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Highly Motivated Yet Exhausted: Exploring the Relationship between Academic Motivation and Burnout among Science and Engineering Students

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Abstract

Science and engineering education is central to national development, yet the academic demands associated with these disciplines may increase students' vulnerability to burnout. This study examined academic motivation and burnout among science and engineering students in Malaysian higher education and investigated the relationship between these constructs. A quantitative cross-sectional survey was conducted among 124 students from the Centre of Foundation Studies, Universiti Teknologi MARA (UiTM), and Universiti Teknologi Malaysia (UTM). Academic motivation was assessed through value, expectancy, and affective components, while burnout was evaluated in terms of exhaustion and disengagement. Students demonstrated high levels of extrinsic goal orientation, task value, and control beliefs for learning, although moderate levels of self-efficacy and examination-related affective responses were observed. Exhaustion was particularly evident in students' reports of feeling tired before the academic day and requiring longer recovery periods after classes. A significant positive relationship was found between overall motivation and burnout ($r = .344$, $p < .001$), indicating that higher academic motivation may coexist with greater burnout. These findings suggest that strong achievement motivation does not necessarily protect students from academic exhaustion. Universities should therefore consider both motivational and well-being factors when designing academic support strategies for science and engineering students.

Keywords: Academic Motivation, Academic Burnout, Science Students, Engineering Students, Exhaustion, Higher Education, Malaysia

Introduction

Background of Study

Academic motivation and burnout are important psychological constructs influencing students' learning experiences, academic engagement, and well-being in higher education. Academic motivation refers to the processes that initiate and sustain goal-directed learning behaviours, encompassing students' learning goals, perceived task value, beliefs about academic competence, and affective responses to learning (Pintrich & De Groot, 1990; Schunk et al., 2014). In contrast, academic burnout reflects prolonged responses to academic demands and is commonly characterised by exhaustion and disengagement from learning activities (Campos et al., 2011). Although motivation is generally associated with persistence and academic achievement, highly motivated students may also experience exhaustion when sustained academic effort is accompanied by demanding performance expectations (Eccles et al., 1998).

Science and engineering programmes involve distinctive learning demands, including complex theoretical concepts, quantitative problem-solving, laboratory-based activities, and continuous assessment. These requirements may place substantial demands on students' cognitive and emotional resources, particularly when academic achievement is closely associated with future educational and career opportunities (Prendergast et al., 2024). While motivation may encourage students to invest greater effort in their studies, sustained engagement under demanding academic conditions may also coexist with fatigue and emotional exhaustion (Ding, 2022). Understanding motivation alongside burnout is therefore relevant to supporting students' academic performance and well-being in science and engineering education (Li et al., 2021; Jansen et al., 2022).

Previous research has examined academic motivation and burnout across different educational populations. Karimi and Fallah (2021) investigated academic burnout, intrinsic motivation, and teacher support among English as a Foreign Language (EFL) learners, while Zolkapli et al. (2024) explored learning motivation and burnout among Malaysian pre-university students in English language education. Research involving medical students has also documented academic burnout and its association with psychological and educational factors (Fares et al., 2016; Li et al., 2021). Although these studies provide valuable evidence, their findings arise from educational contexts with different curricula, assessment structures, and learning demands. Consequently, their applicability to students pursuing science and engineering programmes requires further examination.

Evidence from Malaysian higher education indicates that the relationship between motivation and burnout may be more complex than commonly assumed. Mustafar et al. (2025), in a study involving 664 Malaysian undergraduates, reported a significant negative association between academic motivation and burnout, suggesting that stronger motivational resources may be associated with lower burnout. Conversely, Che Mat et al. (2025) reported positive associations between motivation and burnout dimensions among Malaysian university students. These contrasting findings suggest that academic motivation may not consistently correspond to reduced burnout across educational populations. However, the

extent to which these relationships characterise students in science and engineering programmes remains insufficiently established (Rahmat et al., 2021).

Statement of Problem

Academic motivation is generally regarded as a resource that supports learning engagement, persistence, and academic achievement. However, students who demonstrate strong motivation may continue to experience academic exhaustion, particularly when their efforts are directed towards achieving high grades and meeting demanding academic expectations. This raises questions about whether academic motivation necessarily corresponds to lower burnout among students enrolled in academically demanding programmes.

Existing studies provide important insights into motivation and burnout among EFL learners, teachers, medical students, and broader university populations (Karimi & Fallah, 2021; Li et al., 2021; Sato et al., 2022; Mustafar et al., 2025). Nevertheless, these findings do not fully establish how motivational characteristics and burnout are associated within Malaysian science and engineering education. In particular, limited discipline-focused evidence is available on students' intrinsic and extrinsic goal orientations, task value, self-efficacy, control beliefs, and affective responses in relation to exhaustion and disengagement.

This gap is relevant because science and engineering students may experience high achievement expectations alongside sustained demands for conceptual understanding, practical competence, and academic performance. Furthermore, the contrasting relationships reported in recent Malaysian studies (Che Mat et al., 2025; Mustafar et al., 2025) highlight the need for additional evidence from specific academic populations. Without a clearer understanding of these relationships, educational strategies that focus exclusively on increasing students' motivation may overlook their experiences of academic exhaustion and disengagement.

Accordingly, the present study examines academic motivation and burnout among science and engineering students at Universiti Teknologi MARA (UiTM) and Universiti Teknologi Malaysia (UTM). By assessing motivation through value, expectancy, and affective components, and burnout through exhaustion and disengagement, the study provides discipline-focused descriptive and correlational evidence within Malaysian higher education. The findings are intended to inform a more balanced understanding of students' motivational characteristics and academic well-being.

Objective and Research Questions

The general objective of this study is to examine academic motivation and burnout among science and engineering students in Malaysian higher education and investigate the relationship between these two constructs.

Specifically, this study aims to:

1. Assess academic motivation among science and engineering students based on value, expectancy, and affective components.
2. Examine academic burnout among science and engineering students in terms of exhaustion and disengagement.

3. Determine the relationship between academic motivation and burnout among science and engineering students.

To address these objectives, the following research questions were formulated:

1. What are the levels of academic motivation among science and engineering students in terms of value, expectancy, and affective components?
2. What are the levels of academic burnout among science and engineering students in terms of exhaustion and disengagement?
3. Is there a significant relationship between academic motivation and burnout among science and engineering students?

Literature Review

Motivation in Learning

Academic motivation is a central construct in educational psychology that explains the initiation, direction, and persistence of students' learning behaviours (Schunk et al., 2014; Koenka, 2020). According to Pintrich and De Groot (1990), motivation encompasses value, expectancy, and affective components. The value component reflects students' reasons for engaging in academic activities, including intrinsic goal orientation, extrinsic goal orientation, and task value. The expectancy component concerns students' beliefs about their capabilities and control over learning outcomes, whereas the affective component represents emotional responses associated with academic tasks, particularly examination anxiety.

These motivational components may have different implications for students' academic experiences. Intrinsic motivation and task value may support sustained engagement through interest and perceived relevance, whereas extrinsic motivation may encourage persistence through the pursuit of grades, recognition, and achievement. However, strong achievement-oriented motivation does not necessarily indicate the absence of academic strain, particularly when students perceive academic success as requiring sustained effort under demanding learning conditions.

Self-determination theory provides an additional perspective on academic motivation by emphasising the role of psychological needs in supporting autonomous motivation and engagement (Ryan & Deci, 2020). Previous research has also associated emotional experiences and emotional intelligence with students' motivation and learning behaviours (Arias et al., 2022; Zhu et al., 2022). Nevertheless, evidence concerning motivation should distinguish between students' willingness to engage in learning and their capacity to sustain that engagement without experiencing exhaustion. This distinction is particularly relevant to science and engineering education, where academic activities frequently require sustained conceptual understanding, problem-solving, and practical learning.

Causes of Burnout

Academic burnout represents a prolonged response to educational demands and is commonly examined through exhaustion and disengagement (Campos et al., 2011). Exhaustion reflects the depletion of physical, cognitive, and emotional resources associated with academic activities, whereas disengagement refers to increasingly negative attitudes toward studying and reduced psychological involvement in learning.

Several factors have been associated with academic burnout, including academic pressure, demanding coursework, performance expectations, and difficulties balancing educational responsibilities with personal commitments (Xu & Ba, 2022). Additional academic stressors may arise from uncertainty about academic performance, comparisons with higher-achieving peers, and information overload associated with digital information resources (Tynan, 2020; Adekoya & Akune, 2023; Schlechter et al., 2025).

Previous studies involving medical students have documented the association between academic burnout and psychological factors, including perceived stress, personality characteristics, and social support (Li et al., 2021). Fares et al. (2016) similarly highlighted stress and burnout among preclinical medical students. Although medical education shares some characteristics with science and engineering programmes, including demanding academic content and practical training, differences in curricular organisation, assessment requirements, and professional expectations limit the direct transferability of these findings.

For science and engineering students, the combination of theoretical learning, laboratory activities, quantitative assessments, and achievement expectations may create conditions in which academic engagement and exhaustion coexist. However, these contextual demands should be distinguished from empirically established causes of burnout. Their relevance provides a rationale for examining students' reported motivation and burnout within these disciplines.

Previous Studies on Academic Motivation

Previous research has examined academic motivation across diverse educational settings, including language learning and general higher education. Zhu et al. (2022) highlighted the relationship between learning motivation, positive academic emotions, and learning performance. Similarly, research grounded in self-determination theory has emphasised the importance of psychological factors in sustaining learning motivation (Ryan & Deci, 2020).

Studies involving EFL learners have also contributed to understanding motivation and students' emotional experiences. Karimi and Fallah (2021) examined academic burnout, shame, intrinsic motivation, and teacher affective support among Iranian EFL learners. In Malaysia, Zolkapli et al. (2024) investigated reasons for learning English and burnout among pre-university students, demonstrating the relevance of motivation and exhaustion within language-learning environments.

However, motivation in language learning is embedded in educational goals and learning activities that may differ from those encountered in science and engineering programmes. Consequently, findings from EFL populations cannot be assumed to represent the motivational characteristics of students undertaking mathematically intensive, laboratory-based, or technically oriented courses (Malik & Pervaiz, 2023).

Furthermore, examining motivation as a multidimensional construct is particularly relevant because different motivational components may not have equivalent relationships with burnout. Students who value learning and believe in their academic capabilities may demonstrate strong engagement, while those predominantly motivated by grades and external recognition may experience additional performance-related demands. This

distinction highlights the need to examine value, expectancy, and affective components rather than treating academic motivation as a uniform experience.

Previous Studies on Academic Burnout and Its Relationship with Motivation

Previous investigations have established academic burnout as a concern across higher education populations. Li et al. (2021) examined burnout prevalence among medical students in China, while Fares et al. (2016) investigated stress, burnout, and coping strategies among preclinical medical students. These studies highlight the relevance of academic stress and psychological well-being in demanding educational settings.

Research involving EFL learners has also examined how motivational characteristics relate to burnout. Karimi and Fallah (2021) investigated intrinsic motivation alongside burnout and teacher affective support, while Yu et al. (2022) examined motivation, burnout, and maladaptive emotion regulation strategies among university EFL learners.

More directly relevant evidence has emerged from Malaysian higher education, although reported relationships between motivation and burnout are not entirely consistent. Mustafar et al. (2025), in a cross-sectional study involving 664 Malaysian undergraduates, identified a significant negative correlation between academic motivation and burnout ($r = -0.29$, $p < 0.001$). Their findings suggested that stronger motivational characteristics, particularly self-efficacy and task value, were associated with lower burnout.

In contrast, Che Mat et al. (2025) examined 82 Malaysian university students and reported positive correlations between academic motivation and exhaustion ($r = 0.456$, $p < 0.01$) and between motivation and disengagement ($r = 0.549$, $p < 0.01$). These results suggest that stronger reported motivation may coexist with greater burnout symptoms in some student populations.

The contrasting findings indicate that the relationship between academic motivation and burnout may vary across samples, motivational characteristics, and measurement approaches. Although Malaysian studies have investigated these constructs among university students, their findings do not clearly establish the relationship specifically within science and engineering student populations. Moreover, evidence from language learners, teachers, and medical students is insufficient to characterise the motivational and burnout experiences associated with science and engineering education.

Accordingly, further discipline-focused investigation is warranted to examine academic motivation and burnout among science and engineering students in Malaysian higher education. Assessing motivation through value, expectancy, and affective components, alongside exhaustion and disengagement, can provide a more detailed description of students' motivational characteristics and burnout experiences. Examining the overall association between these constructs may also help clarify whether the relationship observed in this population is consistent with the contrasting findings reported in previous Malaysian studies.

Conceptual Framework

The conceptual framework of this study was developed based on the motivational components described by Pintrich and De Groot (1990) and the burnout dimensions adopted from Campos et al. (2011). Academic motivation comprises three principal components: value, expectancy, and affective responses. The value component includes intrinsic goal orientation, extrinsic goal orientation, and task value beliefs, while the expectancy component comprises self-efficacy and control beliefs for learning. The affective component addresses students' examination-related emotional responses. Academic burnout is represented by exhaustion and disengagement.

The framework proposes an association between academic motivation and burnout without assuming that motivation necessarily reduces burnout. This approach is informed by previous evidence showing both negative and positive relationships between these constructs among Malaysian university students (Che Mat et al., 2025; Mustafar et al., 2025).

Within this framework, motivation and burnout are treated as distinct but potentially related constructs. Students may demonstrate strong motivation while simultaneously reporting exhaustion or disengagement. The present study therefore examines the motivational and burnout characteristics of science and engineering students and evaluates the statistical relationship between the two constructs. Figure 1 illustrates the conceptual relationship between academic motivation and academic burnout among science and engineering students.

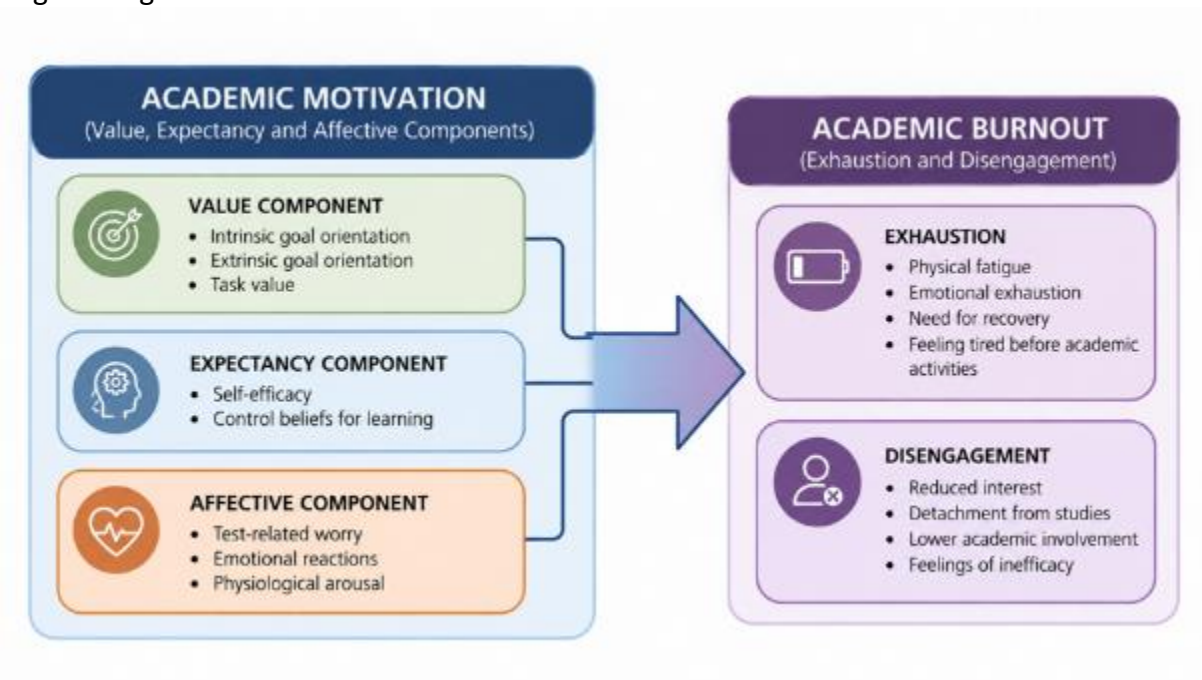

Figure 1 Conceptual Framework of the study: Motivation and Burnout among learners.

Methodology

This quantitative study is done to explore motivation factors for learning among undergraduates. A purposive sample of 124 participants responded to the survey. The study employed a five-point Likert-scale questionnaire adapted from Pintrich and De Groot (1990) and Campos et al. (2011) in table 1 below. The survey has 4 sections. Section A has items on demographic profile. Section B has 12 items Value components, 7 expectancy component and

also 5 affective components. Section C has 8 components for both burnouts' exhaustion and disengagement.

Table 1
Distribution of Items in the Survey

SECT	CONSTRUCT	MAIN CATEGORY		VSUB-CATEGORY		Total Items	Cronbach Alpha
B	MOTIVATION Pintrich and De Groot (1990)	VALUE COMPONENT	(i)	Intrinsic Goal Orientation	4	24	.890
			(ii)	Extrinsic Goal Orientation	3		
			(iii)	Task Value Beliefs	5		
		EXPECTANCY COMPONENT	(i)	Students' Perception of Self- Efficacy	5		
			(ii)	Control Beliefs for Learning	2		
		AFFECTIVE COMPONENTS			5		
C	BURNOUT Campos et al. (2011)	BURNOUT-EXHAUSTION			8	16	.667
		BURNOUT-DISENGAGEMENT			8		
				TOTAL NO OF ITEMS		40	.867

Table 1 also shows the reliability of the survey. The analysis shows a Cronbach alpha of .890 for section B and Cronbach Alpha for section C is .667. This thus reveal a good reliability of the instrument chosen/used as the total .867. Further analysis using SPSS is done to present findings to answer the research questions for this study.

Findings

Findings for Demographic Profile

Table 2
Percentage (%) for Demographic Profile

Q1	Gender	Male	Female
		33.9	66.1
Q2	University	UiTM	UTM
		81.5	18.5
Q3	Programme	Science	Engineering
		66.1	33.9

The total number of respondents in this study comprises of 124 students, with 33.9% being male and 66.1% being female. The survey was distributed at both Universiti Teknologi MARA

(UiTM) and Universiti Teknologi Malaysia (UTM), with 81.5% and 18.5% of students emanating from UiTM and UTM, respectively. Furthermore, 66.1% of the respondents were enrolled in science programs, while the remaining 33.9% were affiliated with engineering programs as in Table 2.

Findings for Motivation

This section presents data to answer the first question of research question: How learners perceive motivation in learning, which consists of two components that are value and consumption.

Value Component

Table 3

Mean for INTRINSIC GOAL ORIENTATION (4 items)

	Mean
MSVCQ1In this program, I prefer class work that is challenging so I can learn new things.	3.7
MSVCQ2In the courses of a program like this, I prefer course materials that arouse my curiosity, even if they are difficult to learn.	3.7
MSVCQ 3The most satisfying thing for me in this program is trying to understand the content of the courses	4.2
MSVCQ 4When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	3.5

Table 3 presents the mean scores for items related to intrinsic goal orientation of students in a program. The MSVQ3 has the highest average score of 4.2, indicating that students are highly motivated to understanding the course material on an intrinsic level. The mean scores for the MSVQ1, MSVQ2, and MSVQ4 range from 3.5 to 3.7, suggesting a moderate level of agreement that is marginally lower than the score obtained for MSVQ3. These results imply that students are motivated by challenges and learning opportunities, as well as by curiosity and the intrinsic value of the course assignments, rather than solely by the pursuit of good grades. The overall high mean scores for all items suggest that intrinsic goal orientation is a prevalent attitude among the students in this program.

Table 4

Mean for EXTRINSIC GOAL ORIENTATION (3 items)

	Mean
MSEGQ1Getting a good grade in the classes is the most satisfying thing for me right now.	4.6
MSEGQ 2The most important thing for me right now is improving my overall grade point average, so my main concern in this program is getting a good grade.	4.7
MSEGQ 3I want to do well in the classes because it is important to show my ability to my family, friends, or others.	4.4

The highlighted section refers to Table 4, which shows average scores for three statements about external goals. The average score is 4.6, indicating that participants find achieving good grades highly satisfying and an average score of 4.7, suggesting that improving their overall GPA is most important for participants. Additionally with mean score 4.4, indicating that participants aim to excel in classes to prove their abilities to family, friends, or others.

The study participants show a strong focus on external goals, evident from the high average scores for all three statement especially participants prioritize achieving good grades and enhancing their GPA.

Recent evidence from Malaysian higher education suggests that academic motivation is generally inversely associated with burnout. Mustafar et al. (2025), examining 664 undergraduates, reported a significant negative relationship between overall motivation and academic burnout, with self-efficacy and task value particularly associated with lower exhaustion. The present findings differ from this pattern, as motivation was positively correlated with burnout. This divergence may indicate that high motivation does not uniformly function as a protective factor, particularly when students' motivational profiles are strongly oriented toward external achievement and academic performance.

Table 5
Mean for TASK VALUE BELIEFS (5 items)

	Mean
MSTVQ1I think I will be able to transfer what I learn from one course to other courses in this program.	3.7
MSTVQ2 It is important for me to learn the course materials in the courses.	4.3
MSTVQ3I think the course material in the courses of this program is useful for me to learn	4.3
MSTVQ4I like the subject matter of the courses.	4.2
MSTVQ5Understanding the subject matter of the courses is very important to me.	4.4

Table 5 delineates the mean values representing respondents' perceptions of task value beliefs. Among the 124 participants, an average score of 3.7 indicates that respondents believe in their ability to transfer acquired knowledge and correlate it with other courses within the same program. Conversely, respondents attribute significance to the acquisition of materials deemed useful for their future, as evidenced by a mean score of 4.3. Additionally, respondents express a positive inclination towards the subject matter, reflected in mean scores of 4.2 and 4.4, denoting both an affinity for the subject matter and a recognition of its importance in achieving a comprehensive understanding. Overall mean score indicate that the respondents have high values towards their task belief which may extrapolated to their grades for the courses.

Expectancy Component
Table 6
Mean for STUDENTS 'PERCEPTION OF SELF-EFFICACY (5 items)

	Mean
ECSEQ1I believe I will receive excellent grades in the classes.	3.6
ECSEQ2I'm confident I can understand the most complex materials presented by the instructors in the courses.	3.5
ECSEQ3I'm confident I can do an excellent job on the assignments and tests in this program.	3.7
ECSEQ4I'm certain I can master the skills being taught in the classes.	3.7
ECSEQ5Considering the difficulty of the courses, the teachers, and my skills, I think I will do well in the classes.	3.8

The mean scores for students' perceptions of self-efficacy, comprising five items that related to students' beliefs about their ability to perform well in their classes, are tabulated in Table 6. The mean scores presented in the table denote the average level of agreement or disagreement among the students with respect to each self-efficacy item. The mean scores vary between 3.5 and 3.8 represent the average level of self-efficacy expressed by the students for each statement. The degree to which students attribute greater self-efficacy to a particular assertion is proportional to the mean score. The table provides a summary of the students' perceptions of their own self-efficacy in various aspects related to their academic performance.

Recent research has increasingly examined motivation together with students' perceived academic competence. Chen and Lai (2026) demonstrated that academic motivation and self-efficacy provide meaningful explanatory information regarding learning burnout, suggesting that burnout should be interpreted within a broader motivational framework rather than exclusively as a consequence of academic workload.

Academic self-efficacy has increasingly been identified as an important psychological resource against academic burnout. In a study involving 1,431 undergraduates, Niu et al. (2026) found that greater academic self-efficacy was associated with lower burnout, both directly and indirectly through greater self-control and learning engagement. These findings suggest that students' beliefs in their academic capabilities may influence burnout partly through their capacity to remain actively involved in learning.

Table 7
Mean for CONTROL BELIEFS FOR LEARNING (2 items)

	Mean
ECCBQ1 If I study in appropriate ways, then I will be able to learn the material in the courses of this program	4.3
ECCBQ2 If I try hard enough, then I will understand the course materials.	4.4

The highlighted text refers to Table 7, which displays the mean values for the construct "CONTROL BELIEFS FOR LEARNING" in the survey. The mean values for these items are 4.3 and 4.4, respectively. These mean values indicate the average level of agreement or disagreement with the statements among the respondents.The higher the mean value, the higher the agreement with the statement. Based on the mean values, it can be concluded that the respondents generally have a positive belief in their ability to learn the material and understand the course materials through appropriate studying and effort.

Table 8
Mean for AFFECTIVE COMPONENT -reversing (5 items)

	Mean
ACQ1When I take a test I think about how poorly I am doing compared with other students.	3.1
ACQ2When I take a test, I think about items on other parts of the test I can't answer	2.8
ACQ3When I take tests I think of the consequences of failing.	2.6
ACQ4I have an uneasy, upset feeling when I take an exam.	2.8
ACQ5I feel my heart beating fast when I take an exam.	2.8

Table 8 presents the mean scores reflecting the 124 respondents' affective components related to examination session. With a mean score of 3.1, respondents commonly engage in the practice of comparing their test performance with that of others. Additionally, with a mean score of 2.8, respondents tend to dwell on questions they have missed during examinations. Notably, among the lowest mean scores recorded is 2.6, indicating respondents' consideration of the potential consequences of test failure. Furthermore, a mean score of 2.8 suggests that respondents experience feelings of unease or agitation, accompanied by a rapid heartbeat, during examinations. The overall mean score indicates that respondents exhibit a relatively low mean score concerning affective components.

Findings for Burnout

This section presents data to answer the research question two on how learners perceive their cause of burnout in learning.

Table 9

Mean for - BURNOUT (EXHAUSTION)

	Mean
EQ1 There are days when I feel tired before the day begins	3.7
EQ2 After classes, I tend to need more time than in the past in order to relax and feel better	3.7
EQ3I can tolerate the pressure of my studies very well	3.5
EQ4 During classes, I often feel emotionally drained	3.1
EQ5 After classes, I have enough energy for my leisure activities	3.2
EQ6 after classes, I usually feel energized	2.9
EQ7 after my classes, I usually feel worn out and weary	3.3
EQ8 Usually, I can manage the amount of my work well	3.6

As tabulated in Table 9, the means score for burnout specifically exhaustion. The findings provide an understanding of the level of exhaustion experienced by the participants in relation to different statements/questions from the mean scores. The highest mean scores are from EQ1 and EQ2 which are 3.7 indicated that participants often feel tired before the day begins and need more time to relax and feel better after classes. Furthermore, the highest mean scores suggest that feeling tired before the day begins and needing more time to relax after classes are common experiences among the participants. Meanwhile, EQ6 has the lowest mean score of 2.9, suggesting that participants usually do not feel energized after classes. Moreover, the mean scores for EQ4 indicate that participants often experience emotional exhaustion during classes.

Table 10

Mean for DISENGAGEMENT

	Mean
DQ1I always find new and interesting aspects in my study	3.9
DQ2It happens more and more often that I talk about my studies in a negative way	2.8
DQ3Lately, I tend to think less during classes and attend classes almost mechanically	3.1
DQ4 I find my studies to be positive challenging	4.0
DQ5 Over time, students can become disconnected from this type of routine	3.4
DQ6 This is only thing (studying) that I can imagine myself doing now	3.7
DQ7I feel more and more engaged in my studies	3.7
DQ8 Sometimes I feel sickened by my study tasks	3.3

The highlighted text is a table titled "Table 10- Mean for DISENGAGEMENT. The questions in the table assess various aspects of disengagement, such as finding new and interesting aspects in studying, talking about studies in a negative way, thinking less during classes, finding studies positively challenging, becoming disconnected from routine, imagining studying as the only option, feeling more engaged in studies, and feeling sickened by study tasks. The mean scores for each question range from 2.8 to 4.0.

The highest mean score is for the statement "I find my studies to be positively challenging" with a score of 4.0. The lowest mean score is for the statement "It happens more and more often that I talk about my studies in a negative way" with a score of 2.8. Overall, the respondents tend to agree more with statements related to finding new and interesting aspects in their study and feeling engaged in their studies.
On the other hand, they tend to disagree more with statements related to talking about studies in a negative way and feeling sickened by study tasks.
These findings suggest that the respondents may have a higher level of engagement and motivation in their studies, but there may still be some instances of disengagement and negative attitudes towards studying.

Findings for Relationship between Motivation and Burnout
This section addresses the third research question by examining the relationship between academic motivation and burnout among science and engineering students. Pearson's correlation analysis was conducted to determine the strength, direction, and statistical significance of the association between the two constructs. The results are presented in Table 11.

Table 11
Correlation between motivation and burnout

Correlations

		Motivation	Burnout
Motivation	Pearson Correlation	1	.344**
	Sig. (2-tailed)		<.001
	N	124	124
Burnout	Pearson Correlation	.344**	1
	Sig. (2-tailed)	<.001	
	N	124	124

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation analysis revealed a statistically significant positive association between academic motivation and burnout among science and engineering students ($r = .344$, $p < .001$, $N = 124$). The correlation indicates a moderate positive relationship, suggesting that students who reported higher levels of academic motivation also tended to experience greater burnout. This finding highlights that academic motivation and burnout are not necessarily mutually exclusive. Students may remain strongly motivated to achieve academic success

while simultaneously experiencing exhaustion and disengagement. Nevertheless, the cross-sectional nature of the study prevents causal interpretations regarding the relationship between these constructs.

Conclusion

Summary of Findings and Discussions

The findings suggest that learners generally have a positive belief in their ability to learn and understand course materials through appropriate studying and effort. This is inferred from mean values of 4.3 and 4.4 for the construct "control beliefs for learning" in the survey, indicating a high level of agreement with the statements related to this construct. Higher mean values imply stronger agreement. Thus, it can be concluded that respondents exhibit a positive perception of their motivation in learning, expressing confidence in their capacity to learn through diligence and effective study strategies.

The findings of learners' perceptions of burnout in learning show that exhaustion is a significant factor. The highest averages of 3.7 indicate that participants are often tired before the start of the day and require additional time to relax after the classes. This indicates that fatigue before and after classes prevails among participants. Overall, participants may show high interest and motivation in the study, but there are cases of disengagement and negative attitudes towards the study, as indicated by these results. The correlation coefficient between motivation and burnout is 0.344, indicating a moderate positive correlation. The significance level shows the probability of observing the correlation coefficient by chance. The significance level below 0.001 indicates that the correlation is statistically significant, meaning that it is unlikely to occur by chance. The sample size (N) of the two variables is 124, meaning that the correlation is based on data from 124 participants using a 5-point Likert scale.

Pedagogical Implications and Suggestions for Future Research

Future research in the field of motivation and burnout among science students could focus on the role of specific contextual factors in the formation of motivational trajectories and burnout experiences of students. For example, examining how the structure and organization of scientific programmes, including factors such as course load, assessment methods and practical laboratory experiences, affect student motivation and burnout sensitivity, could provide valuable insights. Furthermore, studying the effects of social and interpersonal factors, such as peer interaction, faculty support and mentorship opportunities, on students' motivation and burning, could further improve our understanding of these phenomena in the context of science education. Furthermore, longitudinal studies that track students from entry into scientific programmes to graduation could shed light on the long-term effects of motivation factors and fatigue on academic achievement, career goals and overall well-being. By solving these research problems, future research will contribute to the development of evidence-based interventions and policies to promote a supportive learning environment and promote the success and prosperity of students in the scientific fields.

References

Adekoya, O. M., & Akune, C. (2023). Information overload and its effects on academic performance of students. Global Review of Library and Information Science, 19(2).

Arias, J., Soto-Carballo, J. G., & Pino-Juste, M. R. (2022). Emotional intelligence and academic motivation in primary school students. Psicologia: Reflexão e Crítica, 35, Article 14. https://doi.org/10.1186/s41155-022-00216-0

Campos, J. A. D. B., Zucoloto, M. L., Bonafé, F. S. S., Jordani, P. C., & Maroco, J. (2011). *Reliability and validity of self-reported burnout in college students: A cross randomized comparison of paper-and-pencil vs. online administration.* Computers in Human Behavior, 27, 1875–1883. https://doi.org/10.1016/j.chb.2011.04.011

Chen, B., & Lai, X. (2026). How academic motivation and self-efficacy predict learning burnout: An empirical study of senior English majors in Chinese independent colleges. BMC Psychology, 14, 669. https://doi.org/10.1186/s40359-026-04424-6

Che Mat, N. H., Lin, N. M., Hamzah, S., Telajan, D. S. D., Zainudin, Z. N., & Rahmat, N. H. (2025). A look at the relationship between motivation for learning and sources of burnout among students in a Malaysian university. International Journal of Education, Psychology and Counselling, 10(58), 964–979. https://doi.org/10.35631/IJEPC.1058061

Ding, X. (2022). *Management work mode of college students based on emotional management and incentives.* Frontiers in Psychology, 13, 122. https://doi.org/10.3389/fpsyg.2022.963122

Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). *Motivation to succeed.* In W. Damon & N. Eisenberg (Eds.), Handbook of child psychology: Social, emotional, and personality development (pp. 1017–1095). John Wiley & Sons, Inc.

Fares, J., Al Tabosh, H., Saadeddin, Z., El Mouhayyar, C., & Aridi, H. (2016). *Stress, burnout and coping strategies in preclinical medical students.* North American Journal of Medical Sciences, 8(2), 75–81. https://doi.org/10.4103/1947-2714.177299

Jansen, T., Meyer, J., Wigfield, A., & Möller, J. (2022). *Which student and instructional variables are most strongly related to academic motivation in K-12 education? A systematic review of metaanalyses.* Psychological Bulletin, 148(1–2), 1–26. https://doi.org/10.1037/BUL0000354

Karimi, M. N., & Fallah, N. (2021). *Academic burnout, shame, intrinsic motivation and teacher affective support among Iranian EFL learners: A structural equation modeling approach.* Current Psychology, 40(4), 2026–2037. https://doi.org/10.1007/s12144-019-0138-2

Koenka, A. C. (2020). *Academic motivation theories revisited: An interactive dialog between motivation scholars on recent contributions, underexplored issues, and future directions.* Contemporary Educational Psychology, 61, 101831. https://doi.org/10.1016/j.cedpsych.2019.101831

Li, Y., Cao, L., Mo, C., Tan, D., Mai, T., & Zhang, Z. (2021). *Prevalence of burnout in medical students in China: A meta-analysis of observational studies.* Medicine (Baltimore), 100(26), e26329. https://doi.org/10.1097/MD.0000000000026329

Malik, S. F., & Pervaiz, A. (2023). *Investigating the effects of ESL learners' motivation and anxiety on task based language teaching in Pakistan.* Linguistics and Literature Review, 9(1), 65–87.

Mustafar, M. Z., Mohd Aziz, M. K. N., Abd Razak, A. Q., & Mohd Fadzil, M. F. (2025). The relationship between student motivation and academic burnout among undergraduate students in Malaysian higher education. International Journal of Research and

Innovation in Social Science, 9(26), 8409–8417. https://doi.org/10.47772/IJRISS.2025.903SEDU0634

Niu, Y., Talib, O. B., Ishak, Z. B., Pee, H. W.-H., & Dong, X. (2026). Academic self-efficacy and academic burnout among college students: The chain-mediating roles of self-control and learning engagement. Behavioral Sciences, 16(7), 1202. https://doi.org/10.3390/bs16071202

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. Journal of Educational Psychology, 82(1), 33–40. https://doi.org/10.1037/0022-0663.82.1.33

Prendergast, M., Cardoso Pinto, A. M., Harvey, C. J., & Muir, E. (2024). *Burnout in early year medical students: Experiences, drivers and the perceived value of a reflection-based intervention.* BMC Medical Education, 24(1), 1–11. https://doi.org/10.1186/s12909-023-04948-0

Rahmat, N. H., Sukimin, I. S., Sim, M. K., Anuar, M., & Mohandas, E. S. (2021). *Online learning motivation and satisfaction: A case study of undergraduates vs postgraduates.* International Journal of Asian Social Sciences, 11(2), 88–97. http://dx.doi.org/10.18488/journal.1.2021.112.88.97

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. Contemporary Educational Psychology, 61, Article 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Sato, M., Fernández Castillo, F., & Oyanedel, J. C. (2022). Teacher motivation and burnout of English-as-a-foreign-language teachers: Do demotivators really demotivate them? Frontiers in Psychology, 13, Article 891452. https://doi.org/10.3389/fpsyg.2022.891452

Schunk, D. H., Meece, J. L., & Pintrich, P. R. (2014). *Motivation in education: Theory, research, and applications* (4th ed.). Pearson.

Schlechter, P., Meyer, T., Hagen, M., Baranova, K., & Morina, N. (2025). Comparative thinking among university students: An ecological momentary assessment of upward comparisons, stress and learning behavior during exam preparation. Social Psychology of Education, 28, Article 54. https://doi.org/10.1007/s11218-025-10026-8

Tynan, M. C. (2020). *Multidimensional tolerance of ambiguity: Construct validity, academic success, and workplace outcomes* (Doctoral dissertation). Iowa State University.

Xu, J., & Ba, Y. (2022). *Coping with students' stress and burnout: Learners' ambiguity of tolerance.* Frontiers in Psychology, 13, 842113. https://doi.org/10.3389/fpsyg.2022.842113

Yu, X., Wang, Y., & Liu, F. (2022). *Language learning motivation and burnout among English as a foreign language undergraduates: The moderating role of maladaptive emotion regulation strategies.* Frontiers in Psychology, 13, 808118.

Zhu, Y., Xu, S., Wang, W., Zhang, L., Liu, D., Liu, Z., & Xu, Y. (2022). The impact of online and offline learning motivation on learning performance: The mediating role of positive academic emotion. Education and Information Technologies, 27, 8921–8938. https://doi.org/10.1007/s10639-022-10961-5

Zolkapli, R. B. M., Kenali, S. F. M., Hadi, N. F. A., Basiron, M. K., Shaharudin, N. A. D., & Mohamad, H. A. (2024). Exploring reasons for learning English and burnout among pre-university students. Malaysian Journal of Social Sciences and Humanities, 9(1), Article e002670. https://doi.org/10.47405/mjssh.v9i1.2670