



Impact of digital learning platforms on student performance: The role of digital literacy and user satisfaction

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ABSTRACT

This study investigates the impact of digital learning platform utilization on student performance in higher education, considering the mediating roles of digital literacy and student satisfaction. The research employs a quantitative approach using survey methodology and path analysis to examine the direct and indirect relationships between variables. Data were collected from students using digital learning platforms and analyzed using Structural Equation Modeling (SEM) with Partial Least Squares (PLS) approach. The results reveal that digital learning platform utilization significantly influences student performance through both digital literacy and student satisfaction. Digital literacy emerged as a stronger mediator compared to student satisfaction, highlighting its crucial role in enhancing academic performance in the digital learning environment. Interestingly, the quality of instructor-student interaction did not significantly affect student performance through satisfaction. The study found that digital learning platform utilization strongly correlates with increased digital literacy and student satisfaction. Furthermore, digital literacy showed a moderate positive effect on student performance. These findings underscore the importance of fostering digital literacy skills and optimizing digital learning platforms to enhance student performance in higher education. The research provides valuable insights for educational institutions in developing effective digital learning strategies and emphasizes the need for comprehensive approaches in implementing digital learning platforms.

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1. INTRODUCTION.

The development of information and communication technology has brought significant changes to the world of higher education (Bizami et al., 2023; Harandi, 2015). Digital Learning Platforms (DLPs) have become an integral part of the teaching and learning

process in universities. However, the effective utilization of DLPs and their impact on student performance remains a topic that requires further research (Cui et al., 2023; Eze et al., 2018). This study aims to analyze how the use of DLPs affects student performance, taking into account the mediating role of digital literacy and student satisfaction levels.

Adaptation to Digital Learning Platforms (DLPs) significantly influences students' learning strategies, which are closely related to their academic satisfaction and performance. The use of DLPs enhances students' digital literacy, an essential skill in the digital age. Research indicates that higher utilization of DLPs correlates with improved levels of digital literacy and student satisfaction. Digital literacy acts as a key mediator in the relationship between DLP usage and academic performance; students who are more skilled in using technology tend to perform better. Although academic satisfaction also contributes to performance, its impact is not as strong as that of digital literacy. This suggests that educational institutions should focus on developing students' digital skills to enhance their learning experiences. Additionally, the quality of interaction between instructors and students does not significantly impact academic performance in the context of digital learning, indicating that other factors may play a more significant role in determining student satisfaction and performance. Overall, this research emphasizes the importance of a comprehensive strategy in implementing DLPs, focusing on enhancing digital literacy and creating satisfying learning experiences to support academic success in the digital era.

This research specifically seeks to understand the influence of DLP utilization on digital literacy and student satisfaction levels, as well as the extent to which these two variables mediate the relationship between DLP utilization and student performance. Additionally, this study explores whether the quality of instructor-student interaction plays a role in influencing student performance through satisfaction levels (Alshammari & Alhalafawy, 2023; Ferrer et al., 2022). Thus, this problem formulation encompasses an analysis of direct and indirect relationships between key variables in the context of digital learning in higher education, with the goal of providing a more comprehensive understanding of the factors that influence student performance in the digital era.

To address the research questions, this study employs a quantitative approach utilizing survey methods. The research model is structured using path analysis to examine both direct and indirect effects among variables. Structural Equation Modeling (SEM) with a Partial Least Squares (PLS) approach is applied to analyze the data and test the proposed hypotheses.

Previous research has extensively discussed the use of technology in higher education, but few have integrated aspects of digital literacy, student satisfaction, and the quality of instructor-student interaction into one comprehensive model (Gikas & Grant, 2013; Gustiani, 2020). The novelty of this research lies in the simultaneous analysis of the mediating roles of digital literacy and student satisfaction levels in the relationship between DLP utilization and student performance. Furthermore, this study also considers the quality of instructor-student interaction as a potential variable influencing student satisfaction and performance in the context of digital learning.

In addition to digital literacy and student satisfaction, several other factors may mediate the relationship between the use of Digital Learning Platforms (DLPs) and student performance, including the quality of interaction between instructors and students, technical support, family support, academic motivation, and students' self-efficacy. The quality of interaction can influence students' engagement and motivation in the learning process, while technical and family support can create a more conducive learning environment. Academic motivation plays a crucial role in encouraging students to actively use DLPs, whereas self-efficacy reflects students' confidence in their ability to overcome learning challenges. All these factors contribute to the dynamics of learning in the digital age and can significantly affect students' academic performance.

The utilization of Digital Learning Platforms (DLPs) has become the focus of much research in higher education (Campillo-Ferrer & Miralles-Martínez, 2021; Keržič et al., 2021). Several studies show that the use of DLPs can improve access to learning materials, flexibility, and interactivity in the teaching and learning process (Lai & Bower, 2019; Littlejohn et al., 2016). Digital literacy, on the other hand, has been identified as a critical skill needed by students to succeed in the digital era. Previous research has also explored the relationship between student satisfaction and academic performance (Panigrahi et al., 2018), indicating that students who are more satisfied with their learning experience tend to show better performance (Judijanto, Harsono, et al., 2023; Ulum, 2021).

Nevertheless, there are still gaps in understanding how these factors interact in the context of digital learning. This study aims to fill these gaps by analyzing the complex relationships between DLP utilization, digital literacy, student satisfaction, quality of instructor-student interaction, and student performance within an integrated framework.

2. RESEARCH METHOD.

This research employs a quantitative approach with a survey method to analyze the impact of digital learning platform utilization on student performance, considering the mediating roles of digital literacy and student satisfaction levels. The adopted research design is cross-sectional, where data is collected at a single point in time to examine relationships between variables. The research model is based on path analysis to test direct and indirect effects among variables. The study population consists of students using digital learning platforms in higher education institutions. Although the sampling method and sample size are not explicitly mentioned in the document, it can be assumed that the sampling technique used considers population representativeness.

Data is collected using a questionnaire covering several key variables: Digital Learning Platform Utilization (DLP), Digital Literacy, Student Satisfaction Level, Quality of Faculty-Student Interaction, and Student Performance. Each variable is measured using multiple indicators that have been tested for validity and reliability.

The questionnaire for this study was developed through a series of systematic steps that included initial design based on literature review and research objectives, item question formulation using a Likert scale, as well as validity and reliability testing to ensure measurement consistency and accuracy. After pilot testing the questionnaire with a small group of respondents to gather feedback, revisions were made to enhance item clarity. The final questionnaire was then distributed online to 100 randomly selected respondents from Universitas Pignatelli Triputra students, aiming to collect representative data regarding the impact of utilizing digital learning platforms on student performance.

The data analysis is carried out using Structural Equation Modeling (SEM) with a Partial Least Squares (PLS) approach, employing SmartPLS software. The process involves several stages, including measurement model analysis, structural model analysis, and mediation effect analysis. In the measurement model analysis, the validity and reliability of the constructs are evaluated through outer loading values, Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE). The structural model analysis explores the relationships between latent variables using R-square values, path coefficients, and significance levels (t-values and p-values). The mediation effect analysis assesses indirect effects through the bootstrapping method to evaluate the mediating roles of digital literacy and student satisfaction. The quality of the model is assessed using various criteria, such as R-square values to measure predictive capability, outer loading values above 0.7 for indicator validity, Cronbach's Alpha and Composite Reliability values exceeding 0.7 for construct reliability, and AVE values over 0.5 for convergent validity.

We did not utilize the Q-square value or goodness of fit (GoF) test in our analysis. This research focuses on the impact of utilizing Digital Learning Platforms (DLPs) on student performance while considering the mediating roles of digital literacy and student satisfaction. We applied path analysis using Structural Equation Modeling (SEM) with a Partial Least Squares (PLS) approach to evaluate the relationships among the existing variables. Although Q-square and GoF are commonly used measures in SEM analysis, we chose not to employ them and instead concentrated on the R-square value, which indicates that approximately 42.4% of the variation in student performance can be explained by our model. Additionally, we analyzed path coefficients and mediation effects, providing deeper insights into how DLPs influence student performance through digital literacy and student satisfaction. With this approach, we believe our research findings offer a comprehensive overview of the factors affecting student performance in the digital era without relying on Q-square and GoF values.

Although not explicitly mentioned in the document, it can be assumed that this research adheres to research ethics principles, including informed consent from participants and data confidentiality protection. This research methodology is designed to provide a comprehensive understanding of how digital learning platform utilization affects student performance, considering the mediating roles of digital literacy and student satisfaction levels.

3. RESULTS AND DISCUSSIONS.

This research analyzes the impact of digital learning platform (DLP) utilization on student performance, considering the mediating roles of digital literacy and student satisfaction levels. The analysis using Structural Equation Modeling (SEM) with a Partial Least Squares (PLS) approach reveals several important findings (Putra et al., 2024).

2.1 Structural Model and Path Coefficients.

The path analysis shows that DLP utilization has a significant positive influence on digital literacy (path coefficient 0.232) and student satisfaction levels (path coefficient 0.893). This indicates that higher DLP utilization correlates with higher digital literacy and student satisfaction levels.

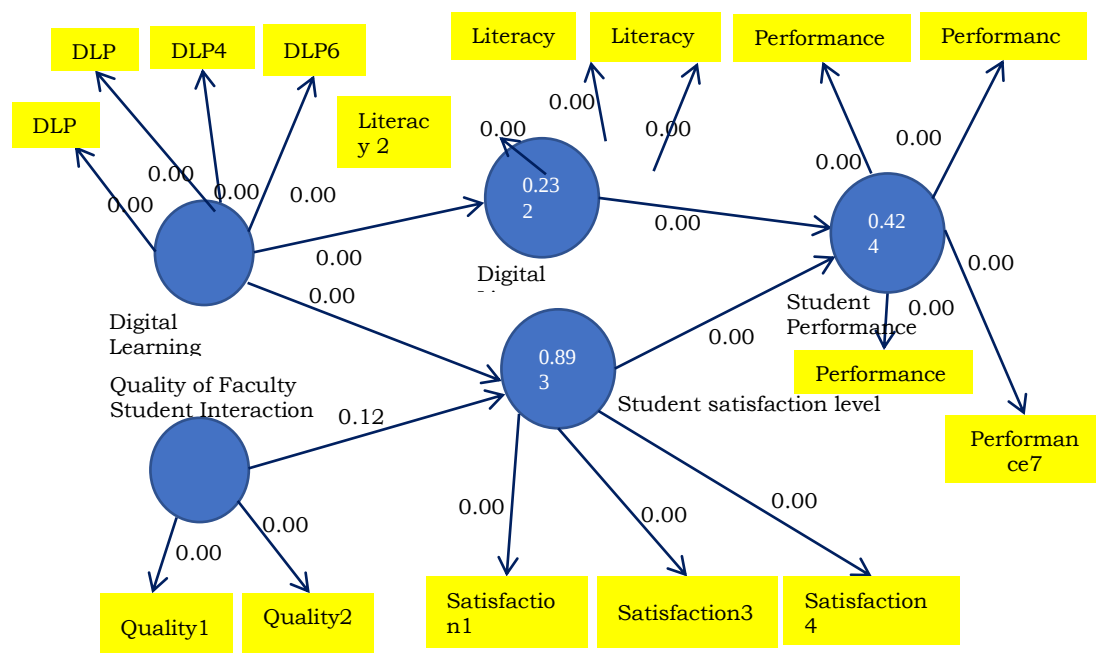


Figure 1. Structural Diagram.

Digital literacy has a moderate positive influence on student performance (path coefficient 0.424), while student satisfaction level has a weaker positive influence on student performance (path coefficient 0.128). These findings suggest that digital literacy plays a more crucial role in improving student performance compared to satisfaction levels.

Table 1. Path Coefficients.

	Original Sample	T Statistics	P values
Quality of Faculty-Student Interaction → Student Satisfaction Level.	0.043	1.138	0.128
Digital Literacy → Student Performance.	0.446	4.134	0.000
Digital Learning Platform Utilization → Digital Literacy.	0.482	5.216	0.000
Digital Learning Platform Utilization → Student Satisfaction Level.	0.971	38.268	0.000
Student Satisfaction Level → Student Performance.	0.309	3.370	0.000

a. R-square Analysis.

The R-square value for student performance is 0.424, indicating that approximately 42.4% of the variation in student performance can be explained by the variables in the model. Digital literacy has an R-square of 0.232, suggesting that 23.2% of its variation is explained by DLP utilization. Student satisfaction level has a very high R-square of 0.893, showing that almost 90% of its variation can be explained by the model.

Table 2. R-square.

	R-square	R-square adjusted
Student Performance	0.424	0.412
Digital Literacy	0.232	0.225
Student Satisfaction Level	0.893	0.891

b. Construct Reliability and Validity.

All constructs in the model demonstrate good reliability and validity, with Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE) values meeting the criteria. This indicates that the research instruments were well-designed and reliable for measuring the studied variables.

Table 3. Reliability and Validity.

	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
Student Performance	0.834	0.844	0.889	0.668
Quality of Faculty-Student Interaction	0.963	0.963	0.982	0.964
Digital Literacy	0.863	0.871	0.916	0.784
Digital Learning Platform Utilization	0.842	0.858	0.894	0.679
Student Satisfaction Level	0.807	0.821	0.888	0.727

c. Mediation Effects.

Analysis of indirect effects shows that DLP utilization significantly improves student performance through increased student satisfaction levels ($p < 0.05$) and digital literacy ($p < 0.05$). This confirms the important mediating roles of both variables.

Table 4. Mediation Effects.

	Original Sample	T Statistics	P values
Digital Learning Platform Utilization → Student Satisfaction Level → Student Performance.	0.300	3.357	0.000
Digital Learning Platform Utilization → Digital Literacy → Student Performance.	0.215	3.350	0.000
Quality of Faculty-Student Interaction → Student Satisfaction Level → Student Performance.	0.013	1.028	0.152

3.2 Discussion

The research findings highlight the importance of DLP utilization in improving student performance. DLPs not only increase student satisfaction but also contribute to improved digital literacy, which in turn positively impacts academic performance. These results align with previous research emphasizing the crucial role of technology in higher education (Clark, 2017; Damnjanovic et al., 2013).

Digital literacy proves to be a key factor in mediating the relationship between DLP utilization and student performance (Mehrvarz et al., 2021). This indicates that students' ability to effectively use technology is an important component of academic success in the digital era (Cela et al., 2015; Goulão & Menezes, 2015). Higher education institutions need to focus efforts on improving students' digital literacy through targeted training and development (Balalle, 2024). Although student satisfaction levels also play a mediating role, its influence is not as strong as digital literacy. This suggests that while ensuring student satisfaction with DLPs is important, the primary focus should be on improving students' ability to use technology effectively for learning (Memon et al., 2022). Overall, these research findings provide valuable insights into the dynamics of digital learning in higher education and highlight areas that need to be focused on in developing effective learning strategies in the digital era.

4. CONCLUSION.

This research demonstrates that the utilization of digital learning platforms (DLPs) has a significant impact on student performance, both directly and indirectly through the enhancement of digital literacy and student satisfaction levels. The analysis reveals that DLP utilization has a strong positive correlation with digital literacy and student satisfaction. Digital literacy proves to be a key factor in improving student performance, with a stronger influence compared to student satisfaction levels. These findings emphasize the importance of efforts to improve digital literacy among students as a strategy to enhance academic performance in the era of digital learning. Interestingly, this study also reveals that the quality of faculty-student interaction does not have a significant impact on student performance through student satisfaction levels in the context of digital learning. This suggests that in digital learning environments, other factors may play a more significant role in determining student satisfaction and performance (Judijanto, Murthada, et al., 2023; Putra, 2024). These findings open up opportunities for further research on the dynamics of interaction in digital learning and the factors that influence its effectiveness. Overall, this research provides valuable insights into the crucial role of digital learning platforms in higher education. The results highlight the need for a comprehensive strategy in implementing DLPs, focusing not only on providing technology but also on improving students' digital literacy and creating satisfying learning experiences. The implications of this research can serve as a guide for higher education institutions in designing and developing effective digital learning programs to enhance students' academic performance in the digital era.

The findings from this study extend existing theories concerning digital literacy, student satisfaction, and digital learning models by providing a more comprehensive understanding of the interaction among these variables. First, this research affirms that digital literacy is not merely an additional skill but a key component mediating the relationship between Digital Learning Platform (DLP) usage and students' academic performance. By demonstrating that improvements in digital literacy significantly contribute to student performance, this study underscores the importance of focusing on developing digital skills within higher education curricula. Furthermore, although student satisfaction also serves as a mediator, its influence is not as strong as that of digital literacy, suggesting that learning strategies should prioritize enhancing students' technological capabilities for achieving academic success. This research also identifies the quality of interaction between instructors and students as a factor worthy of attention, even though it does not have a significant impact on academic performance within a digital learning context. Thus, these findings provide new insights for higher education institutions to design more effective digital learning programs by integrating digital literacy training and creating satisfying learning experiences to enhance academic performance in the digital age.

Several limitations of this research should be noted. First, this study employs a cross-sectional approach, meaning data were collected at one point in time. This limits our ability to draw stronger causal conclusions between the studied variables. Second, this research may not consider other contextual factors that could influence student performance, such as educational background, socio-economic conditions, or home learning environments.

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