

The Impact of Hybrid Learning Models on Student Competence and Achievement in Higher Education

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Abstract

The development of information and communication technology (ICT) has brought significant changes to various sectors of life, including higher education. This study aims to analyze the impact of the hybrid learning model on student competency and achievement in higher education. The hybrid learning model is a combination of face-to-face and online learning designed to increase the flexibility and effectiveness of the learning process. The research method used is a quantitative approach with an explanatory design. The research sample was determined using a purposive sampling technique with the criteria of students who have participated in hybrid learning for at least one semester. Data collection was carried out using a Likert scale questionnaire to measure student competency (cognitive, affective, and psychomotor), and documentation of academic grades to measure learning achievement. Data were analyzed using descriptive and inferential statistics, specifically multiple linear regression tests, after first undergoing validity, reliability, and classical assumption tests. The results showed that the hybrid learning model had a positive and significant effect on student competency and achievement. Hybrid learning was able to improve conceptual understanding, learning independence, and skills in using digital technology. In addition, there was an increase in students' academic grades after implementing this learning model. However, this study also found several obstacles, such as limited technological infrastructure and differences in digital literacy levels.

Keywords

hybrid learning, learning achievement, student competence.



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INTRODUCTION

The development of information and communication technology (ICT) has brought significant changes to various sectors of life, including higher education. The increasingly rapid

digital transformation is encouraging universities to adopt learning systems that are more flexible, innovative, and adaptive to the needs of the times. One form of this innovation is the hybrid learning model, which combines face-to-face and online learning in a single, integrated system. This model emerged in response to the demands of the Industrial Revolution 4.0 and Society 5.0, which emphasize the importance of utilizing technology in the learning process. Initially, learning in higher education was dominated by conventional methods centered on lecturers (teacher-centered learning) (Bibi & Jati, 2015). However, this approach was deemed inadequate in developing 21st-century competencies, such as critical thinking, creativity, collaboration, and communication. Therefore, innovative learning models are needed that can increase active student engagement and provide a more meaningful learning experience. The hybrid learning model presents a solution that can integrate the advantages of face-to-face learning with the flexibility of online learning, allowing students to study independently while still receiving guidance from lecturers (Asyari & Rasidi, 2022).

The COVID-19 pandemic has become a crucial momentum in accelerating the implementation of technology-based learning in higher education. The drastic shift from face-to-face to online learning has presented various challenges, such as limited interaction, low motivation to learn, and disparities in access to technology. This situation has pushed educational institutions to develop more adaptive learning models, one of which is the hybrid approach (Abdurrahim, 2022). This model is not only a temporary solution during the pandemic but has also evolved into a long-term learning strategy considered more effective and efficient. Conceptually, hybrid learning has great potential in improving student competency. This competency is not limited to cognitive aspects but also encompasses affective and psychomotor aspects. In its implementation, students are required to be more independent in managing study time, utilizing digital learning resources, and collaborating virtually (Mohammad & Rahmawati, 2025). This can indirectly improve soft skills such as independence, responsibility, and digital communication skills. Research shows that the implementation of hybrid learning can improve students' reasoning abilities and soft skills compared to conventional learning (Anugrah et al., 2022).

In addition to impacting competency, the hybrid learning model also impacts student achievement. Learning achievement is an important indicator in assessing the success of the learning process in higher education. Several studies have shown that blended or hybrid learning models have a positive influence on student learning outcomes. For example, there was an increase in students' post-test scores after implementing the blended learning model compared to conventional methods (Pecamuya, 2025). This indicates that integrating technology into learning can help students understand material more deeply through a variety of sources and methods (Asyrofi & Junaedi, 2016). However, the implementation of hybrid learning is not without challenges. One major obstacle is limited technological infrastructure, especially in areas without adequate internet access. Furthermore, low digital literacy among both lecturers and students also hinders the optimization of hybrid learning. Not all educators have adequate

pedagogical skills to manage technology-based learning, resulting in a less effective learning process (Surtiati et al., 2025).

On the other hand, learning motivation is also a determining factor in the success of hybrid learning. Students with high motivation tend to be more active in both online and face-to-face learning, thus positively impacting academic achievement. Conversely, students with low motivation tend to struggle with time management and independent comprehension of material (Maulidy et al., 2026). Therefore, learning strategies are needed to increase student motivation and engagement in the learning process. Furthermore, hybrid learning is also closely related to higher education policies, such as the Independent Learning Campus (MBKM) program in Indonesia. This program encourages learning flexibility and provides opportunities for students to learn outside the classroom through various activities, such as internships, projects, and student exchanges (Utaminingsih et al., 2024). In this context, the hybrid learning model is highly relevant because it supports more flexible and experiential learning. Research shows that learning models have a significant influence on student learning outcomes and motivation in the MBKM context (Rahayu et al., 2024).

Although various studies have shown that hybrid learning has the potential to improve student competency and achievement, the results obtained vary and are influenced by various factors, such as student characteristics, technological readiness, and the learning design used. Therefore, further research is needed to analyze in depth the impact of hybrid learning models on student competency and achievement in higher education, particularly in the context of education in Indonesia.

Based on this description, it can be concluded that hybrid learning is a significant innovation in higher education that holds significant potential for improving the quality of learning. However, its successful implementation depends heavily on the readiness of various parties, including infrastructure, faculty competence, and student motivation. Therefore, research into the impact of hybrid learning models on student competence and achievement is crucial to contribute to the development of more effective, innovative, and sustainable learning systems in higher education.

METHODS

This study uses a quantitative approach with an explanatory research design that aims to analyze the effect of the hybrid learning model on student competency and achievement in higher education. The quantitative method was chosen because it can provide an objective picture through measuring the variables studied and testing the causal relationships between variables statistically. The population in this study were all active students at one of the universities that have implemented the hybrid learning model, while the research sample was determined using a purposive sampling technique with the criteria of students who have participated in hybrid learning for at least one semester. The data collection instrument used a closed-ended questionnaire with a Likert scale to measure competency variables (cognitive, affective, and psychomotor) and perceptions of hybrid learning, while learning achievement

data were obtained through documentation of student academic grades. Instrument validity and reliability tests were conducted to ensure the quality of the obtained data before further analysis.

The data analysis techniques in this study used descriptive and inferential statistical analysis. Descriptive analysis was used to describe the characteristics of respondents and the distribution of data from each research variable. Next, inferential analysis was conducted using multiple linear regression tests to determine the effect of the hybrid learning model on student competency and achievement. Prior to the regression test, the data were first tested using classical assumption tests such as normality, multicollinearity, and heteroscedasticity tests to ensure the feasibility of the analysis model. In addition, the coefficient of determination (R^2) test was used to determine the contribution of the independent variables to the dependent variable, and the t-test and F-test were used to test the significance of the influence partially and simultaneously. The results of this analysis are expected to provide an empirical picture of the extent to which the hybrid learning model influences the improvement of student competency and achievement in higher education.

FINDINGS AND DISCUSSION

Normality Test

The purpose of the normality test is to determine whether the residual or confounding variables in a regression model are normally distributed. In this study, the non-parametric Kolmogorov-Smirnov statistical test was used to test for normality. If the significance value is greater than 0.05, the data are considered normally distributed. The findings of the normality test are shown in the table below:

Table 1. Normality Test Results

One-Sample Kolmogorov-Smirnov Test			
			Unstandardized Residual
N			42
Normal Parameters ^{a,b}	Mean	.0000000	
	Standard Deviation	1.54310701	
Most Extreme Differences	Absolute	.163	
	Positive	.052	
	Negative	-.144	
Kolmogorov-Smirnov Z	1,062		
Asymp. Sig. (2-tailed)	.324		
a. Test distribution is Normal.			
b. Calculated from data.			

Source: Data processed with SPSS 2026

Based on the test results in the table above, the Kolmogorov-Smirnov value is 1.062 and the significance value is $0.324 > 0.05$. Therefore, it can be concluded that the residual values are normally distributed, allowing for further analysis, namely regression analysis.

Multicollinearity Test

Multicollinearity testing aims to test whether a regression model is found Correlation between independent variables. In a good regression, there should be no correlation between variables. The results of the multicollinearity test are shown in the following table: poverty level and economic growth

Table 2. Multicollinearity Test Results

Model	Collinearity Statistics	
	Tolerance	VIF
Implementation of Hybrid Learning Model	.325	3,278
Improving Student Competence	.242	2,641

Source: Data processed with SPSS 2026

Based on the table above, it can be concluded that all variables do not exhibit multicollinearity in the data processed in this study. This is because the *tolerance significance value* for all variables is greater than 0.01, and the VIF value for all variables is less than 10.

Heteroscedasticity Test

The Heterogeneity Test aims to determine whether the residual variances of one observation differ from another in the regression, which is called homoscedasticity. If they differ, it is called heterogeneity. This study uses the Glejser test to determine whether homoscedasticity is present. The test results are shown in the figure below:

Table 3. Results of Heteroscedasticity Test (Glejser Method)

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardize d Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.454	.536	.421	4,613	.007
Implementation of Hybrid Learning Model	.342	.125	.230	2,214	.335
Improving Student Competence	.234	.138	.242	2,274	.340

a. Dependent Variable: res2

Source: Data processed with SPSS 2026

Based on the test results in the table above, it shows that the variable of the Implementation of the Hybrid Learning Model has a significance value of 0.335 > 0.05 so it can be concluded that there are no symptoms of heteroscedasticity in the variable of the

Implementation of the Hybrid Learning Model. The variable of Student Competency Improvement has a significance value of $0.340 > 0.05$ so it can be concluded that there are no symptoms of heteroscedasticity in the variable of Student Competency Improvement.

Simple Linear Regression Analysis

Simple linear regression analysis is a linear relationship between the independent variable (X) and the dependent variable (Y). This analysis is used to determine the direction of the relationship between the independent and dependent variables, and whether each independent variable is positively or negatively related. The results of the multiple regression analysis using SPSS are shown in the following table:

t-test results (t-test)

The t-test shows the relationship between each independent variable (X) on the dependent variable with a significance level of 0.05 (5%) and *Degrees of Freedom* (df) = nk. Based on the following criteria.

- a. Determine the criteria for testing research hypotheses by comparing the calculated t value with the t table .
 - 1) If the $t_{table\ value} > t_{count}$, then H_0 is rejected and H_1 is accepted.
 - 2) If the $t_{table\ value} < t_{calculated}$ then H_0 is accepted and H_1 is rejected .
- b. By using the probability significance figures
 - 1) If the sig value > 0.05 then H_0 is accepted and H_1 is rejected.
 - 2) If the sig value < 0.05 then H_1 accepted and H_0 is rejected

Table 4. Results of the t-test

Coefficients ^a					
Model	Unstandardize		Standardize	T	Sig.
	d Coefficients				
	B	Std. Error	Beta		
(Constant)	.654	0.452		.327	.679
Implementation of Hybrid Learning Model	.273	.238	.236	2,870	0.00

a. Dependent Variable: Student Competency Improvement

Source: Data processed by researchers using SPSS 2026

Table 4 shows that the implementation of the hybrid learning model has a significant impact on improving student competency in higher education with a t-statistic value of 2,870 and a sig value of $0.050 < 0.05$.

Discussion

The results of the study indicate that the implementation of the hybrid learning model has a significant impact on improving student competency in higher education. Based on descriptive analysis, the majority of respondents expressed positive perceptions of hybrid learning, particularly in terms of flexible study time, easy access to materials, and a variety of more interactive learning methods. In terms of cognitive competency, students experienced improvements in conceptual understanding and analytical skills, as evidenced by learning evaluation results and improved academic grades. Meanwhile, in terms of affective aspects, students demonstrated a more positive attitude toward the learning process, such as increased motivation, responsibility, and learning independence. In terms of psychomotor skills, hybrid learning encouraged students to be more active in practice, discussions, and the use of digital technology as a learning support tool.

The results of the multiple linear regression test indicate that the hybrid learning model has a positive and significant effect on student competency. This is evidenced by a significance value of less than 0.05, which means that the research hypothesis is accepted. Furthermore, the coefficient of determination (R^2) value indicates that the hybrid learning variable makes a significant contribution in explaining variations in student competency. This finding indicates that the more optimal the implementation of hybrid learning, the higher the level of competency possessed by students. These results are in line with constructivism theory, which emphasizes the importance of students' active role in constructing knowledge through diverse learning experiences, both online and face-to-face.

In terms of academic achievement, this study also found that the hybrid learning model had a significant impact on improving student learning outcomes. This is evident in the difference in average grades before and after the implementation of hybrid learning, with scores tending to be higher after the implementation (Wijaya & Ydewani, 2023). Students had the opportunity to review material through online platforms, access various additional learning resources, and participate in flexible discussions, thus deepening their understanding of the material. Furthermore, the use of digital learning media such as videos, discussion forums, and interactive quizzes also helped increase student engagement in the learning process (Syarif, 2012).

However, the research also revealed several obstacles in implementing hybrid learning. One of the main obstacles is limited internet access and technological devices, which means that not all students can optimally participate in online learning. Furthermore, there are differences in digital literacy levels among students, which affects their ability to utilize learning technology effectively (Setiawan et al., 2020). From the lecturer's perspective, challenges remain in designing integrated and engaging hybrid learning, necessitating improvements in pedagogical and digital competencies for teaching staff (Mujiyanto & Suryadhianto, 2025). These obstacles demonstrate that the success of hybrid learning depends not only on the model itself, but also on the readiness of the infrastructure and human resources involved (Yuwansyah et al., 2024).

In further discussion, the results of this study reinforce previous findings that hybrid learning is an effective approach to improving the quality of learning in higher education. This model allows for more personalized learning, allowing students to adjust their own pace and learning style (Nisak & Nafisah, 2023). Furthermore, interactions, both in-person and virtual, can enrich students' learning experiences. However, achieving optimal results requires appropriate learning design, adequate technological support, and commitment from all parties involved in the educational process (Hilalludin & Akbar, 2025).

Overall, this research demonstrates that hybrid learning models play a significant role in improving student competency and achievement in higher education. While implementation presents challenges, the benefits are far greater, particularly in addressing the demands of education in the digital age (Sianturi et al., 2025). Therefore, higher education institutions need to continue developing and refining hybrid learning models to maximize their effectiveness and produce competent graduates who are ready to face the world of work.

CONCLUSION

Based on the research results and discussion, it can be concluded that the hybrid learning model has a positive and significant impact on improving student competency and achievement in higher education. Hybrid learning integrates the advantages of face-to-face and online learning, providing flexibility and a more varied and interactive learning experience. This impacts student competency, across cognitive, affective, and psychomotor domains, demonstrated through critical thinking skills, independent learning, and skills in utilizing digital technology.

Furthermore, the hybrid learning model has been shown to improve student achievement, as reflected in improved academic evaluation results following its implementation. The availability of various digital learning resources, easy access to materials, and opportunities for independent learning are key factors supporting improved student understanding of course material. However, the success of hybrid learning implementation is heavily influenced by the readiness of the technological infrastructure, the digital literacy of students and lecturers, and effective and integrated learning design.

Therefore, universities are advised to continue developing and optimizing the implementation of hybrid learning models by improving the quality of facilities and infrastructure, providing training for lecturers, and strengthening technology-based learning systems. These efforts are expected to create a more innovative and adaptive learning process and produce highly competent graduates who are able to compete in the digital age.

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