

The Effect of E-Learning Use on Student Learning Outcomes

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Abstrak

Kata Kunci:

e-learning, hasil belajar, mahasiswa, pembelajaran daring, regresi linier

Perkembangan teknologi digital telah mendorong transformasi besar dalam dunia pendidikan, khususnya melalui pemanfaatan e-learning sebagai media utama pembelajaran daring. Penelitian ini bertujuan untuk menganalisis pengaruh penggunaan e-learning terhadap hasil belajar mahasiswa di perguruan tinggi. Penelitian dilakukan dengan pendekatan kuantitatif menggunakan metode survei korelasional, dengan jumlah responden sebanyak 33 mahasiswa. Instrumen penelitian diuji validitas dan reliabilitasnya, menghasilkan nilai Cronbach's Alpha sebesar 0,960. Data yang terkumpul dianalisis menggunakan regresi linier sederhana. Hasil analisis menunjukkan bahwa penggunaan e-learning berpengaruh secara positif dan signifikan terhadap hasil belajar mahasiswa, dengan nilai koefisien determinasi (R^2) sebesar 0,896 dan nilai signifikansi $p < 0,001$. Temuan ini mengindikasikan bahwa e-learning merupakan media pembelajaran yang efektif dalam meningkatkan capaian akademik mahasiswa, meskipun masih menghadapi tantangan seperti keterbatasan akses, literasi digital, dan motivasi belajar mandiri. Oleh karena itu, diperlukan strategi pengembangan pembelajaran daring yang adaptif, inklusif dan ditopang oleh infrastruktur teknologi yang memadai.

Abstract

Key Words:

e-learning, learning outcomes, students, online learning, linear regression

The development of digital technology has significantly transformed the field of education, particularly through the utilization of e-learning as a primary medium for online learning. This study aims to analyze the influence of e-learning usage on student learning outcomes in higher education. A quantitative approach with a correlational survey method was employed, involving 33 student respondents. The research instrument was tested for validity and reliability, yielding a Cronbach's Alpha value of 0.960. Data were analyzed using simple linear regression. The results show that e-learning usage has a positive and significant effect on student learning outcomes, with a coefficient of determination (R^2) of 0.896 and a significance value of $p < 0.001$. These findings indicate that e-learning is an effective learning medium to improve academic achievement among students, although challenges such as access limitations, digital literacy gaps, and low independent learning motivation still persist. Therefore, the development of adaptive and inclusive online learning strategies supported by adequate technological infrastructure is highly recommended.

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INTRODUCTION

The development of digital technology has been a catalyst for transformation in the world of education, especially since the COVID-19 pandemic forced all educational institutions to adapt to distance learning. In this context, e-learning emerges as the main solution to ensure the teaching and learning process continues. E-learning allows teachers and learners to be online, without space and time constraints, and provides greater flexibility for students and lecturers.

In higher education, the implementation of e-learning is facilitated through Learning Management System (LMS) platforms such as Google Classroom or Zoom. This system supports various academic activities, ranging from material delivery, online discussions, interactive quizzes, to system-based assessments. Students can access learning content at any time according to their own learning rhythm. Not only that, e-learning also supports diverse learning styles, enriches digital interactions, and reduces geographical barriers in accessing education.

However, although e-learning offers many advantages, its effectiveness in improving student learning outcomes is still debatable. Some studies mention that not all students are able to adjust to the online learning system. Technical constraints such as limited devices, unstable internet connection, and low digital literacy are still a big challenge. In addition, low motivation to learn independently and lack of direct interaction with lecturers

can also affect the process of achieving learning outcomes.

Learning outcomes are an important indicator in measuring the success of the education process. These results not only reflect academic achievement in the form of grades or GPA. But it also includes students' ability to understand the material, complete assignments on time, and apply knowledge in a real context. In an e-learning system, learning outcomes are strongly influenced by the extent to which students are able to utilize technology optimally to support their learning process.

Therefore, it is important to examine more deeply the extent to which the use of e-learning influences student learning outcomes. This study was conducted to empirically examine the relationship between the two variables through a quantitative approach and correlational design. Thus, the findings of this study are expected to be the basis for policy returns in the development of a more effective and adaptive online learning system in the university environment..

RESEARCH METHODS

This research uses a quantitative approach with a correlational survey research type. The qualitative approach was chosen because it is able to test the relationship between variables objectively through numerical data and statistical analysis. The correlational design is used to determine the effect between the use of e-learning (variable X) on student learning outcomes (variable Y) (Sugiyono, 2021). 2 The sample in this study amounted to 33 students who were selected purposively with the criteria of having actively participated in online learning using e- learning. The instrument used was a 1-5 Likert scale with 15 items for each variable. Before use, the instrument was tested for reliability using Cronbach's Alpha and obtained a value of 0.960, which indicates a very high level of reliability (Ghozali, 2021).

RESEARCH RESULTS

This study was conducted to determine the effect of e-learning use on student learning outcomes. Data were obtained from 33 students using a Likert scale questionnaire. Before the main analysis, some statistical tests were conducted as follows:

1. Validity Test

Based on the results of the validity test on the variable effect of using e-learning (X) which was carried out during the instrument trial on 33 respondents with 15 statements, the results obtained 15 valid statements. Based on the results of the validity test on the student learning outcomes variable (Y) which was carried out during the instrument trial on 33 respondents with 15 statements, the results obtained 15 valid statements.

2. Reliability Test

Table 1. Reliability Test

Cronbach's Alpha	N of Items
0,960	15

From the table above, the Cronbach's Alpha value is 0.960, this shows that the questionnaire on the effect of using e-learning (variable X) and the student learning outcomes questionnaire (variable Y) are declared reliable, because the Cronbach's Alpha value is $0.960 > 0.600$.

3. Normality Test

Before conducting regression analysis, the data was tested for distribution using the One-Sample Kolmogorov-Smirnov Test. The normality test results show that the residual data has an Asymp. Sig. (2-tailed) of 0.200, which is greater than 0.05. This indicates that the data is normally distributed and meets the assumptions of linear regression (Sugiyono, 2021).

Table 2. Kolmogorov-Smirnov Normality Test

Parameter	Nilai
N	33
Std. Deviation	0,1772
Asymp. Sig. (2-tailed)	0,200

4. Linear Regression Analysis

After the normality assumption is met, a simple linear regression analysis is conducted to determine how much influence the use of e-learning (X) has on student learning outcomes (Y). The regression results show the value of $R = 0.947$ and $R^2 = 0.896$, which means that 89.6% of the variation in student learning outcomes is explained by the variable effect of e-learning use, while the remaining 10.4% is influenced by other factors outside this model (Arikunto, 2020).

Table 3. ANOVA^a (Regression Analysis)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	868,419	1	868,419	267,736	< 0,001
Residual	100,551	31	3,244		
Total	968,970	32			

5. Linearity Test (ANOVA Table)

Furthermore, the Linearity test was conducted to test the significance of the model simultaneously. The ANOVA test results show a Linearity value of 231.418 with a significance of 0.001. This shows that the regression model as a whole is significant in predicting the dependent variable, namely student learning outcomes.

Table 4. ANOVA Table Results

Source of Variasi	Sum of Squares	df	Mean Square	F	Sig.
Between Groups (Combined)	908,928	16	58,808	15,138	< 0,001
Linearity	868,419	1	868,419	231,418	< 0,001
Deviation from Linearity	40,509	15	2,701	0,720	0,735
Within Groups	60,042	16	3,753		
Total	968,970	32			

6. Test t (Partial) and Regression Coefficient

The t-test was conducted to determine the effect of the variable effect of the use of e learning partially on student learning outcomes. The regression coefficient value of 0.694 with a t-count value of 16.363 and $\text{sig.} = 0.000$ ($p < 0.001$) indicates that there is a positive and significant influence between the variables of the influence of the use of e-learning on student learning outcomes. The regression equation is:

$$Y = -0.406 + 0.694X$$

This means that every one unit increase in the application of information technology will increase student performance by 0.694 units (Nasution, 2021).

Table 5. Results of t Test and Regression Coefficient

Variabel	B	Std. Error	Beta	t	Sig.
Constant	0,944	0,630	-	1,498	0,764
E-Learning (X)	0,238	0,024	0,824	9,760	< 0,001

Overall, the results of this study indicate that the use of e-learning has a positive and significant effect on student learning outcomes. This finding supports the view that the integration of digital technology can improve the effectiveness and efficiency of learning in higher education (Munir, 2020).

DISCUSSION

The results of this study indicate that the use of e-learning has a positive and significant influence on student learning outcomes. The coefficient of determination (R^2) of 0.896 indicates that 89.6% of the variation in student learning outcomes can be explained by the intensity and quality of e-learning usage. The regression equation obtained, namely $Y = -0.406$

$+ 0.694X$, also indicates that every one unit increase in e-learning usage can increase learning outcomes by 0.694 units (Ghozali, 2021).

This finding is in line with the results of previous research which states that e-learning can increase learning motivation, time efficiency, and access to wider learning resources. Students who use e-learning actively tend to be more involved in independent learning, and have greater control over the speed and depth of understanding of the material learned (Hasanah & Prasetya, 2023). The ability to access videos, discussion forums, and assignments flexibly makes learning more adaptive to individual learning styles.

In terms of theory, these results support the constructivistic view of digital learning, where students act as active subjects who build their knowledge through interaction with digital content and fellow users in an e-learning environment. Constructivism emphasizes that learning is no longer one-way from lecturer to student, but collaborative and contextual (Sanjaya, 2021). With e-learning, students can explore various sources of knowledge, repeat material that has not been understood, and discuss in a virtual space without being limited by time and place.

Furthermore, the use of e-learning also opens up opportunities for strengthening technology based learning in higher education, especially in improving the efficiency and effectiveness of academic processes. The e-learning platform that is integrated with the academic management system allows lecturers to monitor student activities in real time, such as activeness in discussions, assignment submission, and learning evaluation results. This provides a complete picture of student engagement and encourages more directed learning (Mulyasa, 2022).

However, there are still challenges that need to be considered. Not all students have adequate digital readiness, both in terms of technical skills and supporting infrastructure such as devices and internet networks. This inequality can hinder the optimal utilization of e-learning and potentially create a gap in learning achievements between students. Therefore, efforts are needed from educational institutions to ensure equitable access to technology and the provision of sustainable digital literacy training.

Another noteworthy finding is that there are still 10.4% of other variables that influence student learning outcomes outside the use of e-learning. Factors such as intrinsic motivation, learning strategies, family environment support, and lecturers' leadership style also play an important role in students' academic achievement. So, even though e-learning is proven to be effective, learning strategies should still be holistic and consider non-technical factors in education.

In general, the results of this study reinforce the argument that digital transformation in higher education

must be accompanied by increased capacity of students and lecturers in managing technology-based learning processes. E-learning is not just a tool, but has become the main medium in the contemporary learning process. Its success in improving student learning outcomes is clear evidence that digital education innovation needs to be continuously developed and strengthened in higher education institutional policies.

CONCLUSIONS

Based on the results of the research that has been conducted, it can be concluded that the use of e-learning has a significant and positive effect on student learning outcomes. The regression analysis results show that 89.6% of the variation in learning outcomes can be explained by the use of e-learning, which means that the more intensive and qualified the use of e-learning, the higher the learning outcomes achieved. This finding confirms that e-learning can be an effective tool in supporting the learning process in higher education, especially in post pandemic distance learning situations.

Nevertheless, the effectiveness of e-learning still faces various challenges such as limited infrastructure, uneven digital literacy, and low motivation to learn independently among students. Therefore, in addition to optimizing the use of e-learning platforms, institutional support is needed in the form of training, strengthening digital systems, and adaptive and inclusive learning approaches. The results of this study are expected to be the basis for policy making in developing a more targeted, efficient and sustainable online learning strategy in higher education.

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