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ONLINE LEARNING SELF-EFFICACY AND ACADEMIC STRESS AS PREDICTORS OF ONLINE LEARNING ENGAGEMENT AMONG UNIVERSITY STUDENTS

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Abstract: *Online learning has become a central mode of instruction in higher education, making student engagement a critical factor for learning effectiveness and academic success. This study examines the relationships among online learning self-efficacy, academic stress and online learning engagement among university students. Using a quantitative, cross-sectional research design, data were collected through a structured questionnaire administered to undergraduate students. After data screening, 143 valid responses were analysed using descriptive statistics, Pearson correlation analysis and multiple regression analysis. The correlation results indicate that online learning self-efficacy is strongly and positively associated with online learning engagement, while academic stress shows a weak but significant negative relationship with engagement. However, multiple regression analysis reveals that online learning self-efficacy is the only significant predictor of online learning engagement, whereas academic stress does not exert an independent effect when self-efficacy is taken into account. These findings highlight the central role of students' confidence in their online learning abilities in sustaining engagement and suggest that enhancing self-efficacy may be more effective than stress-focused interventions alone in promoting active participation in online learning environments.*

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Keywords: *Online Learning Engagement, Online Learning Self-Efficacy, Academic Stress, University Students, Quantitative Study.*

Introduction

Online learning has become an integral component of higher education worldwide, particularly following the large-scale shift toward digitally mediated instruction during the COVID-19 pandemic. Universities increasingly adopt online and blended learning approaches to enhance flexibility, accessibility and continuity of education. Despite these advantages, sustaining student engagement in online learning environments remains a persistent challenge. Empirical research consistently highlights issues such as limited interaction, increased reliance on self-regulation and reduced opportunities for immediate feedback, all of which may hinder students' active participation and involvement in online learning (Akpen et al., 2024; Hu & Xiao, 2025).

In the context of Malaysian public universities, these challenges are especially salient. Many students, particularly those at the diploma level, are still adapting to independent and self-directed learning environments. Students may encounter difficulties such as managing their study time effectively, maintaining motivation, and engaging actively in virtual classes. In addition, factors such as inconsistent internet access, limited peer interaction and reduced instructor presence may further contribute to disengagement. As a result, understanding the factors that influence online learning engagement among Malaysian university students has become increasingly important.

Learning engagement is widely recognised as a key indicator of learning quality and academic success. It encompasses behavioural participation, cognitive investment and emotional involvement in learning activities. Higher levels of engagement have been associated with improved academic performance, persistence and student satisfaction in online learning contexts (Sharif Nia et al., 2023; Wang et al., 2025). However, maintaining engagement in online environments is more complex compared to traditional face-to-face settings, as students are required to rely more heavily on their own motivation and self-regulation capabilities.

One psychological factor that has received considerable attention in explaining student engagement is online learning self-efficacy. Grounded in social cognitive theory, self-efficacy refers to individuals' beliefs in their ability to organise and execute actions required to accomplish specific tasks. In online learning contexts, self-efficacy reflects students' confidence in their ability to use digital platforms, manage their learning activities and complete academic tasks successfully. Empirical studies consistently show that students with higher levels of online learning self-efficacy demonstrate greater motivation, persistence and engagement in online classes (Getenet et al., 2024; Wu, 2023). These findings suggest that self-efficacy plays a central role in facilitating students' active participation and sustained involvement in online learning environments.

In contrast, academic stress has been widely identified as a potential barrier to student engagement. Academic stress may arise from factors such as workload, performance expectations, time constraints and technological challenges in online learning settings. High levels of stress can negatively affect students' concentration, emotional well-being and

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motivation, potentially leading to reduced engagement. However, empirical findings regarding the relationship between academic stress and engagement remain inconsistent. While some studies report a negative association between stress and engagement, others suggest that the impact of stress may depend on students' psychological resources, such as their ability to cope with academic demands.

In particular, students with higher levels of self-efficacy may be better equipped to manage academic stress and remain engaged despite experiencing pressure. This suggests that self-efficacy may buffer the negative effects of stress, raising important questions about the relative influence of these variables. Nevertheless, it remains unclear whether academic stress continues to significantly predict online learning engagement when online learning self-efficacy is taken into account within the same analytical framework. Most previous studies have examined these factors independently or focused on mediating and moderating relationships, resulting in limited empirical evidence on their combined predictive effects.

Furthermore, there is a lack of empirical research that examines these relationships within the Malaysian public university context. Given the rapid expansion of online learning and the unique challenges faced by students in this setting, it is important to understand how psychological factors such as self-efficacy and academic stress influence engagement. Addressing this gap is essential for developing effective strategies to enhance student participation and learning outcomes in online education.

Accordingly, this study aims to examine the relationships among online learning self-efficacy, academic stress and online learning engagement among university students. By employing Pearson correlation and multiple regression analyses, this study seeks to determine the relative contribution of self-efficacy and academic stress in predicting online learning engagement. The findings are expected to contribute to the literature by providing empirical evidence on the dominant psychological factors influencing engagement and offering insights for improving online learning practices in higher education.

Literature Review

Online learning engagement has received increasing attention in recent educational research due to its critical role in shaping students' learning experiences and outcomes in digital learning environments. Empirical evidence consistently demonstrates that engagement serves as a key mechanism through which instructional and psychological factors influence academic performance and persistence in higher education (Sharif-Nia et al., 2023; Tao et al., 2022). Accordingly, this section reviews recent empirical studies on online learning engagement to establish a foundation for the present study.

Online Learning Engagement in Higher Education

Online learning engagement has been widely recognised as a critical determinant of learning effectiveness and academic success in higher education. Engagement is commonly conceptualised as a multidimensional construct encompassing behavioural, cognitive and emotional dimensions, reflecting students' active participation, investment in learning processes and emotional involvement in academic activities (Sharif-Nia et al., 2023; Tao et al., 2022). A substantial body of empirical evidence demonstrates that higher levels of engagement

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are associated with improved academic performance, persistence and student satisfaction in online learning environments (Akpen et al., 2024; Wang et al., 2025).

Despite its importance, sustaining engagement in online learning remains a persistent challenge. The transition from face-to-face to digitally mediated learning environments has increased students' dependence on self-regulation, reduced opportunities for immediate interaction and heightened the risk of social isolation (Polly, 2024). These challenges are particularly pronounced in developing educational contexts, including Malaysia and the broader Southeast Asian region, where disparities in digital access, technological readiness and learning support systems may further hinder students' ability to remain actively engaged. Consequently, identifying the key psychological factors that influence engagement is essential for enhancing the effectiveness of online learning in higher education.

Online Learning Self-Efficacy and Student Engagement

Online learning self-efficacy refers to students' beliefs in their capability to effectively perform tasks in online learning environments, such as managing time, navigating digital platforms and completing academic activities. Rooted in Bandura's social cognitive theory, self-efficacy has been consistently identified as a central determinant of motivation, behaviour and academic success (Demir, 2023; Lu & Rameli, 2023).

Empirical research provides strong and consistent support for the positive relationship between online learning self-efficacy and engagement. Students with higher levels of self-efficacy are more likely to exhibit sustained effort, persistence and active participation in online learning activities (Wu, 2023). They are also more capable of regulating their own learning processes, maintaining focus and overcoming challenges associated with independent learning environments (Getenet et al., 2024). These findings indicate that self-efficacy not only facilitates students' adaptation to online learning but also enhances their overall engagement across behavioural, cognitive and emotional dimensions.

Evidence from Southeast Asian contexts further supports the relevance of self-efficacy in shaping engagement. Studies in similar educational settings suggest that students with higher confidence in their digital and self-management skills demonstrate greater participation and commitment in online and blended learning environments. This suggests that self-efficacy is particularly critical in contexts where students must adapt rapidly to evolving digital learning systems.

Academic Stress and Online Learning Engagement

Academic stress refers to the psychological strain experienced by students due to academic demands such as workload, performance expectations, time constraints and technological challenges. In online learning environments, these stressors may be intensified by the need for increased independence, reduced instructor guidance and unfamiliarity with digital platforms.

The relationship between academic stress and online learning engagement has produced mixed findings in the literature. Some studies report that high levels of academic stress negatively affect students' concentration, emotional well-being and motivation, thereby reducing engagement (Fayda-Kinik, 2023). Under high stress conditions, students may experience fatigue, anxiety and disengagement from learning activities.

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However, other studies suggest that the impact of academic stress is not uniformly negative and may depend on individual differences in coping mechanisms and psychological resources (Stan et al., 2022; Irawati & Fatmawati, 2023). In certain cases, moderate levels of stress may even motivate students to remain focused and engaged, particularly when they possess effective self-regulation strategies. Within Malaysian and Southeast Asian contexts, additional stressors such as technological challenges, varying levels of digital literacy and adaptation to online learning systems further complicate this relationship, suggesting that the effect of academic stress on engagement is complex and context-dependent.

Synthesis of Variables: Interplay Between Self-Efficacy and Academic Stress

While online learning self-efficacy and academic stress have been widely examined, existing research has largely treated these variables independently. However, theoretical and empirical evidence suggests that they are interrelated and jointly influence student engagement.

Self-efficacy may act as a protective or buffering factor that mitigates the negative effects of academic stress. Students with high self-efficacy are more likely to perceive academic challenges as manageable and adopt adaptive coping strategies, enabling them to maintain engagement even under stressful conditions (Lu & Rameli, 2023). In contrast, students with low self-efficacy may experience greater difficulty coping with academic demands, thereby intensifying the negative effects of stress and reducing engagement.

This interplay suggests that the relationship between academic stress and engagement cannot be fully understood without considering the role of self-efficacy. Nevertheless, empirical studies that simultaneously examine the relative predictive strength of these variables within a single regression framework remain limited. This gap is particularly evident in the Malaysian public university context, where the combined influence of self-efficacy and academic stress on online learning engagement has not been sufficiently explored.

Research Gap and Hypotheses Development

Based on the reviewed literature, it is evident that online learning self-efficacy consistently demonstrates a strong positive association with student engagement, while academic stress exhibits a potentially negative but inconsistent relationship with engagement. Furthermore, the interaction between these variables remains underexplored, particularly in Malaysian and Southeast Asian higher education contexts.

Most previous studies have either examined self-efficacy and academic stress independently or focused on mediating and moderating mechanisms, resulting in limited empirical evidence on their relative contribution when considered simultaneously. This lack of integration constrains a comprehensive understanding of the key psychological determinants of online learning engagement.

To address this gap, the present study investigates the combined effects of online learning self-efficacy and academic stress on online learning engagement among university students. Accordingly, the following hypotheses are proposed:

H_1: Online learning self-efficacy has a significant positive effect on online learning engagement.

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H_2: Academic stress has a significant negative effect on online learning engagement.

Methodology

This section outlines the methodological approach adopted in the study to achieve the research objectives. It describes the research design, participants, research instrument, data screening procedures and analytical techniques employed in the study.

Research Design

This study employed a quantitative cross-sectional research design to examine the relationships among online learning self-efficacy, academic stress and online learning engagement. A survey method was adopted to collect numerical data from respondents, enabling the use of statistical techniques such as Pearson correlation and multiple regression analysis.

Target Population and Study Location

The target population comprised undergraduate students enrolled in a Malaysian public university. Data were collected from students at Universiti Teknologi MARA (UiTM) Cawangan Terengganu, Kampus Dungun. This setting was considered appropriate as it represents a typical public higher education institution where online and blended learning approaches are widely implemented.

Sample Size Justification

The adequacy of the sample size was evaluated using established guidelines for multiple regression analysis. According to Tabachnick and Fidell (2007), the minimum required sample size should satisfy the criterion $N \geq 50 + 8m$, where m represents the number of independent variables. With two predictors included in this study, the recommended minimum sample size is 66. The final sample size of 143 exceeds this requirement, indicating that it is sufficient for the analysis.

In addition, based on statistical power considerations ($\alpha = .05$, power = .80, medium effect size), the required sample size for detecting significant effects in multiple regression is approximately 68. Therefore, the sample used in this study is considered adequate to ensure reliable and meaningful results.

Data Screening and Response Quality

To ensure the quality of the data, three attention-check items were embedded in the questionnaire. These items required respondents to select specific responses to confirm attentiveness. A total of 90 responses were excluded due to failure in one or more of these attention-check items.

Prior to data analysis, data screening was conducted to ensure response quality. Three attention-check items were embedded in the questionnaire to identify inattentive or careless responses. These items required respondents to select specific response options: Question 8 required a response of "1", Question 15 required a response of "2" and Question 23 required a response of "3". Responses that failed any of these attention-check items were removed from the dataset. As a result, 90 responses were excluded and 143 valid responses were retained for subsequent statistical analysis.

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The relatively high number of excluded responses may indicate inattentive responding, survey fatigue or low engagement with the questionnaire. Removing these responses improved the overall reliability of the dataset, ensuring that the final analysis was based on valid and attentive responses.

Research Instrument

Data were collected using a structured questionnaire consisting of four sections. All items were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Online learning self-efficacy was measured using six items, assessing students' confidence in managing and completing online learning tasks:

1. I am confident in my ability to manage my online learning tasks.
2. I can successfully complete assignments in an online learning environment.
3. I am able to use online learning platforms effectively.
4. I can organise my study time effectively in online learning.
5. I am confident in participating in online learning activities.
6. I believe I can succeed in online courses.

Academic stress was measured using six items, capturing students' perceived academic pressure and psychological strain:

1. I feel stressed due to my academic workload.
2. I feel under pressure to perform well academically.
3. I feel overwhelmed by the amount of academic tasks.
4. I experience tension related to academic assessments.
5. I feel mentally exhausted due to my academic responsibilities.
6. I find it difficult to cope with academic demands.

Online learning engagement was measured using eight items, covering behavioural, cognitive and emotional engagement:

1. I actively participate in online learning activities.
2. I pay close attention during online classes.
3. I complete my online learning tasks on time.
4. I feel motivated to engage in online learning.
5. I find online learning activities meaningful.
6. I make an effort to understand online learning materials.
7. I enjoy participating in online learning sessions.
8. I am committed to my online learning activities.

Validity and Reliability

Content Validity

To ensure content validity, the questionnaire items were reviewed by subject matter experts in the field of education and online learning. Their feedback was used to refine the wording and relevance of the items, ensuring that the instrument adequately captured the intended constructs.

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Pilot Testing

A pilot test was conducted with a small group of undergraduate students to assess the clarity and comprehensibility of the questionnaire. Minor revisions were made based on the feedback received, improving the overall quality of the instrument.

Reliability Analysis

Internal consistency reliability was assessed using Cronbach's alpha. The results indicate satisfactory reliability for all constructs, with online learning self-efficacy recording a value of $\alpha = 0.834$, academic stress $\alpha = 0.847$ and online learning engagement $\alpha = 0.835$. All coefficients exceed the recommended threshold of 0.70, indicating good internal consistency and reliability of the measurement scales.

Construct Validity

Construct validity was assessed using exploratory factor analysis (EFA) with principal component analysis and Varimax rotation. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.857, exceeding the recommended threshold of 0.60, indicating that the data were suitable for factor analysis. Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 1247.625$, $df = 190$, $p < .001$), confirming that the correlation matrix was appropriate for factor analysis.

The rotated component matrix revealed a clear three-factor structure corresponding to online learning engagement, academic stress and online learning self-efficacy. All items loaded strongly on their respective constructs, with factor loadings ranging from 0.542 to 0.803, exceeding the recommended threshold of 0.50. No substantial cross-loadings were observed, indicating that each item distinctly represents its intended construct.

These findings provide strong evidence of construct validity and confirm that the measurement model is both empirically and theoretically sound.

Convergent and Discriminant Validity

Convergent validity was established based on the factor loadings obtained from exploratory factor analysis. All measurement items loaded significantly on their respective constructs, with factor loadings ranging from 0.542 to 0.803, exceeding the recommended threshold of 0.50, indicating that the items adequately converge to measure their intended constructs.

Discriminant validity was supported by the absence of significant cross-loadings in the rotated component matrix. Each item loaded strongly on its corresponding construct and weakly on other constructs, confirming that the constructs are distinct and empirically separable.

Data Analysis

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarise respondents' demographic characteristics. Pearson correlation analysis was performed to examine the relationships among the study variables. Subsequently, multiple regression analysis was conducted to determine the extent to which online learning self-efficacy and academic stress predict online learning engagement.

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Findings

This section presents the empirical findings of the study. An overview of the respondents' demographic characteristics is provided in Table 1 to contextualize the subsequent statistical analyses.

Table 1: Demographic Background of Respondents

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	33	23.1
	Female	110	76.9
Level of Study	Diploma	136	95.1
	Degree	7	4.9
Faculty	Business and Management	115	80.4
	Hotel and Tourism Management	28	19.6
Current Semester	Semester 1–2	29	20.3
	Semester 3–4	85	59.4
	Semester 5 and above	23	20.3

Note. Percentages are based on valid responses (N = 143).

This section presents the demographic profile of the 143 valid respondents included in the final analysis. An overview of the respondents' characteristics is summarised in Table 1, which reports information on gender, level of study, faculty affiliation and current semester.

With regard to gender, the sample was predominantly female. As shown in Table 1, 110 respondents (76.9%) were female, while 33 respondents (23.1%) were male. This distribution reflects a higher representation of female students in the sample, which is consistent with enrolment trends commonly observed in several business- and management-related academic programmes.

In terms of the level of study, the majority of respondents were enrolled at the diploma level. Table 1 indicates that 136 respondents (95.1%) were diploma students, whereas 7 respondents (4.9%) were pursuing degree-level studies. This suggests that the sample largely represents students in the early stages of higher education.

The majority of respondents were affiliated with the Faculty of Business and Management, accounting for 115 students (80.4%), while 28 students (19.6%) were from the Faculty of Hotel and Tourism Management. This distribution indicates that the sample is largely drawn from management- and business-related academic programmes, which are closely aligned with the focus of online learning engagement in applied and professional disciplines.

With respect to the current semester, Table 1 shows that the largest proportion of respondents were enrolled in Semester 3–4, comprising 85 students (59.4%). Meanwhile, 29 students (20.3%) were in Semester 1–2 and another 29 students (20.3%) were in Semester 5 and above. This indicates that most respondents were in the middle phase of their academic programmes, having sufficient exposure to university-level online learning environments.

Overall, the demographic profile presented in Table 1 indicates that the respondents predominantly consist of female diploma students from business- and management-related

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faculties, with most being in the middle semesters of their academic studies. This composition provides a suitable basis for examining online learning self-efficacy, academic stress and online learning engagement in subsequent correlation and multiple regression analyses.

Table 2: Pearson Correlation Matrix among Study Variables (N = 143)

Variable	Online Learning Self-Efficacy	Academic Stress	Online Learning Engagement
Online Learning Self-Efficacy	1		
Academic Stress	-.121	1	
Online Learning Engagement	.743**	-.189**	1

Note. *N = 143. **. Correlation is significant at the 0.05 level (2-tailed).*

Pearson product–moment correlation analysis was conducted to examine the relationships among online learning self-efficacy, academic stress and online learning engagement. The results of the correlation analysis are presented in Table 2, based on 143 valid responses.

The analysis indicates that online learning self-efficacy is strongly and positively correlated with online learning engagement ($r = .743$, $p < .05$). This finding suggests a strong relationship, indicating that students who report higher confidence in managing and completing online learning tasks tend to be more actively engaged in online learning activities. This result highlights the central role of self-efficacy in promoting students' behavioural, cognitive and emotional engagement in online learning environments.

In contrast, online learning self-efficacy is not significantly associated with academic stress ($r = -.121$, $p = .150$). Although the correlation is negative, the relationship is weak and not statistically significant, suggesting that students' confidence in their online learning abilities does not directly reduce perceived academic stress.

The results further reveal that academic stress is negatively and significantly correlated with online learning engagement ($r = -.189$, $p = .024$). This weak but statistically significant negative relationship indicates that students who experience higher levels of academic stress tend to exhibit lower levels of engagement in online learning. This finding suggests that elevated stress may interfere with students' motivation, concentration and active participation in online learning activities.

Overall, the correlation results indicate that online learning self-efficacy plays a more critical role in enhancing online learning engagement than academic stress, while academic stress exerts a modest inhibitory effect on engagement. Importantly, all correlation coefficients are below the commonly accepted threshold for multicollinearity concerns ($r < .80$), indicating that the variables are sufficiently distinct and appropriate for inclusion in subsequent regression analysis.

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Table 3: Multiple Regression Analysis Predicting Online Learning Engagement (N = 143)

Predictor	B	SE	β	t	p
Constant	1.328	0.240	—	5.533	< .05
Online Learning Self-Efficacy	0.669	0.052	0.731	12.985	< .05
Academic Stress	-0.075	0.042	-0.101	-1.791	.076

Model statistics: R = .750, R^2 = .563, Adjusted R^2 = .556, F(2, 140) = 90.043, p < .05
Note. Dependent Variable = Online Learning Engagement. β = Standardized Regression Coefficient.

Multiple regression analysis was conducted to examine the extent to which online learning self-efficacy and academic stress predict online learning engagement among university students. Online learning engagement served as the dependent variable, while online learning self-efficacy and academic stress were entered simultaneously as independent variables. The analysis was based on 143 valid responses and the results are presented in Table 3.

Overall Model Fit

The regression model demonstrated a strong and statistically significant fit. The model summary indicates a multiple correlation coefficient of R = .750, with an R^2 value of .563 and an adjusted R^2 of .556. This suggests that 56.3% of the variance in online learning engagement is jointly explained by online learning self-efficacy and academic stress. In the context of educational and psychological research, this represents a substantial level of explanatory power. The ANOVA results further confirm the adequacy of the model, F(2, 140) = 90.043, p < .05, indicating that the set of predictors significantly explains online learning engagement.

Individual Predictors

Examination of the regression coefficients reveals that online learning self-efficacy emerged as a strong and statistically significant positive predictor of online learning engagement (B = 0.669, β = .731, t = 12.985, p < .05). This finding indicates that students who have higher confidence in their ability to manage and succeed in online learning tasks are substantially more likely to demonstrate higher levels of engagement. The magnitude of the standardized beta coefficient highlights online learning self-efficacy as the dominant predictor in the regression model.

In contrast, academic stress did not exhibit a statistically significant independent effect on online learning engagement (B = −0.075, β = −.101, t = −1.791, p = .076). Although the direction of the relationship was negative, indicating that higher academic stress tends to reduce engagement, the effect did not reach statistical significance when online learning self-efficacy was taken into account. This suggests that the impact of academic stress on engagement is overshadowed by the stronger influence of self-efficacy.

The regression constant was statistically significant (B = 1.328, t = 5.533, p < .05), indicating a baseline level of online learning engagement independent of the predictor variables.

Summary of Regression Findings

Overall, the multiple regression results demonstrate that online learning self-efficacy is the primary determinant of online learning engagement, while academic stress does not independently predict engagement once self-efficacy is controlled for. These findings suggest

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that students' confidence in their online learning capabilities plays a more critical role in sustaining engagement than perceived academic stress.

Discussion

The present study examined the relationships among online learning self-efficacy, academic stress and online learning engagement among university students, using Pearson correlation and multiple regression analyses. The findings provide important empirical insights into the relative roles of psychological confidence and stress in shaping students' engagement in online learning environments.

The correlation analysis revealed that online learning self-efficacy is strongly and positively associated with online learning engagement. This finding indicates that students who are confident in their ability to manage online learning tasks, use digital platforms effectively and succeed in online courses are more likely to demonstrate higher levels of behavioural, cognitive and emotional engagement. This result reinforces the central role of self-efficacy in promoting active participation and sustained involvement in online learning contexts. Students with higher self-efficacy are likely to approach online learning challenges with greater persistence, motivation and adaptability, thereby enhancing their engagement.

In contrast, academic stress was found to be weakly and negatively correlated with online learning engagement. This relationship suggests that higher levels of perceived academic stress may slightly reduce students' engagement in online learning activities. Elevated stress may interfere with concentration, motivation and emotional investment, leading to reduced participation and effort. However, the relatively small magnitude of this relationship indicates that academic stress alone does not substantially determine students' engagement levels.

More definitive conclusions emerge from the multiple regression analysis. When online learning self-efficacy and academic stress were examined simultaneously, online learning self-efficacy emerged as the only statistically significant predictor of online learning engagement, while academic stress did not exert an independent effect. This finding indicates that the influence of academic stress on engagement becomes negligible once students' self-efficacy is taken into account. In other words, students' confidence in their online learning abilities plays a far more decisive role in sustaining engagement than the level of stress they experience.

The non-significant regression effect of academic stress suggests that self-efficacy may buffer or override the negative impact of stress on online learning engagement. Students with high self-efficacy may be better equipped to cope with academic demands, manage workload pressure and remain engaged despite experiencing stress. This interpretation aligns with self-regulation and social cognitive perspectives, which emphasise the protective function of self-beliefs in challenging learning environments. Rather than disengaging when stressed, students with strong self-efficacy may maintain focus and persistence through adaptive coping strategies.

Overall, the findings highlight that online learning engagement is primarily driven by students' self-efficacy, while academic stress functions as a secondary and context-dependent factor. Although stress may undermine engagement at a basic level, it does not independently

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determine students' engagement behaviour once psychological confidence is considered. These results underscore the importance of fostering students' self-efficacy as a key mechanism for sustaining engagement in online learning settings.

Conclusion

The present study examined the roles of online learning self-efficacy and academic stress in predicting online learning engagement among university students. Using Pearson correlation and multiple regression analyses, the study provides empirical evidence on the relative importance of psychological confidence and perceived stress in shaping students' engagement in online learning environments.

The findings indicate that online learning self-efficacy is strongly and positively associated with online learning engagement and emerges as the sole significant predictor in the regression model. This result suggests that students who are confident in their ability to manage online learning tasks, use learning platforms effectively and succeed in online courses are substantially more likely to demonstrate higher levels of engagement. In contrast, academic stress shows a weak negative association with engagement at the correlational level but does not exert an independent effect once self-efficacy is taken into account.

Overall, the results suggest that online learning engagement is primarily driven by students' self-efficacy rather than by their perceived academic stress. While academic stress may undermine engagement to some extent, its influence appears secondary and context-dependent when compared to the dominant role of self-efficacy. These findings highlight the importance of strengthening students' confidence and self-beliefs to sustain engagement in online learning contexts.

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