

PAI uad students' digital readiness towards the integration of artificial intelligence in islamic values-based learning

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ABSTRACT

The swift advancement of Artificial Intelligence (AI) has significantly impacted higher education, encompassing Islamic Religious Education (PAI). This research intends to evaluate the preparedness of Islamic Religious Education students at Universitas Ahmad Dahlan regarding the incorporation of Artificial Intelligence into learning based on Islamic principles. An explanatory sequential mixed-methods approach was utilized in this investigation, which comprised both quantitative and qualitative stages. The quantitative portion involved the collection of data via structured online questionnaires distributed to 109 currently enrolled PAI students, while qualitative insights were gathered through semi-structured interviews with chosen individuals to elaborate on the quantitative results. The quantitative data were examined using descriptive statistical methods (including frequency, percentage, and mean score), whereas the qualitative data underwent thematic analysis. The results indicate that students demonstrate relatively high digital readiness, particularly in technical competence and positive perceptions of AI. Ethical awareness toward AI utilization based on Islamic values also shows a high level, while adaptive readiness and critical AI literacy still require improvement. The qualitative findings reveal that Islamic values, institutional support, and lecturer guidance strengthen students' responsible use of AI in learning. This study concludes that successful AI integration in Islamic education requires not only technological competence but also ethical awareness and institutional support aligned with Islamic values.

1. INTRODUCTION

The development of Artificial Intelligence (AI) has changed the paradigm of higher education globally through its ability to provide adaptive, personalized, and data-driven learning. The presence of various generative AI technologies, such as ChatGPT, Gemini, Claude, and Copilot, is no longer seen as just an information search tool, but has developed into a learning partner that is able to support the preparation of materials, problem solving, learning evaluation, and the development of high-level thinking skills (Zawacki-Richter et al., 2019). This transformation puts universities in a strategic position to prepare students who are not only able to utilize AI technically, but also have adequate digital readiness so that the technology can be used responsibly, ethically, and productively. Various studies show that the success of the implementation of AI in education is more determined by the level of readiness of the user than by the sophistication of the technology itself (Kembau1 et al., 2025). Digital readiness is a multidimensional concept that includes technological readiness, digital competence, AI literacy, psychological readiness, institutional readiness, and adaptability to technological changes. In the context of higher education, digital readiness is the main foundation in supporting the transformation of artificial intelligence-based learning because students are required to be able to critically evaluate AI-generated information, understand the ethical implications of its use, and integrate the technology into the learning process responsibly (Via et al., 2025). Research on digital readiness in universities shows that digital readiness is not only related to access to technology, but is also influenced by academic culture,

institutional policies, the quality of human resources, and the support of a sustainable digital ecosystem. In the Islamic Religious Education (PAI) environment, the development of AI presents opportunities as well as challenges that are more complex than other disciplines (Carey et al., 2026). On the one hand, AI is able to enrich the learning process through the provision of wider learning resources, personalization of materials, automation of academic administration, and increased learning effectiveness. On the other hand, the use of AI also raises ethical issues, academic integrity, validity of Islamic information, the potential for algorithmic bias, and the possibility of reduced critical thinking skills if students are too dependent on technology (Habibulloh, 2025). Therefore, the integration of AI in PAI learning is not enough to only consider technological aspects, but must be balanced with the internalization of Islamic values that emphasize honesty, responsibility, trust, tabayyun, and benefits in the use of digital technology (Ramadani & Desriyeni, 2025). Previous studies have extensively examined Artificial Intelligence (AI) in higher education, primarily focusing on technology acceptance, digital literacy, AI adoption, and the effectiveness of AI-assisted learning in improving academic performance (Arifin, 2026). Other studies have investigated students' readiness to adopt digital technologies; however, these investigations have predominantly been conducted in general higher education settings and have emphasized technological competence without adequately considering ethical and religious dimensions. Furthermore, empirical evidence concerning the digital readiness of students enrolled in Islamic Religious Education (PAI) programs remains limited, particularly within Indonesian Islamic higher education institutions (Handayani et al., 2026). Existing studies rarely integrate technical readiness, adaptive readiness, AI literacy, and ethical readiness grounded in Islamic values into a single analytical framework. Consequently, there is still insufficient empirical evidence explaining how PAI students prepare to utilize AI responsibly while maintaining the principles of academic integrity, tabayyun, responsibility, and other Islamic values (Alotaibi et al., 2025).

Addressing this gap is important because PAI students are prospective Islamic educators who are expected not only to master emerging technologies but also to apply them in accordance with Islamic ethical principles. Therefore, this study fills the existing research gap by employing an explanatory sequential mixed-methods approach to empirically examine the digital readiness of PAI students at Universitas Ahmad Dahlan toward the integration of Artificial Intelligence in Islamic values-based learning. Based on the identified research gap, this study aims to analyze the digital readiness of Islamic Religious Education (PAI) students at Universitas Ahmad Dahlan toward the integration of Artificial Intelligence in Islamic values-based learning using an explanatory sequential mixed-methods approach. Specifically, the study examines students' technical readiness, perceptions of AI, adaptive readiness, ethical readiness, and institutional support, while qualitative findings are used to provide a deeper explanation of the quantitative results (Aldhi et al., 2025). This condition shows a conceptual gap because the implementation of AI in Islamic education has different characteristics from other fields of science, especially related to the integration of spiritual dimensions, Islamic ethics, and character formation as the main goals of Islamic education (Abdul Kodir, 2025). Ahmad Dahlan University as one of the Muhammadiyah universities that develops technology-based learning has a great opportunity to develop a conceptual model regarding the digital readiness of PAI students in facing AI integration that is still based on Islamic values. Students of the Islamic Religious Education Study Program are seen as a strategic group because they are prepared to become prospective educators, academics, and practitioners of Islamic education who are expected to be able to integrate technological innovation with the principles of Islamic education in a balanced manner (Afif & Ningrum, 2024). Based on these conditions, Despite the growing body of literature on AI adoption and digital readiness in higher education, empirical studies focusing on Islamic Religious Education students remain limited, particularly within the context of Islamic values-based learning. Most previous studies have examined technology acceptance, digital literacy,

or AI effectiveness without investigating students' actual readiness in Islamic higher education settings. This empirical gap highlights the need for evidence-based research that examines the digital readiness of PAI students toward AI integration while considering ethical and Islamic value dimensions (Tahir et al., 2026). Therefore, this empirical mixed-methods study aims to analyze the digital readiness of Islamic Religious Education students at Universitas Ahmad Dahlan toward the integration of Artificial Intelligence in Islamic values-based learning by combining quantitative survey findings with qualitative explanations obtained through interviews (Fitri et al., 2026).

2. METHODS

This research utilized an explanatory sequential mixed-methods framework, comprising two sequential stages. The initial stage focused on gathering quantitative data to assess the degree of digital preparedness among students of Islamic Religious Education (PAI) regarding the incorporation of Artificial Intelligence (AI) into learning centered around Islamic values. The following stage consisted of qualitative interviews with chosen participants to clarify and enhance the quantitative results. The combination of quantitative and qualitative outcomes provided a broader understanding of students' digital readiness through both statistical data and contextual insights (Putra et al., 2026). The population of this study consisted of all active undergraduate students of the Islamic Religious Education (PAI) Study Program at Universitas Ahmad Dahlan who were enrolled in the first, third, fifth, seventh, and ninth semesters during the 2025/2026 academic year. These students were selected as the target population because they had participated in digital-based learning activities and had varying levels of experience in utilizing Artificial Intelligence (AI) applications to support their academic learning. The quantitative phase involved 109 students, selected using purposive sampling. The sampling criteria were as follows: Active undergraduate students of the Islamic Religious Education (PAI) Study Program at Universitas Ahmad Dahlan, Enrolled in the first, third, fifth, seventh, or ninth semester during the data collection period, Had experience using Artificial Intelligence applications (e.g., ChatGPT, Gemini, or Microsoft Copilot) to support learning activities, Voluntarily agreed to participate in the study by completing the online questionnaire. For the qualitative phase, six participants were purposively selected based on the quantitative findings to represent students with high, moderate, and low levels of digital readiness. Semi-structured interviews were conducted to obtain a deeper understanding of the factors influencing students' readiness toward AI integration in Islamic values-based learning.

Tabel 1. Research Population

Angkatan	Number of Students	Percentage (%)
Semester XI	4	3,7%
Semester VII	15	13,8%
Semester V	50	45,9%
Semester III	26	23,9%
Semester I	14	12,8%
Total	109	100%

The quantitative data were collected using a structured questionnaire developed by adapting the Digital Readiness framework proposed by and the Technology Read (Bond et al., 2018)iness Theory (TRI) developed by (Parasuraman, 2000). The questionnaire was modified to suit the context of Artificial Intelligence utilization in Islamic Religious Education and enriched with ethical dimensions derived from Islamic values, including academic honesty (amanah), responsibility, tabayyun (information verification), and ethical use of AI. The questionnaire consisted of statements measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Table 2. Questionnaire Blueprint

Variable	Indicator	Number of Items	Theoretical Source
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Technical Readiness	Ability to operate digital devices and AI applications	5	Bond et al. (2018)
AI Perception	Perceived usefulness and effectiveness of AI	4	Parasuraman (2000)
Adaptive Readiness	Openness and adaptability toward AI technology	4	Parasuraman (2000)
Ethical Readiness	Academic honesty, responsibility, tabayyun, ethical AI use	5	Adapted from Islamic values
Institutional Support	Lecturer guidance, digital infrastructure, AI learning environment	3	Developed from previous literature

The numerical information was gathered via an online survey sent out through Google Forms. Once the numerical data was evaluated, qualitative insights were gathered through semi-structured interviews with a group of six chosen respondents. These interviews examined the experiences of students utilizing AI, as well as the advantages and obstacles they faced, ethical issues, and the support provided by institutions for incorporating AI in education aligned with Islamic values. The numerical data was assessed using descriptive statistics, such as frequency distributions, percentages, and average scores, to portray the levels of digital preparedness among students in each area. The analysis of average scores adhered to the categories outlined in Table 3.

Table 3. Mean Score Interpretation

Mean Score	Classification
1.00-1.80	Extremely Low
1.81-2.60	Low
2.61-3.40	Average
3.41-4.20	High
4.21-5.00	Extremely High

Prior to data collection, the questionnaire was reviewed by two experts in educational technology and Islamic education to establish content validity. A pilot test was conducted involving students outside the research sample. The internal consistency of the questionnaire was assessed using Cronbach's Alpha, with a coefficient of $\alpha \geq 0.70$, indicating that the instrument had acceptable reliability for research purposes (Hair et al., 2019)

3. RESULTS AND DISCUSSION

RESULTS

Respondents' Characteristics

Table 4. Research Population

Angkatan	Number of Students	Percentage (%)
	4	3,7%
Semester VII	15	13,8%
Semerter V	50	45,9%
Semester III	26	23,9%
Semester I	14	12,8%
Total	109	100%

A total of 109 students participated in this study. As presented in Table 4, most respondents were fifth-semester students (45.9%), followed by third-semester students (23.9%), seventh-semester students (13.8%), first-semester students (12.8%), and ninth-semester students (3.7%). This distribution indicates that the respondents represented different stages of study and had diverse experiences in utilizing digital technology and Artificial Intelligence (AI) in learning.

Students' Digital Readiness toward AI Integration

Table 5. Student Technical Readiness

Indicator	Agree (%)	Strongly Agree (%)	Total Positive
Use of digital devices	38,5%	45,9%	84,4%
Use of digital platforms	49,5%	22,0%	71,5%

As shown in Table 5, students demonstrated a relatively high level of technical readiness. A total of 84.4% of respondents agreed or strongly agreed that they were able to operate digital devices effectively, while 71.5% indicated that they were familiar with using digital learning platforms. These findings indicate that most students possess adequate technical competence to support AI-assisted learning.

Table 6. Perception of the Benefits of AI

Indicator	Agree (%)	Strongly Agree (%)	Total
Helps understanding	57,8%	18,3%	76,1%
Learning effectiveness	52,3%	24,8%	77,1%

Table 6 shows that 76.1% of respondents perceived AI as helpful for understanding learning materials, while 77.1% believed that AI improves learning effectiveness.

Table 7. Student Adaptive Readiness

Indicator	Agree (%)
Ready to use AI	56,0%
Technological adaptation	54,1%
Openness to AI	51,4%

Table 7 indicates that 56.0% of students expressed readiness to use AI, 54.1% reported being able to adapt to technological changes, and 51.4% stated openness toward AI integration.

Table 8. Student Ethical Awareness

Indicator	Total Positive (%)
AI in accordance with Islamic values	85,3%
Awareness of ethical risks	85,3%

According to Table 8, 85.3% of respondents agreed that AI should be used in accordance with Islamic values, and the same percentage recognized the importance of ethical awareness when utilizing AI.

Table 9. Supporting Factors of Integration AI

Factors	Total Positive (%)
Institutional support	84,4%
Readiness and ethics	50,5%

Table 9 shows that 84.4% of respondents acknowledged institutional support as an important factor for AI integration, while 50.5% emphasized that digital readiness and ethical awareness contribute to successful AI implementation.

DISCUSSION

Technical Readiness of PAI Students toward Artificial Intelligence Integration

The findings indicate that Islamic Religious Education (PAI) students at Universitas Ahmad Dahlan demonstrate a relatively high level of technical readiness for Artificial Intelligence (AI) integration. As presented in Table 5, 84.4% of respondents agreed or strongly agreed that they were capable of operating digital devices effectively, while 71.5% reported familiarity with digital learning platforms. These findings suggest that the majority of students possess the basic digital competencies required to utilize AI as a learning support tool. This result is consistent with the (Bond et al., 2018). Digital Readiness framework proposed by Michael, which identifies technical competence as one of the primary dimensions of students' readiness for digital transformation in higher education (Hasim et al., 2022). Students who possess adequate digital skills are generally more prepared to adopt emerging educational technologies, including AI-assisted learning systems. The findings also support the Technology Readiness Theory introduced by (Parasuraman, 2000).

According to this theory, individuals with higher levels of optimism and innovativeness tend to demonstrate greater confidence in adopting new technologies. The high percentage of students capable of operating digital devices indicates that technological barriers are relatively low among PAI students, thereby creating favorable conditions for AI implementation in Islamic higher education. Nevertheless, approximately 15.6% of respondents did not report positive technical readiness, indicating that a proportion of students may still experience challenges in utilizing digital technologies. This finding suggests that universities should continue strengthening students' digital competencies through continuous AI literacy programs and practical training.

Students' Perceptions of Artificial Intelligence in Learning

The results demonstrate that students generally perceive Artificial Intelligence positively. A total of 76.1% of respondents believed that AI facilitates understanding of learning materials, while 77.1% considered AI effective in improving learning outcomes. These findings indicate that students increasingly recognize AI as a complementary learning tool rather than merely a technological innovation. Such positive perceptions align with Parasuraman's Technology Readiness Theory, particularly the dimension of technological optimism, which suggests that individuals who perceive technology as useful are more likely to adopt it in their daily activities. Similarly, the findings correspond with previous studies on AI in higher education, which emphasize that AI can enhance personalized learning, improve access to information, and support students' independent learning processes. However, AI should function as an instructional support system rather than replacing lecturers' pedagogical roles. Within Islamic Religious Education, AI is expected to facilitate knowledge acquisition while lecturers remain responsible for guiding students' moral, spiritual, and critical development (Juliani et al., 2026).

Adaptive Readiness toward AI Integration

Although students demonstrated relatively high technical competence, adaptive readiness was comparatively lower. Only 56.0% of respondents expressed readiness to use AI regularly, 54.1% reported being able to adapt to technological changes, and 51.4% indicated openness toward AI integration. These findings suggest that technical competence does not automatically lead to adaptive readiness. While students are generally able to operate digital technologies, some remain hesitant to integrate AI consistently into academic learning. This condition supports Bond et al. (2018), who argue that digital readiness encompasses not only technical skills but also psychological readiness, confidence, and the willingness to adapt to continuous technological change. From the perspective of Technology Readiness Theory, this finding reflects differences in students' levels of optimism and discomfort toward emerging technologies. Some students may still express concerns regarding the accuracy of AI-generated information, dependency on AI, or uncertainty about appropriate academic use. Consequently, universities should strengthen AI literacy initiatives that encourage responsible, reflective, and critical AI utilization.

Ethical Readiness Based on Islamic Values

One of the most significant findings of this study is the exceptionally high level of ethical readiness. As presented in Table 8, 85.3% of respondents agreed that AI should be utilized in accordance with Islamic values, while the same proportion acknowledged the importance of ethical awareness when using AI (Febrianti et al., 2026). This finding indicates that students' readiness extends beyond technological competence to encompass moral and ethical responsibility. Such results may be closely associated with the educational environment at Universitas Ahmad Dahlan, where Islamic values are systematically integrated into the curriculum through Al-Islam and Kemuhammadiyah (AIK) courses. These courses emphasize academic honesty (amanah), responsibility, integrity, tabayyun (verification of information), and ethical decision-making, which may contribute to students' awareness of responsible AI use in academic contexts. The integration of Islamic ethical principles into AI utilization represents an important contribution of this study

(Mustapha et al., 2025). While existing Digital Readiness and Technology Readiness models primarily focus on technological competence and technology acceptance, the present findings demonstrate that ethical readiness constitutes an equally essential dimension in Islamic higher education (Ma'arif et al., 2025). AI should therefore be understood as a learning instrument (*wasilah*) that supports educational objectives while remaining subject to Islamic ethical principles. These findings also reinforce the argument that AI implementation in Islamic Religious Education should not merely emphasize technological proficiency but should also cultivate students' moral responsibility in evaluating, verifying, and utilizing AI-generated information critically (Zahra, 2026).

Institutional Support for AI Integration

Institutional support emerged as another important determinant of AI integration. Table 9 indicates that 84.4% of respondents considered institutional support essential for successful AI implementation, whereas 50.5% emphasized that digital readiness and ethical awareness jointly influence AI adoption. These findings suggest that successful AI integration cannot rely solely on students' individual competencies. Instead, institutional readiness including digital infrastructure, lecturer guidance, curriculum development, and AI-related policies plays a crucial role in facilitating responsible AI adoption (Schmidt et al., 2025). This interpretation corresponds with the conceptual framework presented in Figure 1, which illustrates the interrelationships among technical readiness, AI perception, adaptive readiness, ethical readiness, and institutional support. The empirical findings indicate that ethical readiness functions as a connecting dimension between technological competence and Islamic educational values. Consequently, AI integration within Islamic Religious Education requires a balanced approach that combines technological innovation with ethical responsibility and institutional commitment (Nasution et al., 2025). Overall, the findings demonstrate that PAI students at Universitas Ahmad Dahlan possess a relatively high level of digital readiness for AI integration. Nevertheless, universities should continue strengthening adaptive readiness and AI literacy through systematic training, curriculum development, and institutional policies to ensure that AI is utilized effectively, critically, and in accordance with Islamic values (Fauziddin & Agustin, 2024).

Table 10. Initial Coding Sheet (Thematic Analysis)

Initial Code	Meaning	Theme
Frequently use AI for assignments	Students regularly utilize AI in academic activities	Technical Readiness
AI helps understand learning materials	AI facilitates comprehension of difficult course materials	AI Perception
AI saves learning time	AI increases learning efficiency and productivity	AI Perception
Verify AI-generated information	Students check AI responses before using them	Ethical Readiness
Rewrite answers in own words	Avoiding plagiarism and maintaining academic integrity	Ethical Readiness
AIK strengthens responsibility	Islamic values guide ethical AI utilization	Ethical Readiness
Need AI training	Students expect AI literacy development	Adaptive Readiness

Table 11. Theme Development

Theme	Supporting Codes
Technical Readiness	Frequent AI use, digital competence, AI operation, use of digital platforms
AI Perception	AI improves understanding, learning effectiveness, time efficiency, productivity
Adaptive Readiness	Need for AI training, willingness to adapt, AI literacy improvement
Ethical Readiness	Verification of AI information (tabayyun), academic honesty (amanah), rewriting AI outputs, responsibility, academic integrity
Institutional Support	AI Premium access, lecturer guidance, digital infrastructure, university policy, AI literacy programs

Table 12. Data Integration Matrix (Quantitative-Qualitative Findings)

Quantitative Findings	Qualitative Theme	Interpretation
Technical readiness = 84.4%	Students frequently use AI to complete assignments, search for references, summarize learning materials, and understand difficult concepts.	The interview findings confirm that students possess adequate digital competence and confidence to utilize AI in academic learning, supporting the high level of technical readiness identified in the survey.
AI usefulness = 76.1–77.1%	Participants stated that AI helps explain complex materials, saves learning time, and increases learning productivity.	The qualitative findings reinforce the quantitative results by demonstrating that students perceive AI as an effective learning companion that supports independent learning.
Adaptive readiness = 51.4–56.0%	Students expressed expectations for AI literacy programs and practical training to maximize AI utilization.	Although students are technically capable of using AI, they still require institutional support to strengthen adaptive competence and responsible AI utilization.
Ethical readiness = 85.3%	Participants consistently emphasized verifying AI-generated information, rewriting AI outputs in their own words, and applying amanah, tabayyun, and responsibility in accordance with AIK values.	The interview data explain why ethical readiness achieved the highest percentage. Students' awareness of responsible AI use is reinforced by Islamic values and the AI-Islam and Kemuhammadiyahahan (AIK) curriculum at Universitas Ahmad Dahlan.
Institutional support = 84.4%	Students expected AI Premium access, AI literacy training, lecturer guidance, and improved digital facilities from the university.	Institutional support is essential for strengthening students' digital readiness and ensuring the sustainable and ethical implementation of AI in higher education

The integration of quantitative and qualitative findings indicates that students' digital readiness toward Artificial Intelligence is influenced by five interrelated dimensions: technical competence, positive AI perception, adaptive readiness, ethical awareness, and institutional support. The quantitative findings demonstrate that technical readiness and ethical awareness were relatively high, while adaptive readiness remained moderate (Lestari et al., 2025). The qualitative findings are expected to provide contextual explanations regarding students' experiences, challenges, and ethical considerations when utilizing AI. Together, these findings support the conceptual framework illustrating that successful AI integration in Islamic Religious Education requires not only

technological competence but also institutional commitment and adherence to Islamic values (Rochmawati et al., 2023).

4. CONCLUSION

This research demonstrates that undergraduate learners in the Islamic Religious Education (PAI) Study Program at Universitas Ahmad Dahlan show a notably high degree of digital preparedness regarding the incorporation of Artificial Intelligence (AI) into learning that is based on Islamic principles. The results indicate that the students have a solid foundation in technical skills and a favorable view of AI, while their capacity to adapt is at an average level, suggesting a need for ongoing enhancements in AI literacy and adaptability. Furthermore, the students show an exceptionally high level of ethical preparedness, underscoring the significance of weaving Islamic principles into the use of AI. The support from institutions also significantly contributes to the effective and responsible implementation of AI. All in all, the results suggest that for AI to be successfully integrated into Islamic higher education, there needs to be a harmonious mixture of technological skills, ethical consciousness, adaptability, and institutional backing..

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