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How Does AI Readiness Shape Teacher Performance? The Mediating Roles of Digital Literacy and Digital Competence In Education Management

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Abstract: The integration of artificial intelligence (AI) in education requires teachers to develop readiness to adopt and use emerging technologies. However, AI readiness does not necessarily improve teacher performance directly. This study examines the effect of AI Readiness on Teacher Performance and the mediating roles of Digital Literacy and Digital Competence. A quantitative survey was conducted involving 188 teachers from Muhammadiyah elementary schools in Samarinda, Indonesia. Data were analyzed using SEM-PLS with SmartPLS 4. The results show that AI Readiness positively and significantly affects Digital Literacy and Digital Competence. Both Digital Literacy and Digital Competence also positively and significantly affect Teacher Performance, while AI Readiness has no significant direct effect. Mediation analysis confirms that Digital Literacy and Digital Competence fully mediate the relationship between AI Readiness and Teacher Performance. These findings indicate that AI readiness alone is insufficient to improve teacher performance and must be supported by adequate digital capabilities. This study contributes to educational management research by highlighting Digital Literacy and Digital Competence as key mechanisms linking AI readiness to teacher performance.

Keywords: AI Readiness; Digital Literacy; Digital Competence; Teacher Performance; Educational Management.

INTRODUCTION

The development of artificial intelligence (AI) has transformed educational practices by supporting instructional design, assessment, feedback, and data-informed decision-making. However, the availability of AI does not automatically improve teacher performance, as its effectiveness depends on teachers' readiness to understand, evaluate, and use AI responsibly. Ramazanoglu & Akın (2025) define AI readiness in terms of cognitive, affective, and behavioral preparedness, including technological efficacy, learner interaction, and ethical awareness. Recent studies emphasize the importance of AI literacy, technological knowledge, and responsible AI integration in teaching (Sperling et al., 2024; Chiu et al., 2024; Delcker et al., 2025; Shi, 2025; Lucas et al., 2024; Yim, 2024). From the Resource-Based View (RBV), teachers' knowledge and skills represent valuable resources that can support professional

performance when effectively utilized (Barney, 1991; Peteraf, 1993). Therefore, AI readiness should be examined in relation to the digital capabilities that enable teachers to translate technological preparedness into effective professional practices.

The relationship between AI readiness and teacher performance can be explained through the Resource-Based View (RBV) and Social Cognitive Theory (SCT). While RBV emphasizes the value of professional resources, SCT highlights the interaction between personal factors, behavior, and environmental conditions (Bandura, 1986; Bandura, 1997). Previous studies emphasize teachers' AI competencies, digital proficiency, and ability to integrate AI ethically into educational practices (Delcker et al., 2025; Shi, 2025; Hava & Babayiğit, 2025; Lucas et al., 2024). Research further highlights the importance of developing AI literacy through teacher education and professional learning (Sperling et al., 2024; Chiu et al., 2024; Ding et al., 2024). Ding et al. (2024) found that case-based professional development can support teachers' AI literacy development and AI integration practices. Meanwhile, Ayanwale et al. (2024) demonstrated that AI knowledge among pre-service teachers predicts several dimensions of AI literacy, including AI use, ethics, and problem-solving. In this study, digital literacy refers to the ability to access, evaluate, and use digital information critically and responsibly. In contrast, digital competence concerns the application of digital knowledge and skills to professional tasks. Although related, these constructs represent distinct capabilities that may explain different pathways between AI readiness and teacher performance.

Digital literacy has expanded beyond technical skills to encompass critical information evaluation, professional development, digital equity, and technology-supported teaching (Liu & Xu, 2025). Similarly, AI literacy involves applying knowledge meaningfully, while AI competence includes the responsible and ethical use of AI in educational practice (Chiu et al., 2024; Sperling et al., 2024; Delcker et al., 2025; Shi, 2025). From the RBV perspective, digital literacy and digital competence are complementary professional resources; SCT further explains how teachers' experiences, behaviors, and institutional environments influence their application. Nevertheless, the distinct mediating roles of these capabilities in the relationship between AI readiness and teacher performance remain insufficiently understood, particularly among Islamic elementary school teachers in regional Indonesia. Accordingly, this study examines the relationship between AI readiness and teacher performance and investigates digital literacy and digital competence as parallel mediators.

In this process, digital literacy is one of the fundamental abilities that allows teachers to transform their readiness for AI into productive use of

technology. Digital literacy encompasses more than the technical ability to operate digital devices. It refers to the capacity to access, comprehend, assess, organize, and utilize information within digital environments critically and responsibly. Liu & Xu (2025) showed that research on teachers' digital literacy has evolved from technical skills issues to broader issues, such as professional development, digital equity, learning innovation, and technology-based teaching practices. These findings show that digital literacy has developed into an important part of teachers' professional capacity to face educational transformation.

Empirical evidence also supports the connection between teachers' professional practices and digital literacy. According to Temirkhanova et al. (2024), teachers can use a variety of digital resources to support students' learning outcomes and create a more interactive learning environment by improving their digital literacy. The study shows that digital literacy does not stop at mastering technology, but can influence the way teachers carry out learning and utilize technology to improve the effectiveness of educational practices. Thus, teachers who have good digital literacy have a stronger foundation to evaluate digital information, including information generated by AI, as well as determine how the technology can be used to support professional tasks.

In addition to digital literacy, digital competence is an increasingly important ability in explaining teachers' ability to adapt to technological transformation. Digital literacy emphasizes the ability to understand and use information and technology critically, while digital competence shows the ability to apply digital knowledge and skills in a specific work context. In the teaching profession, digital competence includes the ability to choose and use appropriate technology, integrate technology into learning, communicate in a digital environment, develop digital learning resources, conduct technology-based assessments, solve digital problems, and develop professional competencies in an ongoing manner. Lucas et al. (2024) show that there is a relationship between teachers' knowledge of AI, trust in AI, and digital competence. The study also shows that knowledge about AI is an important predictor of teachers' trust in AI, while the relationship between digital competence and trust in AI becomes weaker when AI knowledge is not taken into account. These findings reinforce the argument that digital skills and knowledge about AI are interconnected components in teachers' readiness to face new technologies.

The association of digital skills with teacher performance has increasingly drawn attention in empirical studies. Damanik & Widodo (2024) A study of 465 secondary school teachers in Indonesia, shows that digital literacy

is related to teacher professional performance through mechanisms involving teaching creativity and learning quality. These findings show that digital skills can have consequences for the implementation of teachers' professional work, not only on the ability to use technology. Research on factors that affect teacher performance in the digital era also shows that teacher performance is influenced by a combination of technological, pedagogical, personal, organizational, environmental support, and digital divide factors (Nadifa et al., 2024). Thus, teacher performance in a digital environment needs to be understood as the result of the interaction between individual capacity and teachers' ability to utilize available technological resources.

This issue is becoming increasingly relevant in the Indonesian context because digital transformation does not take place in uniform conditions. Differences in infrastructure, access to technology, digital capabilities, and the use of technology can result in different experiences for teachers in carrying out their work. Data from the 2025 Indonesian Digital Society Index (IMDI) shows that the city of Samarinda obtained an overall score of 54,83 and is in the high category. However, there is a considerable difference between the pillars of Infrastructure and Ecosystem, which reached 69,81, and the pillars of Digital Literacy at 48,97, Empowerment at 51,44, and Employment at 49,39. These conditions show that the development of digital infrastructure in Samarinda has not been fully followed by the level of digital literacy and the use of technology for equivalent work activities. For educational organizations, this condition shows that the availability of digital infrastructure is an important prerequisite, but it cannot guarantee that teachers are able to turn technology into resources that increase work effectiveness.

This condition has special relevance for Muhammadiyah schools in Samarinda City. Official data from the Ministry of Primary and Secondary Education shows that SD Muhammadiyah 1 Samarinda has 51 teachers, 1,175 students, 38 study groups, and dedicated internet access in the even semester of the 2025/2026 school year. This condition shows that the school has a digital infrastructure base that can support the use of technology in educational activities. On the other hand, SD Muhammadiyah 4 Terpadu Samarinda is recorded to have 34 teachers, 697 students, 25 study groups, and shared internet access. The school also provides laboratories, libraries, and multimedia rooms and expresses its commitment to integrating educational values with technological developments. The difference in the characteristics of digital access shows that teachers in the Muhammadiyah Samarinda School environment can work in technological conditions that are not completely uniform. This situation is an interesting context to examine whether teachers'

individual readiness in dealing with AI can be a factor that explains the difference between digital skills and professional performance.

The presence of AI in the Muhammadiyah school environment also needs to be seen from the perspective of human resource development. Schools can provide digital devices, internet networks, and various technological applications, but the use of technology is still determined by the capacity of teachers. Teachers who have access to AI but do not have adequate readiness can have difficulty in determining the appropriate use of technology. On the other hand, teachers who have good AI readiness can more easily develop the ability to understand technology, evaluate information, and use it to complete professional tasks. Ramazanoglu & Akın (2025) show that AI readiness is an empirically measurable construct and includes aspects of technology efficacy, interaction with students, and ethical awareness. Meanwhile, Delcker et al. (2025) emphasized the importance of teachers' ability to use and evaluate AI ethically and responsibly. Therefore, the relationship between AI readiness and teacher performance needs to be explained through abilities that allow teachers to turn that readiness into professional actions.

Previous studies have shown that AI readiness of teachers is increasingly important in dealing with the integration of AI in education. Wang et al. (2023) found that AI readiness contributes to AI-based innovation. The findings of Ramazanoglu & Akın (2025) suggest that being prepared to adopt AI involves technological self-confidence, the ability to engage with learners, and sensitivity to ethical issues. Delcker et al. (2025), Chiu et al. (2025) and Shi (2025) further affirm that teachers' AI competencies include technological, pedagogical, professional, and ethical aspects. Lucas et al. (2024) found a relationship between AI knowledge, trust in AI, and teachers' digital competence, while Yue et al. (2024) demonstrated the importance of TPACK readiness in AI education. However, Lucas et al. (2025) found that prospective teachers in Spain and Portugal are not yet fully ready to integrate AI, suggesting that the existence of technology has not automatically resulted in adequate professional readiness and capabilities.

On the other hand, research shows that digital literacy and digital competence play an important role in teacher practice and professional development. Temirkhanova et al. (2024) show that the development of digital literacy supports the use of more interactive technology in learning, while Trixa & Kaspar (2024) emphasize the importance of the ability to evaluate digital information. Liu & Xu (2025) show that teacher digital literacy research develops on the themes of professional development, TPACK, and teaching practices. Damanik & Widodo (2024) also found a link between digital literacy

and teacher professional performance in Indonesia. Meanwhile, Aydin et al. (2024) and Seifert & Lindmeier (2024) emphasized that digital competence is a multidimensional ability related to the application of technology in professional practice. Tian et al. (2025) found a positive relationship between digital competence and job efficacy, while Sun & Yoon (2025) showed that digital self-efficacy can be a mechanism that connects digital transformation with performance. Masaeed et al. (2025) and Amemasor et al. (2025) further demonstrate how digital transformation and professional development play a role in changing educational practices and performance.

However, previous research still tends to examine AI readiness, digital literacy, and digital competence separately. Research on AI focuses more on AI readiness, competence, trust, and integration, while digital research is more related to learning practices and performance without explaining how AI readiness translates into professional performance. Zakir et al. (2025) Demonstrate that digital literacy and digital competence can contribute to academic performance through several intervening mechanisms. However, their findings are situated within the student learning context and do not address how these digital capabilities may operate among teachers who are adapting to artificial intelligence. Consequently, the pathway through which AI readiness is converted into professional performance remains insufficiently explained. The present study responds to this limitation by examining digital literacy and digital competence simultaneously as parallel mediators between AI readiness and teacher performance. The novelty of the research lies in the effort to explain the mechanism of how teachers' readiness to face AI can be translated into digital skills and subsequently contribute to enhanced professional performance among teachers in Muhammadiyah schools across Samarinda City.

Based on these developments, this research offers novelty by placing digital literacy and digital competence as two mediation mechanisms that explain the relationship between AI readiness and teacher performance. This approach differs from studies that focus solely on the direct effect of AI readiness on outcomes or examine how digital literacy is associated with performance in isolation. This research seeks to answer a more substantive question, namely how teachers' readiness to face AI can translate into improved professional performance. Conceptually, AI readiness is seen as an initial capacity that makes teachers more ready to accept and use AI, while digital literacy is the ability to understand, evaluate, and utilize information and digital technology. Furthermore, digital competence represents the applicative ability of teachers to use technology to carry out professional tasks. These three capacities are expected to contribute to the ability of teachers to carry out their work more effectively.

Thus, this research develops two complementary mediation pathways. The first path explains that AI readiness can increase digital literacy, which in turn supports teacher performance. The second path explains that AI readiness can increase digital competence, which then contributes to teacher performance. The model allows research to test whether AI readiness has a direct influence on performance as well as an indirect influence through digital skills. This approach also makes an empirical contribution because the research was conducted on Muhammadiyah school teachers in Samarinda City, namely educational contexts that have their own institutional characteristics and digital environment. The local context is important because previous research on AI readiness and teachers' digital competence was mostly conducted in educational contexts in other countries, while empirical evidence linking the four constructs to school teachers in Indonesia is still limited.

Drawing on the preceding arguments, this research formulates several hypotheses concerning the relationships among the variables. First, AI readiness is expected to contribute positively to teacher performance (H1), digital literacy (H2), and digital competence (H3). In addition, digital literacy is hypothesized to enhance teacher performance (H4), as is digital competence (H5). Beyond these direct relationships, the study also examines the potential mediating roles of digital literacy and digital competence. Specifically, digital literacy is proposed to function as an intermediary mechanism through which AI readiness influences teacher performance (H6). Similarly, digital competence is expected to mediate the effect of AI readiness on teacher performance (H7). To provide empirical support for the proposed model, a quantitative survey approach was adopted, with Partial Least Squares Structural Equation Modeling (PLS-SEM) used to analyze the collected data. The method enables an integrated evaluation of the proposed model, including the direct associations among the constructs and the indirect pathways through which the mediating variables transmit their effects.

Based on this description, this study aims to analyze the influence of AI readiness on teacher performance among Muhammadiyah school teachers in Samarinda City and examine the role of digital literacy and digital competence as mediators in this relationship. This research is expected to make a theoretical contribution by expanding understanding of the mechanism of teacher performance formation in the AI era, especially through the integration of AI readiness perspectives and digital capabilities. Practically, the results of the research are expected to be the basis for Muhammadiyah school managers in designing teacher professional development strategies that are not only oriented towards the provision of AI infrastructure and applications, but also towards strengthening AI readiness, digital literacy, and digital competence as human resources that support the improvement of teacher performance.

RESEARCH METHODOLOGY

Research Design

The research utilized an explanatory quantitative approach to assess how AI Readiness relates to Digital Literacy, Digital Competence, and Teacher Performance within the proposed research model. The proposed model was developed to investigate both the direct effect of AI Readiness on Teacher Performance and the indirect effects through Digital Literacy and Digital Competence as parallel mediating variables. The relationships among the constructs were examined using Structural Equation Modeling based on Partial Least Squares (SEM-PLS) with SmartPLS version 4. This analytical approach was selected because it enables the simultaneous examination of multiple relationships within a predictive structural model.

Population and Sample

The population comprised active teachers working at Muhammadiyah elementary schools (SD Muhammadiyah) in Samarinda, Indonesia. The study involved 188 teachers who met the established respondent criteria. A purposive sampling strategy was employed to recruit participants who met the predetermined eligibility criteria: The sample comprised teachers who were actively teaching at Muhammadiyah elementary schools in Samarinda, being directly involved in teaching and learning activities, and having experience using or interacting with digital technologies in performing teaching-related tasks. These criteria were applied to ensure that respondents had sufficient experience to assess their readiness for AI, digital capabilities, and professional performance.

Data Collection Techniques

The required information was gathered directly from the respondents through an online questionnaire distributed via Google Forms. Each item in the research instrument was rated on a four-point Likert-type scale, with response options extending from 1, indicating strong disagreement, to 4, indicating strong agreement. The questionnaire consisted of four main constructs. AI Readiness was operationalized by considering teachers' technological self-confidence, their ability to interact with students, and their awareness of ethical issues. (Ramazanoglu & Akın, 2025). Digital Literacy was assessed based on teachers' ability to access, understand, evaluate, and use digital information and technology (Temirkhanova et al., 2024; Liu & Xu, 2025). Digital Competence reflected teachers' ability to effectively apply digital technologies in pedagogical and professional activities (Aydin et al., 2024;Lucas et al., 2024). Teacher Performance was measured through instructional planning, implementation,

assessment, reflection, and professional responsibilities (Brownlee et al., 2024; Sun & Yoon, 2025).

Data Analysis Techniques

The collected data were analyzed using SEM-PLS through SmartPLS version 4. The analysis was conducted in three sequential stages.

Evaluation of the Measurement Model (Outer Model). Evaluation of the measurement model focused on determining whether the indicators adequately represented the intended constructs and produced consistent results. The assessment of convergent validity relied on outer loading values and Average Variance Extracted (AVE), whereas construct reliability was evaluated using Cronbach's Alpha, rho_c, and Composite Reliability. Discriminant validity was assessed using The Cross Loading and the Fornell–Larcker to ensure that each construct was empirically distinct from the others.

Evaluation of the Structural Model (Inner Model). Following confirmation of the measurement model, the analysis proceeded to the structural model evaluation. The analysis focused on the model's ability to account for variations in the dependent constructs as well as its predictive performance. The evaluation incorporated R^2 for explanatory power, f^2 for the contribution of individual predictors. Furthermore, path coefficient estimates were analyzed to identify both the direction and strength of the proposed associations between constructs.

Hypothesis Testing and Mediation Analysis. To assess the proposed hypotheses, a bootstrapping technique was implemented using SmartPLS 4. Direct relationships were evaluated based on the estimated path coefficients, *t*-statistics, and *p*-values. Statistical significance was assessed at the 5% significance level, with relationships considered statistically significant when the *p*-value was below 0.05. The mediating roles of Digital Literacy and Digital Competence were assessed through their respective specific indirect effects, allowing the study to determine whether these constructs explain the mechanism through which AI Readiness influences Teacher Performance.

Research Hypotheses

Based on the proposed conceptual framework, the hypotheses were formulated as follows:

H1: AI Readiness has a positive and significant effect on Teacher Performance.

H2: AI Readiness has a positive and significant effect on Digital Literacy.

H3: AI Readiness has a positive and significant effect on Digital Competence.

H4: Digital Literacy has a positive and significant effect on Teacher Performance.

H5: Digital Competence has a positive and significant effect on Teacher Performance.

H6: Digital Literacy significantly mediates the relationship between AI Readiness and Teacher Performance.

H7: Digital Competence significantly mediates the relationship between AI Readiness and Teacher Performance.

Overall, the methodological framework was structured to empirically examine how AI Readiness is directly associated with Teacher Performance and to clarify whether Digital Literacy and Digital Competence function as parallel mechanisms through which teachers' readiness to engage with AI can be translated into improved professional performance in Muhammadiyah elementary schools in Samarinda. An overview of the study's research framework can be found in Figure 1.

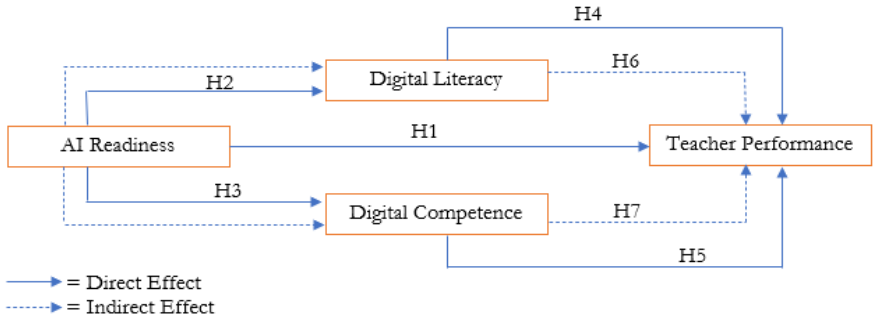


Figure 1. The Research Design.

RESULTS AND DICUSSION

Measurement Model Evaluation (Outer Model)

Convergent Validity Test

The outer loading results indicate that all indicators meet the recommended threshold of 0.70. In Table 1, for AI Readiness, AR1 and AR5 obtained loading values of 0.835 and 0.879, respectively. Digital Competence showed loading values ranging from 0.786 to 0.903, with the highest value observed for DC2 (0.903). For Digital Literacy, all indicators demonstrated satisfactory loadings, ranging from 0.779 to 0.832, while Teacher Performance produced loading values between 0.754 and 0.824. Since all outer loading values exceed 0.70, the indicators demonstrate adequate convergent validity and can be

retained for further analysis of the measurement model (Hair et al., 2021). (See Figure 2 and Table 1).

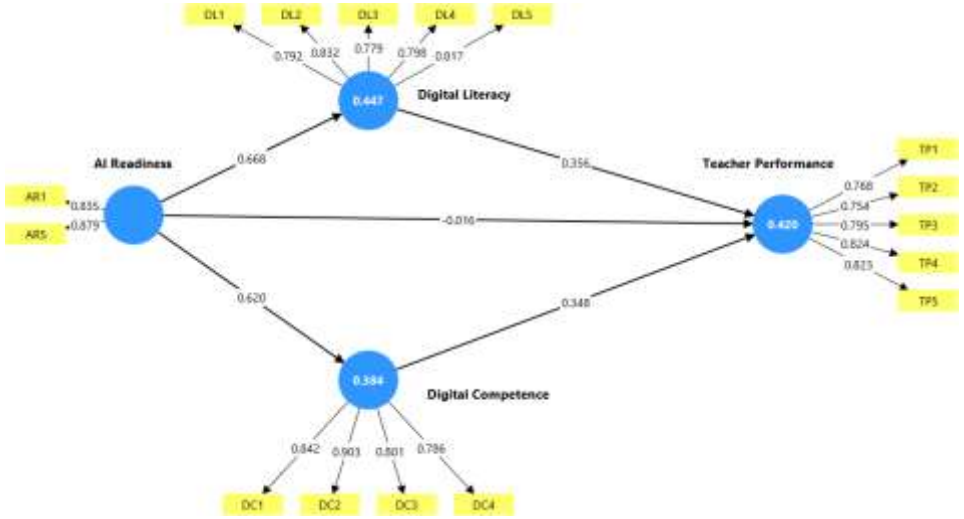


Figure 2. Loading Factor And Structural Model Results

Table 1. Outer Loading Values of Measurement Indicators

	AI Readiness	Digital Competence	Digital Literacy	Teacher Performance	Result
AR1	0.835				Valid
AR5	0.879				Valid
DC1		0.842			Valid
DC2		0.903			Valid
DC3		0.801			Valid
DC4		0.786			Valid
DL1			0.792		Valid
DL2			0.832		Valid
DL3			0.779		Valid
DL4			0.798		Valid
DL5			0.817		Valid
TP1				0.768	Valid
TP2				0.754	Valid
TP3				0.795	Valid
TP4				0.824	Valid
TP5				0.823	Valid

The Average Variance Extracted (AVE) results in Table 2 show that all research constructs exceeded the recommended minimum value of 0.50. AI Readiness obtained an AVE of 0.735, followed by Digital Literacy at 0.646, Digital Competence at 0.696, and Teacher Performance at 0.629. An examination of the AVE values reveals that each latent construct captures over 50% of the variance associated with its indicators. The results consequently support the adequacy of the indicator–construct associations. On this basis, the constructs can be regarded as having acceptable convergent validity, allowing the subsequent assessment of the structural model (Hair et al., 2022).

Table 2. Average Variance Extracted (AVE) Results

	Average variance extracted (AVE)	**Result**
AI Readiness	0.735	Valid
Digital Literacy	0.646	Valid
Digital Competence	0.696	Valid
Teacher Performance	0.629	Valid

Discriminant Validity Test

The cross-loading results in Table 3 demonstrate that all indicators have their highest loading values on the constructs they are intended to measure. The indicators of AI Readiness (AR1 and AR5) load most strongly on AI Readiness, with values of 0.835 and 0.879, respectively. Similarly, the Digital Competence indicators show their highest loadings on Digital Competence, ranging from 0.789 to 0.903. The Digital Literacy indicators also demonstrate higher loadings on their respective construct, ranging from 0.779 to 0.832. Meanwhile, the Teacher Performance indicators have their highest loadings on Teacher Performance, with values ranging from 0.754 to 0.824. Although several indicators show moderate cross-loadings on other constructs, their primary loadings remain higher than the corresponding cross-loadings. Therefore, all indicators meet the cross-loading criterion and demonstrate satisfactory discriminant validity.

Table 3. Cross-Loading Values

	AI Readiness	**Digital Competence**	**Digital Literacy**	**Teacher Performance**	**Result**
AR1	**0.835**	0.528	0.499	0.346	Valid
AR5	**0.879**	0.537	0.639	0.402	Valid
DC1	0.548	**0.842**	0.609	0.52	Valid
DC2	0.536	**0.903**	0.66	0.541	Valid

DC3	0.488	**0.801**	0.593	0.507	Valid
DC4	0.495	**0.786**	0.641	0.446	Valid
DL1	0.577	0.593	**0.792**	0.446	Valid
DL2	0.54	0.617	**0.832**	0.486	Valid
DL3	0.527	0.611	**0.779**	0.424	Valid
DL4	0.447	0.606	**0.798**	0.535	Valid
DL5	0.586	0.586	**0.817**	0.540	Valid
TP1	0.270	0.494	0.473	**0.768**	Valid
TP2	0.412	0.448	0.489	**0.754**	Valid
TP3	0.249	0.425	0.397	**0.795**	Valid
TP4	0.333	0.492	0.509	**0.824**	Valid
TP5	0.454	0.530	0.521	**0.823**	Valid

Evidence from the Fornell–Larcker assessment confirms that, for every construct, the square root of AVE is greater than the correlations observed with the remaining constructs. In Table 4, AI Readiness has a square root of AVE of 0.857, which is higher than its correlations with Digital Competence (0.620), Digital Literacy (0.668), and Teacher Performance (0.438). Digital Competence has a square root of AVE of 0.834, exceeding its correlations with Digital Literacy (0.749) and Teacher Performance (0.605). Likewise, Digital Literacy has a square root of AVE of 0.804, which is higher than its correlation with Teacher Performance (0.606). For the Teacher Performance construct, the discriminant validity assessment yields an AVE square-root value of 0.793. This figure exceeds the correlation coefficients between Teacher Performance and the other constructs examined in the model. The same pattern is observed across the remaining constructs. These findings support the Fornell–Larcker criterion and demonstrate that adequate discriminant validity has been achieved, with each construct representing a distinct empirical concept within the proposed model (Hair et al., 2022).

Table 4. Fornell–Larcker Criterion Results

	AI Readiness	**Digital Competence**	**Digital Literacy**	**Teacher Performance**
AI Readiness	0.857			
Digital Competence	0.620	0.834		
Digital Literacy	0.668	0.749	0.804	
Teacher Performance	0.438	0.605	0.606	0.793

Construct Reliability Test

The construct reliability results in Table 5 indicate that Digital Competence, Digital Literacy, and Teacher Performance demonstrate satisfactory internal consistency, with Cronbach's alpha and composite reliability values exceeding 0.80. For AI Readiness, Cronbach's alpha is 0.641, which is below the conventional threshold of 0.70. However, reliability values between 0.60 and 0.70 may be acceptable in exploratory research, and Cronbach's alpha should be interpreted alongside composite reliability in PLS-SEM (Hair et al., 2022; Sarstedt et al., 2022). In this study, AI Readiness achieves a composite reliability of 0.847, exceeding the recommended threshold of 0.70, while its AVE of 0.735 exceeds the minimum threshold of 0.50, supporting convergent validity. Therefore, the reliability assessment of AI Readiness is considered acceptable based on the combined evidence from composite reliability and AVE, although its Cronbach's alpha warrants cautious interpretation.

Table 5. Construct Reliability and Validity Results

	Cronbach's alpha	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**	**Result**
AI Readiness	0.641	0.847	0.735	Reliable And Valid
Digital Literacy	0.863	0.901	0.646	Reliable And Valid
Digital Competence	0.853	0.901	0.696	Reliable And Valid
Teacher Performance	0.853	0.894	0.629	Reliable And Valid

Model Fit

The model fit in Table 6 assessment indicates that the proposed model demonstrates an acceptable level of fit. The SRMR value was 0.067, which is below the reported threshold of 0.10 in the analysis, indicating good approximate model fit. In addition, the NFI value was 0.803 and was considered acceptable in the reported analysis. Overall, these results indicate that the proposed model provides an adequate representation of the empirical data.

Table 6. Model Fit Test Results

	Rule Of Thumb	**Estimated model**	**Result**
SRMR	< 0.10	0.067	Fit
NFI	Close to value 1	0.803	Fit

Structural Model Evaluation (Inner Model)

Coefficient of Determination (R-Square)

The R^2 results in Table 7 indicate moderate explanatory power of the structural model. Digital Competence, Digital Literacy, and Teacher Performance obtained R^2 values of 0.384, 0.447, and 0.420, respectively, indicating that the model explains 38.4%, 44.7%, and 42.0% of the variance in these constructs. The adjusted R^2 values were 0.381, 0.444, and 0.410, respectively, showing only minor differences from the R^2 values and suggesting stable explanatory power.

Table 7. R-Square Results

	R-square	R-square adjusted	Result
Digital Competence	0.384	0.381	Moderate
Digital Literacy	0.447	0.444	Moderate
Teacher Performance	0.42	0.41	Moderate

Effect Size (f-Square)

The f^2 results in Table 8 show that AI Readiness has large effects on Digital Literacy (0.807) and Digital Competence (0.625). In contrast, Digital Competence (0.086) and Digital Literacy (0.081) have small effects on Teacher Performance. AI Readiness shows no substantive direct effect on Teacher Performance (f^2 = 0.000), suggesting that its contribution to Teacher Performance may operate primarily through Digital Competence and Digital Literacy (Hair et al., 2022).

Table 8. Effect Size (f^2) Results

	AI Readiness	Digital Literacy	Digital Competence	Teacher Performance
AI Readiness		0.807	0.625	0
Digital Competence				0.086
Digital Literacy				0.081

Hypothesis Testing

Path Coefficients

The structural model results in Table 9 show that AI Readiness has a positive and significant effect on Digital Competence ($\beta = 0.620$, $t = 11.229$, $p < 0.050$) and Digital Literacy ($\beta = 0.668$, $t = 12.828$, $p < 0.050$). These findings

indicate that greater readiness to adopt and utilize AI is associated with higher levels of digital competence and digital literacy. In contrast, the direct effect of AI Readiness on Teacher Performance was not significant (β = −0.016, t = 0.188, p = 0.426), indicating that AI Readiness does not directly predict Teacher Performance. Digital Competence was found to have a positive and significant effect on Teacher Performance (β = 0.348, t = 2.803, p = 0.003), while Digital Literacy also had a positive and significant effect on Teacher Performance (β = 0.356, t = 2.813, p = 0.002). Overall, the findings suggest that AI Readiness is strongly associated with the development of Digital Competence and Digital Literacy, whereas these digital capabilities are more directly associated with Teacher Performance.

Table 9. Direct Effect and Hypothesis Testing Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Result
AI Readiness -> Teacher Performance (H1)	-0.016	-0.018	0.085	0.188	0.426	has a negative and non-significant effect
AI Readiness -> Digital Literacy (H2)	0.668	0.669	0.052	12.828	0.000	has a positive and significant effect
AI Readiness -> Digital Competence (H3)	0.62	0.621	0.055	11.229	0.000	has a positive and significant effect
Digital Literacy -> Teacher Performance (H4)	0.356	0.358	0.127	2.813	0.002	has a positive and significant effect
Digital Competence -> Teacher Performance (H5)	0.348	0.352	0.124	2.803	0.003	has a positive and significant effect

Indirect Effects and Mediation

The mediation analysis in Table 10 indicates that Digital Literacy and Digital Competence play significant mediating roles in the relationship between AI Readiness and Teacher Performance. Specifically, the indirect effect of AI Readiness on Teacher Performance through Digital Literacy is positive and

significant (β = 0.238, t = 2.805, p = 0.003), while the indirect effect through Digital Competence is also positive and significant (β = 0.216, t = 2.598, p = 0.005). In contrast, the direct effect of AI Readiness on Teacher Performance is negative but non-significant (β = −0.016, t = 0.188, p = 0.426). These findings indicate an indirect-only mediation effect, suggesting that AI Readiness does not directly improve Teacher Performance but contributes to improved performance through strengthening teachers' proficiency in using digital technologies and developing relevant digital capabilities. Accordingly, both dimensions of digital capability can be regarded as full mediators in the association between AI Readiness and Teacher Performance.

Table 10. Specific Indirect Effects and Mediation Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Result
AI Readiness -> Digital Literacy -> Teacher Performance (H6)	0.238	0.238	0.085	2.805	0.003	has a positive and significant effect
AI Readiness -> Digital Competence -> Teacher Performance (H7)	0.216	0.22	0.083	2.598	0.005	has a positive and significant effect

Discussion

The Effect of AI Readiness on Teacher Performance

The test results showed that AI Readiness had no significant effect on Teacher Performance (β = −0.016, t = 0.188, p = 0.426). Although the path coefficient indicates a negative direction, a p-value well above 0.05 indicates that the relationship does not have sufficient statistical evidence. Thus, H1 is not supported. These findings show that teachers' readiness in using artificial intelligence has not automatically resulted in an improvement in teacher performance. AI readiness is more reflective of readiness in terms of knowledge, ability, perception, vision, and ethical considerations towards AI, while teacher performance is related to the actual ability to perform professional duties. In

other words, being ready for AI is not equivalent to being able to translate AI readiness directly into better job performance.

These findings can be explained through the perspective of the Resource-Based View (RBV). In the perspective of RBV, new organizational or individual resources can produce excellence and performance if these resources can be effectively utilized and combined with other capabilities. AI readiness can be seen as a potential capability, but this readiness does not necessarily result in performance if it is not translated into concrete competencies and work practices. Research by Wang et al. (2023) on 3,164 elementary school teachers also showed that AI readiness is positively related to AI-enhanced innovation and job satisfaction, but the influence takes place through the process of how teachers use and integrate AI in their work, not just because teachers have AI readiness. Thus, the results of this study expand on previous findings by showing that AI readiness alone may be insufficient to directly improve teacher performance. In the context of schools, readiness for AI needs to be converted first into digital skills and digital literacy that can be used in learning planning, material development, evaluation, communication, and completion of professional tasks.

The Effect of AI Readiness on Digital Literacy

The test results showed that AI Readiness had a positive and significant effect on Digital Literacy ($\beta = 0.668$, $t = 12.828$, $p < 0.050$). Thus, H2 is supported. The relatively high coefficient value shows that the higher the readiness of teachers in understanding and using AI, the higher the digital literacy skills of teachers. These findings show that AI readiness is not only related to readiness to accept new technologies, but also encourages teachers to improve their ability to search, evaluate, use, generate, and manage information through digital technology.

These results are in line with the development of the concept of AI literacy, which places understanding AI as part of the ability to use technology critically, productively, and ethically. A systematic review of AI literacy in teacher education shows that AI literacy includes epistemic knowledge, practical knowledge, and ethical dimensions in the use of AI. It is not enough for teachers to know the existence of AI, but they need to have the ability to use and evaluate the technology in a professional context (Sperling et al., 2024). Evidence from the present study is supported by earlier research on teacher preparedness for AI education. According to Fundi et al. (2024), confidence, AI ethics, and subjective norms are among the factors associated with AI readiness.

Theoretically, this relationship can be explained through Social Cognitive Theory (SCT), specifically the idea that individual abilities develop through the

interaction between personal, behavioral, and environmental factors. When teachers have a higher readiness for AI, they are more likely to explore digital technologies, seek out new information, try different applications, and develop experiences using technology. This process gradually strengthens digital literacy. Thus, the results of the study show that AI Readiness is an important factor that supports teachers in strengthening their Digital Literacy.

The Effect of AI Readiness on Digital Competence

The results of the study show that AI Readiness has a positive and significant effect on Digital Competence ($\beta = 0.620$, $t = 11.229$, $p < 0.050$). Therefore, H3 is supported. These findings show that teachers who are more prepared to face AI tend to have better competence in using digital technology to support their professional activities.

The findings have a strong empirical basis. Lucas et al. (2024) found a relationship between knowledge and trust in AI and teachers' digital competence, while Galindo-Domínguez et al. (2024) showed that teachers' digital competence is related to a more positive attitude towards AI. Hava & Babayiğit (2025) research also shows a relationship between AI-TPACK competence and teachers' digital proficiency, which shows that AI competence and digital skills do not stand separately, but are interrelated in educational practice.

These results can also be understood through RBV, where digital competence is a capability that allows teachers to transform technological resources into valuable professional actions. AI readiness provides readiness to accept and understand AI technology, while digital competence provides practical ability to use the technology. Thus, the result $\beta = 0.620$ shows that increasing AI readiness has a strong relationship with the formation of digital competence. This is important because the systematic literature shows that teachers' digital competence includes the ability to plan digital-based learning, use technology in learning, manage students' digital activities, and use technology to support 21st century skills (Claro et al., 2024).

The Effect of Digital Literacy on Teacher Performance

The test results showed that Digital Literacy had a positive and significant effect on Teacher Performance ($\beta = 0.356$, $t = 2.813$, $p = 0.002 < 0.050$). Thus, H4 was supported. These findings show that teachers' ability to access, understand, evaluate, use, and produce information through digital technology contributes to improving teachers' professional performance.

These findings are in line with the research of Temirkhanova et al. (2024), which shows that increasing teachers' digital literacy can support a more

interactive learning process and improve students' ability to use various digital resources. Research on teachers' ICT competencies also shows that digital literacy is one of the factors related to the development of teachers' ICT competencies (Zhao, 2024). Thus, digital literacy is not just a technical ability to operate devices, but is an ability that allows teachers to use information and technology effectively in completing professional work.

These results also support the SCT perspective, because digital literacy provides the behavioral capabilities needed to translate technological knowledge into real actions. Teachers who have higher digital literacy will be better able to find learning resources, choose relevant information, create digital teaching materials, use learning platforms, process information, and adjust learning strategies to the needs of students. Therefore, increasing digital literacy can result in changes in teachers' work behaviors which are then reflected in teacher performance. Research by Runge et al. (2023) also shows that teachers' beliefs about digital competence are positively related to the use of technology to improve the quality of learning, including differentiation and student involvement.

The Effect of Digital Competence on Teacher Performance

The test results showed that Digital Competence had a positive and significant effect on Teacher Performance ($\beta = 0.348$; $t = 2.803$; $p = 0.003$), so H5 was supported. These findings show that the higher the digital competence of teachers, the better their ability to carry out professional tasks, such as planning learning, developing teaching materials, using technology in learning, conducting assessments, and managing learning activities.

These findings are in line with Claro et al. (2024), who show that teachers' digital competence includes the ability to use technology to support various professional activities, in particular learning planning and implementation. Heine et al. (2023) also emphasized that the use of digital resources is an important part of teachers' professional competence. In addition, Hava & Babayiğit (2025) found a link between teacher competence in AI-TPACK and digital proficiency, while Galindo-Domínguez et al. (2024) showed that digital competence is related to teachers' ability to respond to the development of artificial intelligence in education. The development of digital competencies is also influenced by environmental support and teacher professional development (Chiu et al., 2024), while teachers' ability to use technology pedagogically is an important part of the development of digital professional competencies (Ohle-Peters et al., 2024).

Thus, the results of this study strengthen the view that Digital Competence is an important ability that allows teachers to transform digital

resources and technology into more effective work practices, thus ultimately contributing to improving Teacher Performance.

Digital Literacy significantly mediates the relationship between AI Readiness and Teacher Performance.

The results of the indirect effect analysis showed that Digital Literacy significantly mediated the relationship between AI Readiness and Teacher Performance ($\beta = 0.238$, $t = 2.805$, $p = 0.003 < 0.050$). Thus, H6 is supported. These findings show that AI readiness does not directly increase teacher performance, but contributes to teacher performance through increasing digital literacy.

This finding is one of the important results in the study because it provides an explanation of the mechanism of how AI readiness can be translated into teacher performance. The direct effect results show that AI readiness for teacher performance is not significant ($\beta = -0.016$, $p = 0.426$), while the AI readiness pathway for digital literacy and digital literacy for teacher performance are both significant. In addition, the indirect effect is also significant ($\beta = 0.238$, $p = 0.003$). The pattern shows indirect-only mediation so that it can be referred to as full mediation.

Conceptually, these results show that AI readiness is not enough to improve performance if teachers do not have digital literacy skills that allow them to be applied in their work. Teachers may have a positive attitude towards AI and feel ready to use technology, but these benefits can only arise when teachers are able to search for information, assess information quality, use digital applications, produce content, and use technology critically in professional work. These findings are consistent with research that shows that the development of teachers' digital skills is an important part of the successful integration of technology in educational practices (Claro et al., 2024).

Thus, Digital Literacy functions as a transformation mechanism from readiness to performance. These findings strengthen RBV's argument that resources or technological readiness do not automatically produce performance but require capabilities that allow these resources to be converted into productive value.

Digital Competence significantly mediates the relationship between AI Readiness and Teacher Performance.

The test results showed that Digital Competence significantly mediated the relationship between AI Readiness and Teacher Performance ($\beta = 0.216$, $t = 2.598$, $p = 0.005 < 0.050$). Thus, H7 is supported. These results show that AI readiness can improve teacher performance through the development of digital

competence. Like digital literacy, digital competence is a mechanism that connects teachers' readiness for AI with their ability to carry out professional work more effectively.

These findings are consistent with Runge et al. (2023) research which shows that digital competence has an important role in the use of technology by teachers in supporting the quality of learning. Another study using PLS-SEM on 680 educators also showed that digital competence is one of the significant factors in ICT integration by teachers (Peng et al., 2024). Meanwhile, research on EFL teachers' digital competence found that digital competence with TPACK can be a mechanism that connects digital learning with teacher work involvement (Rezai et al., 2024).

From the perspective of RBV, digital competence can be positioned as an organizationally valuable capability because it allows teachers to integrate digital resources into the work process. From the perspective of SCT, digital competence reflects the actual ability of individuals to perform certain actions with technology. Therefore, the higher the digital competence, the greater the ability of teachers to use technology appropriately in planning, implementing, evaluating, communicating, and developing learning.

The overall evidence points to an indirect mechanism underlying the proposed model. Although AI Readiness does not independently translate into a significant improvement in Teacher Performance, it plays an important role in strengthening teachers' Digital Literacy and Digital Competence. Both forms of digital capability subsequently contribute to Teacher Performance. Therefore, the findings indicate that the effect of AI Readiness is realized through the development of these digital capabilities rather than through a direct pathway to Teacher Performance.

These findings suggest that AI readiness needs to be translated into digital literacy and digital competence before it can contribute to teacher performance. This interpretation is consistent with the literature emphasizing that successful AI integration in education depends on teachers' readiness, digital competence, experience in using technology, and ability to apply technology in instructional practices (Wang et al., 2023). From an education management perspective, school leaders should therefore move beyond general AI awareness campaigns and implement targeted professional development programs that strengthen teachers' practical capabilities. Such programs could include hands-on workshops on designing effective pedagogical prompts, evaluating AI-generated instructional materials, applying digital ethics and data privacy principles, and integrating AI tools into lesson planning, assessment, and feedback. School managers should also provide opportunities for collaborative

lesson design, peer mentoring, and classroom-based experimentation, supported by clear institutional guidelines for responsible AI use. The effectiveness of these initiatives can be monitored through practical teaching assignments, lesson-plan evaluations, and periodic assessments of teachers' digital literacy and digital competence. These management actions may help translate teachers' AI readiness into applicable digital capabilities and, ultimately, improved professional performance.

CONCLUSION

The findings indicate that AI Readiness does not directly influence Teacher Performance. Rather, its impact is transmitted indirectly through Digital Literacy and Digital Competence. The mediation analysis confirms the presence of full mediation (indirect-only mediation), indicating that the effect of Artificial Intelligence Readiness on Teacher Performance is entirely transmitted through improvements in teachers' Digital Literacy and Digital Competence. These findings confirm that teachers' readiness in facing Artificial Intelligence technology has not automatically improved performance, but needs to be translated into digital literacy and competence skills that can be applied in the implementation of professional tasks. From a theoretical perspective, the findings offer insight into how Artificial Intelligence Readiness may influence Teacher Performance by involving teachers' digital capabilities as an underlying mechanism. From a practical standpoint, the results highlight the need for educational institutions to enhance teachers' Digital Literacy and Digital Competence while providing continuous professional development to support the effective adoption of AI in educational settings.

The limitations of the research lie in the limited context of Muhammadiyah elementary school teachers in Samarinda City and the use of cross-sectional designs, so generalizations and causal interpretations need to be done carefully. Further research is suggested to expand the context and characteristics of respondents, using longitudinal or mixed-method designs, and consider factors such as organizational support, technological infrastructure, AI self-efficacy, and professional development to gain a more comprehensive understanding of the process of transforming AI Readiness into Teacher Performance.■

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