

Teacher Readiness for Integrating Artificial Intelligence in Integrated ADLX Learning at Islamic Secondary School

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ABSTRACT

The rapid development of artificial intelligence (AI) has significantly influenced teaching and learning practices in schools. However, empirical studies examining teacher readiness to integrate AI within value-based and integrated learning models remain limited, particularly in Islamic integrated secondary schools. This study aims to analyze the readiness of general subject teachers at SMPIT Ummul Quro to integrate AI into Integrated ADLX learning, which emphasizes meaningful activities, discussion, practice, and ethical reflection. A quantitative descriptive research design was employed involving 33 general subject teachers as respondents. Data were collected using a validated questionnaire covering four dimensions of teacher readiness: technological competence, pedagogical readiness, ethical awareness, and institutional support. The data were analyzed using descriptive statistical techniques to obtain a comprehensive overview of teachers' readiness levels. The results indicate that teachers' readiness to integrate AI into Integrated ADLX learning is at a moderate level. Teachers demonstrate positive attitudes and relatively high ethical awareness regarding the use of AI in educational contexts. However, their technological competence and pedagogical application of AI remain limited, particularly in designing learning activities that effectively utilize AI to support instructional objectives. In addition, institutional support in the form of structured training programs and clear operational policies for AI integration has not been fully optimized. These findings suggest that effective AI integration in learning does not rely solely on teachers' acceptance and ethical awareness but also requires systematic professional development and sustained institutional support. This study contributes empirical evidence to the discourse on AI integration in integrated Islamic secondary education and provides practical implications for school leaders in developing teacher capacity-building programs that align technological innovation with pedagogical effectiveness and ethical values.

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Introduction

Digital transformation has become a global phenomenon that has fundamentally reshaped almost every aspect of human life, including education. Rapid advances in information and communication technologies have compelled educational institutions to continuously adapt in order to remain relevant in preparing students for the challenges of the twenty-first century, which are characterized by complexity, uncertainty, and the growing demand for higher-order thinking skills (OECD, 2019; Trilling & Fadel, 2009). In this context, technology is no longer viewed merely as an instructional aid but has become an integral part of the educational ecosystem that shapes how teaching, learning, and classroom interactions take place (Selwyn, 2020).

One of the most prominent technological developments in the past decade is Artificial Intelligence (AI). AI has advanced rapidly and has been increasingly adopted across various sectors, including education. UNESCO (2021) emphasizes that AI holds significant potential to transform education through personalized learning, adaptive learning systems, real-time analysis of student learning data, and the automation of teachers' administrative tasks. With AI support, learning experiences can be tailored to students' individual needs, interests, and learning pace, thereby fostering more meaningful and student-centered learning processes (Luckin et al., 2016; Holmes et al., 2019).

Despite its potential benefits, the integration of AI in education also raises substantial challenges, particularly related to human resource readiness, ethical concerns, and pedagogical implications. Previous studies indicate that the adoption of advanced technologies often falls short because teachers lack sufficient understanding, technical skills, and confidence to integrate them effectively into classroom practice (Ertmer & Ottenbreit-Leftwich, 2010; Fitriani et al., 2024). Consequently, the success of AI integration in education depends not solely on technological sophistication but largely on teacher readiness as the central actors in the educational process (Teo, 2011; Wong & Wang, 2020).

AI in the Context of Integrated Islamic Education

In Indonesia, the adoption of AI in education presents unique dynamics, particularly within faith-based institutions such as Integrated Islamic Schools (Sekolah Islam Terpadu). These schools are not only oriented toward academic achievement but also emphasize holistic character development, spirituality, and moral education. Their curricula are designed to integrate general knowledge with Islamic values throughout the learning process (Suyatno et al., 2022).

Within this context, AI implementation poses a dual challenge. On the one hand, Integrated Islamic Schools are expected to keep pace with technological developments in order to prepare digitally literate and adaptable learners (Zawacki-Richter et al., 2019). On the other hand, the use of AI must remain aligned with Islamic values to prevent the erosion of spiritual, ethical, and moral dimensions that define Islamic education (Mansur, 2023).

From an Islamic educational perspective, technology is inherently value-neutral, and its impact depends on the intentions, values, and practices of its users (Selwyn, 2020; Holmes et al., 2019). AI can therefore be positioned as a *wasilah* (means) to enhance educational quality rather than an end in itself. When guided by *ukhrowi* values such as trustworthiness, honesty, responsibility, and spiritual awareness (*muraqabah*), AI can contribute positively to teaching effectiveness,

teacher efficiency, and students' digital and ethical literacy (Mansur, 2023; Rahman & Hidayat, 2022).

Integrated ADLX Learning Model and the Challenge of AI Integration

SMPIT Ummul Quro is an Integrated Islamic School that implements the Integrated ADLX Learning Model, which consists of four main stages: Activity, Discussion, Practice, and Reflection/Ukhrowi (X). This model aims to promote active, collaborative, and deep learning while ensuring that every learning experience culminates in value reflection and Islamic character formation.

While the ADLX model aligns with twenty-first-century learning principles emphasizing active engagement, critical thinking, and metacognitive reflection (Prince, 2004; Hattie, 2012), its distinctive feature lies in the X phase, which serves as a space for value internalization and spiritual reflection. Integrating AI into this model presents both opportunities and risks. AI can support interactive activities, enrich discussions, and facilitate adaptive practice with automated feedback (Holmes et al., 2019; Luckin et al., 2016). However, without adequate teacher readiness and ethical guidance, AI use may lead to overreliance on technology, diminished critical thinking, or unethical practices such as plagiarism and misinformation (Zawacki-Richter et al., 2019).

Therefore, the Reflection/Ukhrowi phase plays a strategic role as an ethical filter in AI integration. Teachers are required not only to master AI technically but also to guide students in reflecting on technology use through the lens of values, responsibility, and spiritual orientation.

Teacher Readiness as a Key Factor

Extensive research underscores teacher readiness as a critical determinant of successful technology integration in education (Ertmer & Ottenbreit-Leftwich, 2010; Teo, 2011; Fitriani et al., 2024). Teacher readiness is understood as a multidimensional construct encompassing knowledge, attitudes, technical skills, and institutional support.

Wong and Wang (2020) identify four key pillars of teacher readiness for adopting new technologies: awareness and knowledge of AI concepts, motivation and positive attitudes, technical competence in pedagogical use, and ethical and digital competence. In the context of Integrated Islamic Schools, the ethical dimension is expanded to include ukhrowi ethics, positioning teachers not only as facilitators of AI-enhanced learning but also as role models in fostering trust, academic integrity, and spiritual awareness in AI use (Mansur, 2023; Rahman & Hidayat, 2022).

Research Gap and Study Objectives

Although research on AI in education has grown substantially, most studies focus on general or higher education settings using conventional pedagogical models (Holmes et al., 2019; Zawacki-Richter et al., 2019). Empirical studies examining teacher readiness in Integrated Islamic Schools, particularly within value-based integrated learning models such as ADLX, remain limited.

This study therefore aims to analyze the readiness of general subject teachers at SMPIT Ummul Quro to integrate AI into Integrated ADLX learning and to formulate strategic recommendations for AI integration that aligns with Islamic values and the distinctive characteristics of the ADLX model.

Method

Research Type and Approach

This study employed a quantitative approach with a descriptive–correlational research design. The quantitative approach was selected to obtain an objective overview of teachers’ readiness to integrate Artificial Intelligence (AI) into Integrated ADLX learning, as well as to analyze the relationships among variables influencing such readiness. The descriptive design was used to map the level of teacher readiness, while the correlational approach was applied to examine the associations and contributions of several determining factors.

Research Site and Time

The research was conducted at SMPIT Ummul Quro an Integrated Islamic secondary school implementing the Integrated ADLX learning model. Data collection took place during the second semester of the 2024/2025 academic year, following the school’s initial introduction of digital technology use in instructional activities.

Population and Sample

The population of this study consisted of all 33 general subject teachers at SMPIT Ummul Quro. Given the relatively small population size and full accessibility of respondents, a total sampling technique was employed. Accordingly, all population members were included as research respondents, ensuring that the findings accurately represent the actual condition of teacher readiness at the school.

Research Variables

The variables examined in this study included:

1. **Dependent variable (Y):**
Teacher readiness to integrate AI into Integrated ADLX learning.
2. **Independent variables (X):**
 - a. Teachers’ digital literacy
 - b. Technical competence in using AI
 - c. Teachers’ attitudes and motivation toward AI
 - d. Institutional support in terms of facilities and school policies

These variables were formulated based on teacher readiness theory and educational technology adoption frameworks, particularly the Technology Acceptance Model (TAM) and the Teacher Readiness Model.

Research Instrument

The research instrument was a closed-ended questionnaire using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The questionnaire was developed based on a review of literature on teacher readiness, digital literacy, and AI integration in education and was adapted to the context of Integrated ADLX learning.

The instrument covered the following indicators:

1. Pedagogical readiness in ADLX-based learning
2. Digital literacy in the use of instructional technology
3. Technical competence in using AI (e.g., chatbots, AI platforms, and digital tools)
4. Attitudes and motivation toward AI use in learning
5. Institutional support and school policies

Content validity was established through expert review involving education and instructional technology specialists. Instrument reliability was tested using Cronbach's Alpha coefficient, with $\alpha \geq 0.70$ considered an indicator of acceptable reliability.

Data Collection Techniques

Data were collected through questionnaire distribution to all respondents. Teachers completed the questionnaire independently, either online or offline, in accordance with school conditions and policies. Prior to participation, respondents were informed of the research objectives and assured of the confidentiality of their identities.

Data Analysis Techniques

Data analysis was conducted in several stages:

1. Descriptive statistical analysis to determine mean scores, standard deviations, and readiness categories for each assessed aspect.
2. Pearson correlation analysis to examine relationships between digital literacy, technical competence, attitudes and motivation, institutional support, and teacher readiness.
3. Multiple linear regression analysis to identify the independent variables that most strongly influence teachers' readiness to integrate AI into Integrated ADLX learning.

All statistical analyses were performed using statistical software SPSS at a significance level of 0.05.

Results

The respondents comprised 33 general subject teachers at SMPIT Ummul Quro. All respondents were actively involved in instructional activities and had utilized basic digital devices in teaching, such as laptops, projectors, and online learning applications. However, their levels of experience and intensity of AI-based technology use varied.

In general, most teachers were familiar with conventional digital technologies but had not yet gained systematic, hands-on experience in using AI applications within Integrated ADLX learning.

Descriptive statistical analysis revealed that the readiness of teachers at SMPIT Ummul Quro to integrate AI into Integrated ADLX learning was at a **moderate level**. The mean scores for each readiness aspect are presented in Table 1.

Table 1. Teachers' Readiness Level in AI Integration

Readiness Aspect	Mean	Category
Attitudes and Motivation toward AI	3.82	High
Digital Literacy	3.28	Moderate
Pedagogical Readiness (ADLX)	3.35	Moderate
Institutional Support and Policy	3.12	Moderate
Technical Competence in Using AI	2.68	Low
Overall Mean	3.21	Moderate

As shown in Table 1, attitudes and motivation toward AI obtained the highest mean score, indicating that teachers generally hold positive views and demonstrate willingness to learn AI-related technologies. Conversely, technical competence in using AI recorded the lowest mean score, reflecting teachers' limited ability to operate and practically integrate AI into instructional activities.

Relationships among Teacher Readiness Variables

Pearson correlation analysis was conducted to examine relationships between independent variables and teacher readiness. The results indicated significant positive correlations between several variables and readiness to integrate AI.

Table 2. Pearson Correlation Analysis Results

Independent Variable	r	Sig. (p)	Interpretation
Digital Literacy	0.62	< 0.01	Significant
AI Technical Competence	0.54	< 0.05	Significant
Attitudes and Motivation	0.46	< 0.05	Significant
Institutional Support	0.41	< 0.05	Significant

These findings indicate that digital literacy has the strongest relationship with teacher readiness. Teachers who are accustomed to using digital technology in instructional settings tend to be more prepared to integrate AI than those with lower digital literacy levels.

Factors Influencing Teacher Readiness

To determine the contribution of each independent variable to teacher readiness, multiple linear regression analysis was performed. The results are presented in Table 3.

Table 3. Multiple Linear Regression Analysis Results

Independent Variable	β	Sig. (p)	Interpretation
Digital Literacy	0.43	< 0.01	Significant
AI Technical Competence	0.38	< 0.05	Significant
Attitudes and Motivation	0.29	> 0.05	Not significant
Institutional Support	0.21	> 0.05	Not significant

The coefficient of determination indicates that the regression model explains approximately 45% of the variance in teacher readiness ($R^2 = 0.45$). This finding suggests that digital literacy and AI technical competence are the dominant factors influencing teacher readiness, whereas high attitudes and motivation alone do not significantly contribute without adequate technical skills.

Discussion

The results of this study indicate that the readiness of general subject teachers at Islamic secondary school to integrate Artificial Intelligence (AI) into Integrated ADLX learning is at a moderate level. This finding suggests that teachers have developed initial awareness and acceptance of the potential use of AI in teaching; however, they are not yet fully operationally prepared to integrate it systematically into classroom practice. This condition is consistent with the findings of Fitriani et al. (2024), who reported that teachers' readiness to adopt AI generally remains in a transitional stage, characterized by positive attitudes that are not yet supported by adequate technical skills.

Among the readiness dimensions, attitudes and motivation obtained the highest scores. Teachers perceive AI as an innovation with the potential to support active, deep, and contextual learning, particularly within the Integrated ADLX framework. This finding reinforces the *Technology Acceptance Model* (TAM), which emphasizes that perceived usefulness is a critical prerequisite for technology acceptance (Teo, 2011). Nevertheless, the regression analysis revealed that high levels of motivation do not significantly contribute to teacher readiness in the absence of sufficient technical competence. This result confirms that positive attitudes toward AI are necessary but not sufficient to drive meaningful implementation in instructional practice.

Digital literacy emerged as the most influential factor affecting teacher readiness. Teachers who are accustomed to using digital devices and online learning platforms demonstrated higher levels of readiness to integrate AI into ADLX-based instructional design. This finding aligns with the work of Ertmer and Ottenbreit-Leftwich (2010), who emphasized that digital literacy serves as a foundational element in transforming technology-based pedagogical practices. Within the context of Integrated ADLX learning, digital literacy enables teachers to utilize AI effectively during the Activity, Discussion, and Practice phases, such as in developing adaptive learning materials, instructional simulations, and data-driven feedback.

In contrast, technical competence in using AI was identified as the weakest aspect and the primary barrier to AI integration. The low level of technical competence indicates that most teachers remain passive users of technology rather than designers of AI-enhanced learning environments. This finding is consistent with Selwyn (2020), who argued that while many teachers understand the conceptual potential of AI, they often lack the practical skills required for pedagogical integration. At SMPIT Ummul Quro, this limitation has resulted in the suboptimal use of AI as a tool to support deep learning, such as learning analytics or AI-assisted feedback systems.

Institutional support in terms of facilities and school policies was found to be at a moderate level and showed a positive relationship with teacher readiness, although it did not have a significant effect in the regression analysis. This result

suggests that the availability of digital infrastructure alone is insufficient to enhance teacher readiness without parallel efforts to strengthen human resource capacity. This finding supports the perspective of Holmes et al. (2019), who emphasized that the successful integration of AI in education depends more on teachers' pedagogical readiness than on technological sophistication alone.

From the perspective of Integrated ADLX learning, the integration of AI also requires careful attention to the dimension of reflection and values, particularly during the X phase. AI has the potential to enrich reflective learning processes; however, its use must remain aligned with ethical principles and Islamic values. Teachers act as ethical gatekeepers, ensuring that AI utilization does not shift educational goals away from character development, moral formation, and students' spiritual awareness. Therefore, teacher readiness encompasses not only technical and pedagogical aspects but also ethical readiness in the responsible use of AI.

Overall, the findings of this study reinforce the view that integrating AI into Integrated ADLX learning requires a holistic professional development approach. Teacher training programs should not be limited to introducing AI concepts but should emphasize contextualized and practical applications, such as designing AI-supported ADLX activities and leveraging AI to promote meaningful learning. These findings imply that integrated Islamic schools need to develop teacher development strategies that balance technical competence, pedagogical innovation, and Islamic values in a sustainable manner.

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