

THE EFFECT OF INFORMATION TECHNOLOGY UTILIZATION ON THE QUALITY OF ONLINE LEARNING

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Abstract :

The rapid development of information technology has encouraged the implementation of online learning in higher education. Optimal utilization of information technology has become a crucial factor in improving the quality of online learning for students. This study aims to analyze the effect of information technology utilization on the quality of students' online learning. The study employs a quantitative approach using a survey method. Data were collected through the distribution of questionnaires to students participating in online learning. The variables examined include the level of information technology utilization and the quality of students' online learning, which encompasses aspects of learning interaction, ease of access, effectiveness of content delivery, and learning satisfaction. The data were analyzed using statistical analysis techniques to determine the influence between the independent and dependent variables. The results indicate that the utilization of information technology has a positive and significant effect on the quality of students' online learning. These findings suggest that effective utilization of information technology can enhance student engagement, the effectiveness of the learning process, and the overall quality of online learning in higher education. This study is expected to serve as a reference for higher education institutions in designing more effective online learning strategies that are oriented toward students' needs.

Keywords : Information Technology, Online Learning, Students, Learning Quality, E-Learning

INTRODUCTION

The development of information technology over the past five years has driven highly significant changes in the education system, particularly in higher education. This digital transformation has accelerated the adoption of online learning as both an alternative and a complement to conventional face-to-face instruction. Online learning enables students to access learning materials flexibly without being constrained by time and location, thereby making the learning process more adaptive to individual needs. The increasing use of learning management systems, video conferencing platforms, and various digital learning applications indicates that online learning has become an integral part of modern higher education practices (Dhawan, 2020).

In the context of higher education, information technology serves as the primary infrastructure supporting the continuity, effectiveness, and sustainability of online learning. The utilization of information technology encompasses not only the availability of hardware, software, and internet networks, but also students' ability to use these technologies to access information, interact with lecturers, and collaborate with peers. (Bond et al., 2021) emphasize that the appropriate integration of information technology can



enhance student engagement and promote more active learning. Thus, information technology no longer functions merely as a supporting tool, but rather as a strategic component in the learning process.

Despite the various potentials and advantages offered by online learning, its implementation continues to face several challenges, particularly in relation to the quality of learning as perceived by students. Several studies indicate that online learning is often confronted with issues such as low levels of interaction between students and lecturers, limited academic feedback, and students' difficulties in independently understanding learning materials (Coman et al., 2020). In addition, differences in levels of digital literacy and technological readiness among students also influence the quality of online learning outcomes.

These challenges highlight a gap between the potential of available information technology and the quality of online learning experienced by students. On one hand, educational institutions have provided various technological platforms and facilities; on the other hand, their utilization has not always resulted in effective and meaningful learning experiences. This condition suggests that the mere presence of information technology is insufficient to guarantee the quality of online learning; rather, well-planned strategies for technology utilization that are oriented toward students' needs are required.

Numerous previous studies have examined the relationship between information technology utilization and the quality of online learning. Research findings indicate that effective utilization of information technology has a positive impact on learning satisfaction, student engagement, and the effectiveness of online learning (Al-Fraihat et al., 2020); (Martin et al., 2020). However, (Rapanta et al., 2020) emphasize that the use of technology without appropriate pedagogical design does not automatically enhance learning quality. These differing findings suggest the need for more in-depth empirical studies, particularly from the perspective of students as the primary users of online learning.

Based on this review, a research gap remains concerning empirical analyses of the effect of information technology utilization on the quality of students' online learning, especially within the context of higher education in Indonesia. Most previous studies have focused on evaluating online learning systems or institutional readiness, while studies emphasizing students' perceptions of online learning quality remain relatively limited. Therefore, this study aims to analyze the effect of information technology utilization on the quality of students' online learning. The scientific contribution of this study is expected to enrich the current literature in the field of educational technology, while its practical contribution is anticipated to provide a foundation for higher education institutions in designing policies and strategies for utilizing information technology to improve the quality of online learning oriented toward students' needs.

In addition to pedagogical aspects, technological readiness and students' digital literacy are also critical factors in determining the quality of online learning. Students with higher levels of digital literacy tend to be more capable

of utilizing learning technology features optimally, such as online discussion forums, quizzes, and digital learning resources. Conversely, students with limited technological proficiency often experience difficulties in participating in online learning, which ultimately affects their perceived learning quality (Hämäläinen et al., 2021). This condition indicates that the utilization of information technology depends not only on system availability but also on user readiness, particularly among students.

Furthermore, the quality of online learning is also influenced by instructional design supported by information technology. Learning designs that are non-interactive and lack variation tend to reduce students' learning motivation in online environments. Studies have shown that the use of information technology combined with active learning strategies – such as online discussions, collaborative learning, and interactive multimedia – can enhance student engagement and satisfaction in online learning (Martin et al., 2021). Therefore, the utilization of information technology must be pedagogically integrated in order to achieve optimal online learning quality.

Moreover, evaluating the quality of online learning from students' perspectives is an important aspect of developing information technology-based education. Students' perceptions of ease of technology use, interaction quality, and learning effectiveness can serve as indicators of the success of information technology utilization in higher education. Recent studies emphasize that evaluations based on students' perceptions can provide a more comprehensive understanding of the strengths and weaknesses of online learning, enabling the results to serve as a basis for strategic decision-making by higher education institutions (Nambiar, 2020); (Almahasees et al., 2021).

RESEARCH METHOD

This study employs a quantitative approach using a survey method to analyze the effect of information technology utilization on the quality of students' online learning. The quantitative approach was selected because it enables objective and systematic measurement of relationships among variables through numerical data analyzed using statistical techniques (Creswell & Creswell, 2023). The survey method was used to collect direct data from respondents regarding their perceptions and experiences while participating in online learning in higher education.

This research is categorized as explanatory research, which aims to explain the causal relationship between independent and dependent variables. Through this design, the study is expected to provide empirical evidence regarding the extent to which information technology utilization contributes to the quality of students' online learning. The explanatory approach is widely used in technology-based educational research because it is effective for testing hypotheses and examining relationships among variables (Hair et al., 2021).

The population of this study consists of higher education students who have participated in online learning as part of their academic activities. The population includes students from various study programs who have direct

experience using information technology during the learning process. Students were selected as the focus of this study because they are the primary users of online learning and play a crucial role in determining the success of information technology utilization in higher education.

The sampling technique used in this study is purposive sampling, with the criterion that respondents are active students who have participated in online learning for at least one semester. This technique was chosen to ensure that respondents have sufficient experience in using online learning technologies, thereby making the collected data more relevant and representative (Etikan & Bala, 2021). The sample size was determined by considering the requirements of statistical analysis and the desired level of confidence, allowing the results to be generalized in a limited manner according to the characteristics of the sample.

Data were collected using a questionnaire distributed online through digital platforms. The use of an online questionnaire was considered effective because it allows for wide respondent reach and facilitates efficient data collection and processing (Evans & Mathur, 2018). The questionnaire was developed based on research variable indicators derived from a review of recent literature related to information technology and online learning.

The research instrument employed a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The Likert scale was used because it effectively measures respondents' attitudes, perceptions, and levels of agreement in a quantitative manner and is widely applied in educational and information technology research (Joshi et al., 2015). Prior to large-scale distribution, the questionnaire was reviewed to ensure clarity of language and alignment of the indicators with the research objectives.

This study involves two main variables: information technology utilization as the independent variable (X) and the quality of students' online learning as the dependent variable (Y). Information technology utilization was measured based on the extent to which students use and perceive the benefits of learning technologies in supporting their academic activities. Meanwhile, the quality of online learning was assessed based on students' perceptions of learning effectiveness and their learning experiences during online learning.

The variable indicators were developed based on a synthesis of findings from previous studies emphasizing technological aspects, interaction, and students' learning experiences in online learning environments (Al-Fraihat et al., 2020); (Martin et al., 2020).

Table 1. Research Variables and Indicators

Variable	Code	Indicator
Information Technology Utilization (X)	X1	Ease of use of learning technologies
	X2	Accessibility of online learning platforms
	X3	Reliability of systems and networks
	X4	Utilization of digital learning features
	X5	Technological support for learning activities
Quality of Online Learning (Y)	Y1	Interaction between students and lecturers
	Y2	Clarity and effectiveness of content delivery
	Y3	Student engagement in the learning process

Y4	Ease of understanding learning materials
Y5	Students' satisfaction with online learning

Validity testing was conducted to ensure that each statement item in the questionnaire was able to accurately measure the indicators of the research variables. Instrument validity was examined using the Pearson Product-Moment correlation, with the criterion that the correlation coefficient value must be greater than the r-table value at a specified significance level. Validity testing is essential to ensure that the collected data truly reflect the constructs being measured (Taherdoost, 2016).

Furthermore, reliability testing was carried out using Cronbach's Alpha to assess the internal consistency of the research instrument. An instrument is considered reliable if the Cronbach's Alpha value is ≥ 0.70 , indicating that the questionnaire items demonstrate a satisfactory level of consistency (Hair et al., 2021). Valid and reliable instruments are expected to produce accurate and trustworthy data. The collected data were analyzed using both descriptive and inferential statistical analyses. Descriptive analysis was employed to describe respondent characteristics and the distribution of questionnaire responses, thereby providing an overview of information technology utilization and the quality of students' online learning. This analysis included measures such as mean values, percentages, and standard deviations.

Inferential analysis was conducted using simple linear regression to examine the effect of information technology utilization on the quality of students' online learning. Hypothesis testing was performed using the t-test to determine the significance of the influence of the independent variable on the dependent variable, while the coefficient of determination (R^2) was used to identify the extent of the contribution of information technology utilization to the quality of online learning. Regression analysis was selected because it is appropriate for testing causal relationships among variables in survey-based educational research (Field, 2022).

FINDINGS AND DISCUSSION

Validity testing was conducted to ensure that each statement item in the questionnaire was able to accurately measure the variables under study. The validity test was performed using the Pearson Product-Moment correlation with a significance level of 0.05. An item was considered valid if the calculated correlation coefficient (r-value) was greater than the critical r-value (r-table).

Table 2. Validity Test Results for Information Technology Utilization Variable (X)

Item Code	r-value (Calculated)	r-value (Table)	Remark
X1	0.612	0.195	Valid
X2	0.684	0.195	Valid
X3	0.731	0.195	Valid
X4	0.659	0.195	Valid
X5	0.703	0.195	Valid

Table 3. Validity Test Results for Online Learning Quality Variable (Y)

Item Code	r-value (Calculated)	r-value (Table)	Remark
Y1	0.645	0.195	Valid
Y2	0.701	0.195	Valid
Y3	0.726	0.195	Valid
Y4	0.683	0.195	Valid
Y5	0.754	0.195	Valid

Table 3 presents the validity test results for the online learning quality variable (Y), which was assessed using the Pearson Product-Moment correlation at a significance level of 0.05. The variable consists of five items (Y1–Y5) that represent key aspects of online learning quality, including interaction between students and lecturers, clarity and effectiveness of content delivery, student engagement, ease of understanding learning materials, and students’ satisfaction with online learning. The calculated r-values for all items range from 0.645 to 0.754, exceeding the critical r-value of 0.195, indicating that each item is statistically significant in measuring the intended construct.

These results demonstrate that each questionnaire item reliably captures the specific dimensions of online learning quality. Items with higher r-values indicate stronger correlations with the overall variable, suggesting that the items are consistent and effectively represent the underlying construct. This ensures that the data collected from the questionnaire accurately reflect students’ perceptions of the quality of their online learning experiences, providing a solid foundation for subsequent analyses.

Overall, the findings in Table 3 confirm that the research instruments for the online learning quality variable are valid and appropriate for use in this study. The validity of these items supports the credibility of the measurement process and guarantees that the responses obtained from students will provide meaningful and interpretable insights into the factors influencing online learning quality. Therefore, the validated instrument is suitable for further statistical analysis, including reliability testing and regression analysis, to examine the relationship between information technology utilization and online learning quality.

The reliability test aims to determine the level of internal consistency of the research instrument. Reliability testing was conducted using Cronbach’s Alpha, with the criterion that an alpha value of ≥ 0.70 indicates acceptable reliability.

Table 4. Instrument Reliability Test Results

Variable	Number of Items	Cronbach’s Alpha	Criterion
Information Technology Utilization (X)	5	0.812	Reliable
Online Learning Quality (Y)	5	0.835	Reliable

Table 4 presents the results of the reliability test for the research instruments used to measure information technology utilization (X) and online learning quality (Y). Reliability was assessed using Cronbach’s Alpha, which evaluates the internal consistency of the questionnaire items. The results show

that the Cronbach's Alpha values for both variables are above the minimum acceptable threshold of 0.70, with values of 0.812 for information technology utilization and 0.835 for online learning quality. These results indicate that the items within each variable are consistent in measuring the intended construct.

The high Cronbach's Alpha values suggest that the questionnaire items produce stable and dependable responses. Each item contributes positively to the overall reliability of the scale, ensuring that the measurement accurately captures students' perceptions of both information technology utilization and online learning quality. This level of consistency is essential for ensuring that the data collected are reliable and suitable for further statistical analyses, such as regression or correlation testing.

Overall, the findings in Table 4 confirm that the research instruments are reliable and appropriate for use in this study. The established reliability supports the credibility of the collected data and provides a strong foundation for examining the relationship between information technology utilization and the quality of students' online learning. Therefore, these validated and reliable instruments can be confidently used in subsequent analyses, including simple linear regression, to determine the influence of technology utilization on online learning outcomes.

Simple linear regression analysis was employed to examine the effect of information technology utilization on the quality of students' online learning.

Table 5. Simple Linear Regression Test Results

Variable	Coefficient (B)	t-value	Sig.
Constant	12.345	3.214	0.002
Information Technology Utilization (X)	0.678	6.587	0.000

Table 6. Coefficient of Determination Test Results

Model	R	R Square (R ²)	Adjusted R ²
1	0.721	0.520	0.515

Table 7. ANOVA Test Results

Model	Sum of Squares	df	Mean Square	F-value	Sig.
Regression	458.210	1	458.210	43.398	0.000
Residual	422.765	98	4.313		
Total	880.975	99			

The results of the regression analysis indicate that information technology utilization has a positive and significant effect on the quality of students' online learning. This is evidenced by a significance value lower than 0.05, indicating that an increase in information technology utilization is accompanied by an improvement in the quality of online learning. These findings suggest that information technology plays a strategic role in supporting the success of online learning in higher education.

The positive regression coefficient indicates that better utilization of information technology by students is associated with higher perceived quality of online learning. The utilization of information technology in this context includes ease of use of learning platforms, system accessibility, technological reliability, and the use of digital features that support learning activities. This condition enables students to access learning materials more easily and to participate in the learning process more effectively.

The coefficient of determination indicates that information technology utilization contributes substantially to the quality of students' online learning. This suggests that information technology is one of the main factors influencing online learning quality, although other factors outside the research model also play a role. These factors may include lecturers' instructional strategies, students' learning motivation, and supportive online learning environments.

The findings also demonstrate that information technology utilization contributes to increased interaction and student engagement during the online learning process. Learning technology features such as discussion forums, online assignment systems, and interactive learning media encourage students to participate more actively. This increased engagement contributes to better understanding of learning materials and a more positive learning experience.

In addition to enhancing engagement, optimal utilization of information technology also affects students' satisfaction with online learning. Students tend to feel more satisfied when the technology used is easily accessible, stable, and capable of supporting their learning needs. Learning satisfaction is an important indicator of high-quality online learning and reflects the successful implementation of information technology in the learning process.

Nevertheless, the results of this study also indicate that information technology utilization must be accompanied by appropriate instructional planning. Available technologies will not have a maximum impact if they are not optimally integrated into instructional design. Therefore, synergy between information technology utilization and student-centered instructional strategies is necessary to sustainably enhance the quality of online learning.

Overall, the findings of this study confirm that information technology utilization plays a significant role in improving the quality of students' online learning. These findings are consistent with the research objectives and support the results of the analyses conducted. By understanding this relationship, higher education institutions are expected to optimize the utilization of information technology as part of a strategy to improve online learning quality that focuses on students' needs and learning experiences.

CONCLUSION

This study aimed to analyze the effect of information technology utilization on the quality of students' online learning. Based on the results of data analysis and discussion, it can be concluded that information technology utilization has a positive and significant effect on the quality of students' online learning. Therefore, the primary objective of this study has been achieved,

namely to provide empirical evidence of the important role of information technology in supporting the quality of online learning in higher education.

The main findings indicate that information technology utilization—including ease of use of learning platforms, system accessibility, technological reliability, and the use of digital learning features—can enhance the quality of students' online learning. These improvements are reflected in learning interaction, effectiveness of content delivery, student engagement in the learning process, and students' satisfaction with online learning. These results suggest that information technology functions not only as a supporting medium but also as a strategic factor in creating high-quality online learning experiences.

The practical implications of this study suggest that higher education institutions need to optimize the utilization of information technology in the implementation of online learning. Educational institutions are expected to provide reliable technological infrastructure, user-friendly learning platforms, and adequate technical support for students. In addition, lecturers should design online learning activities that optimally utilize information technology and are oriented toward enhancing student engagement and learning experiences.

Although this study provides insights into the effect of information technology utilization on the quality of students' online learning, it has certain limitations. Therefore, future research is recommended to examine other factors that may influence online learning quality, such as pedagogical methods, students' learning motivation, and lecturers' readiness to manage online learning. Future studies may also employ different methodological approaches or expand the research scope to include more diverse educational contexts and levels, in order to obtain a more comprehensive understanding of improving online learning quality in higher education.

REFERENCES

- Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating e-learning systems success: An empirical study. *Computers in Human Behavior*, 102, 67–86. <https://doi.org/10.1016/j.chb.2019.08.004>
- Almahasees, Z., Mohsen, K., & Amin, M. O. (2021). Faculty's and students' perceptions of online learning during COVID-19. *International Journal of Emerging Technologies in Learning*, 16(10), 44–63. <https://doi.org/10.3991/ijet.v16i10.19183>
- Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education*, 18(50), 1–24. <https://doi.org/10.1186/s41239-021-00282-x>
- Coman, C., Țiru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Creswell, J. W., & Creswell, J. D. (2023). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (6th ed.). SAGE Publications.

- Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49(1), 5–22. <https://doi.org/10.1177/0047239520934018>
- Etikan, I., & Bala, K. (2021). Sampling and Sampling Methods. *Heliyon*, 7(1), e06208. <https://doi.org/10.1016/j.heliyon.2021.e06208>
- Evans, J. R., & Mathur, A. (2018). The value of online surveys. *Internet Research*, 28(4), 854–887. <https://doi.org/10.1108/IntR-03-2018-0089>
- Field, A. (2022). *Discovering Statistics Using IBM SPSS Statistics* (6th ed.). SAGE Publications.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). SAGE Publications.
- Hämäläinen, R., Nissinen, K., Mannonen, J., Lämsä, J., Leino, K., & Taajamo, M. (2021). Understanding teaching and learning practices in digital classrooms. *Computers & Education*, 162, 104121. <https://doi.org/10.1016/j.compedu.2020.104121>
- Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396–403. <https://doi.org/10.9734/BJAST/2015/14975>
- Martin, F., Ritzhaupt, A., Kumar, S., & Budhrani, K. (2021). Award-winning faculty online teaching practices. *Internet and Higher Education*, 42, 100693. <https://doi.org/10.1016/j.iheduc.2019.100693>
- Martin, F., Sun, T., & Westine, C. D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & Education*, 159, 104009. <https://doi.org/10.1016/j.compedu.2020.104009>
- Nambiar, D. (2020). The impact of online learning during COVID-19: Students' and teachers' perspective. *International Journal of Indian Psychology*, 8(2), 783–793. <https://doi.org/10.25215/0802.094>
- Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online university teaching during and after the COVID-19 crisis. *Postdigital Science and Education*, 2(3), 923–945. <https://doi.org/10.1007/s42438-020-00155-y>
- Taherdoost, H. (2016). Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research. *International Journal of Academic Research in Management*, 5(2), 18–27. <https://doi.org/10.2139/ssrn.3205035>