



# Technology Literacy and Digital Learning Media Design Competence among University Students

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## Abstract

The rapid development of digital technology in the 21st century requires Islamic Education students as prospective educators to possess technological literacy skills in developing innovative and adaptive digital learning media. This study aims to analyze the effect of technological literacy on the ability of Islamic Education students to design digital learning media. The study employed a quantitative approach using a correlational method. The population consisted of 442 fifth-semester students of the Islamic Education Study Program, with a sample of 70 students selected randomly using the Slovin formula. Data were collected through questionnaires and analyzed using simple linear regression analysis. The results showed that technological literacy had a significant effect on students' ability to design digital learning media, with a significance value of  $0.000 < 0.05$  and a coefficient of determination of 0.568. These findings indicate that technological literacy contributes 56.8% to students' ability to design digital learning media. This study emphasizes the importance of strengthening technological literacy in teacher education programs to support the development of adaptive, creative, and professional digital pedagogical competencies in the era of digital educational transformation.

## INTRODUCTION

The development of technology in the current digital era has increased significantly and has provided various opportunities in the field of education, including for Islamic Education students as prospective educators. These developments require students to possess competencies that are adaptive to technological changes, one of which is technological literacy (Alfian et al., 2025; Asril et al., 2023; Engkizar et al., 2023). Technological literacy refers to the knowledge and skills in using digital media, communication tools, and networks to identify, evaluate, utilize, and create information in a healthy and responsible manner Falloon, (2020). This competency has become an essential skill that must be possessed by students, particularly prospective teachers, in facing the challenges of learning in the digital era.

As prospective educators, Islamic Education students are required to prepare pedagogical competencies in order to conduct effective learning processes in the future. One of the pedagogical competencies that needs to be developed is the ability

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to design learning media. The appropriate use of learning media can increase interaction in the learning process so that students do not easily become bored during learning activities (Sudarsana et al., 2019). In addition, learning media are important components in enhancing students' interest and motivation in learning. Arsyad states that learning media function to clarify messages, increase attention and learning motivation, and help achieve learning objectives effectively (Hakim & Wahyuni, 2024).

Technological development has also brought changes to the development of learning media. This condition has become an important foundation requiring Islamic Education students as prospective educators to be capable of designing technology-based learning media. According to the Association for Educational Communications and Technology, as cited by Warsita, the field of educational technology consists of five major areas, namely design, development, utilization, policy implementation, and evaluation (Williamson et al., 2020). Therefore, the ability to design digital learning media has become an important part of the pedagogical competence that students must possess as prospective professional teachers in the digital era.

Islamic Education students face particular challenges in the learning process, especially in integrating Islamic materials with digital learning media that are engaging, contextual, and pedagogically valuable. The International Society for Technology in Education, as cited by Febriani and colleagues, defines digital literacy as the competence to understand and use information technology effectively in the contexts of learning, problem-solving, and communication (Yeşilyurt & Vezne, 2023). Thus, technological literacy is not only related to the ability to use digital devices but also to the ability to utilize them effectively to support the learning process.

Several previous studies have shown that technological literacy has a positive relationship with educators' pedagogical competence. Research conducted by Nur Ahyani and colleagues revealed that digital literacy influences teachers' performance, particularly in their ability to utilize digital technology as an effective learning tool. Other studies in the field of Islamic education have also shown that digital literacy significantly affects the pedagogical competence of Islamic Education teachers, including their ability to utilize and design information and communication technology-based learning media (Yadi et al., 2024). Furthermore, Harahap and Warman stated that technology-based Islamic Education learning media design can improve students' interactivity and understanding (Lorenza et al., 2025).

Based on these findings, it can be understood that technological literacy plays an important role in supporting students' ability to design digital learning media. However, studies specifically discussing the relationship between students' technological literacy and their ability to design digital learning media among Islamic Education students are still limited. Therefore, this study is important to examine the correlation between students' technological literacy and their ability to design digital learning media among Islamic Education students as prospective educators in the era of digital transformation (Akem et al., 2025; Ani et al., 2025; Utami et al., 2025).

## METHODS

This study employed a quantitative approach using a correlational design. The correlational method was used to determine the relationship and influence between technological literacy and students' ability to design digital learning media. This approach was selected because it is appropriate for analyzing the relationship between variables based on indicators measured quantitatively (Arifin & Roshaidai, 2018). The variables in this study consisted of technological literacy as the independent variable and the ability to design digital learning media as the dependent variable.

Population refers to the entire group of objects or subjects that become the focus of a study (Boro & Saikia, 2020). The population in this study consisted of all fifth-semester students of the undergraduate Islamic Education Study Program at the Faculty of Tarbiyah and Teacher Training of Universitas Islam Negeri Sjech M. Djamil Djambek Bukittinggi, totaling 442 students. A sample is a subset of the population selected to represent the entire population (Mohajan, 2020). The sample in this study was selected randomly using the Slovin formula, resulting in 70 students.

The sample selection was based on students who had completed the learning media course because they had studied the development of digital learning media in that course.

The research instrument used in this study was a closed-ended questionnaire employing a five-point Likert scale. Each indicator consisted of five statements. The technological literacy variable consisted of five indicators, namely internet searching (the ability to search for and find digital information), hypertext navigation (the ability to navigate links and digital structures), content evaluation (the ability to assess the authenticity and credibility of information), knowledge assembly (the ability to combine information into new knowledge), and digital communication (the ability to communicate through digital media) (Engkizar et al., 2026; Lionar et al., 2025). Meanwhile, the variable of digital learning media design ability consisted of five indicators, namely planning, designing, media development, utilizing tools (the use of software applications), and media evaluation. The data were collected through questionnaire distribution to respondents and analyzed using simple linear regression analysis to determine the effect of technological literacy on students' ability to design digital learning media (Afriana et al., 2022; Antwi & Hamza, 2015; Malandrino, 2024).

## RESULT AND DISCUSSION

Data collection in this study was conducted using a closed-ended questionnaire. Before the instrument was used in the research, a pilot test was carried out to determine the validity and reliability of the questionnaire. The validity and reliability tests were conducted using Statistical Package for the Social Sciences version 21.

The validity test results showed that, for the technological literacy variable, 23 items were valid and 2 items were invalid. Meanwhile, for the digital learning media design ability variable, all 23 items were declared valid. After the validity test, the instrument reliability was examined using Cronbach's Alpha. The reliability test results are presented in Table 1.

**Table 1. Instrument Reliability Test Results**

Variables	Cronbach's Alpha	Description
Technological literacy	0.941	Reliable
Ability to design digital learning media	0.942	Reliable

Based on Table 1, the Cronbach's Alpha values for both variables were above 0.90, indicating that the research instruments had a very high level of reliability. Therefore, all valid statement items were considered appropriate for use in this study.

The descriptive analysis of the technological literacy questionnaire indicated that most Islamic Education students had a good level of technological literacy. The highest response category was "often" at 41%, followed by "sometimes" at 31.9%, "always" at 19.1%, "rarely" at 6.3%, and "never" at 1.7%. These findings indicate that the majority of students were accustomed to utilizing digital technology in academic and learning activities.

Furthermore, the descriptive analysis of students' ability to design digital learning media showed that Islamic Education students possessed relatively good abilities in developing digital learning media. The highest response category was also "often" at 42.4%, followed by "sometimes" and "always," each at 22.6%, "rarely" at 5.5%, and "never" at 0.5%. These results demonstrate that most students had experience and competence in designing technology-based digital learning media.

### Simple Linear Regression Analysis

Simple linear regression analysis was conducted to determine the effect of technological literacy on students' ability to design digital learning media. The results of the regression analysis are presented in Table 2.

**Table 2. Simple Linear Regression Analysis Results**

Model	Unstandardized Coefficients (B)	Standard Error	Beta	t	Significance
Constant	17.509	7.561	-	2.316	0.024
Technological literacy	0.828	0.088	0.754	9.393	0.000

Based on Table 2, the calculated t-value of 9.393 was greater than the t-table value of

2.660, with a significance value of  $0.000 < 0.05$ . These results indicate that the alternative hypothesis was accepted and the null hypothesis was rejected. Therefore, technological literacy has a significant effect on Islamic Education students' ability to design digital learning media.

To determine the magnitude of the contribution of technological literacy to students' ability to design digital learning media, a coefficient of determination ( $R^2$ ) analysis was conducted. The results are presented in Table 3.

**Table 3. Coefficient of Determination Results**

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.754	0.568	0.562	9.14174

Based on Table 3, the R Square value was 0.568 or 56.8%. This finding indicates that technological literacy contributed 56.8% to Islamic Education students' ability to design digital learning media. Meanwhile, the remaining 43.2% was influenced by other factors outside the scope of this study, such as understanding of instructional media design stages, interest in media development, and environmental factors that support students' abilities in designing digital learning media.

The results of this study revealed that technological literacy had a significant effect on Islamic Education students' ability to design digital learning media. These findings confirm that technological literacy is an essential competency that prospective educators must possess in the twenty-first century digital era. The ability to utilize technology is no longer limited to operating digital devices but also includes the ability to manage, evaluate, and create innovative learning media relevant to students' needs.

The findings of this study are consistent with the opinion of Ng, who stated that *"Digital literacy is the ability to use technology to access, evaluate, and create information in order to function in a knowledge society"* (Ng, 2012). This statement indicates that technological literacy is not only related to technical skills in using digital devices but also involves the ability to create information and technology-based products. In the context of this study, this ability is reflected in students' competence in designing creative, interactive, and educational digital learning media. Therefore, the better the students' technological literacy, the better their ability to develop digital-based learning media.

The findings of this study also support previous research indicating that digital literacy has a close relationship with educators' pedagogical competence. Research conducted by Supriyadi and colleagues showed that digital literacy significantly influences the pedagogical competence of Islamic Education teachers, including their ability to utilize and develop technology-based learning media (Yadi et al., 2024). These findings demonstrate that mastery of technological literacy can assist educators in delivering learning materials in a more factual, engaging, and interactive manner. Therefore, technological literacy has become an important factor in supporting the development of effective digital learning media.

In addition, the findings revealed that technological literacy contributed 56.8% to students' ability to design digital learning media. This percentage indicates that technological literacy has a relatively strong influence on supporting students' competence in designing learning media. However, there are still other factors influencing students' ability to design digital learning media, such as understanding instructional design principles, creativity, experience in using software applications, learning motivation, and a supportive academic environment for developing digital skills (Defriyanto et al., 2026; Engkizar et al., 2026; Kassymova et al., 2025).

The implications of this study highlight the importance of strengthening technological literacy in teacher education, particularly in Islamic Education study programs. Higher education institutions are expected to develop practice-based learning oriented toward improving students' digital skills, such as training in digital learning media design, interactive content development, and the utilization of educational technology in the learning process (Kalsum et al., 2025; Kassymova et al., 2025). In addition, Islamic Education students are expected not only to become technology users but also to utilize technology critically, creatively, and ethically in supporting learning processes in the era of digital transformation.

## CONCLUSION

This study revealed that technological literacy has a significant effect on Islamic Education students' ability to design digital learning media. Technological literacy

contributed 56.8% to students' ability to develop digital learning media, indicating that technological mastery is an important factor in supporting the pedagogical competence of prospective educators in the digital era. The findings of this study confirm that technological literacy is not only related to the use of digital devices but also includes the ability to evaluate, manage, and create innovative and interactive learning media. Therefore, strengthening technological literacy should become a major concern in teacher education, particularly through practice-based digital learning and the development of technology-based pedagogical competencies.

This study also implies that higher education institutions need to develop learning programs that support students' digital media design skills. In addition, future studies are recommended to examine other factors influencing the ability to design digital learning media, such as creativity, learning motivation, and experience in using technology.

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