

PERCEIVED TEACHING SUPPORT AND LEARNING SYSTEM QUALITY AS PREDICTORS OF STUDENT ACADEMIC ENGAGEMENT IN TECHNOLOGY-MEDIATED HIGHER EDUCATION

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Abstract: Student academic engagement is widely recognised as a critical determinant of learning effectiveness and academic success in higher education. Drawing upon Student Engagement Theory, this study examines the predictive roles of perceived teaching support and learning system quality in influencing student academic engagement within a higher education context. A quantitative cross-sectional research design was employed, and data were collected from 129 valid respondents from the Faculty of Business and Management, Universiti Teknologi MARA (UiTM) Cawangan Terengganu Kampus Dungun using a structured questionnaire. The measurement instrument demonstrated satisfactory reliability, with Cronbach's alpha values ranging from .787 to .812, while Exploratory Factor Analysis supported the construct validity of the scales. Descriptive statistics were used to summarise respondents' demographic characteristics, whereas Pearson correlation and multiple regression analyses were performed to examine the relationships among the study variables. The findings revealed that perceived teaching support and learning system quality were both positively and significantly associated with student academic engagement. However, when examined simultaneously, learning system quality emerged as the only significant predictor of

student academic engagement, while perceived teaching support did not demonstrate a statistically significant independent effect. The results suggest that the quality of digital learning systems plays a more influential role in fostering student engagement than instructional support alone within technology-mediated learning environments. This study contributes to the student engagement literature by clarifying the relative influence of instructional and technological factors and provides practical implications for higher education institutions seeking to enhance student engagement through effective learning system design and implementation.

Keywords: *Student Academic Engagement, Perceived Teaching Support, Learning System Quality, Student Engagement Theory, Higher Education.*

Introduction

Higher education has undergone substantial transformation due to the increasing integration of digital technologies into teaching and learning processes. Learning management systems, online platforms and other technology-mediated tools are now widely utilised to facilitate instructional delivery, communication and academic activities. Although these technological advancements have improved flexibility and accessibility, they have also introduced new challenges in maintaining students' active participation and involvement in learning processes.

Student academic engagement is widely recognised as a critical determinant of learning effectiveness and academic success in higher education. Academic engagement encompasses behavioural, cognitive and emotional involvement in learning activities and is associated with higher levels of academic achievement, persistence and satisfaction (Sharif Nia et al., 2023). Students who are highly engaged are more likely to participate actively in learning activities, invest effort in academic tasks and achieve positive educational outcomes. Conversely, low levels of engagement may contribute to reduced motivation, weakened academic performance and a greater likelihood of disengagement from learning.

Despite its importance, sustaining student engagement remains a significant challenge in contemporary higher education, particularly within online and blended learning environments. Akpen et al. (2024) reported that students frequently encounter difficulties maintaining engagement due to reduced interaction opportunities, technological barriers and increased demands for self-regulated learning. Similarly, Stan et al. (2022) found that students' engagement in online learning environments is influenced by a variety of individual and environmental factors, suggesting that engagement cannot be assumed to occur automatically even when digital learning opportunities are readily available. These findings indicate the need to better understand the factors that promote and sustain student engagement in technology-mediated learning environments.

One important factor associated with student engagement is perceived teaching support. Perceived teaching support refers to students' perceptions of lecturers' guidance, encouragement, responsiveness and feedback throughout the learning process. Previous studies have consistently demonstrated that supportive teaching practices positively influence students' motivation, participation and engagement. A systematic literature review by Prananto et al. (2025) concluded that teacher support plays a significant role in enhancing student engagement

in higher education, while Tao et al. (2022) found that perceived teacher support contributes to academic achievement through increased student engagement. Likewise, Zhang et al. (2024) reported that perceived teacher support significantly predicts students' behavioural engagement in blended learning environments. These findings highlight the importance of instructional support in fostering meaningful learning experiences.

In addition to instructional factors, technological factors have emerged as important determinants of student engagement. Learning system quality refers to students' perceptions of the reliability, accessibility, usability and functionality of institutional learning platforms. As digital learning systems have become the primary medium through which students access learning materials, communicate with lecturers and participate in academic activities, the quality of these systems may substantially influence learning experiences. Wu (2023) found that effective online learning systems positively influence student engagement, while Fuzi et al. (2024) reported that system usability and digital learning support contribute significantly to students' learning experiences and academic outcomes. When learning systems function effectively, students encounter fewer barriers to participation and are more likely to remain engaged in learning activities. Conversely, poor system quality may discourage participation and reduce engagement regardless of the level of teaching support available.

Although previous studies have established the importance of both perceived teaching support and learning system quality, most existing research has examined these factors independently or within mediation-based frameworks. Consequently, limited empirical evidence exists regarding their relative contribution to student academic engagement when both variables are examined simultaneously within a single predictive model (Huang, 2024; Prananto et al., 2025). Existing studies tend to focus on either instructional factors or technological factors, leaving insufficient evidence regarding which factor exerts a stronger influence on student engagement in higher education settings. This limitation creates uncertainty for higher education institutions seeking to prioritise interventions and allocate resources effectively to enhance student engagement.

Addressing this gap is particularly important in contemporary higher education environments where teaching and learning interactions increasingly occur through digital platforms. A clearer understanding of the relative influence of perceived teaching support and learning system quality can assist institutions in making informed decisions regarding instructional improvement, learning system development and resource allocation. Accordingly, this study examines the predictive roles of perceived teaching support and learning system quality in influencing student academic engagement among university students. By investigating the relationships among these variables using correlation and multiple regression analyses, this study seeks to identify the factors that most strongly contribute to student engagement and provide empirical evidence to support strategies for enhancing engagement in higher education.

Theoretical Framework

This study is grounded in Student Engagement Theory, which explains how students' engagement is shaped by factors within their learning environment. According to Kahu (2013), student engagement is a multidimensional construct comprising behavioural, cognitive and emotional involvement in learning activities. The theory proposes that engagement is influenced

by a combination of institutional, educational and psychosocial factors that affect students' learning experiences and their willingness to participate actively in academic activities.

Student Engagement Theory emphasises that engagement does not occur solely as a result of students' personal characteristics but is strongly shaped by the learning conditions created by educational institutions. These conditions include the quality of instructional support provided by educators and the learning environments through which educational activities are delivered. When students perceive their learning environment as supportive and conducive to learning, they are more likely to demonstrate higher levels of engagement, persistence and academic involvement.

Within the context of the present study, perceived teaching support represents an instructional factor that influences student engagement. Teaching support refers to students' perceptions of lecturers' guidance, responsiveness, encouragement and feedback throughout the learning process. According to Student Engagement Theory, supportive teaching practices create positive learning experiences that promote students' motivation and participation in academic activities. When students perceive instructors as approachable, responsive and supportive, they are more likely to invest effort and attention in their studies.

In addition, learning system quality represents an environmental factor that influences engagement in technology-mediated learning environments. Contemporary higher education increasingly relies on digital learning systems through which students access learning materials, communicate with lecturers and participate in academic activities. Learning systems that are reliable, accessible and user-friendly may facilitate participation and reduce barriers to engagement. Conversely, ineffective or poorly designed systems may hinder students' ability to participate actively regardless of the level of instructional support available.

Drawing upon Student Engagement Theory, this study proposes that both perceived teaching support and learning system quality function as antecedents of student academic engagement. The theory suggests that instructional and environmental factors jointly influence students' behavioural, cognitive and emotional involvement in learning activities. Consequently, the present study examines the extent to which perceived teaching support and learning system quality predict student academic engagement among university students.

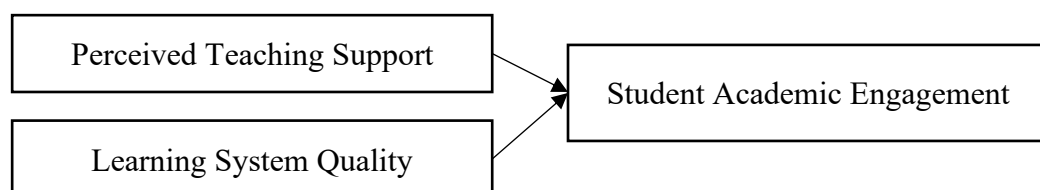


Figure 1: Theoretical Framework of the Study

Literature Review

Student Academic Engagement in Higher Education

Student academic engagement is widely recognised as a multidimensional construct that plays a central role in determining learning effectiveness and academic success in higher education.

Academic engagement encompasses behavioural, cognitive and emotional dimensions, reflecting students' participation in learning activities, investment in academic tasks and emotional commitment to learning (Sharif Nia et al., 2023). Engaged students are more likely to demonstrate persistence, motivation and academic achievement, whereas disengaged students often experience learning difficulties and weaker academic outcomes.

The significance of engagement has become increasingly evident in technology-mediated learning environments, where students must interact with instructional content through digital platforms. A systematic review by Akpen et al. (2024) identified student engagement as a critical determinant of learning effectiveness in online and blended learning environments. However, the review also highlighted persistent challenges associated with sustaining engagement due to reduced interaction, technological constraints and increased self-regulation demands. Similarly, Stan et al. (2022) reported that engagement is influenced by a range of environmental and instructional factors, suggesting that institutions must establish supportive learning conditions to encourage active participation. These findings indicate that understanding the factors that promote engagement remains an important priority in higher education research.

Perceived Teaching Support and Student Academic Engagement

Perceived teaching support refers to students' perceptions of lecturers' guidance, encouragement, feedback, responsiveness and availability throughout the learning process. Teaching support is widely recognised as a key element of effective instruction because it contributes to students' confidence, motivation and willingness to participate actively in academic activities.

Empirical studies consistently demonstrate a positive relationship between perceived teaching support and student engagement. Prananto et al. (2025) concluded that teacher support significantly enhances student engagement across higher education contexts. Likewise, Tao et al. (2022) found that perceived teacher support contributes to academic achievement through increased student engagement. In blended learning environments, Zhang et al. (2024) reported that perceived teacher support significantly predicts behavioural engagement, particularly when students receive timely feedback and socio-emotional support. Huang (2024) further demonstrated that teaching quality influences academic performance both directly and indirectly through student engagement.

Collectively, these studies suggest that perceived teaching support contributes positively to student engagement. However, the strength of this relationship may vary according to the learning context. In traditional learning environments, instructional support is often delivered through direct face-to-face interactions. In contrast, digital learning environments require instructional support to be mediated through technology. Consequently, the effectiveness of teaching support may depend on the quality of the technological systems used to facilitate communication, feedback and learning activities. This observation suggests that although teaching support remains important, its influence may be contingent upon other environmental factors present within technology-mediated learning environments.

Learning System Quality and Student Academic Engagement

Learning system quality has emerged as an important technological factor influencing students' learning experiences and engagement. Learning system quality generally refers to the reliability, usability, accessibility and functionality of digital learning platforms used to support teaching and learning activities. High-quality learning systems enable students to access learning resources efficiently, communicate with lecturers and participate actively in academic tasks.

Recent empirical studies increasingly highlight the importance of learning system quality in promoting student engagement. Wu (2023) found that perceptions of system effectiveness and digital learning support positively influence engagement in online learning environments. Similarly, Fuzi et al. (2024) reported that system usability and platform functionality contribute significantly to students' learning experiences and academic outcomes. These findings indicate that learning systems play a crucial role in facilitating participation and reducing barriers that may discourage engagement.

Unlike teaching support, which primarily influences instructional interactions, learning system quality affects students' day-to-day academic experiences. Students rely on learning systems to access lecture materials, complete assessments, receive feedback and communicate with lecturers. Therefore, learning system quality may function as a foundational condition for engagement because students' ability to benefit from instructional support often depends on the effectiveness of the learning system itself. Even highly supportive teaching practices may have limited impact if students encounter difficulties accessing or using the learning platform.

Combined Effects of Teaching Support and Learning System Quality

Although both perceived teaching support and learning system quality have been identified as important antecedents of student engagement, the relative importance of these factors remains unclear. Educational research has traditionally emphasised the role of teaching support in enhancing motivation, participation and engagement through effective instructor-student interactions (Prananto et al., 2025; Tao et al., 2022). From this perspective, lecturers play a central role in creating learning experiences that encourage active student involvement.

In contrast, recent studies conducted in online and blended learning environments increasingly emphasise the importance of technological factors. Learning systems have become the primary medium through which students access learning content, communicate with instructors and participate in academic activities (Wu, 2023; Fuzi et al., 2024). As a result, students' engagement may be influenced not only by the quality of instructional support but also by the effectiveness of the systems through which that support is delivered.

This difference in emphasis suggests that learning system quality may strengthen, facilitate or partially account for the effects of teaching support in technology-mediated learning environments. When learning systems are reliable, accessible and user-friendly, instructional support can be delivered more effectively and may exert a stronger influence on engagement. Conversely, poor system quality may constrain the effectiveness of teaching support and reduce students' willingness to engage regardless of lecturers' efforts. Consequently, technological factors may emerge as stronger predictors of engagement within digitally mediated learning contexts.

Given these competing perspectives, there is a need to examine perceived teaching support and learning system quality simultaneously within a single predictive framework. Such an approach provides a clearer understanding of their relative contributions to student academic engagement and offers insights into whether instructional or technological factors exert greater influence on engagement in contemporary higher education environments.

Hypotheses Development

Drawing upon Student Engagement Theory and previous empirical findings, perceived teaching support is expected to positively influence student academic engagement. Students who perceive higher levels of guidance, encouragement and responsiveness from lecturers are more likely to participate actively in academic activities and invest greater effort in learning. Therefore, the following hypothesis is proposed:

H₁: Perceived teaching support is positively associated with student academic engagement.

Similarly, previous studies indicate that learning system quality facilitates access to learning resources, communication and participation, thereby promoting higher levels of engagement in technology-mediated learning environments. Students who perceive learning systems as reliable, accessible and user-friendly are expected to demonstrate stronger engagement in academic activities. Therefore, the following hypothesis is proposed:

H₂: Learning system quality is positively associated with student academic engagement.

Furthermore, Student Engagement Theory suggests that instructional and environmental factors jointly influence students' engagement. As perceived teaching support and learning system quality represent important instructional and environmental conditions, their combined influence is expected to explain significant variation in student academic engagement. Therefore, the following hypothesis is proposed:

H₃: Perceived teaching support and learning system quality significantly predict student academic engagement.

Methodology

This section presents the research design, population and sampling procedure, participants, research instrument, data collection procedure, data screening process, reliability and validity assessment, and data analysis techniques employed in the study. The methodological procedures were designed to examine the predictive roles of perceived teaching support and learning system quality in influencing student academic engagement among university students.

Research Design

This study employed a quantitative cross-sectional research design to investigate the relationships among perceived teaching support, learning system quality and student academic engagement in a higher education setting. A survey-based approach was adopted because it enables the systematic collection of numerical data from a large group of respondents and facilitates the examination of relationships and predictive effects among variables through correlation and regression analyses. The cross-sectional design was considered appropriate as the study sought to capture students' perceptions at a single point in time.

Population and Sampling

The target population comprised students enrolled in programmes offered by the Faculty of Business and Management at Universiti Teknologi MARA (UiTM) Cawangan Terengganu Kampus Dungun. A non-probability convenience sampling approach was employed due to accessibility considerations and the voluntary nature of participation. The sampling frame consisted of students who were active users of UFUTURE, the university's primary learning management system, and who were reachable through institutional communication channels during the data collection period.

Students from various academic programmes within the Faculty of Business and Management were invited to participate in the study. Participation was voluntary, and respondents were informed about the purpose of the study before completing the questionnaire. No personally identifiable information was collected, and all responses were treated confidentially.

Participants

A total of 159 responses were initially collected through an online questionnaire administered to students at UiTM Cawangan Terengganu Kampus Dungun. Following data screening procedures, 129 valid responses were retained for analysis, while 30 responses were excluded due to failed attention-check items.

The final sample consisted of 96 female respondents (74.4%) and 33 male respondents (25.6%). In terms of level of study, 126 respondents (97.7%) were enrolled in diploma programmes, while only 3 respondents (2.3%) were enrolled in degree programmes. Regarding current semester, 34 respondents (26.4%) were in Semester 1–2, 76 respondents (58.9%) were in Semester 3–4, and 19 respondents (14.7%) were in Semester 5 and above. The final sample size of 129 respondents exceeded the minimum requirement for multiple regression analysis involving two predictor variables and was therefore considered adequate for statistical analysis.

The respondents were drawn from various programmes offered by the Faculty of Business and Management and regularly utilised UFUTURE as part of their teaching and learning activities. Although students from both diploma and degree programmes participated in the study, the sample was heavily dominated by diploma students. Consequently, the findings should be interpreted primarily within the context of diploma-level students and should not be assumed to represent the perceptions of diploma and degree students equally.

Data Collection Procedure

Data were collected using an online questionnaire distributed through institutional communication platforms. Prior to completing the survey, respondents were informed of the study's objectives and their rights as participants. Participation was entirely voluntary, and respondents were assured that all information provided would remain confidential and be used solely for academic purposes. Data collection continued until a sufficient number of responses was obtained for statistical analysis.

Research Instrument

Data were collected using a structured questionnaire adapted from previously validated instruments reported in the literature. The questionnaire consisted of three constructs: perceived teaching support, learning system quality and student academic engagement. All items were

measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Perceived Teaching Support (PTS) was measured using three items adapted from instructor support and teaching presence scales developed by Kember et al. (2010) and Zhu et al. (2019). Learning System Quality (LSQ) was measured using three items adapted from the Information Systems Success Model proposed by DeLone and McLean (2003) and subsequently applied in e-learning contexts by Al-Emran et al. (2018). Student Academic Engagement (SAE) was measured using six items adapted from the Utrecht Work Engagement Scale–Student Version (UWES-S) developed by Schaufeli et al. (2002) and validated in higher education settings. The questionnaire therefore contained a total of 12 measurement items.

Minor wording modifications were made to improve clarity and suitability for the UiTM student context while preserving the original meaning of the measurement items. All items were positively worded; therefore, reverse coding was not required.

Data Screening and Preparation

Prior to analysis, data screening procedures were conducted to ensure response quality. Three attention-check items were embedded within the questionnaire to identify inattentive or careless responses. These items required respondents to select a specific response option and served as a mechanism for detecting insufficient-effort responding.

Of the 159 responses initially collected, 30 responses (18.9%) failed one or more attention-check items and were consequently excluded from the analysis. The remaining 129 responses were retained for subsequent statistical analyses. The inclusion of attention-check procedures is consistent with recommended survey research practices aimed at improving data quality and reducing measurement error.

Following data screening, composite scores for each construct were computed by averaging the respective item scores. This approach is commonly employed in educational and behavioural research when measuring latent constructs using multiple indicators.

Reliability and Validity Assessment

Content validity was established through the adaptation of measurement scales that had been previously validated in the literature. The Perceived Teaching Support items were adapted from Kember et al. (2010) and Zhu et al. (2019), the Learning System Quality items were adapted from DeLone and McLean (2003) and Al-Emran et al. (2018), while the Student Academic Engagement items were adapted from the Utrecht Work Engagement Scale–Student Version (UWES-S) developed by Schaufeli et al. (2002). Minor wording modifications were made to enhance contextual suitability while maintaining conceptual equivalence with the original instruments.

Construct validity was assessed using Exploratory Factor Analysis (EFA) employing Principal Component Analysis with Varimax rotation. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was .855, exceeding the recommended threshold of .60. Bartlett's Test of Sphericity was statistically significant, $\chi^2(66) = 622.912$, $p < .001$, indicating that the correlation matrix was suitable for factor analysis.

The results produced a three-factor solution corresponding to Student Academic Engagement, Perceived Teaching Support and Learning System Quality. The three extracted factors accounted for 63.88% of the total variance, exceeding the minimum level commonly considered acceptable in social science research. The factor loadings ranged from .473 to .805, indicating satisfactory convergent validity and supporting the construct validity of the measurement instrument.

Internal consistency reliability was assessed using Cronbach's alpha coefficient. As presented in Table 1, the Cronbach's alpha values ranged from .787 to .812, exceeding the recommended threshold of .70. These findings indicate satisfactory internal consistency reliability for all measurement scales employed in the study. Tolerance values exceeded .10 and VIF values were below 5.00, indicating that multicollinearity was not a concern.

Table 1: Reliability Analysis

Construct	Number of Items	Cronbach's Alpha
Perceived Teaching Support	3	.812
Learning System Quality	3	.810
Student Academic Engagement	6	.787

Note. Cronbach's alpha values greater than .70 indicate acceptable internal consistency reliability.

Table 2: Exploratory Factor Analysis Results

Measure	Value
KMO Measure of Sampling Adequacy	.855
Bartlett's Test of Sphericity (χ^2)	622.912
Degrees of Freedom	66
Significance	< .001
Number of Extracted Factors	3
Total Variance Explained	63.88%

Table 3: Rotated Component Matrix Summary

Construct	Item	Loading
Student Academic Engagement	When studying, I feel full of energy.	.768
	I feel enthusiastic about my studies.	.703
	My studies are meaningful to me.	.664
	I am proud of being a UiTM student.	.473
	I am deeply involved in my studies.	.723
	Time passes quickly when I am studying.	.616
Perceived Teaching Support	My lecturers are available when I need academic assistance.	.805
	My lecturers provide clear explanations for course content.	.760
	My lecturers encourage me to actively participate in class.	.770
Learning System Quality	The learning system used at UiTM is reliable.	.621
	The system is easy to access anytime I need it.	.681
	The system supports my learning activities effectively.	.714

Data Analysis

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were first employed to summarise respondents' demographic

characteristics. Pearson product-moment correlation analysis was subsequently performed to examine the relationships among perceived teaching support, learning system quality and student academic engagement. Finally, multiple regression analysis was conducted to assess the extent to which perceived teaching support and learning system quality predict student academic engagement. Statistical significance was evaluated at the .05 level.

Findings

This section presents the empirical findings of the study. An overview of the respondents' demographic characteristics is first presented to provide context for the subsequent statistical analyses.

Table 4: Demographic Background of Respondents

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	96	74.4
	Male	33	25.6
Level of Study	Diploma	126	97.7
	Degree	3	2.3
Current Semester	Semester 1–2	34	26.4
	Semester 3–4	76	58.9
	Semester 5 and above	19	14.7

Note. Percentages are based on valid responses (N = 129).

This section presents the demographic characteristics of the respondents included in the final analysis. An overview of the respondents' demographic background is summarised in Table 4, based on 129 valid responses retained after data screening procedures.

In terms of gender, the sample was predominantly female. As shown in Table 4, 96 respondents (74.4%) were female, while 33 respondents (25.6%) were male. This distribution indicates a higher participation rate among female students, which is commonly observed in empirical studies involving higher-education populations, particularly in applied and management-related programmes.

With regard to the level of study, the majority of respondents were enrolled at the diploma level. Specifically, 126 respondents (97.7%) were diploma students, whereas only 3 respondents (2.3%) were pursuing degree-level studies. This suggests that the sample largely represents students in the early to intermediate stages of higher education, who are actively engaged in structured coursework and institutional learning systems.

Regarding the current semester, most respondents were enrolled in the middle phase of their academic programmes. As indicated in Table 4, 76 respondents (58.9%) were in Semester 3–4, representing the largest subgroup in the sample. In comparison, 34 respondents (26.4%) were in Semester 1–2, while 19 respondents (14.7%) were in Semester 5 and above. This distribution suggests that a substantial proportion of respondents had acquired sufficient exposure to university learning environments, including interaction with teaching support mechanisms and learning systems.

Overall, the demographic profile presented in Table 4 indicates that the respondents predominantly consist of female diploma students in the middle semesters of their academic programmes. This composition provides an appropriate context for examining perceived teaching support, learning system quality and student academic engagement, as the respondents are actively involved in ongoing teaching–learning processes and institutional digital platforms.

Table 5: Pearson Correlation Matrix among Study Variables (N = 129)

Variable	Perceived Teaching Support	Learning System Quality	Student Academic Engagement
Perceived Teaching Support	1		
Learning System Quality	0.577**	1	
Student Academic Engagement	0.420**	0.527**	1

Note. $p < .01$ (two-tailed). All correlations are statistically significant at the 0.01 level.

Pearson product–moment correlation analysis was conducted to examine the relationships among perceived teaching support, learning system quality and student academic engagement. The results of the correlation analysis are presented in Table 5, based on 129 valid responses.

As shown in Table 5, perceived teaching support is positively and significantly correlated with student academic engagement ($r = .420$, $p < .001$). This result indicates that higher levels of perceived support from instructors are associated with higher levels of student engagement in academic activities. The magnitude of the correlation suggests a moderate positive relationship, highlighting the importance of instructional support in fostering students' involvement in learning.

In addition, learning system quality demonstrates a strong positive and statistically significant relationship with student academic engagement ($r = .527$, $p < .001$). This finding suggests that students who perceive the learning system as reliable, accessible and effective tend to exhibit higher levels of engagement. Among the relationships examined, this coefficient represents the strongest association with student academic engagement, underscoring the critical role of system quality in supporting engagement within learning environments.

Furthermore, perceived teaching support is strongly and positively correlated with learning system quality ($r = .577$, $p < .001$). This result indicates that students who perceive higher levels of support from instructors are also more likely to report positive perceptions of the learning system. The strength of this relationship suggests that instructional support and system quality may complement one another in shaping students' overall learning experience.

Overall, the correlation coefficients indicate that all study variables are positively related and statistically significant at the 0.01 level. Importantly, none of the correlation coefficients exceed commonly accepted thresholds for multicollinearity, suggesting that the variables are sufficiently distinct and suitable for inclusion in subsequent multiple regression analysis.

**Table 6: Multiple Regression Analysis Predicting Student Academic Engagement
(N = 129)**

Predictor	B	SE	β	t	p
Constant	1.949	0.329	—	5.928	< .001
Perceived Teaching Support	0.175	0.092	0.174	1.900	.060
Learning System Quality	0.383	0.082	0.426	4.663	< .001

Model statistics: $R = .545$, $R^2 = .298$, Adjusted $R^2 = .286$, $F(2, 126) = 26.684$, $p < .001$

Note. Dependent Variable = Student Academic Engagement. B = Standardised Regression Coefficient.

Multiple regression analysis was conducted to examine the extent to which perceived teaching support and learning system quality predict student academic engagement. The results of the regression analysis are presented in Table 6, based on 129 valid responses.

Overall Model Fit

The regression model demonstrated a statistically significant fit. As shown in the Model Summary, the model yielded a multiple correlation coefficient of $R = .545$, with an R^2 value of .298 and an adjusted R^2 of .286. This indicates that approximately 29.8% of the variance in student academic engagement is jointly explained by perceived teaching support and learning system quality. In the context of educational and behavioural research, this represents a moderate level of explanatory power.

The ANOVA results further confirmed the suitability of the regression model, $F(2, 126) = 26.684$, $p < .001$, indicating that the independent variables collectively predict student academic engagement to a statistically significant degree.

Individual Predictors

With respect to the individual predictors, learning system quality emerged as a strong and statistically significant predictor of student academic engagement ($\beta = .426$, $t = 4.663$, $p < .001$). This result suggests that students who perceive the learning system as reliable, accessible and effective are more likely to demonstrate higher levels of engagement in academic activities. The magnitude of the standardized coefficient indicates that learning system quality is the most influential predictor in the model.

In contrast, perceived teaching support showed a positive but marginally non-significant effect on student academic engagement ($\beta = .174$, $t = 1.900$, $p = .060$). Although the direction of the relationship is positive, the effect does not reach the conventional significance threshold of $p < .05$. This finding indicates that when learning system quality is controlled for, perceived teaching support does not independently predict students' academic engagement at a statistically significant level.

The regression constant was statistically significant ($B = 1.949$, $t = 5.928$, $p < .001$), representing the baseline level of student academic engagement when the predictor variables are held constant.

Summary of Regression Findings

Overall, the regression results indicate that learning system quality plays a dominant role in predicting student academic engagement, while perceived teaching support contributes positively but does not exert a statistically significant independent influence once learning

system quality is taken into account. The strength and significance of the overall model, together with the moderate explained variance, support the adequacy of the regression analysis. Additionally, the correlation levels among the predictors remained within acceptable limits, suggesting that multicollinearity is not a concern.

Table 7: Summary of Hypothesis Testing

Hypothesis	Statement	Result
H ₁	Perceived teaching support is positively associated with student academic engagement.	Supported
H ₂	Learning system quality is positively associated with student academic engagement.	Supported
H ₃	Perceived teaching support and learning system quality significantly predict student academic engagement.	Partially Supported

Discussion

This study examined the relationships between perceived teaching support, learning system quality and student academic engagement in higher education using correlation and multiple regression analyses. The findings provide empirical insights into how instructional and technological factors jointly shape students' engagement in contemporary learning environments.

The findings supported H₁ and H₂, indicating that perceived teaching support and learning system quality are positively associated with student academic engagement. However, H₃ was only partially supported because learning system quality emerged as a significant predictor whereas perceived teaching support did not demonstrate a statistically significant independent effect in the regression model.

The correlation results indicate that both perceived teaching support and learning system quality are positively and significantly associated with student academic engagement. These findings suggest that students who perceive stronger instructional support and higher quality learning systems tend to be more behaviourally, cognitively and emotionally engaged in their academic activities. The moderate to strong correlations corroborate prior empirical evidence highlighting the importance of both pedagogical and technological dimensions in enhancing student engagement in higher education.

More nuanced insights emerge from the multiple regression analysis. While the overall model demonstrates a statistically significant fit and explains a meaningful proportion of variance in student academic engagement, learning system quality emerged as the only significant predictor when both predictors were considered simultaneously. This finding underscores the dominant role of system quality in sustaining engagement, particularly in environments where access, reliability, usability and functionality of learning platforms are central to daily learning activities.

In contrast, perceived teaching support did not show a statistically significant independent effect on student academic engagement once learning system quality was controlled for. Although teaching support was positively correlated with engagement, its explanatory power diminished in the regression model. This suggests that the influence of teaching support may be indirect or

contingent upon the effectiveness of the learning system through which instruction is delivered. In technology-mediated learning contexts, students' engagement may depend less on perceived interpersonal support alone and more on the extent to which instructional guidance is effectively integrated into high-quality digital learning systems.

Taken together, the findings highlight that learning system quality plays a more critical role than teaching support in predicting student academic engagement within the examined context. While supportive teaching practices remain important, their impact on engagement may be maximised when embedded within robust, user-friendly and reliable learning systems. This interpretation aligns with the growing emphasis on the integration of pedagogical support and technological infrastructure in driving meaningful student engagement.

Conclusion and Implications

This section summarises the key findings of the study and outlines their practical and academic implications. The conclusion highlights the main contributions, followed by implications for higher education practice.

Conclusion

This study investigated the predictive roles of perceived teaching support and learning system quality in influencing student academic engagement among university students. Based on data from 129 valid respondents, the findings demonstrate that while both factors are positively associated with engagement, learning system quality is the strongest and most significant predictor of student academic engagement. Perceived teaching support, although positively related to engagement, does not independently predict engagement when system quality is taken into account.

These results suggest that in higher education settings characterised by digital and blended learning, students' engagement is more strongly shaped by the quality of the learning systems they interact with than by instructional support alone. The study contributes empirical evidence to the student engagement literature by clarifying the relative importance of instructional and technological factors within a predictive framework.

Practical Implications

The findings offer several practical implications for higher education institutions and educators. First, institutions should prioritise investments in high-quality learning systems that are reliable, accessible and user-friendly, as these systems play a decisive role in fostering student engagement. Enhancing platform stability, interface design and system responsiveness may directly promote students' cognitive and behavioural involvement in learning.

Second, while teaching support alone may not independently predict engagement, it remains an essential component of the learning experience. Educators are encouraged to strategically embed instructional support within digital platforms by providing clear guidance, timely feedback and structured learning activities that are well supported by the learning system. Aligning pedagogical practices with system capabilities may amplify the impact of teaching support on engagement.

Finally, institutional leaders should consider integrated approaches that combine effective teaching practices with strong learning system infrastructure. Such alignment may create learning environments that better support students' engagement and academic success.

Limitations and Future Research

Despite its contributions to the student engagement literature, this study is subject to several limitations that should be considered when interpreting the findings.

First, the study employed a cross-sectional research design, which limits the ability to establish causal relationships among perceived teaching support, learning system quality and student academic engagement. Although the findings identify significant associations among the variables, causal inferences cannot be drawn because the data were collected at a single point in time. Future studies are encouraged to employ longitudinal or experimental research designs to examine how these relationships evolve over time and to provide stronger evidence regarding causality.

Second, the study relied on self-reported data collected through questionnaires. While self-report measures are widely used in educational research, they may be susceptible to common method bias, response bias and social desirability effects. Respondents may unintentionally overestimate or underestimate their perceptions and behaviours. Future research could incorporate alternative data sources, such as learning analytics, system usage records or lecturer evaluations, to complement self-reported measures and provide a more comprehensive assessment of student engagement.

Third, the study was conducted within a single institutional setting, namely the Faculty of Business and Management at Universiti Teknologi MARA (UiTM) Cawangan Terengganu Kampus Dungun. As a result, the findings may not be fully generalisable to students from other faculties, universities or educational contexts that use different learning systems and instructional approaches. Future studies should replicate the research across multiple institutions, disciplines and geographical contexts to enhance the external validity and generalisability of the findings.

Fourth, although students from both diploma and degree programmes were included in the study, the final sample was predominantly composed of diploma students (97.7%), with only a small proportion of degree students represented. Consequently, the findings primarily reflect the experiences and perceptions of diploma-level students and should not be interpreted as equally representative of degree students. Future studies should employ more balanced sampling strategies to ensure adequate representation across different levels of study and allow meaningful comparisons between diploma and degree student populations.

Finally, the present study examined only two predictors of student academic engagement, namely perceived teaching support and learning system quality. Although the regression model explained a meaningful proportion of the variance in student engagement, a substantial amount of variance remained unexplained. Future research should investigate additional factors that may influence engagement, such as academic self-efficacy, learning motivation, digital competence, self-regulated learning and social presence. Furthermore, future studies may

explore mediating and moderating mechanisms to provide a deeper understanding of how instructional and technological factors interact to influence student academic engagement.

Overall, these limitations provide valuable directions for future research and highlight opportunities to further develop the understanding of student academic engagement in technology-mediated higher education environments.

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