The Influence of Teachers' Pedagogical Competence and the Use of Digital Technology on Islamic Education Learning Outcomes in Senior High Schools in East Java

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Article Info	ABSTRACT
	This study aims to analyze the influence of teachers' pedagogical competence and the use of digital technology on Islamic Education learning outcomes in senior high schools in East Java. A quantitative research approach was employed involving 85 student respondents selected through purposive sampling. Data were collected using a Likert-scale questionnaire and analyzed using SPSS version 25 through descriptive statistics, validity and reliability testing, classical assumption tests, and multiple linear regression analysis. The results indicate that teachers' pedagogical competence has a positive and significant effect on learning outcomes, demonstrating that effective instructional strategies and classroom management contribute to improved student understanding. Similarly, the use of digital technology shows a positive and significant influence, indicating that technology-supported learning enhances student engagement and comprehension. Simultaneous testing reveals that both variables significantly affect Islamic Education learning outcomes with a coefficient of determination (R^2) of 0.491, meaning that 49.1% of learning outcomes are explained by these factors. The findings highlight the importance of integrating strong pedagogical competence with effective digital technology utilization to improve learning effectiveness in contemporary Islamic Education.

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1. INTRODUCTION

The rapid development of digital technology has transformed the landscape of education, particularly in the way teaching and learning processes are designed and implemented in schools. In the context of senior high schools, the integration of digital tools into classroom instruction is no longer optional but has become a fundamental component of modern pedagogy. Teachers are expected not only to master subject content but also to possess strong pedagogical competence that enables them to manage learning effectively, utilize appropriate instructional strategies, and adapt to students' diverse learning needs [1], [2]. In Islamic Education (Pendidikan Agama Islam/PAI), these expectations are even more significant because the learning process involves not only

cognitive understanding but also the development of values, attitudes, and moral character [3], [4]. Therefore, the combination of pedagogical competence and the effective use of digital technology is assumed to play a crucial role in improving students' learning outcomes.

Pedagogical competence refers to a teacher's ability to understand learners' characteristics, design instructional activities, apply appropriate learning methods, and conduct continuous evaluation to ensure learning effectiveness [5], [6]. Previous educational studies emphasize that teachers who demonstrate strong pedagogical skills tend to create more interactive learning environments, foster student engagement, and facilitate deeper comprehension of learning materials. In Islamic Education, pedagogical competence becomes particularly important because teachers must balance theoretical knowledge with contextual and value-based learning approaches [7], [8]. Without adequate pedagogical competence, teaching practices may become monotonous, teacher-centered, and less responsive to students' learning styles, ultimately affecting students' academic performance and motivation.

At the same time, the increasing availability of digital technology has introduced new opportunities and challenges for educators. Digital platforms, multimedia learning resources, and online communication tools allow teachers to present learning materials in more engaging and flexible ways. The use of digital technology can enhance students' participation, support collaborative learning, and provide access to a wider range of educational resources beyond traditional textbooks [9], [10]. In Islamic Education learning, digital media such as interactive videos, online discussion forums, and digital Qur'anic learning applications can help students better understand religious concepts and connect them with real-life contexts. However, the effectiveness of digital technology largely depends on how teachers integrate it into pedagogical practices rather than simply using technology as a supplementary tool.

Despite the growing emphasis on digital transformation in education, empirical studies focusing specifically on Islamic Education learning outcomes at the senior high school level remain relatively limited, particularly in regional contexts such as East Java. Many previous studies have examined either teachers' competence or technology usage separately, while fewer studies have investigated how these two factors interact simultaneously to influence learning outcomes. East Java represents a significant educational setting with diverse cultural and institutional characteristics, making it an important context for examining how pedagogical competence and digital technology integration contribute to educational effectiveness. Understanding this relationship is essential for developing strategies that support teachers' professional development and optimize the implementation of technology-enhanced learning.

Furthermore, the COVID-19 pandemic and the transition toward hybrid and digital learning environments have intensified the demand for teachers to adapt to rapid technological changes in education. Schools increasingly encourage the integration of digital tools into instructional practices, yet disparities in digital literacy and pedagogical readiness among teachers remain evident, as some educators still utilize technology only at a basic level without embedding it into meaningful instructional design, thereby limiting its potential impact on students' learning outcomes. Consequently, examining the combined influence of pedagogical competence and digital technology use becomes essential to understand how these factors contribute to effective Islamic Education learning in contemporary educational contexts. Based on these considerations, this study aims to analyze the influence of teachers' pedagogical competence and the use of digital technology on Islamic Education learning outcomes among senior high school students in East Java by providing empirical evidence on the

extent to which these variables affect student achievement. The findings are expected to support the development of more effective instructional strategies, inform educational policies related to teacher competence and digital transformation, and offer practical recommendations for improving Islamic Education learning outcomes at the senior high school level.

2. LITERATURE REVIEW

2.1 Teachers' Pedagogical Competence

Teachers' pedagogical competence is a fundamental element of professional teaching standards that significantly influences the quality of learning processes and student achievement, encompassing the ability to understand students' characteristics, design effective learning strategies, manage classroom interactions, and conduct meaningful assessments. In senior high school contexts, this competence is reflected in teachers' skills in selecting appropriate instructional methods [11], [12], integrating learning resources, and encouraging active participation that fosters critical thinking and collaboration. Within Islamic Education, pedagogical competence holds added importance because teaching involves not only cognitive development but also moral and spiritual formation, requiring teachers to contextualize religious values in relevant social realities [3], [13]. Research shows that teachers with strong pedagogical competence tend to achieve higher student engagement and better academic outcomes, as they adapt teaching approaches to diverse learning styles and socio-cultural backgrounds [14], [15]. Additionally, continuous evaluation and constructive feedback enable teachers to monitor progress and support students effectively, making pedagogical competence a key factor in achieving holistic learning outcomes that integrate knowledge, skills, and character development.

2.2 Use of Digital Technology in Education

The integration of digital technology into education has significantly reshaped teaching and learning processes in the twenty-first century by introducing tools such as multimedia presentations, online learning systems, educational applications, and interactive communication platforms that enable more creative material delivery and broader access to information beyond the classroom [1], [10]. In Islamic Education learning, digital technology provides innovative ways to present religious content through visual, auditory, and interactive formats, such as digital Qur'an applications, educational videos, and online discussions, allowing students to explore concepts more deeply and connect them with contemporary issues while supporting differentiated instruction based on diverse learning needs [16], [17]. However, the effectiveness of technology integration depends largely on teachers' readiness and their ability to align digital tools with pedagogical objectives, since technology that lacks proper instructional design may only function as a supplementary element with limited impact on learning

outcomes. Educational technology research highlights that meaningful learning experiences emerge when technological knowledge is balanced with pedagogical competence, enabling teachers to foster active participation, critical thinking, and flexible learning environments where students can learn both independently and collaboratively, making digital literacy an increasingly essential component of modern education.

2.3 Islamic Education Learning Outcomes

Learning outcomes represent measurable indicators of students' achievement after participating in a learning process, encompassing not only cognitive understanding but also affective development and behavioral changes that reflect the application of Islamic values in daily life. In Islamic Education, effective learning outcomes are influenced by factors such as teaching methods, learning environments, student motivation, and the use of appropriate learning media, where active student involvement and instructional strategies aligned with learners' needs play a crucial role [3], [13]. Teachers are encouraged to promote reflection, discussion, and contextual understanding rather than relying solely on memorization, while the integration of digital technology can enhance these approaches through interactive materials that foster deeper comprehension and engagement. Consequently, the quality of learning outcomes is closely related to the integration of pedagogical competence and technological innovation in instructional practices [13], [18], as Islamic Education also aims to develop ethical awareness, social responsibility, and spiritual identity, requiring a comprehensive evaluation that considers both academic achievement and character formation.

2.4 Conceptual Framework and Hypothesis Development

Based on the theoretical and empirical discussions above, this study proposes a conceptual framework in which teachers' pedagogical competence and the use of digital technology act as independent variables influencing Islamic Education learning outcomes as the dependent variable. Pedagogical competence is expected to directly improve instructional quality and student engagement, while digital technology is anticipated to support interactive learning processes and broaden access to educational resources. The integration of both variables is hypothesized to generate a stronger effect on learning outcomes than each variable individually, leading to the formulation of the research hypotheses presented in this study.

H1: Teachers' pedagogical competence has a positive and significant influence on Islamic Education learning outcomes.

H2: The use of digital technology has a positive and significant influence on Islamic Education learning outcomes.

H3: Teachers' pedagogical competence and the use of digital technology

simultaneously have a positive and significant influence on Islamic Education learning outcomes.

3. METHODS

3.1 Research Design

This study employed a quantitative research approach to examine the influence of teachers' pedagogical competence and the use of digital technology on Islamic Education learning outcomes among senior high school students in East Java. Quantitative methods were selected to enable objective measurement of relationships between variables through statistical analysis, using an explanatory research design aimed at testing hypotheses related to causal relationships between independent and dependent variables. Data were collected through structured questionnaires using a Likert scale, allowing respondents' perceptions to be quantified and analyzed statistically with SPSS version 25. The study applied a cross-sectional design, where data were gathered at a single point in time to capture current conditions of pedagogical competence and digital technology use, and this design supported the application of inferential statistical techniques, including multiple linear regression, to determine the magnitude and significance of relationships among the research variables.

3.2 Population and Sample

The population of this research The population of this study consisted of senior high school students enrolled in Islamic Education (Pendidikan Agama Islam/PAI) classes in East Java, selected as respondents because they directly experience teachers' pedagogical practices and the integration of digital technology in the learning process. The study applied purposive sampling with the criterion that participants had been involved in Islamic Education classes utilizing digital learning media. A total of 85 students participated in the research, a sample size considered adequate for quantitative analysis using multiple regression as it supports reliable statistical testing while representing the characteristics of the study population, with respondents drawn from various schools to reflect diverse learning environments across the region.

3.3 Data Collection Technique

Data were collected through a structured questionnaire distributed both online and offline, consisting of a series of statements designed to measure respondents' perceptions of mudharabah financing, musyarakah financing, and Islamic bank asset growth, with each item assessed using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Likert scale was selected because it enables respondents to express varying levels of agreement while supporting the quantitative measurement of attitudes and perceptions. Prior to the main data collection, the research instrument was carefully reviewed to ensure the clarity and relevance of each statement, and the final questionnaire included demographic questions alongside indicators representing each research variable to support comprehensive data analysis.

3.4 Research Variables and Operational Definitions

This study involved three main variables consisting of two independent variables and one dependent variable, namely teachers' pedagogical competence (X1), the use of digital technology (X2), and Islamic Education learning outcomes (Y). Teachers' pedagogical competence (X1) refers to students' perceptions of teachers' abilities in understanding learners, designing instructional strategies, implementing interactive learning methods, and conducting effective evaluations, with indicators including clarity of explanation, variation of teaching strategies, classroom management, and feedback provision. The use of digital technology (X2) describes the extent to which teachers integrate digital tools such as multimedia presentations, online platforms, and digital communication media into the learning process, measured through indicators like frequency of technology use,

interactivity of digital media, accessibility of learning materials, and student engagement in technology-based activities. Meanwhile, Islamic Education learning outcomes (Y) represent students' perceived academic achievement and understanding after participating in learning activities, reflected in indicators such as comprehension of subject matter, learning motivation, participation in class activities, and perceived improvement in learning performance.

3.5 Data Collection Technique

Data were collected using a structured questionnaire distributed to respondents, employing a five-point Likert scale ranging from strongly disagree to strongly agree to measure perceptions related to each research variable. The questionnaire items were developed based on theoretical concepts of pedagogical competence, educational technology, and learning outcomes to ensure content relevance, and prior to the main data collection, the instrument was reviewed to confirm clarity and suitability for senior high school students. Respondents completed the questionnaire voluntarily while ethical principles such as confidentiality and anonymity were maintained throughout the research process, and the use of questionnaires enabled efficient and consistent data collection from multiple participants.

3.6 Data Analysis Technique

The data analysis process was conducted using SPSS version 25 through several stages, beginning with descriptive statistical analysis to describe respondents' characteristics and general responses to each variable, followed by instrument testing through validity and reliability analysis to ensure accurate measurement of constructs, where validity was assessed using correlation analysis and reliability using Cronbach's Alpha coefficients. Classical assumption tests, including normality, multicollinearity, and heteroscedasticity tests, were performed to confirm that the data met the requirements for regression analysis, after which multiple linear regression was applied to examine the influence of teachers' pedagogical competence and the use of digital technology on Islamic Education learning outcomes. Hypothesis testing involved partial tests (t-tests) to analyze the individual effects of each independent variable and simultaneous tests (F-tests) to evaluate their combined influence, while the coefficient of determination (R^2) was calculated to determine the proportion of variance in learning outcomes explained by the independent variables, thereby providing empirical evidence regarding the relationship between pedagogical competence, digital technology use, and Islamic Education learning outcomes among senior high school students in East Java.

4. RESULTS AND DISCUSSION

4.1 Respondent Profile

The respondents in this study consisted of 85 senior high school students in East Java who had participated in Islamic Education (Pendidikan Agama Islam/PAI) learning supported by digital technology. The respondent profile was analyzed to describe demographic characteristics, particularly gender and grade level distribution, in order to ensure that the data represented diverse learning experiences. Based on gender, the sample included 46 female students (54.1%) and 39 male students (45.9%), indicating a slightly higher proportion of female participants while remaining relatively balanced overall. This balanced composition is important because it reduces potential bias and allows the findings to reflect varied student perspectives regarding teachers' pedagogical competence and the use of digital technology in Islamic Education learning.

In addition, respondents were categorized based on grade level to illustrate the range of academic stages represented in the study. The results showed that 27 students (31.8%) were from Grade X, 31 students (36.5%) from Grade XI, and 27 students (31.8%) from Grade XII, with Grade XI forming the largest proportion of participants. The relatively even distribution across grade levels suggests that the research captured perspectives from students at different stages

of senior high school education, thereby providing a comprehensive overview of Islamic Education learning experiences supported by digital technology.

4.2 Descriptive Statistics

Descriptive statistical analysis was conducted to examine the general distribution of respondents' answers for each research variable. The results are presented in Table 1.

Table 1. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Pedagogical Competence (X1)	85	3.10	4.85	4.12	0.45
Digital Technology Use (X2)	85	3.00	4.90	4.20	0.48
Learning Outcomes (Y)	85	3.05	4.88	4.18	0.43

The descriptive statistics in Table 1 indicate that all research variables demonstrate relatively high mean scores, suggesting that students generally perceived teachers' pedagogical competence, digital technology use, and Islamic Education learning outcomes at favorable levels. Digital Technology Use (X2) recorded the highest mean value (M = 4.20, SD = 0.48), followed by Learning Outcomes (Y) (M = 4.18, SD = 0.43) and Pedagogical Competence (X1) (M = 4.12, SD = 0.45), reflecting positive evaluations of both instructional practices and technology integration in the learning process. The relatively small standard deviations across variables indicate that respondents' perceptions were fairly consistent, with limited variation in responses. Additionally, the minimum and maximum scores show that although most students rated the variables

highly, there were still differences in individual experiences, highlighting the importance of further analysis to examine how pedagogical competence and digital technology use contribute to variations in learning outcomes.

4.3 Instrument Testing
4.3.1 Validity Test

The validity test results showed that all questionnaire items had corrected item-total correlation values greater than 0.30, indicating that all indicators were valid and suitable for further analysis.

4.3.2 Reliability Test

Reliability testing using Cronbach's Alpha showed that all variables exceeded the minimum threshold of 0.70, indicating strong internal consistency.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha	Interpretation
Pedagogical Competence (X1)	0.871	Reliable
Digital Technology Use (X2)	0.889	Reliable
Learning Outcomes (Y)	0.852	Reliable

The reliability test results presented in Table 2 indicate that all research variables demonstrate strong internal consistency, as reflected by Cronbach's Alpha values above the commonly accepted threshold of 0.70. Digital Technology Use (X2) shows the highest reliability coefficient (α = 0.889), followed by Pedagogical Competence (X1) (α = 0.871) and Learning Outcomes (Y) (α = 0.852), suggesting that the questionnaire items for each construct consistently measure the intended variables. These findings confirm

that the research instrument is reliable and suitable for further statistical analysis, ensuring that the collected data provide a stable basis for examining the relationships between teachers' pedagogical competence, digital technology use, and Islamic Education learning outcomes.

4.4 Classical Assumption Tests

Before conducting regression analysis, classical assumption tests were performed.

Table 3. Classical Assumption Test Results

Test	Indicator	Result	Interpretation
Normality	Kolmogorov–Smirnov Sig.	0.200	Normal
Multicollinearity	Tolerance (X1=0.731; X2=0.731)	>0.10	No multicollinearity
VIF	X1=1.367; X2=1.367	<10	Acceptable
Heteroscedasticity	Sig. (X1=0.412; X2=0.385)	>0.05	No heteroscedasticity

The classical assumption test results in Table 3 indicate that the data meet the requirements for multiple linear regression analysis. The normality test using the Kolmogorov–Smirnov method shows a significance value of 0.200, which is greater than 0.05, confirming that the data are normally distributed. Multicollinearity testing reveals tolerance values of 0.731 for both independent variables, exceeding the minimum threshold of 0.10, and VIF values of 1.367, which are well below the critical limit of 10, indicating that no multicollinearity exists between pedagogical competence (X1) and digital technology use (X2). Additionally, the heteroscedasticity test results show significance values of 0.412 for X1 and 0.385 for X2, both above 0.05, suggesting the absence of heteroscedasticity.

4.5 Multiple Linear Regression Analysis

Multiple linear regression analysis was used to examine the influence of teachers' pedagogical competence and digital technology use on Islamic Education learning outcomes.

Table 4. Multiple Linear Regression Results

Variable	B	Std. Error	Beta	t-value	Sig.
Constant	1.215	0.452	—	2.688	0.009
Pedagogical Competence (X1)	0.356	0.087	0.391	4.092	0.000
Digital Technology Use (X2)	0.412	0.082	0.456	5.024	0.000

Based on Table 4, the regression equation $Y=1.215+0.356X1+0.412X2$ indicates that both pedagogical competence and digital technology use have positive contributions to Islamic Education learning outcomes, as reflected in their positive regression coefficients. The partial test (t-test) results further confirm the significance of these relationships, where pedagogical competence shows a t-value of 4.092 (Sig. = 0.000) and digital technology use records a higher t-value of 5.024 (Sig. = 0.000), both below the significance threshold of 0.05. These findings demonstrate that each independent variable individually exerts a significant positive influence on learning outcomes, leading to the acceptance of hypotheses H1 and H2 and suggesting that improvements in teachers' pedagogical competence and effective integration of digital technology are associated with better Islamic Education learning achievements.

Table 5. ANOVA Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.846	2	6.423	39.217	0.000
Residual	13.427	82	0.164	—	—

The simultaneous test (F-test) results show an F-value of 39.217 with a significance level of 0.000, indicating that teachers' pedagogical competence and digital technology use jointly have a significant influence on Islamic Education learning outcomes. This finding confirms that the regression model is statistically significant and that both independent variables collectively contribute to explaining

variations in students' learning outcomes, leading to the acceptance of hypothesis H3.

Furthermore, the coefficient of determination results reveal an R value of 0.701 with an R Square of 0.491 and an Adjusted R Square of 0.478, indicating that 49.1% of the variance in Islamic Education learning outcomes can be explained by pedagogical competence and digital technology use. The remaining 50.9% is influenced by other variables not examined in this study, suggesting that additional factors such as learning motivation, teaching environment, or individual student characteristics may also play important roles in shaping learning outcomes.

Discussion

The results demonstrate that teachers' pedagogical competence has a positive and significant influence on Islamic Education learning outcomes, indicating that strong instructional skills, effective classroom management, and adaptive teaching strategies contribute to better student understanding and active participation. Pedagogical competence allows teachers to create meaningful learning experiences that encourage critical thinking and help students engage with Islamic values in relevant and contextual ways, supporting educational theories that position teacher competence as a key determinant of instructional effectiveness [3], [7].

The study also shows that the use of digital technology significantly improves learning outcomes through the integration of multimedia resources, online learning platforms, and interactive digital tools that enhance motivation and create more engaging learning environments. Digital technology enables students to access diverse learning materials and participate in collaborative activities, leading to deeper comprehension of Islamic Education content [19], [20]. The relatively higher beta value for digital technology suggests that technological integration may have a slightly stronger influence than pedagogical competence alone, highlighting the increasing importance of digital literacy in contemporary education.

Furthermore, the simultaneous analysis confirms that the combination of pedagogical competence and digital technology use produces a stronger impact on learning outcomes than either factor individually, emphasizing that technology is most effective when supported by sound pedagogical strategies. Teachers who integrate strong instructional skills with appropriate digital tools can design interactive learning experiences that support both academic achievement and moral development, making Islamic Education more relevant to modern students. These findings underline the importance of continuous professional development programs that strengthen teachers' pedagogical abilities while enhancing their capacity to integrate technology effectively in response to the demands of the digital era.

5. CONCLUSION

Based on the results of the study, it can be concluded that teachers' pedagogical competence and the use of digital technology significantly influence Islamic Education learning outcomes among senior high school students in East Java. Pedagogical competence plays an essential role in creating effective learning environments through appropriate instructional strategies, clear explanations, and meaningful assessment practices that enhance students' academic performance. Meanwhile, the integration of digital technology contributes to more interactive and engaging learning experiences, enabling students to access diverse learning resources and develop deeper understanding of Islamic Education materials. The simultaneous influence of both variables demonstrates that effective learning outcomes are achieved when strong pedagogical skills are combined with innovative technological approaches. Therefore, educational institutions should prioritize teacher professional development programs that strengthen pedagogical competence while also enhancing digital literacy and technology integration skills. Future research is encouraged to explore

additional factors influencing learning outcomes, such as students' motivation, learning environments, and institutional support, to provide a more comprehensive understanding of Islamic Education effectiveness in the digital era.

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