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The Influence of Self-Efficacy, Technology Support, Learning Motivation, Learning Environment, and Digital Literacy on the Pedagogical Readiness of PGMI Students at IAIN Curup

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A R T I C L E I N F O

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A B S T R A C K

This study aimed to examine the effects of self-efficacy, technology support, learning motivation, learning environment, and digital literacy on the pedagogical readiness of students in the Primary Teacher Education Program (PGMI) at IAIN Curup. A quantitative survey design was employed, involving 408 students selected through stratified random sampling. Data were collected using a structured questionnaire and analyzed through Structural Equation Modeling–Partial Least Squares (SEM-PLS). The results indicated that all constructs met the required validity and reliability criteria. Hypothesis testing revealed that self-efficacy, technology support, learning motivation, learning environment, and digital literacy each had a positive and significant effect on students' pedagogical readiness. Among these factors, learning motivation emerged as the strongest predictor, followed by learning environment, self-efficacy, technology support, and digital literacy. The findings further demonstrated that the proposed model possessed substantial explanatory power, with an R^2 value of 0.787, indicating that 78.7% of the variance in pedagogical readiness was explained by the five predictor variables, while the remaining variance was attributable to factors outside the model. The study concludes that pedagogical readiness is shaped by the interaction of psychological, environmental, and technological factors. These findings provide important implications for developing more comprehensive and adaptive teacher education programs to meet the demands of twenty-first-century education

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INTRODUCTIONS

Pedagogical readiness is one of the fundamental competencies that preservice teachers must possess to meet the increasingly complex and technology-driven demands of 21st-century education. Pedagogical readiness extends beyond mastery of learning theories and encompasses the ability to understand learners' characteristics, design instruction, select appropriate teaching strategies and media, utilize technology, conduct assessments, and reflect on the teaching and learning process. Within teacher education, pedagogical readiness serves as an important indicator of the extent to which preservice teachers are prepared to perform their professional responsibilities upon graduation. Previous studies have consistently emphasized that the quality of teaching and learning is strongly influenced by the pedagogical readiness and competencies of teachers and preservice teachers (Leijen et al., 2024; Liquido & Potane, 2023). Furthermore, pedagogical readiness plays a crucial role in determining instructional quality, professional commitment, and future teaching effectiveness (Ladd et al., 2024; Uysal, 2025). Consequently, examining the factors that influence preservice teachers' pedagogical readiness has become a highly relevant issue in higher education. This need has become even more pressing as digital transformation and post-pandemic educational reforms have introduced new challenges that require more comprehensive and adaptive pedagogical preparedness among teacher candidates (Ibrahem et al., 2023; Rapanta et al., 2021).

The shift toward technology-enhanced and digitally mediated learning has transformed the role of teachers from information providers into learning facilitators capable of effectively integrating technology into educational practices. This transformation requires students enrolled in teacher education programs to develop pedagogical competencies that are not only conceptually sound but also responsive to technological advancements. Previous studies have demonstrated that teaching readiness and pedagogical readiness are influenced by individuals' ability to utilize technology, adapt to digital learning environments, and respond to changes in instructional models (Husain et al., 2023; Seetal et al., 2021). Other studies have identified a persistent gap between technological proficiency and the ability to integrate technology effectively into authentic teaching practices (Kormos, 2024; Limbong et al., 2024). These findings suggest that preservice teachers' pedagogical readiness cannot be separated from the psychological, environmental, and technological factors that support their learning experiences. Therefore, research that comprehensively examines the determinants of pedagogical readiness among teacher education students in the digital era remains necessary.

One factor that is expected to influence pedagogical readiness is self-efficacy. According to Bandura's theory, self-efficacy refers to individuals' beliefs in their capabilities to organize and execute actions required to achieve specific goals, which subsequently influence their thinking, behavior, and task performance (Abdullah et al., 2020). Within teacher education, self-efficacy plays a critical role in shaping preservice teachers' confidence in managing learning activities, completing academic tasks, and addressing professional challenges. Previous studies have demonstrated that self-efficacy is strongly associated with

teaching quality, work engagement, professional competence, and readiness to perform educational responsibilities (Han & Wang, 2021; Zheng et al., 2022). Moreover, preservice teachers with higher levels of self-efficacy tend to exhibit greater readiness in fulfilling their pedagogical and professional roles (Akhyar et al., 2024; Каримова et al., 2020). These findings indicate that self-efficacy is an important psychological factor that should be considered in efforts to enhance the pedagogical readiness of PGMI students as future elementary and Islamic primary school teachers.

In addition to self-efficacy, technology support has become an increasingly important factor in shaping students' pedagogical readiness in the digital era. Technology support includes the availability of technological devices, internet access, ease of technology use, perceived usefulness of technology in learning, and comfort in utilizing technological resources. Previous studies have shown that the successful integration of technology in education is largely influenced by the level of technological support available to students and educators (Alkasasbeh & Amawi, 2024; Bati & Workneh, 2020). Adequate technological support enables students to experience more effective learning, develop digital competencies, and improve their readiness to implement technology-enhanced instruction in the future (Amemasor et al., 2025; Seboka et al., 2025). Conversely, limited access to technology may hinder the development of pedagogical competencies required in contemporary digital education (Ethe, 2025; Ndibalema, 2022). Therefore, technology support is considered a significant determinant of preservice teachers' pedagogical readiness.

Another important factor is learning motivation. Learning motivation represents the internal drive that encourages students to actively engage in learning activities, maintain persistence in their studies, and achieve academic goals. High levels of motivation promote active participation in educational activities and facilitate the development of competencies required for professional teaching practice (Shrol & Poliukhovych, 2021). Previous research has demonstrated that motivation is positively associated with academic competence, learning effectiveness, and readiness to meet evolving educational demands (Alj & Bouayad, 2024; Shah et al., 2021). Moreover, motivation contributes to the development of self-directed learning and students' readiness to continuously improve their professional competencies throughout their careers (Santosa et al., 2024; Timmermans, 2023). Consequently, learning motivation is expected to play a significant role in enhancing the pedagogical readiness of PGMI students for future teaching responsibilities.

The learning environment also contributes substantially to the development of pedagogical readiness. A supportive learning environment is characterized by positive interactions between students and lecturers, peer support, a conducive academic climate, and opportunities for active participation in learning activities. Numerous studies have demonstrated that a positive learning environment enhances students' competencies, engagement, and professional readiness (Cavender, 2022; Iqbal, 2021). The social and academic support students receive during their educational journey also influences the development of their professional identity and preparedness for entering the

workforce (Duncheon et al., 2023; Haatainen et al., 2024). Within teacher education, an effective learning environment provides meaningful pedagogical experiences that strengthen students' readiness to perform instructional responsibilities in the future (Niyibizi, 2025; A. E. D. Plessis & Dreyer, 2024). Therefore, the learning environment should be considered a potential factor influencing the pedagogical readiness of PGMI students.

In addition, digital literacy has become an essential competency in modern education. Digital literacy extends beyond the ability to use technological tools and includes the capacity to locate, evaluate, process, and utilize digital information critically and ethically (Koltay & Szőke-Milinte, 2020). Previous studies have emphasized that digital literacy is a prerequisite for preservice teachers to effectively integrate technology into teaching and learning processes (Chama & Subaveerapandiyan, 2023; Syatriana et al., 2025). High levels of digital literacy enable students to better respond to technology-based learning challenges, utilize digital learning resources effectively, and develop innovative pedagogical practices (Mekheimer & AbdElaal, 2025; Semeniako et al., 2024). Conversely, limited digital literacy may restrict students' ability to maximize the educational benefits of technology. Therefore, digital literacy is regarded as a strategic factor that can enhance pedagogical readiness in the context of educational digital transformation.

Although previous studies have examined the relationships between self-efficacy, technology support, learning motivation, learning environment, digital literacy, and various educational outcomes, research simultaneously investigating the effects of these five variables on the pedagogical readiness of PGMI students remains limited. Most previous studies have focused on in-service teachers, online learning readiness, or technology integration in education, whereas investigations specifically targeting preservice teachers in Islamic primary teacher education programs remain scarce (Lausa et al., 2024; Niyibizi, 2025). Yet, PGMI students represent future educators who will play a crucial role in shaping the foundation of elementary education. Therefore, their pedagogical readiness warrants closer examination. This study contributes to the existing literature by expanding understanding of the factors influencing pedagogical readiness among preservice teachers within the context of Islamic higher education in Indonesia, particularly among PGMI students at IAIN Curup. Furthermore, the application of Structural Equation Modeling (SEM) enables a comprehensive examination of interrelationships among variables, thereby providing a stronger empirical model for explaining the determinants of pedagogical readiness.

Based on the foregoing discussion, this study addresses the following research questions: self-efficacy positively influence the pedagogical readiness of PGMI students at IAIN Curup, technology support positively influence the pedagogical readiness of PGMI students at IAIN Curup, learning motivation positively influence the pedagogical readiness of PGMI students at IAIN Curup,the learning environment positively influence the pedagogical readiness of PGMI students at IAIN Curup, digital literacy positively influence the pedagogical readiness of PGMI students at IAIN Curup, To what extent do self-

efficacy, technology support, learning motivation, learning environment, and digital literacy collectively explain the pedagogical readiness of PGMI students at IAIN Curup through a Structural Equation Modeling (SEM) approach

LITERATURE REVIEW

Self-Efficacy and Pedagogical Readiness

Self-efficacy refers to individuals' beliefs in their ability to perform tasks and achieve specific goals, which play a crucial role in shaping educators' pedagogical readiness to meet the demands of 21st-century learning (Abdullah et al., 2020). In higher education contexts, self-efficacy encourages lecturers and preservice teachers to develop greater confidence in designing, managing, and evaluating learning processes effectively (Han & Wang, 2021; Ladd et al., 2024). Previous studies have shown that individuals with high levels of self-efficacy tend to demonstrate stronger engagement in learning activities, enhanced reflective abilities, and higher instructional quality, thereby fostering pedagogical readiness (Leijen et al., 2024). Self-efficacy has also been found to enhance professional competence, readiness to adopt educational innovations, and the ability to solve complex pedagogical challenges (Ajani, 2024; Voloshyn et al., 2022). In increasingly digitalized educational environments, confidence in one's own capabilities becomes a critical factor that encourages educators to utilize technology, implement online learning, and integrate digital innovations into teaching practices (Offermann, 2025; Zhu & Siquan, 2025). Other studies have demonstrated that self-efficacy contributes to the development of pedagogical competence, teaching commitment, professionalism, and readiness to adapt to changing educational environments (Akhyar et al., 2024). Furthermore, self-efficacy strengthens motivation, self-regulation, and agency, which are essential for the continuous development of pedagogical readiness (Davies, 2021). Therefore, higher levels of self-efficacy are expected to be associated with higher levels of pedagogical readiness in implementing effective, innovative, and adaptive teaching practices in modern educational settings (Liquido & Potane, 2023; Lohmann et al., 2023). H1 : Self-efficacy has a positive and significant effect on pedagogical readiness.

Technology Support and Pedagogical Readiness

Technology support is a critical factor influencing educators' pedagogical readiness in response to the ongoing digital transformation of education. Previous studies have demonstrated that the availability of technological infrastructure, access to digital resources, professional development opportunities, and institutional support contribute significantly to teachers' ability to integrate technology effectively into teaching and learning processes (Bati & Workneh, 2020; Dawadi, 2022). In online and hybrid learning environments, technology support has been found to enhance teaching readiness, self-efficacy, and pedagogical competence in managing digital learning settings (Husain et al., 2023; Seetal et al., 2021). Moreover, adequate technology support helps educators overcome digital divides and increases their readiness to implement innovative instructional strategies, including artificial intelligence applications, flipped classrooms, and virtual learning environments

(Ali, 2024; Reyes, 2025). Research also indicates that pedagogical readiness develops more effectively when educators have access to technology-based professional development and sustained learning community support (Seboka et al., 2025). Within the framework of Technological Pedagogical Content Knowledge (TPACK) and post-pandemic education, the integration of technology and pedagogy has become a prerequisite for achieving effective and sustainable learning outcomes (Starkey et al., 2021). However, variations in the level of technology support available to educators continue to create differences in pedagogical readiness. Therefore, further investigation is needed to determine whether technology support significantly and positively influences pedagogical readiness. H2: Technology support has a positive and significant effect on pedagogical readiness.

Learning Motivation and Pedagogical Readiness

Learning motivation is a psychological factor that plays a vital role in shaping individuals' pedagogical readiness to effectively engage in teaching and learning activities. Social learning theory suggests that motivation encourages individuals to develop self-confidence, active engagement, and readiness to address complex learning challenges (Abdullah et al., 2020). In higher education, motivation contributes to greater self-directed learning, self-regulation, and academic engagement, all of which serve as foundations for the professional readiness of future educators (Shah et al., 2021). Previous studies have shown that high levels of motivation promote the development of pedagogical competence, problem-solving skills, professional reflection, and commitment to high-quality teaching practices (Igwe et al., 2022). Motivation has also been found to enhance readiness to adopt educational innovations, educational technologies, online learning, and artificial intelligence in instructional processes (Alj & Bouayad, 2024; Offermann, 2025). Studies on teaching readiness further indicate that individuals with high learning motivation are more prepared to adapt to pedagogical changes, integrate technology, and continuously develop their professional competencies (Be, 2024; Sedek & Mohd, 2024). Furthermore, motivation contributes to the enhancement of self-efficacy, which subsequently strengthens instructional quality and pedagogical readiness (Ladd et al., 2024). Pedagogical readiness itself reflects an individual's preparedness in terms of knowledge, skills, attitudes, and commitment required to conduct learning activities effectively (Havryshkiv, 2020). Although numerous studies have confirmed the importance of motivation in enhancing competence and learning readiness, the direct relationship between learning motivation and pedagogical readiness among preservice educators in higher education contexts requires further empirical examination. H3: Learning motivation has a positive and significant effect on pedagogical readiness.

Learning Environment and Pedagogical Readiness

The learning environment is an important factor influencing pedagogical readiness because it provides the social, technological, organizational, and experiential support necessary for preservice teachers and educators to develop effective teaching competencies. A supportive learning environment fosters interaction, reflection, collaboration, and self-efficacy, all of which serve as foundations for pedagogical readiness (Davies, 2021). In higher education and

digital learning contexts, the quality of the learning environment, supported by technology, resources, and learning communities, contributes to teaching readiness, instructional quality, and professional commitment (Rapanta et al., 2021). Previous studies have demonstrated that support for online learning, institutional readiness, technological infrastructure, and a positive learning climate enhance teachers' readiness to implement effective pedagogical practices (Keskin et al., 2021). In addition, learning environments that encourage innovation, flexible learning, professional development, and technology integration strengthen pedagogical readiness and adaptability to the educational changes of the 21st century (Parlakkılıç, 2025). Other findings suggest that high-quality learning experiences, active engagement, and social support within learning environments improve individuals' readiness to perform their professional roles as educators (D. Plessis, 2023). Therefore, a supportive learning environment is expected to positively contribute to pedagogical readiness. H4: Learning environment has a positive and significant effect on pedagogical readiness.

Digital Literacy and Pedagogical Readiness

Digital literacy is a critical competency that enables educators to access, evaluate, manage, and utilize technology effectively in teaching and learning processes, thereby contributing to enhanced pedagogical readiness (Koltay & Szőke-Milinte, 2020). In the context of 21st-century education, digital literacy supports the development of innovative, reflective, and learner-centered instructional practices that are central to the pedagogical readiness of teachers and preservice teachers (Voloshyn et al., 2022). Previous studies have shown that digital literacy enhances technology integration in education, strengthens pedagogical knowledge, and supports the effective implementation of the Technological Pedagogical Content Knowledge (TPACK) framework (Alkasasbeh & Amawi, 2024). Furthermore, technological and ICT competencies have been associated with readiness for online teaching, blended learning, and virtual learning environments, all of which have become increasingly important in the digital era (Madanat et al., 2024). Numerous studies have also emphasized that pedagogical readiness is influenced by the ability to utilize technology for designing, managing, and evaluating learning effectively (Al-Shehhi & Eryılmaz, 2025). High levels of digital literacy help educators adapt to educational changes, strengthen professional confidence, and expand their capacity for instructional innovation (Kundu & Bej, 2025). Therefore, higher levels of digital literacy are expected to lead to greater pedagogical readiness in addressing the demands of contemporary education. H5: Digital literacy has a positive and significant effect on pedagogical readiness.

METHODOLOGY

Research Design

This study employed a quantitative approach using an explanatory research design to examine the causal relationships among learning motivation, technology support, self-efficacy, learning environment, digital literacy, and pedagogical readiness among students enrolled in the Primary Islamic Teacher

Education (PGMI) Program. The relationships among variables were tested using Structural Equation Modeling (SEM), enabling the study to provide empirical evidence regarding the strength of the structural relationships developed based on theoretical foundations and previous empirical findings (Uysal, 2025).

Population and Sample

The study population consisted of all active PGMI students enrolled in the second, fourth, sixth, and eighth semesters. Students from different academic levels were included because each semester group possesses distinct academic experiences, levels of technology exposure, and learning experiences, which may influence their pedagogical readiness. A total of 408 students participated in the study. The sample size was determined based on SEM-PLS guidelines, which recommend a minimum sample size of ten times the number of indicators included in the research model (Henseler et al., 2014). Given that the model comprised 34 indicators, the minimum required sample size was 340 respondents. Therefore, the final sample of 408 participants exceeded the recommended threshold, ensuring stable and reliable parameter estimation (Reyna-Castillo et al., 2022; Schuberth, 2020).

The sampling procedure employed stratified random sampling. This technique was selected because the population was heterogeneous and divided into strata according to academic semester. Stratified random sampling ensured proportional representation from each semester group, thereby providing a more accurate reflection of population characteristics. In addition to enhancing sample representativeness, this method reduced sampling bias and minimized the risk of overrepresentation from any particular semester group. After determining the proportional sample size for each stratum, respondents were randomly selected within their respective semester groups, ensuring that all members of the population had an equal opportunity to participate in the study (Reddy & Khan, 2023).

Research Instrument

Data were collected using a structured questionnaire developed through the adaptation and modification of measurement instruments used in previous studies. All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Likert scale was selected because it effectively measures respondents' perceptions, beliefs, and levels of agreement regarding the constructs under investigation. The Learning Motivation (LM) construct was adapted from (Alj & Bouayad, 2024; Shrol & Poliukhovych, 2021). It consisted of five indicators: motivation to learn (LM1), interest in learning materials (LM2), achievement orientation (LM3), persistence in learning (LM4), and satisfaction with understanding learning materials (LM5). The Technology Support (TS) construct was adapted from (Alkasasbeh & Amawi, 2024). The indicators included availability of technological devices (TS1), internet accessibility (TS2), ease of technology use (TS3), perceived usefulness of technology in learning (TS4), and comfort in using technology (TS5). The Self-Efficacy (SE) construct was adapted from (Ladd et al., 2024). It consisted of four indicators: confidence in understanding learning materials (SE1), confidence in completing academic tasks (SE2), resilience in dealing with learning difficulties (SE3), and confidence in performing academic responsibilities (SE4). The

Learning Environment (LE) construct was adapted from (Aslan, 2023). It included lecturer support in learning activities (LE1), student-lecturer interaction (LE2), peer support (LE3), and engagement in learning activities (LE4). The Digital Literacy (DL) construct was adapted from (Koval et al., 2024). This construct comprised six indicators: ability to search for information using digital technologies (DL1), ability to evaluate the credibility of digital information (DL2), ability to use educational applications (DL3), ability to process digital information (DL4), understanding of ethical technology use (DL5), and ability to solve digital technical problems (DL6). The Pedagogical Readiness (PR) construct was adapted from (Liquido & Potane, 2023). It consisted of ten indicators: readiness to understand student characteristics (PR1), readiness to master learning theories (PR2), readiness to design instruction (PR3), readiness to select instructional methods (PR4), readiness to utilize instructional media (PR5), readiness to integrate technology into teaching (PR6), readiness to manage learning processes (PR7), readiness to conduct learning assessments (PR8), readiness to develop students' potential (PR9), and readiness to engage in instructional reflection (PR10).

Prior to the main study, the instrument underwent content validation by three experts representing the fields of educational technology, teacher education, and research methodology. A pilot test was subsequently conducted with respondents possessing characteristics similar to those of the target population to evaluate item clarity, indicator suitability, construct validity, and instrument reliability.

Research Procedure

The study was conducted through a series of systematic stages to ensure replicability. The first stage involved a comprehensive literature review to identify research gaps, develop the conceptual framework, and formulate research hypotheses based on relevant theories and empirical evidence. The second stage focused on instrument development through the adaptation of indicators from previous studies related to each research construct. The third stage involved expert validation and subsequent revision of the instrument based on expert feedback. The fourth stage consisted of pilot testing the instrument with respondents who shared characteristics similar to those of the target population. The pilot study results were used to evaluate the validity and reliability of the instrument before its application in the main study. The fifth stage involved determining the proportional sample size for each semester stratum and selecting respondents using stratified random sampling. The sixth stage consisted of data collection through both online and face-to-face questionnaire distribution to selected PGMI students.

Following data collection, a data screening process was conducted, including checks for response completeness, identification of missing values, detection of inconsistent responses, and data coding for statistical analysis. Only data that met the established requirements were included in subsequent analyses using SEM-PLS.

Data Analysis

Data analysis was performed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with the assistance of SmartPLS software. SEM-PLS was selected because it allows the simultaneous examination of complex relationships among multiple latent constructs, including both direct and indirect effects, while providing strong predictive capabilities for educational research involving numerous variables and indicators (Ferrante et al., 2022; Schuberth, 2020). Furthermore, SEM-PLS is particularly suitable for theory development and the examination of structural relationships among constructs. The analysis consisted of three major stages: measurement model evaluation, structural model evaluation, and model fit assessment.

Measurement model evaluation was conducted to ensure that the instrument satisfied validity and reliability requirements. Convergent validity was assessed using outer loadings, with recommended values exceeding 0.70, and Average Variance Extracted (AVE), with values greater than 0.50. Construct reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR), with minimum acceptable values of 0.70. Discriminant validity was subsequently assessed using the Fornell-Larcker Criterion and the Heterotrait-Monotrait Ratio (HTMT) to confirm adequate differentiation among constructs.

In addition to evaluating the measurement and structural models, the study assessed model fit using the Standardized Root Mean Square Residual (SRMR), d_ULS, d_G, Chi-square, and Normed Fit Index (NFI). Within PLS-SEM, SRMR is one of the most widely recommended model fit indices, with values below 0.08 indicating acceptable model fit. NFI was used to compare the estimated model with the null model, whereas d_ULS and d_G were employed to assess discrepancies between the proposed model and empirical data. These evaluations were conducted to ensure that the model demonstrated an adequate level of fit prior to hypothesis testing.

After the measurement model satisfied all required criteria, structural model evaluation was performed by examining the coefficient of determination (R^2) to assess the model's explanatory power and effect size (f^2) to determine the contribution of each exogenous construct to the endogenous construct. Hypothesis testing was conducted using a bootstrapping procedure with 5,000 subsamples to obtain t-statistics, path coefficients, and p-values. Hypotheses were accepted when the t-statistic exceeded 1.96 and the p-value was below 0.05 at the 5% significance level.

Accordingly, the SEM-PLS analysis not only explains the relationships among the investigated variables but also provides a comprehensive understanding of the mechanisms underlying the development of pedagogical readiness among preservice teachers in the digital era.

RESULTS

The results section presents the findings of the data analysis conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the direct and indirect relationships among the variables included in the research model. The analysis was carried out through the evaluation of both the measurement model (outer model) and the structural model (inner model) to

ensure the validity, reliability, and significance of the direct relationships among the constructs. Figure 1 illustrates the Conceptual Research Framework analyzed in this study.

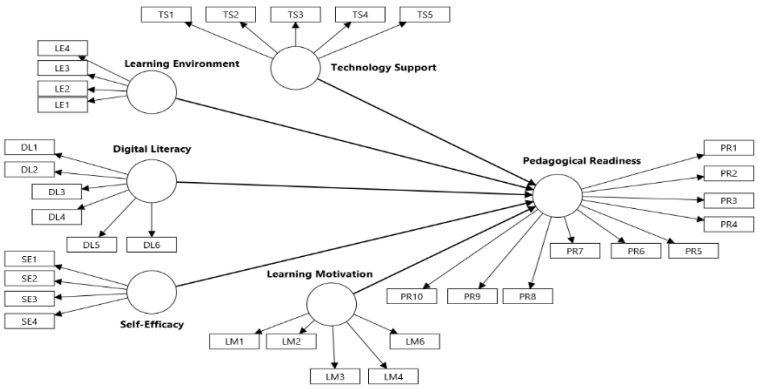

Figure 1. Conceptual Research Framework

Figure 1 illustrates the conceptual model examining the effects of four exogenous variables, namely Learning Motivation (LM), Technology Support (TS), Self-Efficacy (SE), and Digital Literacy (DL), as well as one mediating variable, Learning Environment (LE), on the Pedagogical Readiness (PR) of PGMI students. Each construct was measured using multiple reflective indicators. As shown in the figure, indicator LM4 from the Learning Motivation construct was removed to improve the psychometric quality, validity, reliability, and overall efficiency of the measurement model (Browne et al., 2018).

Measurement Model Evaluation (Outer Model)

The measurement model evaluation was conducted to ensure that each indicator validly and reliably represented its corresponding latent construct. The assessment focused on outer loading values, Average Variance Extracted (AVE), and discriminant validity using the Heterotrait-Monotrait Ratio (HTMT) criterion. The results of the outer loading analysis for each indicator are presented in Table 1. This presentation aims to demonstrate the strength of each indicator's contribution to its respective construct.

Table 1. Outer Loading Values.

	Digital Literacy	Learning Environment	Learning Motivation	Pedagogical Readiness	Self-Efficacy	Technology Support
DL1	0.727					
DL2	0.840					
DL3	0.837					
DL4	0.845					
DL5	0.841					
DL6	0.837					
LE1		0.837				
LE2		0.831				
LE3		0.847				

LE4	0.882				
LM1		0.796			
LM2		0.861			
LM3		0.877			
LM4		0.868			
LM6		0.848			
PR1			0.823		
PR2			0.864		
PR3			0.865		
PR4			0.854		
PR5			0.883		
PR6			0.855		
PR7			0.894		
PR8			0.910		
PR9			0.888		
PR10			0.865		
SE1				0.873	
SE2				0.903	
SE3				0.868	
SE4				0.863	
TS1					0.836
TS2					0.866
TS3					0.888
TS4					0.872
TS5					0.775

Based on the results of the measurement model evaluation presented in Table 1, all indicators associated with the constructs of Digital Literacy, Learning Environment, Learning Motivation, Pedagogical Readiness, Self-Efficacy, and Technology Support demonstrated outer loading values that met the recommended criteria for convergent validity in PLS-SEM. These findings indicate that each indicator adequately reflects its corresponding latent construct, confirming that all measurement items are valid and suitable for retention in subsequent analyses. Therefore, the measurement model satisfies the requirements for convergent validity and can be further evaluated in terms of reliability and structural model assessment. In addition to examining the strength of indicator loadings, it is also necessary to assess the extent to which each construct explains the variance of its indicators. Accordingly, the Average Variance Extracted (AVE) values are presented in Table 2 as the basis for evaluating convergent validity at the construct level.

Table 2. Average Variance Extracted (AVE) Values.

	AVE
Digital Literacy	0.676
Learning Environment	0.722
Learning Motivation	0.723
Pedagogical Readiness	0.758
Self-Efficacy	0.769
Technology Support	0.719

Based on the results presented in Table 2, all research constructs achieved Average Variance Extracted (AVE) values exceeding the minimum threshold recommended in PLS-SEM. These findings indicate that each construct adequately explains the variance of its respective indicators, thereby satisfying the criterion for convergent validity. Consequently, the indicators demonstrate a strong representation of the constructs they are intended to measure, confirming that the measurement model possesses sufficient quality to proceed with reliability assessment and structural model evaluation. In addition to convergent validity, discriminant validity was also assessed to ensure the conceptual distinctiveness of the constructs included in the study. In this research, discriminant validity was evaluated using the Heterotrait-Monotrait Ratio (HTMT) criterion, as presented in Table 3.

Table 3. Heterotrait-Monotrait Ratio (HTMT) Values.

	DL	LE	LM	PR	SE	TS
Digital Literacy						
Learning Environment	0.681					
Learning Motivation	0.591	0.839				
Pedagogical Readiness	0.716	0.857	0.865			
Self-Efficacy	0.744	0.78	0.898	0.856		
Technology Support	0.743	0.802	0.765	0.816	0.827	

Based on the results of the Heterotrait-Monotrait Ratio (HTMT) analysis presented in Table 3, all inter-construct correlation values were below the recommended maximum threshold of 0.90. These findings indicate that each construct in the study demonstrates sufficient distinctiveness from the others, thereby satisfying the criterion for discriminant validity. Accordingly, the constructs of Digital Literacy, Learning Environment, Learning Motivation, Pedagogical Readiness, Self-Efficacy, and Technology Support can be considered empirically distinct and free from measurement overlap. This result confirms that the measurement model possesses adequate discriminant validity and is capable of effectively differentiating among the constructs under investigation. Therefore, the model is deemed appropriate for further analysis of the structural relationships.

Model Fit Evaluation

The overall model fit was assessed using several goodness-of-fit indices, which are summarized in Table 4. This evaluation was conducted to determine the extent to which the proposed model adequately represents the empirical data. Assessing model fit constitutes an essential step prior to interpreting the structural relationships among the constructs. Through these fit indices, researchers can verify that the model demonstrates an acceptable level of fit from both statistical and theoretical perspectives.

Table 4. Model Fit Indices.

	Saturated model	Estimated model
SRMR	0.056	0.056
d_ULS	1.882	1.882
d_G	1.764	1.764
Chi-square	3586.681	3586.681
NFI	0.762	0.762

Based on the model fit assessment presented in Table 4, the proposed research model demonstrates a satisfactory level of fit with the empirical data. The Standardized Root Mean Square Residual (SRMR) value is below the recommended threshold of 0.08, indicating that the discrepancy between the observed correlation matrix and the model-implied correlation matrix is relatively small. Furthermore, the Normed Fit Index (NFI) suggests that the model exhibits an acceptable level of fit to the data. The d_ULS and d_G values were also examined as measures of model discrepancy, with lower values indicating a better correspondence between the proposed model and the empirical data. Overall, the model fit results indicate that the structural model meets the recommended criteria and is suitable for subsequent analyses, including the examination of structural relationships and hypothesis testing.

Structural Model Evaluation (Inner Model)

The structural model evaluation was conducted to assess the direction, strength, and significance of the relationships among the latent variables included in the research model. This stage was performed after the measurement model had satisfied all validity and reliability requirements. Structural analysis provides the empirical basis for testing the hypotheses formulated in the conceptual framework. The results of the path coefficient estimation are presented in Table 5, which serves as the basis for evaluating the causal relationships among the study variables.

Table 5. Path Coefficients.

	β	STDEV	T	P
Digital Literacy -> Pedagogical Readiness	0.132	0.044	3.011	0.001
Learning Environment -> Pedagogical Readiness	0.247	0.056	4.392	0.000
Learning Motivation -> Pedagogical Readiness	0.301	0.062	4.839	0.000
Self-Efficacy -> Pedagogical Readiness	0.176	0.051	3.466	0.000
Technology Support -> Pedagogical Readiness	0.159	0.048	3.304	0.000

Based on the path coefficient results presented in Table 5, the relationship between Digital Literacy and Pedagogical Readiness yielded a path coefficient of 0.132, with a t-statistic of 3.011 and a p-value of 0.001. The relationship between Learning Environment and Pedagogical Readiness demonstrated a path coefficient of 0.247, with a t-statistic of 4.392 and a p-value of 0.000. Furthermore, the relationship between Learning Motivation and Pedagogical Readiness showed a path coefficient of 0.301, with a t-statistic of 4.839 and a p-value of 0.000. The relationship between Self-Efficacy and Pedagogical Readiness produced a path coefficient of 0.176, with a t-statistic of 3.466 and a p-value of 0.000. Meanwhile, the relationship between Technology Support and Pedagogical Readiness yielded a path coefficient of 0.159, with a t-statistic of 3.304 and a p-value of 0.000. All hypothesized relationships exhibited positive effects, with t-statistics exceeding 1.96 and p-values below 0.05, indicating that all proposed paths are statistically significant. These findings provide empirical support for the hypothesized positive influence of Digital Literacy, Learning Environment, Learning Motivation, Self-Efficacy, and Technology Support on students' Pedagogical Readiness. To provide a more comprehensive understanding of the model's explanatory power regarding the dependent variable, the coefficient of determination (R^2) and effect size (f^2) values are presented in Table 6. These measures serve as additional criteria for evaluating the predictive capability and overall strength of the structural model.

Table 6. Effect Size (f^2) and Coefficient of Determination (R^2).

	F-Square	R-Square
Digital Literacy	0.038	-
Learning Environment	0.102	-
Learning Motivation	0.115	-
Pedagogical Readiness	-	0.787
Self-Efficacy	0.036	-
Technology Support	0.041	-

Based on the results presented in Table 6, the R-square (R^2) value for the Pedagogical Readiness construct is 0.787, indicating that Digital Literacy, Learning Environment, Learning Motivation, Self-Efficacy, and Technology Support collectively explain 78.7% of the variance in Pedagogical Readiness. The remaining 21.3% of the variance is attributable to other factors not included in the present research model. This result demonstrates that the proposed model possesses substantial explanatory power in predicting students' pedagogical readiness.

Furthermore, the effect size (f^2) analysis revealed that Digital Literacy contributed an effect size of 0.038, Learning Environment contributed 0.102, Learning Motivation contributed 0.115, Self-Efficacy contributed 0.036, and Technology Support contributed 0.041 to Pedagogical Readiness. These values represent the relative contribution of each exogenous construct to changes in the R-square value of the Pedagogical Readiness construct within the tested structural model. The findings indicate that Learning Motivation provides the

largest contribution to the explanatory power of the model, followed by Learning Environment, Technology Support, Digital Literacy, and Self-Efficacy. Overall, the effect size results confirm that each exogenous variable contributes meaningfully to explaining variations in students' pedagogical readiness.

DISCUSSION

This study examined the effects of self-efficacy, technology support, learning motivation, learning environment, and digital literacy on the pedagogical readiness of students enrolled in the Primary Islamic Teacher Education (PGMI) program. The findings indicate that all proposed hypotheses were supported, suggesting that pedagogical readiness is shaped by a combination of psychological, environmental, and technological factors. Furthermore, the structural model demonstrated substantial explanatory power, indicating that the selected constructs are highly relevant in explaining preservice teachers' readiness to meet the demands of 21st-century education. These findings support the view that pedagogical readiness is a multidimensional construct that develops through the interaction of individual characteristics, learning experiences, and technological resources available within the educational environment.

The results revealed that self-efficacy has a positive and significant effect on pedagogical readiness. This finding suggests that students who possess stronger beliefs in their own capabilities are more prepared to perform pedagogical tasks, including lesson planning, classroom management, instructional decision-making, and learning assessment. This result is consistent with Social Cognitive Theory, which emphasizes that individuals' beliefs about their capabilities influence their motivation, persistence, and performance (Abdullah et al., 2020). Students with high levels of self-efficacy tend to approach challenges with greater confidence, persist when facing difficulties, and actively seek opportunities to improve their professional competencies. The finding is also consistent with previous studies conducted by (Fan, 2022), (Han & Wang, 2021), (Zheng et al., 2022), which reported significant relationships between self-efficacy, pedagogical competence, and teaching effectiveness. In the context of PGMI students, self-efficacy is particularly important because future elementary school teachers are expected to address diverse student characteristics and complex instructional challenges. Therefore, strengthening students' confidence through teaching practice, microteaching activities, reflective learning, and field experiences may contribute substantially to improving their pedagogical readiness.

The study also found that technology support positively influences pedagogical readiness. This finding indicates that access to technological devices, internet connectivity, ease of technology use, perceived usefulness, and comfort in utilizing digital tools significantly contribute to students' preparedness for professional teaching practice. In contemporary educational settings, technology is no longer an optional component but an integral element of effective pedagogy. Adequate technology support enables students to access diverse learning resources, experiment with innovative instructional strategies, and develop competencies required for technology-enhanced learning environments.

This result aligns with the findings of (Rapanta et al., 2021), who emphasized the inseparable relationship between technology integration and pedagogical practice, as well as (Amemasor et al., 2025), who highlighted the importance of institutional digital readiness in supporting educational innovation. For PGMI students, technology support not only facilitates academic learning but also prepares them to integrate digital tools effectively into future classroom practices, thereby enhancing their pedagogical readiness for the digital era.

Learning motivation emerged as the strongest predictor of pedagogical readiness among all variables examined in this study. This finding demonstrates that students who exhibit higher levels of enthusiasm for learning, stronger achievement orientation, greater persistence, and deeper engagement with academic content are more likely to develop stronger pedagogical readiness. Motivation functions as an internal driving force that encourages individuals to invest effort in acquiring knowledge, developing skills, and pursuing professional growth. The finding supports previous research by (Shrol & Poliukhovych, 2021), which identified motivation as a key determinant of academic achievement, professional competence, and readiness for educational innovation. Highly motivated students are more willing to seek learning opportunities, adapt to new educational demands, and continuously improve their teaching competencies. Consequently, higher education institutions should prioritize instructional strategies that foster intrinsic motivation, including student-centered learning approaches, authentic learning experiences, and opportunities to apply theoretical knowledge in practical contexts.

The results further demonstrated that learning environment has a positive and significant effect on pedagogical readiness. This finding highlights the importance of lecturer support, academic interactions, peer collaboration, and active participation in learning activities for the development of pedagogical competence. A supportive learning environment creates opportunities for students to engage in meaningful learning experiences, receive constructive feedback, and develop professional skills through collaboration and reflection. These findings are consistent with the work of (Aslan, 2023; Madanat et al., 2024), who reported that positive learning environments contribute significantly to learning effectiveness and professional readiness. From a social constructivist perspective, knowledge is developed through social interaction and shared experiences. Therefore, supportive academic environments provide an important foundation for developing pedagogical understanding and professional identity. For PGMI students, positive interactions with lecturers and peers facilitate the acquisition of pedagogical knowledge and teaching skills that are essential for future professional practice.

The findings also revealed that digital literacy positively affects pedagogical readiness. This result suggests that students who possess stronger competencies in accessing, evaluating, processing, and utilizing digital information are better prepared to perform pedagogical tasks in technology-rich educational environments. Digital literacy has become a fundamental competency for teachers because educational technologies increasingly influence how teaching and learning activities are designed and implemented. The finding

is consistent with previous studies conducted by (Hadad et al., 2023; Su et al., 2023), which emphasized the importance of digital literacy for professional competence and technology integration in education. Students with higher levels of digital literacy are more capable of selecting appropriate digital resources, designing engaging learning experiences, and adapting to emerging educational technologies. Consequently, digital literacy should be viewed not only as a technical skill but also as a critical component of pedagogical competence that supports preservice teachers' readiness for contemporary educational practice.

The coefficient of determination indicates that the research model possesses strong explanatory power regarding the pedagogical readiness of PGMI students. The findings suggest that self-efficacy, technology support, learning motivation, learning environment, and digital literacy collectively explain a substantial proportion of the variance in students' pedagogical readiness. In other words, prospective teachers' pedagogical readiness is not shaped by a single factor but rather results from the interaction of various psychological, environmental, and technological factors that complement one another.

These findings reinforce the view that pedagogical readiness is a multidimensional construct that develops through a combination of self-confidence, learning motivation, supportive learning environments, technological support, and the ability to utilize digital technologies effectively. In the context of teacher education, students who demonstrate high learning motivation, experience a conducive learning environment, possess confidence in their abilities, receive adequate technological support, and exhibit strong digital literacy are more likely to be prepared to meet the professional demands of teaching in the digital era. Therefore, efforts to enhance pedagogical readiness should not rely on a partial approach focusing on only one aspect but should instead adopt an integrated development strategy.

From a technology education perspective, these findings indicate that the successful preparation of future teachers is determined not only by the mastery of pedagogical knowledge but also by individuals' readiness to utilize technology and adapt to changing learning environments. The results support previous studies emphasizing the importance of integrating personal, environmental, and technological factors in developing the professional competencies of prospective teachers (Leijen et al., 2024; Rapanta et al., 2021). Thus, the model developed in this study provides empirical evidence that the pedagogical readiness of PGMI students can be comprehensively explained through the combined influence of self-efficacy, technology support, learning motivation, learning environment, and digital literacy.

From a theoretical perspective, this study contributes to the literature by integrating psychological factors (self-efficacy and learning motivation), environmental factors (learning environment), and technological factors (technology support and digital literacy) into a comprehensive model of pedagogical readiness. The findings provide empirical evidence that pedagogical readiness emerges through multidimensional interactions between individual characteristics and contextual learning factors. This contribution extends existing

teacher readiness research, which has often focused primarily on academic competence, by highlighting the combined influence of psychological, environmental, and technological dimensions. In addition, the study contributes to the limited body of research concerning pedagogical readiness among students enrolled in Islamic teacher education programs, particularly within the context of Indonesian Islamic higher education institutions.

Practically, the findings suggest that universities should adopt integrated strategies to strengthen students' pedagogical readiness. Such strategies include enhancing self-efficacy through teaching practice and field experiences, fostering learning motivation through engaging instructional approaches, providing adequate technological infrastructure and support services, integrating digital literacy into teacher education curricula, and creating collaborative learning environments that encourage active participation and professional growth. These efforts are essential to ensure that future teachers possess the pedagogical competencies required to address the challenges of modern education effectively. Nevertheless, this study has several limitations. The research was conducted within a single institutional context, which may limit the generalizability of the findings. Additionally, the use of self-reported survey data may introduce response bias. Finally, the model examined only direct effects among variables and did not investigate potential mediating or moderating mechanisms. Future studies are therefore encouraged to explore more complex structural relationships and include broader educational contexts to provide a deeper understanding of the factors influencing pedagogical readiness among preservice teachers.

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that self-efficacy, technology support, learning motivation, learning environment, and digital literacy have positive effects on the pedagogical readiness of students in the Primary Islamic Teacher Education (PGMI) Program at IAIN Curup. These findings indicate that preservice teachers' pedagogical readiness is the result of the interaction between psychological factors, learning environment conditions, and the ability to utilize digital technologies effectively. Among the factors examined, learning motivation made the strongest contribution, followed by learning environment, self-efficacy, technology support, and digital literacy. Furthermore, the research model exhibited a high level of explanatory power in accounting for variations in students' pedagogical readiness, indicating that these five variables are important determinants in the development of preservice teachers' pedagogical readiness.

Based on the findings, several recommendations can be proposed. First, the PGMI program should strengthen students' learning motivation through more interactive, contextual, and experience-based learning strategies. Second, lecturers and educational institutions should create a more collaborative and supportive learning environment that encourages active student participation in the learning process. Third, efforts to enhance students' self-efficacy should be implemented through scaffolded assignments, constructive feedback, and more frequent teaching practice experiences. Fourth, improving technology support should

become a priority through the provision of adequate digital facilities and training in the use of educational technologies. Fifth, the development of students' digital literacy should be enhanced through the integration of technology across all courses.

FUTURE RESEARCH

Future studies are recommended to involve larger samples drawn from various higher education institutions, employ longitudinal research designs, and develop models that incorporate mediating or moderating variables such as Technological Pedagogical Content Knowledge (TPACK), academic engagement, learning autonomy, or artificial intelligence literacy. Such approaches are expected to provide a more comprehensive understanding of the factors that shape preservice teachers' pedagogical readiness in the digital era.

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