators' or students' critical thinking roles. Several informants also emphasized the need for practical guidance, clear regulations, and training in the use of AI to ensure its productive use while minimizing negative impacts. However, a handful of informants remained unanswered or

remained uncertain about the urgency of such a policy.

Informant 3 stated:

“AI should support lecturers and students, not replace the thinking process itself. Institutions need clear ethical guidelines.”

Informant 2 added:

“Without policy and supervision, AI may encourage plagiarism and reduce students’ independence in learning.”

From a practical perspective, the urgency of this policy reflects educators’ epistemological and ethical concerns. Policymakers worry that without regulation, students will lose their independence of thought and be tempted by the instant convenience offered by AI. Furthermore, there is a risk of a degradation of academic culture, from a literature-based research culture to a technology-based, instant culture. Therefore, policies on the use of AI in learning must be designed comprehensively, participatively, and in a multi-layered manner, encompassing the national level (regulations and norms), the institutional level (technical guidelines and supervision), and the individual level (digital literacy and ethical use). This way, AI can be truly optimized as an educational innovation without sacrificing the essence of learning, which emphasizes critical thinking, creativity, ethics, and integrity.

Digital literacy is an individual’s ability to understand, use, evaluate, and create information effectively, wisely, critically, and responsibly using technological devices. This literacy aims to equip people to distinguish valid information from hoaxes, maintain personal data security, and behave ethically in the digital space. Its aspects include technical skills, information management, digital ethics and security, and creativity and collaboration in cyberspace. With good digital literacy, people are not only users of technology but also able to utilize it to improve the quality of learning, work, and communication, and to contribute positively to social life and national development in the digital era.

AI has enormous potential to transform education into a more efficient, flexible, personalized, and modern environment. This optimism reflects a growing acceptance of technology in education, where AI is viewed not only as a technical tool but also as a learning facilitator that can accelerate access to information, adapt to learning styles, and improve teaching effectiveness.

However, this optimism is tempered by the awareness that AI is not a neutral entity; it can have both positive and negative impacts depending on how it is used.

Another interesting finding is that teachers remain central to the educational process. Informants emphasized that AI cannot replace teachers, particularly in terms of character development, morality, ethics, and humanistic interactions between educators and students. This suggests that AI is perceived as only complementing the technical dimensions of learning, but is unable to address the affective realm and human values. Thus, the emerging narrative is that AI should be positioned as a companion, not a replacement. This perception demonstrates a critical awareness that even powerful technology still has limitations compared to authentic human interaction.

However, many informants highlighted the latent risks of AI use, such as laziness, dependency, and the potential for bias and misinformation. These concerns reflect the paradox of technology: AI is seen as a modern solution to educational problems, but also a source of new problems if used unwisely. Therefore, almost all informants agreed on the importance of regulation, control, and anticipation in AI implementation. They also saw AI as both a challenge and an opportunity, forcing the world of education to adapt, change methods, and reposition learning objectives.

Understanding AI as a technology that mimics human intelligence to assist with work, simplify activities, and provide solutions. Some informants described AI simply as robots, machines, or applications, while a smaller number associated it with technical aspects such as *machine learning* and internet-based data utilization. Ouyang and Jiao (2021) emphasize that understanding AI in education is indeed multifaceted: from technical instruments (instructional tools) to *learning companions* to intelligent tutors. Sanusi et al. (2022) also highlight that AI literacy among lecturers is closely related to the extent to which users can utilize AI critically, not merely functionally. Williamson et al. (2018) also highlight that the unethical use of AI can shift the direction of education from developing intellectual capacity to merely technical efficiency. The importance of AI use policies at both the institutional and national levels. Desired policies should encompass ethical aspects, regulations, usage controls,

data privacy, and practical guidelines for learning. Informants emphasized that AI should be positioned solely as a tool, not a substitute for teachers or students in critical thinking.

AI Utilization Typology

Based on their level of AI literacy, usage patterns, critical attitudes, and views on policy and ethics, informants can be classified into four main typologies—first, Instrumental-Functional Users, who understand AI as a technology that practically assists academic work and learning. AI utilization focuses on preparing teaching materials, searching for references and literature, and improving lecturers' efficiency. Second, creative users: users who not only use AI for routine tasks but also integrate AI into learning design and develop interactive media, animations, and creative content. Third, critical users. These are users concerned about students' over-reliance on AI, which could undermine critical thinking and originality in their work. Fourth, normative users are those who believe that AI should be regulated through policies and guidelines to maintain academic accountability.

D. Conclusion

This study shows that lecturers in the Early Childhood Islamic Education (PIAUD) Study Program at PTKIN Central Java generally have fairly good AI literacy and demonstrate positive acceptance of the use of artificial intelligence in learning. AI is perceived as a technology capable of increasing the effectiveness, efficiency, creativity, and interactivity of learning, particularly in the preparation of teaching materials, reference management, and the development of learning media.

However, research findings also reveal a critical awareness of the risks of AI use, including over-reliance, weakening of students' critical thinking, potential bias and misinformation, and ethical and data privacy challenges. Therefore, AI should not be positioned as a replacement for educators, but rather as a tool that complements their role, particularly in the technical realm of learning.

The majority of informants emphasized the importance of policies and regulations governing the use of AI in learning,

encompassing ethics, digital literacy, and institutional oversight. With a wise, humanistic approach grounded in Islamic educational values, AI has the potential to catalyze the transformation of early childhood education without neglecting the essence of education, which emphasizes character development, morality, and human interaction.

This study contributes to the theoretical literature by extending the discussion of AI literacy in Islamic higher education contexts and proposing a typology of AI users among lecturers. A limitation of this study is its relatively small number of informants, which may limit the generalizability of the findings. Future research is recommended to involve broader institutional contexts, compare public and private Islamic universities, and examine the impact of AI use on students' learning outcomes and the development of critical thinking.

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