

Transforming Islamic Religious Education in the Artificial Intelligence Era: Developing a Digital Literacy Integration Framework for Strengthening Students' Character in Primary Schools

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ABSTRACT

The rapid development of Artificial Intelligence (AI) and digital technology has transformed educational practices, including Islamic Religious Education (PAI). However, technological integration in education requires a value-based pedagogical approach to ensure that digital transformation contributes to students' character development. This study aims to analyze the role of digital literacy-based PAI learning in strengthening students' character in the era of Artificial Intelligence and to develop an integrative framework connecting digital competence, AI utilization, teacher readiness, and Islamic character education. This research employed a mixed-methods approach using a sequential explanatory design. Quantitative data were collected through questionnaires measuring students' digital literacy, teacher digital readiness, and character strengthening, while qualitative data were obtained through interviews, classroom observations, and document analysis. The quantitative results showed that digital literacy had a positive and significant relationship with students' character strengthening ($r = 0.610$, $p < 0.01$), while teacher digital readiness demonstrated a stronger contribution to character development ($\beta = 0.420$, $t = 5.230$, $p < 0.01$). Qualitative findings revealed that AI-supported PAI learning becomes effective when technology is mediated through teachers' pedagogical strategies and Islamic values. This study proposes the PAI Digital Literacy Integration Framework, which emphasizes that AI should function as a pedagogical medium for ethical, reflective, and character-based learning. The findings contribute to the development of digital Islamic education by integrating technological innovation with moral and spiritual dimensions.



Introduction

The rapid advancement of digital technology and Artificial Intelligence (AI) has fundamentally transformed the landscape of education worldwide. Digital transformation has shifted learning practices from traditional knowledge transmission toward more adaptive, personalized, and technology-mediated learning environments. Artificial

Intelligence has emerged as a transformative educational technology that enables personalized learning systems, intelligent tutoring, automated assessment, and data-driven decision-making to support more effective learning processes (Chen, Chen, & Lin, 2020). In this context, AI is no longer positioned merely as a technological instrument but as an emerging pedagogical environment that influences how teachers design learning experiences and how students construct knowledge (Hwang & Tu, 2021).

Despite the significant potential of AI in improving educational quality, the integration of technology into learning processes raises fundamental questions regarding the human, ethical, and moral dimensions of education. Technology-driven learning may enhance efficiency and accessibility; however, it does not automatically guarantee the development of students' moral awareness, social responsibility, and ethical behavior. Previous studies have emphasized that artificial intelligence should be implemented within a human-centered educational framework because excessive technological orientation may reduce the relational and ethical dimensions of teaching and learning (Selwyn, 2022). Therefore, the central challenge of contemporary education is not merely adopting advanced technologies but ensuring that technological innovation contributes to the holistic development of learners.

This challenge becomes more significant in Islamic Religious Education (PAI), where education is not limited to cognitive achievement but also emphasizes spiritual development, moral formation, and character building. Islamic education aims to cultivate individuals who possess intellectual competence, religious commitment, ethical awareness, and social responsibility. Consequently, digital transformation in PAI requires a pedagogical approach that integrates technological competence with Islamic values rather than treating technology as an independent learning tool (Rahman & al., 2023). The implementation of AI in Islamic education must therefore address not only how students learn but also what kind of individuals they become through the learning process.

Digital literacy represents a critical competence in responding to technological transformation in education. Contemporary perspectives define digital literacy as a multidimensional capability that includes accessing information, critically evaluating digital content, creating digital products, communicating effectively, and applying technology ethically (Ng, 2021). Digital literacy extends beyond technical skills because it involves cognitive, social, and ethical competencies required for responsible participation in digital environments (Falloon, 2020). In Islamic education, digital literacy becomes increasingly important because students are exposed to diverse religious information through digital platforms. Without adequate digital literacy, students may encounter misinformation, religious misconceptions, and unethical digital practices.

The emergence of Artificial Intelligence further strengthens the need for digital literacy within Islamic education. AI provides opportunities for adaptive learning, personalized content delivery, and intelligent learning analytics. These capabilities allow teachers to design learning experiences that respond to students' individual needs (Mulyono & Sulisty, 2021). Nevertheless, AI-based learning also introduces several challenges, including algorithmic bias, reliability of digital information, excessive dependence on automated systems, and ethical concerns regarding human interaction in education (Zawacki-Richter, Marin, Bond, & Gouverneur, 2019). These challenges demonstrate that AI integration requires strong pedagogical guidance and ethical frameworks to ensure that technology supports educational values rather than replacing the fundamental role of teachers.

Previous studies have extensively examined digital technology and AI in education. Research on artificial intelligence in education has demonstrated its effectiveness in supporting personalized learning, improving learning efficiency, and providing adaptive

feedback mechanisms (Chen et al., 2020). Similarly, studies on digital literacy have shown that students with stronger digital competencies tend to demonstrate higher levels of critical thinking, information evaluation skills, and learning engagement (Falloon, 2020). However, most existing studies have focused on general education contexts and have paid limited attention to how digital literacy and AI can be integrated with religious education and character development.

Within Islamic education scholarship, several studies have investigated the use of digital media in PAI learning. These studies indicate that digital technology can improve students' motivation, accessibility to learning resources, and classroom engagement (Mulyono & Sulisty, 2021). However, technological integration has often been limited to the function of instructional media and has not sufficiently addressed the deeper process of character internalization, ethical awareness, and religious identity formation. Recent studies also indicate that Islamic education teachers continue to experience challenges in balancing technological innovation with moral and spiritual objectives in the era of Society 5.0 (Nasution & al., 2025).

Based on previous literature, several research gaps can be identified. First, a theoretical gap exists because previous studies have generally examined digital literacy, artificial intelligence, and character education as separate domains. An integrated conceptual framework explaining the relationship between AI-based learning, digital literacy, Islamic pedagogical values, and character formation remains limited. Second, a methodological gap appears because many previous studies rely on either qualitative descriptions or quantitative measurements without combining both approaches to provide a comprehensive understanding of technological transformation in religious education. Third, an empirical gap exists because limited studies have examined how digital literacy and AI-based learning influence students' character development through measurable indicators. Fourth, a contextual gap remains because research on AI integration has predominantly focused on higher education and general subjects, while Islamic education at the primary school level has received less attention.

To address these gaps, this study introduces the PAI Digital Literacy Integration Framework, a conceptual model that integrates digital literacy, Artificial Intelligence, Islamic pedagogical approaches, and students' character development. The novelty of this research lies in repositioning technology from merely an instructional tool into a pedagogical medium that facilitates value-based learning. Unlike previous studies that emphasize technological effectiveness, this research argues that successful digital transformation in Islamic education depends on the interaction between technological competence, teacher mediation, and the internalization of Islamic values.

Furthermore, this study contributes methodologically through the application of a mixed-method sequential explanatory design. This approach enables the integration of quantitative evidence regarding relationships among digital literacy, teacher readiness, and character development with qualitative insights regarding classroom practices, teacher experiences, and students' learning processes (Creswell & Plano Clark, 2018). Through this methodological approach, the study provides a more comprehensive explanation of how AI-based digital literacy can contribute to character strengthening in Islamic education.

The importance of this research is reinforced by the increasing influence of digital environments on students' daily lives. Young learners are exposed to unlimited digital information that requires critical judgment, ethical awareness, and responsible technology use. Digital competence without moral guidance may create learners who are technologically capable but ethically vulnerable. Therefore, Islamic education has a strategic role in preparing students who are not only digitally competent but also spiritually grounded and morally responsible.

Accordingly, this research entitled “Transforming Islamic Religious Education through Digital Literacy-Based Learning for Strengthening Students’ Character in the Artificial Intelligence Era” is significant for both theoretical and practical reasons. Theoretically, it contributes to the development of digital Islamic education studies by proposing an integrative framework connecting technology, pedagogy, and character education. Practically, it provides evidence-based recommendations for teachers, schools, and policymakers in designing adaptive PAI learning models that embrace technological innovation while maintaining Islamic educational values.

Methods

This study employed a mixed-methods research approach using a sequential explanatory design to examine the transformation of Islamic Religious Education (PAI) learning through digital literacy based instruction in strengthening students’ character in the era of Artificial Intelligence (AI). This approach was selected because the research problem requires both statistical measurement and contextual understanding of how digital technology is integrated into Islamic education practices. The sequential explanatory design was implemented in two stages: the quantitative phase was conducted first to identify relationships among digital literacy, AI integration, teacher readiness, and students’ character development, followed by a qualitative phase to explain and deepen the quantitative findings. This approach enables researchers to understand not only the extent to which digital literacy and AI influence character development but also how these processes occur within authentic classroom contexts (Creswell & Plano Clark, 2018). The mixed-methods approach is particularly relevant for digital transformation studies in education because technology integration involves complex interactions between technological competence, pedagogical practices, teacher mediation, and students’ value formation (Schoonenboom & Johnson, 2017).

The research was conducted at SD Negeri 002 Maluang, Berau Regency, East Kalimantan, Indonesia, involving fifth and sixth-grade students and Islamic Religious Education (PAI) teachers as research participants. The research site was selected because it represents an elementary education context experiencing digital transformation while simultaneously facing challenges related to technology adaptation and character education. In the quantitative phase, student participants were selected through stratified random sampling to ensure representation based on grade level and student characteristics, while PAI teachers were selected through purposive sampling due to their direct involvement in implementing technology-supported Islamic education. In the qualitative phase, participants were selected using purposive and snowball sampling techniques to obtain deeper information regarding teachers’ and students’ experiences in utilizing digital technology and AI in PAI learning (Palinkas et al., 2015). Data were collected through structured questionnaires using a five-point Likert scale, semi-structured interviews, classroom observations, and analysis of digital learning documents. The research instruments measured three main constructs: students’ digital literacy, teachers’ pedagogical readiness in integrating AI, and students’ character development, including religious responsibility, honesty, tolerance, social responsibility, and ethical behavior in digital environments (Berkowitz & Bier, 2021).

Data analysis was conducted through complementary quantitative and qualitative procedures. Quantitative data were analyzed using descriptive and inferential statistics to identify patterns and relationships among research variables. Inferential analysis included instrument validity and reliability testing, correlation analysis, regression analysis, and Structural Equation Modeling (SEM) to examine the structural relationships between digital literacy, AI integration, teacher competence, and students’ character strengthening.

SEM was selected because it enables researchers to examine complex relationships among latent variables and evaluate the conceptual model developed in educational research (Hair, Hult, Ringle, & Sarstedt, 2022). Meanwhile, qualitative data were analyzed using thematic analysis, which involved data organization, coding, identification of emerging themes, interpretation of meanings, and construction of conclusions. Qualitative analysis was used to explain classroom contexts, teachers' strategies in integrating technology with Islamic values, and students' experiences in digital-based PAI learning (Braun & Clarke, 2021).

The integration of quantitative and qualitative findings was conducted during the final interpretation stage by connecting statistical results with contextual explanations from classroom practices. The validity of the research findings was ensured through instrument validity and reliability testing in the quantitative phase, while qualitative credibility was maintained through source triangulation, method triangulation, member checking, and audit trails (Carter, Bryant-Lukosius, & DiCenso, 2021). The integrated findings were used to develop the PAI Digital Literacy Integration Framework, which explains that digital technology and AI do not automatically generate students' character development; rather, character formation occurs through the interaction between digital competence, teacher pedagogical mediation, and the internalization of Islamic educational values. Therefore, this methodology contributes not only empirical evidence regarding the relationship between digital transformation and character strengthening but also provides a contextual explanation of how AI-supported PAI learning can be implemented ethically and meaningfully in elementary education (Hwang & Tu, 2021).

Results and Discussion

Quantitative Analysis Results Using SPSS

1. Descriptive Statistics Analysis

Descriptive statistical analysis was conducted using IBM SPSS Statistics to identify the general characteristics of the research variables before conducting hypothesis testing. The analysis focused on three main variables: Digital Literacy (X1), Teacher Digital Readiness (X2), and Students' Character Strengthening (Y). The descriptive results indicate that students demonstrated a relatively strong level of digital literacy, with an average score of 3.85 and a standard deviation of 0.42.

Meanwhile, teacher digital readiness obtained a mean score of 4.02 with a standard deviation of 0.39, indicating that teachers had a good level of preparedness in implementing technology-supported PAI learning. Students' character strengthening showed a mean score of 4.15 with a standard deviation of 0.41, reflecting a high tendency in religious responsibility, honesty, tolerance, social responsibility, and ethical digital behavior.

Table 1. Descriptive Statistics Output from SPSS

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Digital Literacy (X1)	120	2.90	4.70	3.85	0.42
Teacher Digital Readiness (X2)	120	3.00	4.80	4.02	0.39
Students' Character Strengthening (Y)	120	3.10	4.90	4.15	0.41

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These findings indicate that digital competence among students and teachers has developed positively. However, the descriptive results also suggest that technological competence alone does not automatically produce character transformation. Character

development requires pedagogical processes that connect digital experiences with ethical reflection and Islamic values.

2. Reliability Test Using Cronbach's Alpha

The reliability analysis was performed using SPSS through Analyze → Scale → Reliability Analysis with the Cronbach's Alpha coefficient. The purpose of this analysis was to determine the internal consistency of the research instruments. A research instrument is considered reliable when the Cronbach's Alpha coefficient exceeds the minimum acceptable threshold of 0.70 (Taber, 2018).

Table 2. Reliability Statistics Output from SPSS

Variable	Cronbach's Alpha	Number of Items	Interpretation
Digital Literacy (X1)	0.862	15	Reliable
Teacher Digital Readiness (X2)	0.884	12	Reliable
Character Strengthening (Y)	0.901	18	Highly Reliable

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The reliability test demonstrates that all research variables obtained Cronbach's Alpha values above 0.70. Therefore, the instruments used in this study have good internal consistency and are appropriate for further statistical analysis.

3. Normality Test

The normality test was conducted using the One-Sample Kolmogorov-Smirnov Test in SPSS to examine whether the data distribution met the assumption of normality before conducting parametric statistical analysis.

Table 3. Normality Test Output from SPSS

Test	Statistic	Sig. (p-value)	Decision
Kolmogorov-Smirnov	0.071	0.200	Normally Distributed

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The result shows that the significance value was 0.200, which is higher than 0.05. Therefore, the data distribution can be considered normal, allowing the use of parametric statistical techniques such as Pearson correlation and regression analysis.

4. Pearson Correlation Analysis

Pearson correlation analysis was conducted to examine the relationship between students' digital literacy and character strengthening.

Table 4. Correlation Matrix Output from SPSS

Variables	Digital Literacy	Character Strengthening
Digital Literacy	1.000	0.610**
Character Strengthening	0.610**	1.000

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The correlation analysis shows that digital literacy has a positive and significant relationship with students' character strengthening ($r = 0.610$, $p < 0.01$). This finding indicates that students with higher levels of digital literacy tend to demonstrate stronger

character indicators, including responsibility, ethical awareness, and critical judgment in digital environments.

This result supports previous studies stating that digital literacy is not limited to technical ability but includes cognitive, social, and ethical competencies required for responsible participation in digital society (Falloon, 2020). In Islamic education contexts, digital literacy becomes meaningful when students are guided to evaluate information critically and apply ethical principles in digital interactions.

5. Multiple Regression Analysis

Multiple regression analysis was conducted to examine the contribution of digital literacy and teacher digital readiness toward students' character strengthening.

The regression model was formulated as follows:

$$Y = a + b_1X_1 + b_2X_2$$

Where:

- Y = Students' Character Strengthening
- X₁ = Digital Literacy
- X₂ = Teacher Digital Readiness

Table 5. Model Summary Output from SPSS

R	R Square	Adjusted R Square	Std. Error
0.672	0.452	0.443	0.312

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The model summary indicates that the value of R Square = 0.452, meaning that digital literacy and teacher digital readiness simultaneously explain 45.2% of the variance in students' character strengthening, while the remaining 54.8% is influenced by other factors, such as family environment, school culture, peer interaction, and personal experiences.

6. ANOVA Regression Test

Table 6. ANOVA Output from SPSS

Model	F	Sig.
Regression	48.321	0.000

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The ANOVA test shows that the regression model is statistically significant (F = 48.321, p < 0.001). This finding confirms that digital literacy and teacher digital readiness simultaneously influence students' character strengthening.

7. Regression Coefficients Test

Table 7. Coefficients Output from SPSS

Variables	Beta (β)	t-value	Sig.
Digital Literacy (X ₁)	0.280	3.870	0.000
Teacher Digital Readiness (X ₂)	0.420	5.230	0.000

Researcher data processing in 2026

The regression coefficient analysis demonstrates that both independent variables significantly predict students' character strengthening. Digital literacy produced a positive effect ($\beta = 0.280$; $t = 3.870$; $p < 0.01$), indicating that students' ability to use and evaluate digital information contributes to character development. Meanwhile, teacher digital readiness demonstrated a stronger influence ($\beta = 0.420$; $t = 5.230$; $p < 0.01$), indicating that teachers play a more dominant role in transforming digital learning experiences into character-building processes.

The quantitative findings demonstrate that digital literacy contributes positively to students' character strengthening, but its influence depends strongly on teacher mediation. The correlation coefficient ($r = 0.610$) indicates that digital literacy is associated with improved character outcomes, particularly in students' ability to use technology responsibly and critically. However, regression analysis shows that teacher digital readiness has a stronger predictive effect than student digital literacy. This finding confirms that technology does not independently create educational transformation; rather, its impact depends on teachers' pedagogical strategies and ethical guidance.

The stronger effect of teacher readiness ($\beta = 0.420$) highlights the central position of teachers in AI-supported Islamic education. Artificial Intelligence can provide adaptive learning resources, personalized feedback, and digital learning support, but it cannot replace teachers' roles in moral guidance, value transmission, and character formation (Hwang & Tu, 2021). Previous studies also emphasize that successful AI implementation in education requires teachers who possess both technological competence and pedagogical understanding (Zawacki-Richter et al., 2019).

The findings further support the development of the PAI Digital Literacy Integration Framework, which positions digital literacy and AI as supporting components, while teachers function as mediators who transform technology into meaningful Islamic learning experiences. This framework suggests that character strengthening occurs through the interaction between digital competence, teacher guidance, and the internalization of Islamic values.

Therefore, the results indicate that digital transformation in Islamic education should not focus only on technological adoption but must emphasize value-based pedagogy. AI-supported PAI learning becomes effective when technology is integrated with ethical reflection, religious understanding, and character education

Digital Literacy Integration and Students' Character Strengthening

The quantitative findings indicate that students' digital literacy was categorized at a moderate to high level, with a mean score of 3.85 and a standard deviation of 0.42. The statistical analysis demonstrated a significant relationship between digital literacy and students' character strengthening, with a correlation coefficient of $r = 0.61$ ($p < 0.01$). Furthermore, regression analysis showed that digital literacy contributed positively to students' character development with a standardized coefficient of $\beta = 0.28$ and t -value = 3.87, indicating that students with stronger digital literacy tended to demonstrate higher levels of responsibility, honesty, tolerance, and ethical behavior in digital environments.

The qualitative findings obtained from classroom observations and interviews revealed that digital literacy increased students' learning engagement, information evaluation skills, and participation in digital-based PAI activities. However, the findings also demonstrate that digital literacy alone does not automatically produce character transformation. Character development occurred when digital experiences were accompanied by structured pedagogical guidance from teachers. This finding confirms that technology functions as a learning medium rather than an independent determinant of

moral development. Digital literacy becomes meaningful when students are guided to critically evaluate information, reflect on religious values, and apply ethical principles in digital interactions (Eshet-Alkalai, 2021).

These findings support the perspective of Social Constructivism proposed by Vygotsky, which emphasizes that learning occurs through social interaction, dialogue, and reflection within a cultural context (Vygotsky, 1978). In the context of PAI learning, digital literacy expands students' opportunities to access knowledge; however, the construction of religious meaning and character values requires interaction with teachers and peers. Therefore, digital literacy contributes to character formation not merely through technological exposure but through meaningful learning experiences mediated by educators.

This result extends previous studies that primarily positioned digital media as a tool for increasing student motivation. Previous research showed that digital media can improve students' engagement in Islamic education, but its impact on character formation remains limited when technological use is separated from value-based pedagogy (Mulyono & Sulisty, 2021). The current study demonstrates that digital literacy integrated with Islamic pedagogical approaches provides a stronger pathway for character development.

Teacher Digital Readiness and AI-Based PAI Learning

The quantitative analysis further revealed that teacher readiness in integrating Artificial Intelligence and digital literacy significantly influenced students' character strengthening. The statistical model showed that teacher readiness had a positive effect with $\beta = 0.42$, $t = 5.23$, and $p < 0.01$, indicating that teachers' digital-pedagogical competence represents a stronger predictor of character development compared with students' individual digital literacy.

The qualitative findings explain that teachers played a central role as facilitators who connected AI-based learning resources with Islamic values. Teachers who possessed adequate digital competence were able to design learning activities that encouraged students to analyze digital information, discuss ethical issues, and reflect on religious principles. In contrast, when teachers lacked pedagogical strategies for integrating technology, digital activities tended to focus only on technical skills without producing meaningful character development.

This finding reinforces previous research emphasizing that Artificial Intelligence in education should not replace teachers but should strengthen teachers' pedagogical roles. AI can provide adaptive learning resources, personalized feedback, and learning analytics, but ethical and character education still requires human interaction and moral guidance from educators (Hwang & Tu, 2021). Similarly, research on AI implementation in education highlights that technological effectiveness depends largely on teachers' ability to design meaningful learning experiences rather than on the technology itself (Zawacki-Richter et al., 2019).

The findings challenge technology-centered approaches that assume technological availability directly leads to better educational outcomes. Instead, this study demonstrates that teacher mediation is the key mechanism connecting digital innovation with character education. AI becomes educationally meaningful when teachers integrate it with reflection, dialogue, and Islamic ethical principles.

Patterns of Character Strengthening through Digital PAI Learning

The integration of quantitative and qualitative findings identified three main patterns regarding character strengthening in AI-supported PAI learning. First, students with higher digital literacy demonstrated greater learning motivation, critical thinking

ability, and responsibility in using digital resources. Second, teachers with stronger digital pedagogical competence were more successful in transforming digital activities into value-based learning experiences. Third, technological engagement without appropriate pedagogical intervention resulted in high digital participation but limited character internalization.

These findings indicate that character formation in digital learning environments is a multidimensional process involving cognitive, emotional, social, and spiritual dimensions. Digital technology provides access to information and interactive learning opportunities, but character development requires continuous processes of reflection, habituation, and social interaction. This finding aligns with character education perspectives that emphasize the importance of integrating moral knowledge, moral feelings, and moral action in educational practice (Berkowitz & Bier, 2021).

The results also strengthen the argument that Islamic education requires a balanced integration between technological innovation and spiritual values. In PAI learning, digital competence should not be separated from ethical responsibility because students must be prepared not only as capable technology users but also as individuals who possess integrity and moral awareness. Therefore, AI-based digital learning requires a value-oriented framework that places character formation as the central educational objective.

Theoretical Interpretation and Development of the PAI Digital Literacy Integration Framework

The findings contribute to the development of the PAI Digital Literacy Integration Framework, which explains the relationship between digital literacy, Artificial Intelligence, teacher competence, and students' character strengthening. The framework demonstrates that AI and digital literacy function as supporting mechanisms, while teachers act as pedagogical mediators who transform technological experiences into meaningful religious learning.

From a theoretical perspective, this research strengthens Social Constructivism by demonstrating that digital environments can expand students' learning spaces while maintaining the importance of social interaction and teacher guidance. Digital technology provides new forms of interaction, but the construction of religious values still depends on dialogue, reflection, and contextual learning experiences (Vygotsky, 1978).

This study also contributes to contemporary discussions on AI in education by emphasizing that ethical and human-centered approaches are essential in technological transformation. Previous AI studies have largely focused on personalization, efficiency, and adaptive learning systems, whereas this research expands the discussion by integrating AI with character education and Islamic pedagogical values (Hwang & Tu, 2021).

The novelty of this research lies in demonstrating empirically that digital literacy and AI integration contribute to character strengthening only when supported by teacher competence and value-based pedagogy. Thus, the success of digital transformation in Islamic education depends not only on technological infrastructure but also on educators' ability to guide students in developing ethical, reflective, and responsible digital identities.

Conclusion

This study concludes that the transformation of Islamic Religious Education (PAI) learning through digital literacy and Artificial Intelligence (AI) integration contributes significantly to strengthening students' character in the digital era. The quantitative findings demonstrate that students' digital literacy has a positive and significant relationship with character strengthening, as indicated by the correlation coefficient ($r =$

0.610, $p < 0.01$). Furthermore, regression analysis confirms that digital literacy contributes positively to character development ($\beta = 0.280$, $t = 3.870$, $p < 0.01$). These findings indicate that students who possess better digital literacy skills tend to demonstrate stronger responsibility, ethical awareness, critical thinking, and appropriate digital behavior.

However, the study also reveals that teacher digital readiness represents the most influential factor in strengthening students' character. The regression analysis shows that teacher digital readiness has a stronger contribution compared with student digital literacy ($\beta = 0.420$, $t = 5.230$, $p < 0.01$). This finding emphasizes that technological innovation, including AI-based learning, cannot independently create meaningful educational transformation. Teachers remain the central actors who mediate digital experiences, integrate Islamic values, and guide students toward responsible and ethical technology use. Therefore, the effectiveness of AI-supported PAI learning depends not only on technological availability but also on teachers' pedagogical competence and ability to connect digital tools with character education.

The qualitative findings further demonstrate that digital literacy-based PAI learning promotes students' engagement, reflective thinking, and ethical awareness when supported by appropriate teacher guidance. AI and digital technologies function as educational facilitators that expand learning opportunities, but character formation requires continuous interaction, moral reflection, and value-based learning experiences. The findings support the development of the PAI Digital Literacy Integration Framework, which positions digital literacy and AI as supporting elements, while teachers act as pedagogical mediators who transform technology into meaningful Islamic learning practices.

This study contributes theoretically and practically by showing that digital transformation in Islamic education should move beyond technology adoption toward a human-centered and value-oriented approach. The integration of AI in PAI learning should prioritize the development of students who are not only digitally competent but also possess religious awareness, ethical responsibility, and social sensitivity. Future studies are recommended to examine the long-term effects of AI-supported PAI learning across different educational levels and cultural contexts to strengthen the development of sustainable digital Islamic education models.

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