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Teachers' readiness for integrating artificial intelligence to support deep learning in islamic religious education

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Abstract: The development of *Artificial Intelligence* (AI) in education has created new opportunities to support more adaptive and meaningful learning. However, the utilization of AI in Islamic Religious Education (PAI) learning still faces various challenges, particularly regarding teachers' readiness to integrate this technology into *Deep Learning*-oriented instruction. This study aims to analyze the readiness of Islamic Religious Education teachers to integrate AI into *Deep Learning* and to identify the opportunities and challenges encountered in its implementation. The study employed a qualitative approach with a descriptive design. The research participants consisted of eight Islamic Religious Education teachers at the junior secondary (SMP/MTs) and senior secondary (SMA/MA) levels, selected through *purposive sampling*. Data were collected through in-depth interviews, non-participant observation, and document analysis, and were analyzed using the Miles, Huberman, and Saldaña model, which includes data reduction, data display, and conclusion drawing. The findings indicate that Islamic Religious Education teachers demonstrate readiness at the *developing readiness* stage in integrating AI into *Deep Learning*. Teachers have utilized AI to design instructional plans, develop teaching materials, and provide more contextual case studies. AI also has the potential to support more reflective and student-centered learning. Nevertheless, the study identified several challenges, including limited training opportunities, concerns regarding the validity of religious information generated by AI, the potential dependence of students on technology, and the absence of clear guidelines for AI use in Islamic Religious Education learning. The study concludes that the successful integration of AI in Islamic Religious Education is determined not only by technological proficiency but also by teachers' pedagogical, professional, and ethical readiness to utilize AI in supporting meaningful learning.
Keywords: Artificial Intelligence, Deep Learning, Islamic Religious Education, Teacher Readiness, TPACK.

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Introduction

The development of Artificial Intelligence (AI) has become one of the most significant phenomena in the transformation of 21st-century education. This technology is no longer limited to industrial and business sectors but has increasingly been integrated into various educational activities, including the preparation of teaching materials, assessment development, automated feedback provision, and the personalization of students' learning experiences. The emergence of AI-based platforms such as ChatGPT, Gemini, and Copilot demonstrates that artificial intelligence is becoming more accessible to teachers and students in supporting more effective and adaptive learning processes. Emphasizes that AI has substantial potential to improve the quality of education; however, its implementation must be accompanied by the enhancement of teachers' competencies to ensure that the technology is utilized responsibly and aligned with educational objectives (UNESCO, 2023a).

The use of AI in the education sector continues to grow significantly. UNESCO reports that AI-based technologies in learning have expanded rapidly across many countries, particularly following the increasing demand for digital learning and personalized education (UNESCO, 2023a). In Indonesia, this

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trend has also become evident through the use of various AI applications by teachers to assist in lesson planning, instructional media development, and learning assessment design. Nevertheless, the level of AI literacy and teachers' readiness to integrate such technologies remains varied, especially in subjects that traditionally emphasize character formation and value development, including Islamic Religious Education (Pendidikan Agama Islam/PAI).

In the context of Islamic Religious Education, the advancement of AI presents both opportunities and challenges. PAI serves not only as a medium for transferring religious knowledge but also as a means of character building, moral development, and the internalization of Islamic values in students' daily lives. A major challenge lies in how teachers can utilize AI as a learning tool without diminishing the essence of Islamic education, which emphasizes role modeling, reflection, habituation, and moral cultivation. On the other hand, AI has the potential to help teachers create more engaging, contextual, and relevant learning experiences that suit the characteristics of the digital generation growing up in a technology-driven environment (Holmes & Miao, 2023).

Alongside these developments, the Indonesian education system has recently placed considerable attention on the implementation of the Deep Learning approach as a learning paradigm that emphasizes profound understanding, meaningful learning, critical reflection, and the connection between knowledge and students' real-life experiences. This approach aims to develop higher-order thinking skills that extend beyond content mastery to include the ability to analyze, evaluate, and apply knowledge in diverse life contexts. In PAI learning, the Deep Learning approach is particularly relevant because the goals of Islamic education extend beyond cognitive achievement to encompass affective and behavioral dimensions reflected in students' attitudes and religious practices.

The integration of AI into Deep Learning creates new opportunities for innovation in Islamic Religious Education. AI can assist teachers in providing more diverse learning resources, facilitating personalized learning experiences, developing reflective learning activities, and supporting more effective assessment processes. However, the success of such integration largely depends on teachers' readiness as the primary facilitators of learning. Teachers are required not only to possess technical skills in operating technology but also pedagogical competencies to manage meaningful learning experiences and ethical awareness to ensure that AI usage remains consistent with the values of Islamic education.

Teachers' readiness to integrate technology can be explained through the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler (Mishra & Koehler, 2006). This framework highlights that the effectiveness of technology integration depends on teachers' ability to combine technological knowledge, pedagogical knowledge, and content knowledge in a coherent manner. In the context of AI, PAI teachers need to understand how the technology works, master appropriate instructional strategies, and effectively integrate Islamic values into AI-supported learning activities. Therefore, the TPACK framework is highly relevant in explaining that teacher readiness encompasses not only technological proficiency but also pedagogical and professional competencies.

Research on AI in education has increased considerably in recent years. Granström et al. found that teachers' readiness to adopt AI is influenced by digital competence, prior experience with technology, and perceptions of AI's benefits for learning (Granström & Oppi, 2025). However, their study focused primarily on general education and did not examine AI utilization within a specific learning approach. Similarly Alshorman (2024) reported that teachers generally demonstrate positive attitudes toward AI usage but continue to face challenges related to limited training opportunities and insufficient institutional support (Alshorman, 2024). Nevertheless, the study concentrated mainly on technology acceptance and did not explore the pedagogical dimensions that support meaningful learning. Meanwhile, Pratiwi emphasized that successful AI integration requires a balance among technological, pedagogical, and content-related aspects through the TPACK framework ('Pratiwi,

2025). However, the study did not specifically address the characteristics of Islamic Religious Education or the implementation of the Deep Learning approach.

Based on the review of previous studies, several research gaps remain. First, most studies on AI in education have focused on general subjects and have paid limited attention to the unique characteristics of Islamic Religious Education. Second, research on teacher readiness has generally concentrated on technological competence and AI acceptance, while pedagogical, professional, and ethical dimensions have not been comprehensively examined. Third, studies investigating the relationship between AI integration and Deep Learning implementation within the context of Islamic Religious Education remain scarce. These gaps indicate the need for further investigation into the readiness of PAI teachers to integrate AI in supporting Deep Learning practices.

The novelty of this study lies in its integration of three key elements: Artificial Intelligence, Deep Learning, and the readiness of Islamic Religious Education teachers. This study not only examines teachers' technological readiness but also analyzes their pedagogical, professional, and ethical preparedness through the lens of the TPACK framework within the context of PAI learning implementation. Through this approach, the study is expected to contribute conceptually to understanding the dimensions of PAI teachers' readiness in responding to AI-driven educational transformation while enriching the discourse on Deep Learning implementation in Islamic education.

This study aims to analyze the readiness of Islamic Religious Education teachers to integrate Artificial Intelligence into Deep Learning practices, identify the factors influencing such readiness, and describe the opportunities and challenges faced by teachers in utilizing AI to support Islamic Religious Education in the digital era.

Method

This study employed a qualitative approach with a descriptive research design to explore the readiness of Islamic Religious Education (PAI) teachers to integrate Artificial Intelligence (AI) into Deep Learning-based instruction (Sugiyono, 2023). A qualitative approach was chosen because it enables an in-depth understanding of teachers' experiences, perceptions, and practices in utilizing AI within the context of Islamic Religious Education. The study involved eight Islamic Religious Education teachers from junior secondary schools (SMP/MTs) and senior secondary schools (SMA/MA), who were selected through purposive sampling. The participants were chosen based on several criteria: having at least five years of teaching experience, actively using digital technologies in classroom instruction, and being familiar with or having used AI-based applications such as ChatGPT, Gemini, or Canva AI for educational purposes.

The characteristics of the research participants are presented in Table 1.

Table 1. Characteristics of Research Participants

Participant Code	School Level	Teaching Experience	Experience Using AI
GP-01	MTs	12 Years	ChatGPT, Gemini
GP-02	SMP	10 Years	ChatGPT
GP-03	MA	15 Years	ChatGPT, Canva AI
GP-04	SMA	9 Years	ChatGPT, Gemini
GP-05	SMP	8 Years	ChatGPT
GP-06	MTs	14 Years	ChatGPT, Canva AI
GP-07	SMA	11 Years	ChatGPT, Gemini
GP-08	MA	17 Years	ChatGPT, Canva AI

Source: Research Data (2025).

Table 1 shows that all participants possessed substantial teaching experience and had been exposed to the use of AI in educational activities. This condition enabled them to provide relevant

insights regarding the readiness, opportunities, and challenges of integrating AI into Islamic Religious Education learning.

The research data consisted of both primary and secondary sources (Sulung & Muspawi, 2024). Primary data were obtained through semi-structured interviews with eight Islamic Religious Education teachers who served as the main participants in the study. Secondary data were collected from supporting documents, including teaching modules, instructional materials, presentation resources, school policies related to educational digitalization, and relevant scholarly literature. To obtain a comprehensive understanding of teachers' readiness to integrate AI, data collection was conducted through in-depth interviews, non-participant observations of classroom learning activities, and documentation studies of Data were analyzed using the interactive model proposed by Miles and Huberman, which consists of data reduction, data display, and conclusion drawing and verification (Miles & Huberman, 2018). The analysis process was carried out continuously from the initial stage of data collection until the completion of the study in order to identify patterns, themes, and meanings emerging from the findings. Data obtained from interviews, observations, and documentation were analyzed thematically to reveal the forms of teacher readiness, opportunities for AI utilization, and challenges encountered in implementing Deep Learning-based instruction (Rizky Fadilla & Ayu Wulandari, 2023; Umrati & Wijaya, 2020).

The trustworthiness of the data was ensured through source triangulation, methodological triangulation, and member checking (Susanto et al., 2023; Sutriani & Octaviani, 2019). Source triangulation was conducted by comparing information obtained from all participants, while methodological triangulation involved cross-checking findings derived from interviews, observations, and documentation. In addition, member checking was undertaken by reconfirming the researchers' interpretations with the participants to ensure consistency between the research findings and the experiences they reported.

The analysis focused on four main dimensions: technological readiness, pedagogical readiness, professional readiness, and ethical readiness. These dimensions were examined through the Technological Pedagogical Content Knowledge (TPACK) framework to understand how Islamic Religious Education teachers integrate Artificial Intelligence in supporting the implementation of Deep Learning-based instruction.

Results and Discussion

Islamic Religious Education Teachers' Understanding of Artificial Intelligence and Deep Learning

The findings revealed that all participants were familiar with Artificial Intelligence (AI) and had utilized several AI-based platforms in their teaching activities. Based on the interview data, the most frequently used applications were ChatGPT, Gemini, and Canva AI. These platforms were primarily employed to support lesson planning, assessment development, presentation material preparation, and the search for instructional resources. This finding was further supported by documentation data, including teaching modules and presentation materials, which indicated the use of content generated or developed with the assistance of AI tools.

Classroom observations showed that teachers did not use AI directly during instructional activities. Instead, AI was predominantly utilized during the lesson planning stage. In several cases, teachers employed AI to generate brainstorming questions, case studies, and reflective learning activities, which were subsequently adapted to the context of Islamic Religious Education. These findings suggest that AI has been accepted as a professional support tool; however, its utilization remains largely limited to administrative functions and instructional preparation.

These findings are summarized in Table 2.

Table 2. Themes of Teachers' Understanding of Artificial Intelligence

Theme	Key Findings
Understanding of AI Concepts	Teachers understand AI as a technology capable of generating information and learning content efficiently and rapidly.
AI Utilization	AI is used to develop teaching modules, presentation materials, assessment questions, and instructional resources.
Benefits of AI	AI enhances time efficiency, enriches learning resources, and supports creativity in instructional activities.
Limitations of AI	Teachers still encounter inaccurate information generated by AI and recognize the need for verification.
Challenges in AI Utilization	Not all teachers fully understand how AI works, including issues related to algorithmic bias, ethical concerns, and responsible use.

Source: Analysis of interview, observation, and documentation data (2025).

Although all participants demonstrated positive attitudes toward the use of AI, the study revealed a gap between teachers' ability to use AI and their ability to critically understand it. Most teachers were capable of utilizing AI to generate instructional materials; however, they did not fully understand how AI produces information or how to systematically validate the outputs generated by these systems.

One participant stated:

> "I usually use ChatGPT to create sample questions or summarize learning materials. For religious content, I always double-check the information using textbooks or other reliable sources because sometimes the explanations are not entirely accurate." (G3)

This statement indicates that teachers recognize the importance of verifying AI-generated information, particularly in religious subjects that require source accuracy and proper interpretation. However, not all participants followed the same verification procedures. Several teachers admitted that they used AI-generated content after making minor linguistic adjustments without conducting further checks on the references or sources underlying the information provided by the system.

These findings highlight an important paradox in the integration of AI within educational settings. On the one hand, AI enhances teachers' efficiency and broadens access to learning resources. On the other hand, the convenience offered by AI may reduce critical evaluation processes when teachers become overly reliant on system-generated information. In the context of Islamic Religious Education, this issue carries more complex implications than in many other subjects because the content taught involves values, Islamic beliefs, Islamic law, and character development (Puspitasari et al., 2022). Undetected inaccuracies in AI-generated information may affect the quality of students' religious understanding and learning outcomes.

The findings also revealed that teachers' understanding of the Deep Learning concept is still evolving. Several participants admitted that they initially associated Deep Learning with AI technology because the term is frequently used in discussions of artificial intelligence. However, after participating in professional development programs and educational policy socialization activities, teachers came to understand that Deep Learning in the educational context refers to a learning approach that emphasizes deep understanding, reflection, meaningful learning, and active student engagement.

These findings were further supported by classroom observations. Teachers who demonstrated a clearer understanding of the Deep Learning approach tended to employ reflective questioning, contextual case studies, and problem-solving discussions in Islamic Religious Education classes. In contrast, teachers with a more limited understanding primarily used AI to generate instructional

materials and assessment questions without designing learning activities that encouraged students' exploration, critical thinking, and reflection.

Table 3. Findings on Teachers' Understanding of Deep Learning

Theme	Key Findings
Initial Understanding	Some teachers initially associated Deep Learning with AI technology.
Understanding After Training	Teachers came to understand Deep Learning as a learning approach focused on deep understanding and meaningful learning.
Implementation in Islamic Religious Education	Implemented through reflective activities, case studies, discussions, and problem-solving tasks.
Relationship with AI	AI is utilized as a supporting tool to facilitate more meaningful learning experiences.

Source: Analysis of interview, observation, and documentation data (2025).

When analyzed through the Technological Pedagogical Content Knowledge (TPACK) framework, the findings indicate that teachers generally demonstrated strong competencies in both content knowledge and pedagogical knowledge. This was reflected in their ability to connect Islamic Religious Education content with reflective and contextual learning activities. However, the technological knowledge dimension showed considerable variation among participants. Not all teachers possessed the same level of AI literacy, resulting in differences in how technology was integrated into learning activities. In many cases, technology utilization remained highly dependent on individual experience and access to professional training opportunities.

These findings suggest that the main challenge of AI integration in Islamic Religious Education is not the acceptance of technology itself, but rather the transformation of teachers' perceptions regarding the role of technology in learning. Most participants still viewed AI primarily as a tool for improving administrative efficiency rather than as a pedagogical instrument capable of supporting deeper and more meaningful learning experiences. In fact, the essence of the Deep Learning approach lies in students' ability to understand, reflect upon, and construct meaning from their learning experiences.

The results of this study are consistent with the findings of Granström et al. who reported that the extent of teachers' AI utilization does not necessarily correspond to the depth of their understanding of the technology (Granström & Oppi, 2025). Their study found that many teachers had incorporated AI into educational activities but continued to experience difficulties in evaluating the quality and reliability of AI-generated information. The present findings also support the work of Alshorman, who argued that positive attitudes toward AI do not automatically translate into adequate pedagogical readiness and digital literacy (Alshorman, 2024).

In the context of Islamic Religious Education, these findings indicate that strengthening teachers' capacities cannot be achieved solely through training on the technical use of AI applications. Teachers also need to develop critical AI literacy, skills for verifying religious sources, and a deeper understanding of how AI can be utilized to support reflective and meaningful learning. The integration of AI into Islamic Religious Education is likely to have a more significant impact when technology is used not merely to generate instructional content, but also as a means of enriching students' thinking processes, reflection, and internalization of Islamic values.

Readiness of Islamic Religious Education Teachers to Integrate Artificial Intelligence into Deep Learning-Based Instruction

Based on interviews with eight Islamic Religious Education (PAI) teachers, classroom observations, and analyses of instructional documents, the findings revealed that all participants demonstrated positive attitudes toward the use of Artificial Intelligence (AI) in education. Teachers

perceived AI as an innovation capable of enhancing learning effectiveness while simplifying various professional tasks. Of the eight participants, six reported using AI regularly to develop instructional materials, five utilized it for designing assessment tasks, four employed AI to create case studies and reflective learning activities, and three had begun integrating AI directly into students' learning activities.

These findings indicate a relatively high level of acceptance of AI among PAI teachers. However, a high level of acceptance does not necessarily reflect comprehensive readiness. The results showed that most teachers still utilized AI primarily during the lesson planning stage, while its application in instructional practices aligned with Deep Learning principles remained limited (Difa Maulidya et al., 2025).

One participant explained:

> "AI is very helpful for developing teaching modules, designing discussion questions, and finding case examples that are relevant to students' daily lives. However, I am still trying to adapt its implementation in the classroom because I am not yet accustomed to integrating AI into students' learning activities." (GP-02)

This statement illustrates that teachers have recognized the potential of AI as a pedagogical support tool. Nevertheless, its utilization remains in an adaptation phase and has not yet fundamentally transformed classroom learning practices. Classroom observations revealed that instruction was still largely dominated by teacher-led explanations and guided discussions, whereas the use of AI as a tool for student exploration, reflection, and knowledge construction had not been fully optimized.

The analysis of instructional documents demonstrated a similar pattern. Most teaching materials developed with AI assistance contained more diverse and contextualized content (Sa'diyah et al., 2024; Sarmita et al., 2025). However, the learning activities themselves remained focused on conceptual understanding and task completion. Activities designed to encourage deep reflection, critical questioning, and meaningful connections between learning content and real-life experiences were not consistently evident.

These findings suggest that teachers' readiness to integrate AI is still predominantly technological in nature. Teachers generally possess the basic skills required to use various AI platforms, yet many have not fully transformed these technologies into tools that effectively support Deep Learning. This condition demonstrates that technological proficiency does not automatically translate into high-quality pedagogical integration.

From the perspective of the Technological Pedagogical Content Knowledge (TPACK) framework, the findings indicate that most teachers possess adequate content knowledge and pedagogical knowledge, as reflected in their ability to connect Islamic Religious Education content with students' needs and lived experiences. However, the integration of technological knowledge with pedagogical strategies remains less developed. Teachers understand how to use AI tools, but many have not yet leveraged these technologies to create learning experiences that foster exploration, reflection, and meaning-making, which constitute the core principles of the Deep Learning approach.

The findings highlight a gap between technology adoption and pedagogical transformation. Teachers have accepted AI as part of their professional practice, yet most continue to perceive it primarily as a tool for improving work efficiency. Within the Deep Learning paradigm, however, technology should be employed to expand students' thinking processes, facilitate dialogue, and promote deeper understanding of learning content. This suggests that the primary challenge of AI integration is no longer technological access but rather teachers' ability to transform technology into meaningful learning experiences.

The results are consistent with the work of Sharples (2023), who argued that AI in education should be positioned as a *dialogic partner* that supports students in developing understanding through exploration and reflection (Sharples, 2023). The findings also support UNESCO's guidelines, which emphasize that AI should be utilized to strengthen student-centered learning rather than merely increase teachers' administrative efficiency (UNESCO, 2023b).

In addition to technological and pedagogical readiness, the study found that ethical readiness was the strongest dimension demonstrated by the participants. All teachers stated that AI-generated religious information should not be used directly without prior verification. They consistently compared AI-generated outputs with the Qur'an, Hadith, textbooks, and other credible Islamic references before incorporating them into instructional activities.

One participant stated:

> "When dealing with Fiqh or Hadith materials, I never use AI-generated answers directly. I always verify them using reliable sources because I am concerned that some information may be inaccurate or inappropriate for the learning context." (GP-01)

This finding indicates that PAI teachers possess a strong awareness of the limitations of AI as a source of religious knowledge. Such awareness serves as an important foundation for maintaining the validity of instructional materials and preventing the dissemination of unreliable information. In Islamic education, this aspect is particularly significant because scholarly authority cannot be fully delegated to algorithm-based systems.

Interestingly, the study found that teachers' ethical readiness has developed more rapidly than their pedagogical and technological readiness. Teachers were generally capable of recognizing the risks associated with AI use and understood the importance of information verification. However, they still required further support in developing instructional strategies that meaningfully integrate AI into the learning process. These findings suggest that AI-driven educational transformation in Islamic Religious Education requires not only enhanced technological literacy but also stronger pedagogical competencies that enable teachers to connect technology with learning objectives and character development goals.

Overall, the findings indicate that the readiness of PAI teachers to integrate AI can be categorized as being at a developing readiness stage. Teachers have demonstrated a high level of technology acceptance, strong ethical awareness, and an increasing use of AI in various instructional activities. Nevertheless, AI integration remains more focused on improving work efficiency than on transforming students' learning experiences. This condition highlights the need for capacity-building initiatives that emphasize TPACK-based pedagogical competencies, ensuring that AI functions not merely as a technical tool but also as an instrument for fostering reflective, contextualized, and meaningful Deep Learning experiences in Islamic Religious Education.

Opportunities for Integrating Artificial Intelligence into Islamic Religious Education Learning

Based on interviews with eight Islamic Religious Education (PAI) teachers, classroom observations, and analyses of instructional documents, the findings revealed that AI is perceived as an innovation that offers significant opportunities for developing more adaptive, contextualized, and student-centered learning. All participants reported that AI helped accelerate the preparation of instructional materials, seven participants used it to expand learning resources, six employed it to generate case studies relevant to students' everyday experiences, and five believed that AI has the potential to support the implementation of Deep Learning-based instruction.

These findings indicate that AI is increasingly viewed not merely as a technology that supports administrative tasks but also as a source of pedagogical innovation. Classroom observations showed that teachers who utilized AI were generally able to provide more current and relevant examples than those

commonly found in conventional instructional practices. For example, when teaching moral and ethical values (*akhlaq*), teachers used AI to generate case studies related to social media ethics, the spread of misinformation, cyberbullying, and contemporary popular culture issues that closely reflect students' daily lives.

One participant explained:

> "When discussing ethics in social media use, I ask AI to generate several examples of situations that frequently occur among teenagers. Students are then asked to analyze these cases based on Islamic values. They become more engaged in discussions because the cases are closely related to their own experiences." (GP-03)

This finding suggests that AI has the potential to help teachers bridge the gap between normative religious teachings and the social realities encountered by students. In Islamic Religious Education, one of the greatest challenges is not merely conveying Islamic concepts but helping students understand the relevance of Islamic values in their everyday lives. AI creates opportunities for teachers to design more contextualized learning experiences, ensuring that instruction extends beyond memorization and conceptual understanding toward meaningful application.

The analysis of instructional documents further revealed that teaching materials developed with AI assistance tended to include more diverse learning activities than those prepared through conventional methods. Several teachers had begun designing assignments based on case analysis, personal reflection, and problem-solving discussions that align with the characteristics of Deep Learning. These findings indicate that AI can function as a catalyst for transforming instructional design from teacher-centered approaches toward more student-centered learning environments.

However, the study also identified an interesting phenomenon. Most teachers appreciated AI primarily because of its ability to generate information quickly and efficiently, whereas the Deep Learning approach emphasizes thoughtful, reflective, and non-instantaneous learning processes. This finding suggests that the use of AI does not automatically lead to deeper learning. When utilized merely as a tool for obtaining quick answers, AI may inadvertently reinforce a culture of instant learning that contradicts the fundamental principles of Deep Learning.

This issue was evident in the interview data, which showed that several teachers continued to use AI mainly to accelerate the preparation of instructional materials and assessments. Under such circumstances, AI functions more as an efficiency tool than as a pedagogical instrument. Yet, the primary objective of Deep Learning is not to accelerate learning but to deepen students' thinking processes through reflection, exploration, dialogue, and problem-solving. These findings suggest that the success of AI integration depends largely on how teachers position technology within the learning process.

This phenomenon is consistent with the findings of Almulla (2025), who argued that AI has significant potential to support personalized learning and expand access to information (Almulla, 2025). However, it may also increase students' dependence on technology if its use is not accompanied by the development of critical thinking skills. While AI can provide answers quickly and efficiently, it does not necessarily ensure that learners understand the reasoning processes underlying those answers. Consequently, the educational value of AI depends not only on its capacity to deliver information but also on how effectively teachers guide students in critically evaluating, interpreting, and reflecting upon AI-generated content.

In addition to the paradox between efficiency and deep learning, the study identified changes in patterns of knowledge access within schools. Several participants reported that students had become increasingly accustomed to seeking answers through AI before consulting their teachers. This trend

suggests a shift in the locus of knowledge authority, which was previously centered primarily on teachers but is now increasingly shared with digital technologies.

One participant noted:

> "Many students now come to class with answers generated by ChatGPT. Sometimes they ask whether those answers are correct. The situation is very different from a few years ago when students would directly ask the teacher." (GP-08)

This finding is particularly significant because it demonstrates that AI is not only changing how students learn but also transforming the role of teachers in the learning process. Teachers are no longer the sole source of information; instead, they are increasingly becoming facilitators who help students verify, evaluate, and interpret information obtained from various digital sources. In the context of Islamic Religious Education, this transformation carries additional complexity because not all religious information generated by AI possesses sufficient scholarly validity or religious authority.

These findings indicate that the greatest opportunity offered by AI in Islamic Religious Education does not lie in its ability to generate answers but in its capacity to create broader spaces for dialogue among students, teachers, and learning resources. AI can serve as an initial platform for exploring contemporary religious issues; however, the processes of verification, reflection, and value internalization continue to require the guidance of teachers.

The results are consistent with the work of Tlili et al., who emphasized that AI has the potential to support more personalized, flexible, and adaptive learning experiences. Nevertheless, its effectiveness depends heavily on teachers' ability to guide technology use in ways that remain aligned with educational objectives. At the same time, studies on generative AI have warned that AI use without critical literacy may increase students' dependence on technology and diminish the quality of reflective thinking processes.

When analyzed through the TPACK framework, the opportunities for AI integration in Islamic Religious Education extend beyond technological considerations alone. Rather, they depend on teachers' ability to connect technological knowledge with pedagogical strategies and Islamic subject content. Teachers who successfully integrate these three dimensions tend to use AI to facilitate more reflective, contextualized, and meaningful learning experiences. In contrast, teachers who focus solely on the technological dimension are more likely to use AI merely as an administrative support tool, resulting in limited impact on instructional quality.

Therefore, the opportunities for AI integration in Islamic Religious Education should not be measured by how frequently technology is used, but by the extent to which it deepens students' thinking processes, strengthens religious reflection, and helps learners connect Islamic values with contemporary life challenges. The findings demonstrate that AI holds considerable potential to support the implementation of Deep Learning. However, this potential can only be realized when teachers position AI as a pedagogical instrument that enriches the learning process rather than simply accelerating the delivery of information.

Challenges and Strategies for Strengthening the Readiness of Islamic Religious Education Teachers in the Era of Artificial Intelligence

Despite the numerous opportunities offered by Artificial Intelligence (AI), this study found that Islamic Religious Education (PAI) teachers continue to face several challenges that influence the integration of technology into learning practices. Based on interviews with eight participants, all teachers acknowledged that the development of AI has progressed much more rapidly than the enhancement of their own competencies. All eight participants highlighted the lack of AI-specific training for PAI teachers, seven expressed concerns regarding the validity of AI-generated religious

information, six reported concerns about students' increasing dependence on technology, and five identified limitations in digital infrastructure as a barrier to implementation.

These findings indicate that the challenges of AI integration extend beyond technical issues and encompass pedagogical, professional, and ethical dimensions. In other words, the primary challenge lies not in the existence of the technology itself, but in the readiness of the educational ecosystem to manage the changes brought about by technological advancement.

Table 4. Challenges of Artificial Intelligence Integration in Islamic Religious Education

Challenge Theme	Research Findings
Teacher Competency Development	All participants reported the absence of AI training specifically designed for Islamic Religious Education.
Validity of Religious Information	Most teachers expressed concerns regarding the accuracy of sources and interpretations of AI-generated religious content.
Student Dependence on AI	Teachers observed a growing tendency among students to use AI as a source of instant answers.
Digital Infrastructure	Access to devices and reliable internet connectivity remains uneven across schools.
AI Usage Guidelines	No specific standards or guidelines currently exist for AI use in Islamic Religious Education learning.

Source: Analysis of interview, observation, and documentation data (2025).

One of the most prominent challenges identified in this study is the competency gap related to AI among teachers. Although all participants were familiar with and had used AI, most had acquired their knowledge independently. Teachers reported learning about AI through webinars, social media, professional communities, and various online platforms without systematic support from educational institutions.

One participant explained:

> "We learn about AI independently because there has been no training specifically addressing how AI can be used in Islamic Religious Education. As a result, teachers' competencies vary considerably depending on their experience and willingness to learn." (GP-06)

This finding suggests that digital transformation within educational settings remains largely an individual initiative rather than an institutionally coordinated effort. Such conditions may contribute to competency disparities among teachers. Those who actively follow technological developments tend to adapt more quickly, whereas teachers with limited access to professional learning opportunities risk falling behind in the educational transformation process.

Another major concern relates to the validity of AI-generated religious information. Seven of the eight participants stated that they do not fully trust AI-generated responses when dealing with topics related to Islamic creed (aqidah), Islamic jurisprudence (fiqh), Hadith, or Qur'anic interpretation (tafsir). These concerns stem from the fact that AI generates information based on patterns within available datasets rather than through scholarly authority and methodological rigor that characterize the Islamic intellectual tradition.

Classroom observations indicated that teachers generally verified AI-generated information by consulting the Qur'an, Hadith, classical and contemporary Islamic references, and approved textbooks. This finding demonstrates a relatively strong level of ethical awareness among PAI teachers. However, the study also found that verification practices are conducted individually and are not yet supported by clear institutional guidelines.

This issue is particularly significant because it highlights a fundamental distinction between AI-generated knowledge and knowledge within the Islamic educational tradition. In Islamic scholarship, the validity of knowledge is established through scholarly transmission, academic authority, and rigorous verification processes. By contrast, AI operates on probabilistic data models, making it capable of producing information that appears convincing but is not always accurate. These findings suggest that the integration of AI into PAI learning requires not only digital literacy but also strong religious literacy.

Beyond concerns regarding information validity, the study also revealed apprehension about students' growing dependence on AI. Six participants reported that many students have become accustomed to using AI to obtain instant answers when completing assignments or searching for educational information.

Interestingly, this phenomenon presents a contradiction with the objectives of Deep Learning. On the one hand, AI provides rapid and extensive access to information. On the other hand, Deep Learning requires learners to engage in thoughtful, reflective, and analytical thinking processes. When AI is used without appropriate guidance, students may become more focused on obtaining answers than on engaging in the intellectual processes that constitute the primary goal of learning.

These findings reinforce the work of Dirk Ifenthaler and other studies on generative AI in education, which suggest that excessive reliance on AI may reduce students' cognitive engagement when technology is used merely as a provider of instant solutions (Ifenthaler & Schumacher, 2023). In this context, the greatest challenge is not how to encourage students to use AI, but how to ensure that AI is employed to deepen thinking processes rather than replace them.

Another challenge identified in this study concerns digital infrastructure. Although it was not considered the most critical issue, five participants reported that limited internet access and inadequate technological devices continue to hinder AI implementation. Observational data indicated that these constraints were more common in schools with limited technological resources. Consequently, AI is often used only during lesson preparation and has not yet been optimally integrated into students' classroom learning activities.

Based on these challenges, the study identified several strategies that may strengthen the readiness of PAI teachers to integrate AI into Deep Learning-based instruction.

First, more systematic and sustainable professional development programs are needed. Such programs should extend beyond technical training on AI applications and include competencies related to instructional design, information verification, and the integration of AI into student-centered learning strategies.

Second, teacher capacity-building initiatives should be grounded in the Technological Pedagogical Content Knowledge (TPACK) framework. The findings indicate that the greatest challenge lies not in technological proficiency itself but in teachers' ability to connect technology with pedagogy and subject content. Professional development programs should therefore help teachers understand how AI can support reflection, discussion, exploration, and problem-solving within Islamic Religious Education.

Third, greater emphasis should be placed on the ethical dimensions of AI use. Teachers need competencies that enable them to evaluate information validity, recognize algorithmic bias, and cultivate a culture of information verification among students. This is particularly important because PAI aims not only to transmit knowledge but also to foster character development and responsible moral conduct in the use of technology.

Fourth, schools should develop AI usage guidelines that align with educational objectives and Islamic values. Such guidelines can provide practical direction for both teachers and students, encouraging responsible, critical, and productive use of AI. The existence of clear guidelines would help

reduce uncertainty surrounding AI implementation while maintaining the quality and integrity of the learning process.

These findings are consistent with UNESCO's AI competency framework for teachers, which identifies technological competence, pedagogy, ethics, and professional development as the primary foundations for successful AI integration in education. However, this study suggests that within the context of Islamic Religious Education, ethical considerations and knowledge validity occupy a more central role than in many other subject areas. This is because PAI learning extends beyond cognitive development to encompass the formation of values, beliefs, and character.

Overall, the study demonstrates that the challenges associated with AI integration in Islamic Religious Education are not fundamentally technological in nature. Rather, the more critical challenge is ensuring that technology remains guided by educational values and does not replace the processes of critical thinking, reflection, and character formation that constitute the core objectives of Islamic education. In this context, teacher readiness emerges as the key factor determining whether AI serves as an instrument for enhancing educational quality or becomes a source of new challenges within the learning process.

Conclusion

This study reveals that Islamic Religious Education (PAI) teachers demonstrate a relatively good level of readiness for integrating Artificial Intelligence (AI) into Deep Learning-oriented instruction, although their readiness remains at a developing stage. Teachers have become familiar with and utilized various AI platforms to support lesson planning, instructional material development, and the creation of more contextual learning activities. The use of AI also provides opportunities to foster more adaptive, reflective, and relevant learning experiences, thereby supporting the implementation of Deep Learning within Islamic Religious Education.

The findings indicate that teacher readiness extends beyond technological competence and encompasses pedagogical, professional, and ethical dimensions. Teachers have demonstrated a strong awareness of the need to verify religious information generated by AI. However, the use of AI remains largely focused on improving work efficiency rather than transforming learning processes. This suggests that greater emphasis should be placed on strengthening pedagogical competencies to ensure that AI can effectively facilitate reflection, exploration, and deeper knowledge construction among students.

The study further reveals that the primary challenges of AI integration are not related to the availability of technology itself but rather to the readiness of human resources and the broader educational ecosystem. Limited professional training, the potential overreliance of students on AI, concerns regarding the validity of religious information, and the absence of clear guidelines for AI implementation in Islamic Religious Education remain significant issues. Therefore, strengthening teacher competencies through the TPACK framework, developing ethical guidelines for AI use, and enhancing both digital and religious literacy are essential strategies to ensure that AI integration remains aligned with the objectives of Islamic Religious Education, namely fostering deep religious understanding, strong moral character, and the capacity to navigate the challenges of the digital era.

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