AL-TANZIM
Jurnal Manajemen Pendidikan Islam
e-ISSN : 2549-5720
p-ISSN : 2549-3663

Al-Tanzim: Jurnal Manajemen Pendidikan Islam
Vol. 09 No. 01 (2025) : 343-358
Available online at https://ejournal.unuja.ac.id/index.php/al-tanzim/index

Moderating Role of Student Engagement in the Relationship Between Teaching Quality and Academic Performance

Fitriani[1*], Mudjia Rahardjo[2], Hasbullah[3], Saifaldin Idris Onia[4]
[1,2]Islamic Educational Management Department, Universitas Islam Negeri Maulana Malik Ibrahim Malang, East Java Indonesia
[3]Islamic Educational Management Department, Institut Agama Islam Negeri Bone, South Sulawesi, Indonesia
[4]Education Department, University of Khartoum, Sudan
Email: fitri.angel91@gmail.com[1], m_rahardjo2003@yahoo.com[2], hasbullah.kakilangit@gmail.com[3], saifonia89@gmail.com[4]

DOI: http://doi.org/10.33650/al-tanzim.v9i1.10513

Received: 02 January 2025	*Revised: 14 March 2025*	*Accepted: 20 April 2025*

Abstract:

This study examines the influence of teaching quality, campus facilities, and student engagement on academic performance and the moderating role of student engagement in the relationship. Data were collected through a survey of 185 students and analyzed using PLS-SEM. The results showed that teaching quality and student engagement positively and significantly influenced academic performance, while campus facilities did not have a considerable effect. Student engagement did not moderate the relationship between teaching quality and campus facilities on academic performance. This model explained 68.4% of the variation in academic performance and had good prediction. These findings emphasize the importance of teaching quality and student engagement to improve academic performance, while campus facilities have limited influence. The practical implication of this study is the importance of focusing on improving teaching quality and student engagement to improve academic performance. Educational institutions are advised to implement interactive and project-based learning. Although campus facilities are essential, their influence on academic performance is limited.

Keywords: *Teaching Quality, Campus Facilities, Student Engagement, Academic Performance*

Abstrak:

Penelitian ini mengkaji pengaruh kualitas pengajaran, fasilitas kampus, dan keterlibatan mahasiswa terhadap kinerja akademik, serta peran moderasi keterlibatan mahasiswa dalam hubungan tersebut. Data dikumpulkan melalui survei pada 185 mahasiswa dan dianalisis dengan PLS-SEM. Hasil penelitian menunjukkan bahwa kualitas pengajaran dan keterlibatan mahasiswa memiliki pengaruh positif dan signifikan terhadap kinerja akademik, sementara fasilitas kampus tidak berpengaruh signifikan. Keterlibatan mahasiswa tidak memoderasi hubungan antara kualitas pengajaran dan fasilitas kampus dengan kinerja akademik. Model ini menjelaskan 68,4% variasi dalam kinerja akademik dan memiliki prediksi yang baik. Temuan ini menekankan pentingnya kualitas pengajaran dan keterlibatan mahasiswa untuk meningkatkan kinerja akademik, sementara fasilitas kampus memiliki pengaruh terbatas. Implikasi praktis dari penelitian ini adalah pentingnya fokus pada peningkatan kualitas pengajaran dan keterlibatan mahasiswa untuk meningkatkan kinerja akademik. Institusi pendidikan disarankan untuk mengimplementasikan pembelajaran interaktif dan berbasis proyek. Meskipun fasilitas kampus penting, pengaruhnya terhadap kinerja akademik relatif terbatas.

Kata Kunci: *Kualitas Pengajaran, Fasilitas Kampus, Keterlibatan Mahasiswa, Kinerja Akademik*

Please cite this article in APA style as:
Fitriani, Rahardjo, M., Hasbullah, Onia, S. I. (2025). Moderating Role of Student Engagement in the Relationship Between Teaching Quality and Academic Performance. *Al-Tanzim: Jurnal Manajemen Pendidikan Islam*, *9*(1), 343-358.

INTRODUCTION

The relationship between teaching quality, campus facilities, and student engagement in academic performance has been a central focus of educational research. The importance of high-quality teaching methods, noting that effective pedagogy leads to better student comprehension and achievement (Chen et al., 2024; Habibi Baghi et al., 2024; Zhang et al., 2024). Likewise, campus facilities, including libraries, laboratories, and technology, play a significant role in supporting student learning (Asamoah, 2021; Cox, 2021; Zhou, 2022). Furthermore, student engagement has emerged as a crucial factor, with research indicating that active participation in academic and extracurricular activities is linked to improved academic outcomes (Buckley & Lee, 2021; Dickinson et al., 2021; Sá, 2023). Despite the recognition of these variables, limited research has quantitatively examined how they interact to influence academic performance. As universities continue to invest in teaching quality and infrastructure, it is vital to understand how these investments, coupled with student engagement, contribute to student's academic success and where universities should focus their resources for the greatest impact.

Several studies have explored the role of teaching quality and campus facilities in shaping academic performance. Some research found that diverse teaching methods directly enhance student performance by improving engagement and understanding (Han, 2021; Tomaszewski et al., 2022; Ummi et al., 2024). Similarly, research by Al-Adwan et al. (2021), Pandita and Kiran (2023), and Cayubit (2022) demonstrated that adequate campus facilities, such as access to modern learning tools and environments, can significantly support student academic success. In terms of student engagement, some studies argued that students actively participating in academic activities have higher academic achievement, as engagement fosters intrinsic motivation and better learning outcomes (Akram & Li, 2024; Amjad et al., 2023; Kaya & Ercag, 2023). However, despite the individual focus of these studies, there is a gap in understanding how these variables combine to influence academic performance. The lack of a comprehensive quantitative study that explores the simultaneous effects of teaching quality, campus facilities, and student engagement on academic performance remains a critical area for further research, which this study aims to address.

While extensive research has been conducted on teaching quality, campus facilities, and student engagement, a significant gap exists in understanding how these factors influence student academic performance. Previous studies have often isolated these factors, but few have examined their combined effects in a structured, quantitative model. Furthermore, there is a lack of research on how student engagement may moderate the impact of teaching quality and campus

facilities on academic performance. This research addresses these gaps by quantitatively assessing the relationships between these variables. Understanding these interactions is crucial, as it can provide actionable insights for universities aiming to optimize their resources and strategies. Focusing on how these factors collectively influence academic performance, this study seeks to inform policy decisions and institutional practices to improve student outcomes. Addressing this gap will contribute to academic research and offer practical recommendations for higher education institutions.

This study brings a novel perspective by quantitatively analyzing the moderating role of student engagement in the relationship between teaching quality, campus facilities, and academic performance. While existing research has examined these factors independently, few studies have explored how they interact with one another to influence student outcomes. By using structural equation modelling (SEM), this research will provide a comprehensive understanding of the combined effects of these variables. The novelty of this research lies in its focus on student engagement as a potential moderating variable, exploring whether engagement can amplify or reduce the effects of teaching and campus facilities on academic performance. This research is unique in integrating these factors within a single, data-driven model, providing new insights into how higher education institutions can leverage teaching quality, campus resources, and student involvement to improve academic outcomes. The findings will contribute to the broader educational policy and strategic management field.

This research aims to quantitatively examine the effects of teaching quality, campus facilities, and student engagement on academic performance in higher education. Specifically, the study will assess how teaching quality and campus facilities contribute directly to academic success and whether student engagement moderates these relationships. Using a quantitative approach, this study will gather data from a large sample of students and apply structural equation modelling (SEM) to analyze the interrelationships between the variables. The objective is to identify the relative importance of each factor in influencing academic performance and to determine how engagement may act as a mediator. The study will provide evidence-based recommendations for universities looking to enhance academic performance by optimizing teaching practices, improving campus facilities, and fostering greater student engagement. Ultimately, the research will offer valuable insights into how institutions can align their resources and strategies to maximize student success in a competitive academic landscape.

RESEARCH METHOD

This study is conducted within the Islamic Education Management Study Program context at the Faculty of Tarbiyah, IAIN Bone, focusing on understanding the factors influencing student academic performance. This context was selected because it provides a unique opportunity to explore the interplay between teaching quality, campus facilities, and student involvement in Indonesia's public

higher education setting. The study is highly relevant to current educational challenges, as it addresses how these factors contribute to student's academic success in a specific cultural and institutional environment. The research follows a quantitative research design with an explanatory or causal research approach (Bentouhami et al., 2021; Cayubit, 2022; Hendren et al., 2023), aiming to explain the direct impact of independent variables (teaching quality and campus facilities) on the dependent variable (student academic performance) while considering the moderating role of student involvement. This approach was chosen because it allows for clearly measuring relationships between variables and helps establish cause-and-effect patterns, which are essential for understanding educational outcomes.

Data was collected through an online survey distributed to 185 students enrolled in the Islamic Education Management Study Program at IAIN Bone. The use of a survey was chosen because it efficiently gathers data from a large and diverse sample (Osamy et al., 2022; Vatter et al., 2023; Zickar & Keith, 2023), enabling the research to measure various students' perceptions of teaching quality, campus facilities, and their level of involvement. The online method, using Google Forms, was specifically selected to ensure convenience, broad accessibility, and ease of reaching participants across different student groups. This method allows for collecting primary data to directly address the research questions and obtain up-to-date insights into student experiences. The survey design included closed-ended and Likert-scale questions, which are well-suited for testing the hypothesized relationships in the study. By collecting data from students directly, the study captures real, contextual information, ensuring the relevance and specificity of the responses about the research objectives.

The data collected were analyzed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach, using Smart PLS 4 software. SEM was chosen because it is a powerful technique for analyzing complex relationships between latent variables, especially when the data do not meet assumptions of normality or the sample size is relatively small. This method allows for evaluating direct and indirect effects, making it ideal for testing the causal relationships between teaching quality, campus facilities, student involvement, and academic performance. The analysis was conducted in two stages: the outer model test to evaluate the validity and reliability of the measurement items and the inner model test to test the hypothesized relationships (Farida & Setiawan, 2022; Legate et al., 2023; Rönkkö & Cho, 2022). This approach was chosen because it ensures the robustness of the results by confirming that the measurement items effectively represent the latent variables and that the hypothesized relationships are statistically significant. Using this method allows for clear insights into the influences and interactions among the variables, contributing to the reliability and validity of the study's findings.

The framework in this study begins with the selection of three independent variables, namely Teaching Quality (X1), Campus Facilities (X2), and Student

Involvement (Z), which function as moderating variables. These three independent variables are thought to influence the dependent variable, Student Academic Performance (Y). The following is a schematic description of the research framework in Figure 1.

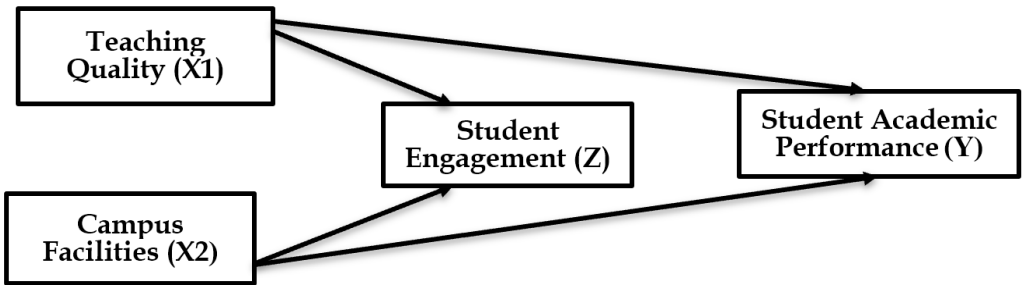

Figure 1. Conceptual Framework of the Relationship between Variables X1, X2, Z and Y

Several hypotheses are proposed based on the following to test the causal relationship between the variables identified in this study.
H1: Teaching quality has a direct influence on student performance student
H2: Physical facilities have a direct influence on student performance student
H3: Student engagement moderates the relationship between teaching quality and student academic performance
H4: Student engagement moderates the relationship between teaching quality and student academic performance

RESULTS AND DISCUSSION

Result

The research results were analyzed with the help of Smart PLS, which evaluated the measurement model, structural model, and goodness and fit of the model. The first stage of analysis is done by measuring the level of validity and reliability of each question item, which is an indicator of each variable. There are 26 question items tested to determine the level of accuracy using the outer loading test through the criteria for eligible items if the value is ≥ 0.7 or the value is ≥ 0.5, and the following are the results of the analysis as shown in Table 1.

Table 1. Outer Loading Results

Variable	Measurement Item	Outer Loading	Description
Teaching Quality (X1)	X1.1	0.734	Valid
	X1.2	0.705	Valid
	X1.3	0.757	Valid
	X1.4	0.769	Valid
	X1.5	0.692	Valid
	X1.6	0.677	Valid
	X1.7	0.764	Valid
Campus	X2.1	0.785	Valid

Facilities (X2)	X2.2	0.769	Valid
	X2.3	0.766	Valid
	X2.4	0.831	Valid
	X2.5	0.817	Valid
	X2.6	0.782	Valid
Student Academic Performance (Y)	Y1	0.764	Valid
	Y2	0.693	Valid
	Y3	0.761	Valid
	Y4	0.841	Valid
	Y5	0.799	Valid
	Y6	0.759	Valid
Student Engagement (Z)	Z1	0.542	Invalid
	Z2	0.775	Valid
	Z3	0.645	Valid
	Z4	0.794	Valid
	Z5	0.783	Valid
	Z6	0.764	Valid
	Z7	0.677	Valid

Table 1. shows that outer loading results for all items in the teaching quality variable (X1) show values that vary between 0.677 and 0.769, with all values higher than the minimum limit of 0.6 recommended by Hair et al. (2019). This means that each indicator is valid for measuring the Teaching Quality latent variable. Therefore, the items from X1.1 to X1.7 have contributed to explaining teaching quality. All items on the campus facilities variable (X2) show a relatively high outer loading value between 0.766 and 0.831. This value indicates that each indicator on the campus facilities variable has a strong and valid relationship in describing students' views on the facilities available on campus. Item X2.4, with a value of 0.831, is the most dominant, showing the most significant contribution in measuring campus facilities.

The outer loading value for the student academic performance variable (Y) is between 0.693 and 0.841. All indicators are considered valid because their values exceed the minimum limit. Item Y4 has the highest outer loading value of 0.841, which indicates that this section (probably related to students' learning outcomes or major achievements) is most significant in describing students' academic performance. The student involvement variable (Z) has one item, Z1, with an outer loading value of 0.542, below the minimum limit of 0.6, so it is considered invalid. This item is not good enough to describe the student involvement variable, so it was decided to be removed from the analysis. Meanwhile, other indicators, such as Z2 to Z7, have outer loading values ranging from 0.645 to 0.794, which indicates that they are valid and relevant to measuring student engagement. Based on the outer loading results, 25 measurement items were used with the following outer loading model, as presented in Figure 1.

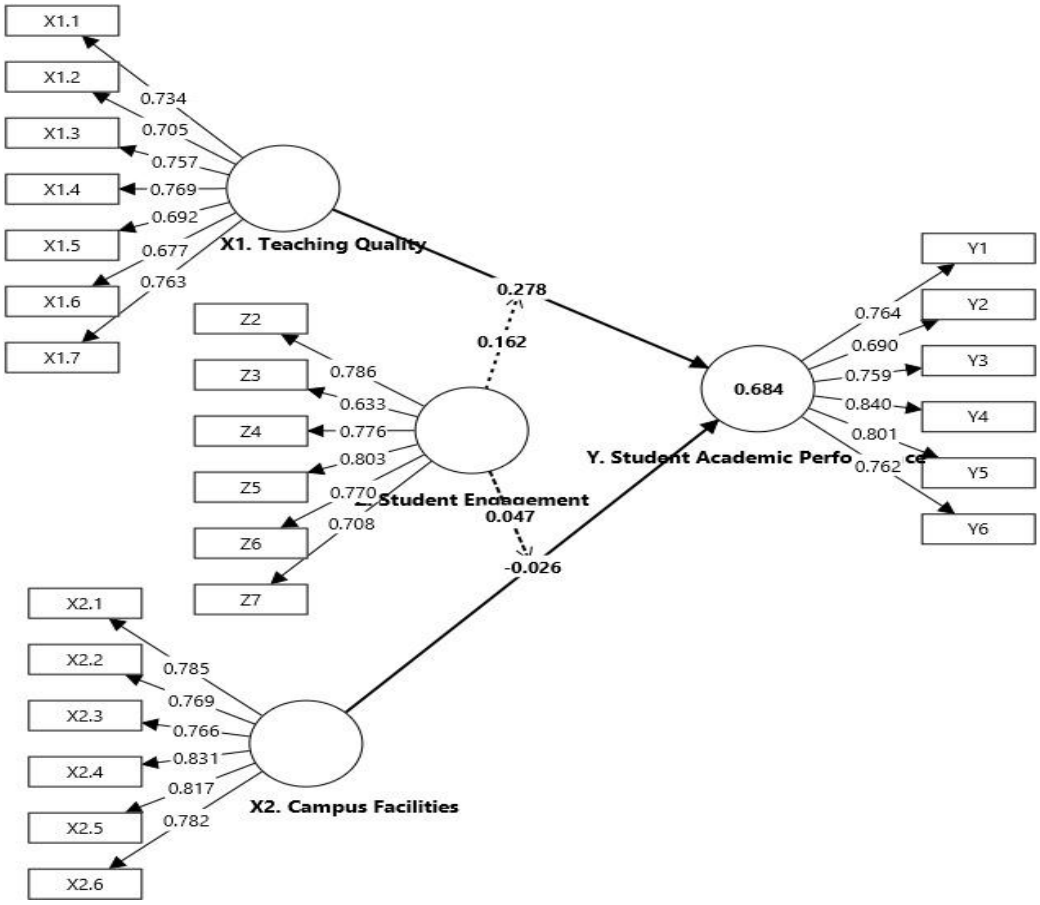

Figure 1. Outer Loading Diagram

After invalid measurement items are removed, the outer loading test results, Cronbach's alpha, composite reliability, and AVE value for each variable are based on the outer loading diagram, and the analysis is carried out as shown in Table 2.

Table 2. Evaluation of Measurement Model

Variable	Item	Indicator	Cronbach's Alpha	Composite Reliability	(AVE)
Teaching Quality (X1)	X1.1	Lecturers' understanding of lecture material	0.853	0.856	0.531
	X1.2	Lecturer's ability to deliver lecture material clearly and systematically			
	X1.3	Lecturer's readiness to answer questions			
	X1.4	Use of varied learning methods			
	X1.5	Utilization of learning media			
	X1.6	Availability of lecturers to discuss outside the lecture schedule			
	X1.7	Lecturer's ability to encourage students to participate in class actively			
Campus Facilities (X2)	X2.1	Availability of comfortable and adequate classrooms	0.882	0.884	0.627
	X2.2	The existence of a learning space equipped with supporting tools			

Variable	Item	Indicator	Cronbach's Alpha	Composite Reliability	(AVE)
	X2.3	Additional facilities such as laboratories, libraries, UKM rooms, places of worship, Ma'had, canteens, sports fields, and parking lots are available.			
	X2.4	Cleanliness and tidiness of physical campus facilities			
	X2.5	Campus internet access to support the learning process			
	X2.6	Multimedia facilities such as projectors in classrooms			
Student Academic Performance (Y)	Y1	GPA Score	0.862	0.867	0.594
	Y2	Improved GPA results from semester to semester			
	Y3	Student's ability to understand the lecture material taught			
	Y4	Success in answering questions			
	Y5	Ability to apply Terri in a real task or project			
	Y6	Problem-solving using knowledge that has been learned			
Student Engagement (Z)	Z2	Participation in discussions and questions and answers during lectures	0.841	0.846	0.560
	Z3	Time devoted to learning outside the classroom			
	Z4	Perseverance in completing tasks			
	Z5	Motivation for academic achievement			
	Z6	Cooperation in group projects or tasks			
	Z7	Participation in organizations or communication on campus			

Table 2. showed that teaching quality (X1) had a significant and positive influence on student academic performance (Y), with a coefficient of 0.278 and a p-value of 0.000, indicating that improving teaching quality can improve students' academic outcomes. Meanwhile, campus facilities (X2) did not significantly affect student academic performance (coefficient -0.026, p-value 0.696), indicating that although facilities are important for learning comfort, they do not directly affect academic outcomes. Student involvement (Z) was also shown to influence academic performance significantly (coefficient 0.539, p-value 0.000), indicating that students more involved in the learning process have better academic performance. However, student engagement did not moderate the relationship between teaching quality and academic performance (p-value 0.076) nor between campus facilities and academic performance (p-value 0.549). These findings suggest that while teaching quality and student engagement are important in improving academic performance, campus facilities do not directly impact significantly, and student engagement is not a moderating factor.

Before testing the hypothesis, the collinearity statistic (VIF) test is carried out to determine whether or not there is multicollinearity between variables. The results of the inner VIF test are shown in Table 3.

Table 3. Inner VIF Test

	VIF
X1. Teaching quality -> Y. Academic Performance	2.266
X2. Campus Facilities -> Y. Academic Performance	2.312
Z. Student Engagement -> Y. Academic Performance	1.495
Z. Student Engagement x X1 Teaching Quality -> Y. Academic Performance	3.666
Z. Student Engagement x X2. Campus Facilities -> Y. Academic Performance	3.623

Table 3 shows the VIF (Variance Inflation Factor) test results to measure the multicollinearity between variables in the model. A VIF value higher than 5 could indicate a multicollinearity problem. However, all values in this table fall below that limit, with the highest VIF on the interaction between student engagement and teaching quality (3,666) and between student engagement and campus facilities (3,623). The estimation test results in Table 3 show that the inner VIF value is < 5, so the level of multicollinearity between variables is low. These results indicate that the VIF estimation results are robust or unbiased so that it can be continued with hypothesis testing. The following is a diagram of the hypothesis test results shown in Figure 3.

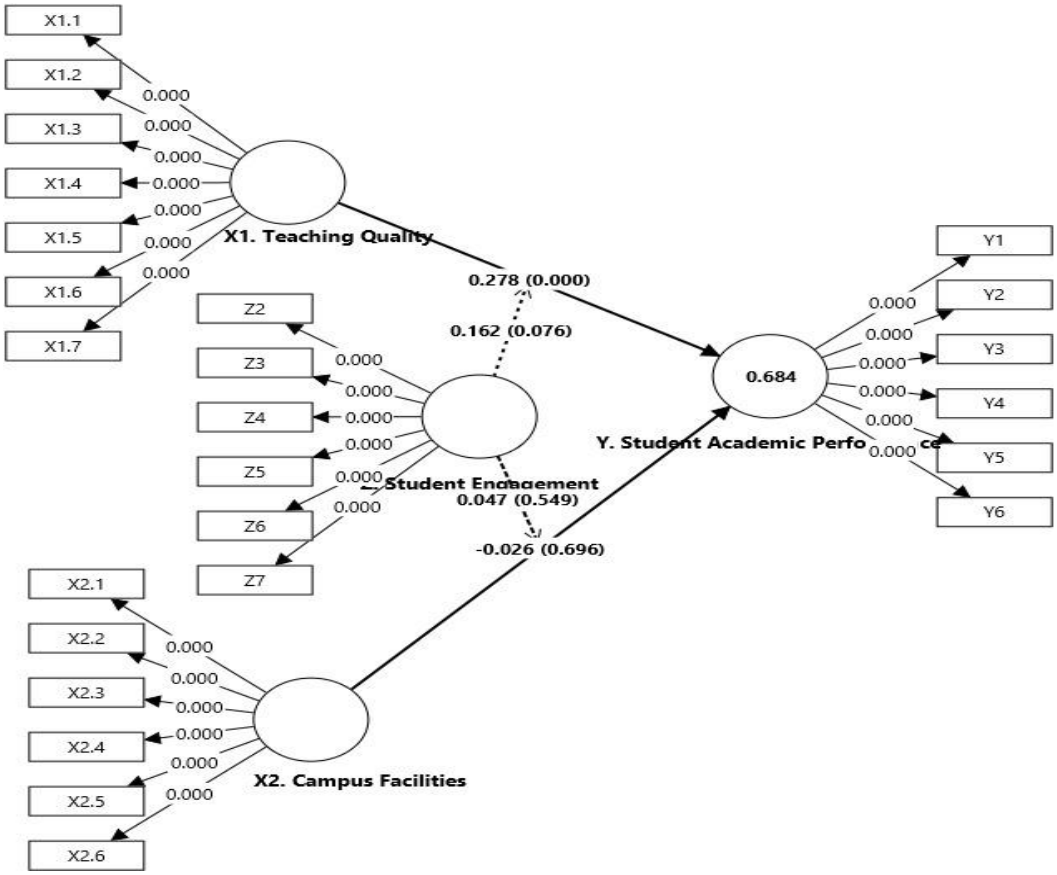

Figure 3: Path Coefficient Diagram and Hypothesis Test P-Value

The diagram in Figure 3 shows the results of hypothesis testing, which are shown in Table 4.

Table 4. Hypothesis Test Results

Hypothesis Statement	Path Coefficients	P-value	95% Confidence Interval Path Coefficient		F-Square	Results
			Lower Limit	Upper Limit		
(H1) X1. Teaching quality -> Y. Academic Performance	0.278	0.000	0.132	0.410	0.108	Accepted
(H2) X2. Campus Facilities -> Y. Academic Performance	-0.026	0.696	-0,150	0,111	0.001	Not accepted
(H3) Z. Student Engagement -> Y. Academic Performance	0,539	0.000	0.442	0.650	0.616	Accepted
(H4) Z. Student Engagement x X1. Teaching quality -> Y. Academic Performance	0,162	0.076	-0,025	0.330	0.003	Not accepted
(H5) Z. Student Engagement x X2. Campus Facilities -> Y. Academic Performance	0,047	0.549	-0,095	0.208	0.025	Not accepted

The results of hypothesis testing in Table 4 show that the first hypothesis (H1) is accepted because teaching quality has a positive and significant effect on student academic performance with path coefficients (0.278) and p-value (0.000 <0.005). Any change in teaching quality will affect the level of student academic performance. At a confidence interval of 95%, the effect of teaching quality on student academic performance lies between 0.132 and 0.410. Teaching quality moderately influences campus academic performance, with an F2 of 0.108 < 0.35. The second hypothesis H2) is not accepted because of the significance value of the p-value (0.000 <0.005). Campus facilities do not significantly affect student academic performance because the path coefficient value is -0.026 and F 2 is (0.001). At a 95% confidence interval, campus facilities have a negative effect if they are at a value of -0.150 to 0.111.

The third hypothesis (H3) is accepted because the significance p-value (0.000 < 0.005) states that student involvement has a positive and significant effect on student academic performance with path coefficients (0.539) and F2 0.616 > 0.35. Student involvement can influence academic performance when the confidence interval is between 0.442 and 0.650. The fourth hypothesis (H4) is not accepted because of the significance value of the p-value (0.076 > 0.005). Student involvement cannot moderate the relationship between teaching quality and student academic performance with the value of path coefficients (0.162) and F2 (0.003) so that at a 95% confidence interval, student involvement cannot moderate the relationship between teaching quality and academic performance because the path coefficient is at a value of -0.025 to 0.330. The fifth hypothesis (H5) is not accepted because student involvement cannot moderate the relationship between campus facilities and student academic performance with a p-value (0.549 > 0.005) with a path coefficient (0.047) and F 2 of (0.025) so that at the 95% confidence interval lies between -0.095 to 0.208.

The following testing stage evaluates the model's goodness and fit. Table 5 shows the results of the R-square and Q-square tests.

Table 5. R-square and Q-square Test Results

	R-Square	Q-Square
Y. Student Academic Performance	0,684	0,391

The results of the R-square test in Table 5 illustrate that 68.4% of the variance in student academic performance (Y) can be explained by the independent variables in the model, namely teaching quality (X1), campus facilities (X2), and student involvement (Z) and their interactions. The R-square value of 68.4% is in the strong category, while other factors influence 31.6%. Q-square is used to evaluate the model's predictive ability on observational data. The Q-square value is 0.391, indicating that the model has sufficient ability (because the value of Q-square is> 0). This indicates that the model fits the data and is relevant in providing predictions of academic performance. The results of the R-square analysis indicate that the model has good predictive quality in explaining the variability of student academic performance. In contrast, the Q-square indicates that the model can provide relevant predictions, which means that the results can predict student academic performance based on independent and moderation variables.

The common thread of the results of this study shows that the quality of teaching and student engagement has a significant influence on student's academic performance, while campus facilities do not have a significant impact. Although campus facilities do not directly affect academic performance, good teaching quality and active involvement of students are proven to improve their academic outcomes. In addition, student engagement does not serve as a moderation factor that strengthens the relationship between the quality of teaching or campus facilities and academic performance. The model used in this study has good predictive ability with an R-square value of 68.4%, which indicates that the factors tested in this model can explain the variation in student academic performance. These findings underscore the importance of improving the quality of teaching and encouraging student engagement to achieve optimal academic outcomes, even if external factors such as campus facilities do not show a significant influence.

Discussion

This study explores the influence of teaching quality, campus facilities, and student engagement on student academic performance. Its findings provide significant insights into how these factors interact with each other and influence academic outcomes and whether these findings can enrich or challenge existing theories in the relevant literature.

The results of the study show that teaching quality has a positive and significant influence on students' academic performance, supporting findings in previous literature that emphasize the importance of teaching quality as a determining factor for academic success (Hooda et al., 2022; Madigan & Kim, 2021;

Tao et al., 2022). A path coefficient of 0.278 and a very low p-value (0.000) indicate that improving teaching quality, such as using diverse teaching methods and lecturer involvement in discussions, can improve students' academic outcomes. These findings align with constructivist teaching theory, which emphasizes the important role of active and interactive teaching in improving student understanding (Kesler et al., 2022; Li et al., 2023; Marougkas et al., 2023). However, this study also shows that the influence of teaching quality on academic performance is moderate (F2 = 0.108), which means that other factors also explain the variation in academic performance.

In contrast to the quality of teaching, the results of this study show that campus facilities do not significantly influence student academic performance (coefficient -0.026, p-value 0.696). These findings contradict several studies that show that physical facilities such as comfortable classrooms, laboratories, and libraries have a direct effect on students' academic outcomes (Bentouhami et al., 2021; Marougkas et al., 2023; Tao et al., 2022). One potential explanation is that students in the digital age rely more on technology and online resources than traditional physical facilities. Research by Chen et al. (2024) shows that integrating technology into learning is becoming more important than physical campus facilities in supporting learning outcomes. These findings open up space for further research on the role of technology in higher education.

This study also found that student involvement positively and significantly influences student academic performance (coefficient 0.539, p-value 0.000). Involvement in discussions, extracurricular activities, and group projects has been shown to increase academic motivation and understanding of lecture material. These findings reinforce the theory of Self-Determination, which posits that active involvement in the learning process leads to improved academic performance because it increases students' intrinsic motivation (Asamoah, 2021; Cox, 2021; Zhou, 2022). In addition, student engagement showed a more substantial impact than reported in some previous studies, such as the one found by Buckley and Lee (2021), highlighting a positive relationship between engagement and academic outcomes.

This study also shows that student engagement does not moderate the relationship between the quality of teaching or campus facilities and academic performance. This hypothesis was not accepted (p-value 0.076 for teaching quality and p-value 0.549 for campus facilities), which indicates that although student engagement is important, it does not alter or reinforce the impact of the quality of teaching or campus facilities on academic performance. This finding challenges previous views that assumed student engagement can strengthen these relationships (Vatter et al., 2023; Zickar & Keith, 2023). One reason may be that student engagement is more effective in the context of already high-quality teaching. That engagement is not enough to change the less significant influence of campus facilities.

This research contributes significantly to understanding how teaching quality, campus facilities, and student engagement affect student academic performance. By examining these factors in one integrated quantitative model, this study fills the gaps in the educational literature that have tended to separate the

analysis of each factor. In addition, this study also identifies the role of moderation in student engagement, which has not been explored much in this context. The findings of this study are expected to provide new insights for universities in designing more effective policies and strategies to improve academic outcomes by emphasizing the importance of synergy between quality teaching, adequate facilities, and increased student involvement in the learning process. In addition, the results of this research can be a reference in the development of advanced research in higher education.

CONCLUSION

This study explored the relationship between teaching quality, campus facilities, student engagement, and their collective impact on student academic performance. Specifically, it investigated the direct influence of teaching quality and campus facilities on student performance and the moderating role of student engagement in these relationships. The findings demonstrate that teaching quality and student engagement significantly positively affect academic performance, while campus facilities were found to have no direct influence. Moreover, student engagement did not moderate the relationship between teaching quality or campus facilities and academic performance. These results highlight the crucial role of high-quality teaching and active student involvement in driving academic success while suggesting that improving physical campus resources alone may not be sufficient. These findings carry important implications for educational institutions. They suggest that efforts to enhance student performance should focus more on refining teaching methods and fostering greater student engagement rather than solely investing in campus infrastructure. Future research could explore the specific dimensions of student engagement that most effectively impact learning outcomes and investigate other contextual factors that may influence the role of campus facilities in student success.

ACKNOWLEDGMENT

Thank you to all parties who have contributed to this research, especially Universitas Islam Negeri Maulana Ibrahim Malang and Institut Agama Islam Negeri Bone for their support.

REFERENCES

Akram, H., & Li, S. (2024). Understanding the Role of Teacher-Student Relationships in Students' Online Learning Engagement: Mediating Role of Academic Motivation. *Perceptual and Motor Skills, 131*(4), 1415–1438. https://doi.org/10.1177/00315125241248709

Al-Adwan, A. S., Albelbisi, N. A., Hujran, O., Al-Rahmi, W. M., & Alkhalifah, A. (2021). Developing a Holistic Success Model for Sustainable E-Learning: A Structural Equation Modeling Approach. *Sustainability (Switzerland), 13*(16), 9453. https://doi.org/10.3390/su13169453

Amjad, A. I., Habib, M., Tabassum, U., Alvi, G. F., Taseer, N. A., & Noreen, I. (2023). The Impact of Brain-Based Learning on Students' Intrinsic Motivation to Learn and Perform in Mathematics: A Neuroscientific Study in School Psychology. *International Electronic Journal of Elementary Education, 16*(1), 111–122. https://doi.org/10.26822/iejee.2023.318

Asamoah, M. K. (2021). ICT Officials' Opinion on Deploying Open Source Learning Management System for Teaching and Learning in Universities in a Developing Society. *E-Learning and Digital Media, 18*(1), 18–38. https://doi.org/10.1177/2042753020946280

Bentouhami, H., Casas, L., & Weyler, J. (2021). Reporting of "Theoretical Design" in Explanatory Research: A Critical Appraisal of Research on Early Life Exposure to Antibiotics and the Occurrence of Asthma. *Clinical Epidemiology, 13*, 755–767. https://doi.org/10.2147/CLEP.S318287

Buckley, P., & Lee, P. (2021). The Impact of Extracurricular Activity on the Student Experience. *Active Learning in Higher Education, 22*(1), 37–48. https://doi.org/10.1177/1469787418808988

Cayubit, R. F. O. (2022). Why Learning Environment Matters? An Analysis on How the Learning Environment Influences the Academic Motivation, Learning Strategies and Engagement of College Students. *Learning Environments Research, 25*(2), 581–599. https://doi.org/10.1007/s10984-021-09382-x

Chen, Y. T., Li, M., & Cukurova, M. (2024). Unleashing Imagination: An Effective Pedagogical Approach to Integrate into Spherical Video-Based Virtual Reality to Improve Students' Creative Writing. *Education and Information Technologies, 29*(6), 6499–6523. https://doi.org/10.1007/s10639-023-12115-7

Cox, J. (2021). The Higher Education Environment Driving Academic Library Strategy: A Political, Economic, Social and Technological (PEST) Analysis. *Journal of Academic Librarianship, 47*(1), 102219. https://doi.org/10.1016/j.acalib.2020.102219

Dickinson, J., Griffiths, T. L., & Bredice, A. (2021). 'It's Just Another Thing to Think About': Encouraging Students' Engagement in Extracurricular Activities. *Journal of Further and Higher Education, 45*(6), 744–757. https://doi.org/10.1080/0309877X.2020.1813263

Farida, I., & Setiawan, D. (2022). Business Strategies and Competitive Advantage: The Role of Performance and Innovation. *Journal of Open Innovation: Technology, Market, and Complexity, 8*(3), 163. https://doi.org/10.3390/joitmc8030163

Habibi Baghi, M., Abolghasemi, M., Zakerimoghadam, M., Rezaiezadeh, M., & Vahidi Asl, M. (2024). Unveiling CPR Training Challenges in Nursing Education: Pedagogical Strategies for Success. *Nurse Education in Practice, 78*, 104040. https://doi.org/10.1016/j.nepr.2024.104040

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to Use and How to Report the Results of PLS-SEM. *European Business Review, 31*(1), 2–24.

Han, F. (2021). The Relations Between Teaching Strategies, Students' Engagement in Learning, and Teachers' Self-Concept. *Sustainability (Switzerland), 13*(9), 5020. https://doi.org/10.3390/su13095020

Hendren, K., Newcomer, K., Pandey, S. K., Smith, M., & Sumner, N. (2023). How Qualitative Research Methods Can Be Leveraged to Strengthen Mixed Methods Research in Public Policy and Public Administration? *Public Administration Review, 83*(3), 468–485. https://doi.org/10.1111/puar.13528

Hooda, M., Rana, C., Dahiya, O., Rizwan, A., & Hossain, M. S. (2022). Artificial Intelligence for Assessment and Feedback to Enhance Student Success in Higher Education. *Mathematical Problems in Engineering, 2022*(1), 5215722. https://doi.org/10.1155/2022/5215722

Kaya, O. S., & Ercag, E. (2023). The Impact of Applying Challenge-Based Gamification Program on Students' Learning Outcomes: Academic Achievement, Motivation and Flow. *Education and Information Technologies, 28*(8), 10053–10078. https://doi.org/10.1007/s10639-023-11585-z

Kesler, A., Shamir-Inbal, T., & Blau, I. (2022). Active Learning by Visual Programming: Pedagogical Perspectives of Instructivist and Constructivist Code Teachers and Their Implications on Actual Teaching Strategies and Students' Programming Artifacts. *Journal of Educational Computing Research, 60*(1), 28–55. https://doi.org/10.1177/07356331211017793

Legate, A. E., Hair, J. F., Chretien, J. L., & Risher, J. J. (2023). PLS-SEM: Prediction-Oriented Solutions for HRD Researchers. *Human Resource Development Quarterly, 34*(1), 91–109. https://doi.org/10.1002/hrdq.21466

Li, R., Lund, A., & Nordsteien, A. (2023). The Link Between Flipped and Active Learning: A Scoping Review. *Teaching in Higher Education, 28*(8), 1993–2027. https://doi.org/10.1080/13562517.2021.1943655

Madigan, D. J., & Kim, L. E. (2021). Does Teacher Burnout Affect Students? A Systematic Review of Its Association with Academic Achievement and Student-Reported Outcomes. *International Journal of Educational Research, 105*, 101714. https://doi.org/10.1016/j.ijer.2020.101714

Marougkas, A., Troussas, C., Krouska, A., & Sgouropoulou, C. (2023). Virtual Reality in Education: A Review of Learning Theories, Approaches and Methodologies for the Last Decade. *Electronics (Switzerland), 12*(13), 2832. https://doi.org/10.3390/electronics12132832

Osamy, W., Khedr, A. M., Salim, A., Al Ali, A. I., & El-Sawy, A. A. (2022). A Review on Recent Studies Utilizing Artificial Intelligence Methods for Solving Routing Challenges in Wireless Sensor Networks. *PeerJ Computer Science, 8*(3), 313. https://doi.org/10.7717/PEERJ-CS.1089

Pandita, A., & Kiran, R. (2023). The Technology Interface and Student Engagement Are Significant Stimuli in Sustainable Student Satisfaction. *Sustainability (Switzerland), 15*(10), 7923. https://doi.org/10.3390/su15107923

Rönkkö, M., & Cho, E. (2022). An Updated Guideline for Assessing Discriminant Validity. *Organizational Research Methods, 25*(1), 6–14. https://doi.org/10.1177/1094428120968614

Sá, M. J. (2023). Student Academic and Social Engagement in the Life of the Academy—A Lever for Retention and Persistence in Higher Education. *Education Sciences, 13*(3), 269. https://doi.org/10.3390/educsci13030269

Tao, Y., Meng, Y., Gao, Z., & Yang, X. (2022). Perceived Teacher Support, Student Engagement, and Academic Achievement: A Meta-Analysis. *Educational Psychology, 42*(4), 401–420.

Tomaszewski, W., Xiang, N., Huang, Y., Western, M., McCourt, B., & McCarthy, I. (2022). The Impact of Effective Teaching Practices on Academic Achievement When Mediated by Student Engagement: Evidence from Australian High Schools. *Education Sciences, 12*(5), 358. https://doi.org/10.3390/educsci12050358

Ummi, A., Chenshuai, W., Vijayaratnam, P., Rajanthran, S. K., Girija, V., & Ravindran, T. (2024). Exploring Teaching Strategies Used by University Instructors to Enhance Student Engagement in Academic Subjects. *International Journal of Learning, Teaching and Educational Research, 23*(9), 543–559. https://doi.org/10.26803/ijlter.23.9.29

Vatter, J., Mayer, R., & Jacobsen, H. A. (2023). The Evolution of Distributed Systems for Graph Neural Networks and Their Origin in Graph Processing and Deep Learning: A Survey. *ACM Computing Surveys, 56*(1), 1–37. https://doi.org/10.1145/3597428

Zhang, D., Fang, Z., & Liao, M. (2024). The Impact of Teacher's Pedagogical Leadership on Student Achievement: The Mediating Role of Teaching Methods. *Journal of Professional Capital and Community, 9*(4), 398–430. https://doi.org/10.1108/JPCC-11-2023-0074

Zhou, J. (2022). The Role of Libraries in Distance Learning During COVID-19. *Information Development, 38*(2), 227–238. https://doi.org/10.1177/02666669211001502

Zickar, M. J., & Keith, M. G. (2023). Innovations in Sampling: Improving the Appropriateness and Quality of Samples in Organizational Research. *Annual Review of Organizational Psychology and Organizational Behavior, 10*(1), 315–337. https://doi.org/10.1146/annurev-orgpsych-120920-052946