

## Exploring The Impact of Causes of Burnout on Motivational Elements in Learning Mathematics

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### Abstract

The prevalence of burnout among students has emerged as a significant concern in educational settings, leading to adverse effects on their motivation, academic performance, and overall engagement. To investigate this issue, a quantitative survey study was conducted to explore how burnout impacts the motivational aspects of learning mathematics among pre-university students. The study's primary objectives were to understand how learners perceive motivational elements in their math education, identify the root causes of burnout, and examine the relationship between motivational factors and burnout experiences. The data were collected using a questionnaire. The questionnaire focuses on getting responses regarding the instrument, which comprises three sections: the demographic profile, three key components of motivational elements (value, expectancy, and affective), and two components of burnout causes (exhaustion and disengagement) using a 5-point Likert scale. A total of 119 respondents from the Foundation in Science and Engineering programmes at the Centre of Foundation Studies, UiTM Cawangan Selangor, participated in the survey. The findings revealed that students who displayed a comprehensive grasp of foundational mathematics demonstrated higher levels of satisfaction and enthusiasm for acquiring new knowledge, prioritising meaningful learning experiences over mere grade attainment. Notably, the correlation analysis indicated a highly significant association between motivational elements and burnout causes, highlighting the interconnected nature of motivation and burnout. Furthermore, the results indicated that students exhibited a strong

intrinsic goal orientation, valuing opportunities to gain knowledge and skills in mathematics. However, certain factors, such as reading difficulties and a lack of support, contributed to burnout and diminished motivation. Addressing these factors becomes crucial to cultivating a positive learning environment and enhancing students' performance in mathematics. The implications of this study extend to educators and policymakers, who can leverage these findings to develop strategies and interventions that foster student motivation, alleviate burnout, and promote engagement and achievement in mathematics. By addressing the identified burnout causes and enhancing motivational aspects, educational institutions can create a conducive and empowering learning environment for students, ultimately leading to improved academic outcomes and overall well-being.

**Keywords:** Foundation Mathematics, Burnout, Motivation

## **Introduction**

### **Background of Study**

Students at the pre-university level are required to study Foundation Mathematics, which equips them with essential mathematical principles. This course covers various topics, including algebra, trigonometry, calculus, statistics, and probability. In the algebra component, students learn techniques to manipulate variables and equations, enabling them to solve problems through methods like factoring and simplification. Trigonometry delves into the study of triangles and their angles, while calculus focuses on rates of change and introduces concepts like limits, derivatives, and integrations. By engaging with foundational mathematics, students acquire a solid grasp of fundamental principles and concepts, preparing them for advanced mathematical coursework at the university level. This course establishes a strong foundation that empowers students to approach higher-level mathematics with confidence and effectively tackle more complex problems.

Burnout is a phenomenon that can arise in academic settings, as a result of various factors, such as a heavy academic workload, social pressure, and an unfriendly learning environment. It is characterised by emotional exhaustion, depersonalization, and a diminished perception of one's own achievements (Ishak et al., 2013). Initially, burnout was associated primarily with professionals in work settings, but it is now recognised as also impacting students in their academic lives (Cazan, 2015).

In the context of mathematics learning, student motivation, and burnout are crucial factors that significantly influence academic performance and engagement. Motivation refers to the driving forces, whether internal or external, that guide students toward achieving their goals (Hwang and Evans, 2011). Burnout, on the other hand, arises from prolonged stress, overwork, or frustration, leading to emotional exhaustion (Chen et al., 2016). In mathematics learning, burnout manifests as a decline in student motivation, resulting in decreased academic performance and disengagement.

Both internal and external factors can impact student motivation and burnout in mathematics learning. Internal factors include self-efficacy, interest, and anxiety, while external factors encompass instructor support, the classroom environment, and curriculum design (Xie et al., 2021). Students with high levels of self-efficacy and a genuine interest in mathematics are more likely to be motivated and less prone to experiencing burnout. Conversely, students with elevated anxiety levels or limited instructor support are more susceptible to burnout (Wu and Hsieh, 2018; Wong and Wong, 2019).

By understanding these factors and their effects, educators and policymakers can develop strategies and interventions to foster student motivation, alleviate burnout, and create a

conducive learning environment that promotes engagement and achievement in mathematics. This understanding can lead to the implementation of effective support systems, personalized learning approaches, and interventions that address the specific needs and challenges faced by students in their mathematics learning journey.

### **Statement of Problem**

Motivating students in mathematics is of the utmost importance for their learning journey. Motivation refers to the degree of interest, engagement, and persistence exhibited by students when in this case, dealing with mathematical concepts, problems, and tasks. Several factors can influence motivation in mathematics, including personal interest, self-efficacy beliefs, the learning environment, educator support, and feedback. Students who possess high levels of motivation tend to enjoy the subject, demonstrate perseverance in the face of challenges, and achieve better learning outcomes. Conversely, when students lack motivation or experience negative emotions, they may disengage from the subject, struggle with learning, and perform poorly.

Learning mathematics can be a stressful and demanding experience for many students, and can contribute to burnout. Various factors can contribute to burnout in mathematics learning, such as difficulties in comprehending the subject matter, pressure to excel in exams and tests, and feelings of isolation or inadequate support. Some students may find mathematics challenging to understand, leading to frustration and anxiety. Moreover, the pressure to perform well in mathematics due to the need for good grades, test preparation, or academic expectations, can contribute to burnout. Additionally, students may feel isolated or unsupported in their mathematics learning, further exacerbating the risk of burnout.

To foster a positive learning environment and mitigate burnout, it is crucial for educators and educational institutions to consider strategies that promote student motivation, provide adequate support, and create a sense of belonging and engagement in mathematics learning. By addressing these factors, students can experience enhanced motivation, reduced burnout, and improved performance in mathematics.

### **Objective of the Study and Research Questions**

This study is done to explore students' perceptions of their learning motivation and causes of burnout in foundation mathematics at the Centre of Foundation Studies, UiTM Dengkil. Specifically, this study is done to answer the following questions:

1. How do students perceive the motivational elements in their learning?
2. How do students perceive the causes of burnout in their learning?
3. Is there a relationship between motivational elements and the causes of burnout?

### **Literature Review**

#### **Students' Motivation**

Student motivation and burnout play crucial roles in influencing students' academic performance and their engagement in learning mathematics. Motivation refers to the internal drive that initiates, directs, and sustains a student's behavior toward achieving a goal, while burnout represents the emotional exhaustion and cynicism resulting from prolonged stress and overwork. In this context, burnout can significantly undermine a student's motivation, leading to decreased academic performance and disengagement from learning mathematics. Several factors contribute to students' motivation to learn mathematics. Students' attitudes towards the subject, including their perceived usefulness and enjoyment, have been

identified as important predictors of their motivation to learn mathematics (Hembree, 1990). Additionally, students' self-efficacy, which refers to their beliefs in their ability to learn and succeed in mathematics, significantly influences their motivation and engagement in the subject (Ahmad and Safaria, 2013). Students with high self-efficacy in mathematics are more likely to be motivated and engaged, while those with low self-efficacy may experience burnout and disengagement. Furthermore, Chen et al. (2016) emphasised the impact of challenge and autonomy in mathematics instruction on student motivation and engagement. Providing appropriate levels of challenge and opportunities for autonomy positively influences students' motivation to learn mathematics.

### **Causes and Effects of Students' Burnout**

The causes and effects of student burnout can be attributed to various factors. One important aspect is the perceived significance, utility, and relevance of tasks or learning activities, commonly known as value aspects. These value aspects encompass cost value, utility value, achievement value, and intrinsic worth. Understanding students' expectations, perceptions of value, and costs is crucial to comprehending their motivational profiles (Lunenburg, 2011). Furthermore, students' belief in their own efforts and control over their learning outcomes holds significant relevance. Control beliefs for learning have a greater impact on motivation than students' sense of self-efficacy (Jenal et al., 2022). This emphasises the importance of students' conviction in their own abilities and their perceived control over the learning process. In summary, understanding the causes and effects of student burnout requires considering the value aspects related to tasks and learning activities as well as the cognitive factors outlined by the Expectancy Theory. Additionally, acknowledging students' control beliefs and their confidence in their own efforts is crucial for understanding and addressing motivational challenges.

### **Past Studies on Students' Motivation**

Numerous studies have examined the causes and effects of burnout, motivation, and attitudes toward learning mathematics among students. Felaza et al (2020) focused on undergraduate medical students and identified stress-related fatigue as a significant issue. The study emphasized the importance of considering contextual factors, such as culture and resources, to support students and enhance their motivation throughout their studies in medical institutions.

In a study by Xu et al (2021) involving Malaysian and Chinese students majoring in sports, a negative relationship between burnout and motivation was observed. The findings highlighted the need to find strategies to increase students' motivation, particularly in relation to their academic performance. The study underscored the role of teachers in fostering motivation among college students in sports programmes.

Usán et al (2022) conducted a study on primary school students, exploring the interrelationship between academic motivation, burnout, and academic performance. The results revealed a clear association between motivation, burnout, and academic performance in primary education. The study suggested that understanding this interrelationship can inspire students to adopt adaptive behaviours based on their motivation, thereby avoiding academic burnout, and achieving better academic performance.

Perceptions and attitudes towards mathematics significantly impact students' motivation and performance. Otoo et al (2018) discovered that students often perceive mathematics as abstract and lacking practical value, leading to negative attitudes and decreased motivation.

Pavlin et al (2017) highlighted differences in motivation between students in mathematics and language programmes, emphasising the crucial role of positive motivation in students' success in mathematics.

Ethnomathematics-based learning approaches have shown potential for increasing students' engagement, motivation, interest, and confidence in mathematics (Widada et al., 2018). Students' confidence and motivation were found to have a direct effect on their interest in learning mathematics (Otoo et al., 2018). Recognising the usefulness and real-world applications of mathematics can fuel students' motivation and foster positive attitudes toward the subject (Kyndt et al., 2015).

Mathematics anxiety has been identified as a factor that interferes with learning and influences students' attitudes and motivation in mathematics (Garcia and Pintrich, 1991). This aligns with findings from other studies that revealed a negative correlation between mathematics anxiety and metacognitive knowledge, which is essential for effective learning (Taber, 2018). Overcoming mathematics anxiety and promoting positive attitudes are crucial for improving students' mathematics performance.

### **Past Studies on Causes of Burnout**

In previous studies, researchers have explored various factors related to burnout among students, shedding light on its causes and effects. For instance, Paidar et al (2017) examined the relationship between gender, mathematics self-concept, and academic burnout. Their study aimed to uncover gender differences in how students perceive their mathematical abilities and how they relate to burnout. The findings revealed that students experiencing burnout tend to disengage from educational materials, exhibit irregular attendance, show scepticism towards course applications, lack motivation to complete assignments and feel incompetent. This study emphasised the importance of educational counselling in reducing negative mathematical self-concept and preventing academic burnout among students.

Another recent study conducted by Bekker et al (2023) focused on the factors influencing boredom in English and mathematics and its impact on student burnout, engagement, and life satisfaction. Their survey involving 544 secondary school students identified various factors such as home language, previous exam marks, ability to receive help with homework, and teacher liking that influenced boredom levels. The study revealed that experiencing boredom in both subjects led to increased burnout and decreased engagement. Furthermore, boredom indirectly influences life satisfaction through its effects on burnout and engagement. This research highlighted the significance of addressing boredom as a preventive measure against burnout while promoting engagement and enhancing overall satisfaction. Educators can utilise these findings to create more engaging and meaningful learning experiences for students.

### **Conceptual Framework**

Figure 1 shows the conceptual framework of the study. This study explores the elements that influence motivation to learn. Why are these factors important? According to Rahmat et al (2021), for maximum students, whatever they give their attention to becomes their motivation. If they give their attention to the factors that cause exhaustion or even disengage themselves from the learning task, they may experience burnout (Campos et al., 2011).

Nevertheless, burnout can be tolerable for students, depending on their motivational elements. According to Pintrich & DeGroot (1990), there are three types of motivational elements. Firstly, value elements may derive from (i) intrinsic goal orientation, (ii) extrinsic

oriental orientation, and (iii) task value beliefs. Next, students depend on expectancy elements such as (i) students' perception of self-efficacy and (ii) control beliefs for learning. Finally, students also depend on their effective elements to motivate them to learn.

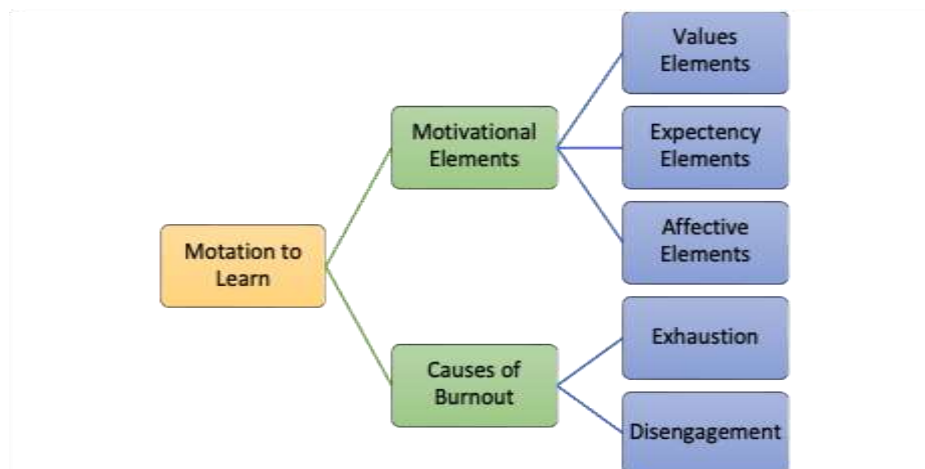


Figure 1. Conceptual Framework of the Study-

The Impact of the Causes of Burnout on Motivational Elements on Motivation to Learn

### Methodology

This quantitative study is done to explore motivational factors for learning among undergraduates. A purposive sample of 119 participants responded to the survey. The instrument used is a 5-point Likert-scale survey and is rooted in Pintrich and De Groot (1990); Campos et al (2011) to reveal the variables in Table 1 below. The survey has three sections. Section A has items on the demographic profile. Section B has 24 items on Motivational Elements, and Section C has 16 items on the Causes of Burnout.

Table 1

*Distribution of items in the survey*

Section	Factors	Construct		Variable	No of Items	Total Items
B	Motivational Elements	Value Elements	(i)	Intrinsic Goal Orientation	4	12
			(ii)	Extrinsic Goal Orientation	3	
			(iii)	Task Value Beliefs	5	
		Expectancy Elements	(i)	Students' Perception of Self- Efficacy	5	7
			(ii)	Control Beliefs for Learning	2	
		Affective Elements				5
C	Causes of Burnout	Burnout-Exhaustion				8
		Burnout-Disengagement				8
		Total No of Items				40

Table 2

*Reliability of survey*

Cronbach's Alpha	N of Items
.914	40

Table 2 shows the reliability of the survey. The analysis shows a Cronbach alpha of .914, thus revealing the good reliability of the instrument chosen or used is good. Further analysis using SPSS is done to present findings that answer the research questions for this study.

**Findings****Section A: Findings for Demographic Profile**

Table 3

*Percentage for Gender*

Male	45%
Female	55%

The gender-based distribution of the 119 survey respondents' demographic profiles is shown in Table 3. Among the respondents, there were 45% male students and 55% female students.

Table 4

*Percentage for Programme*

Science Foundation	66%
Engineering Foundation	34%

The distribution of respondents by programme can be observed in Table 4. The Science Foundation programme accounted for 66% of the participants, while the Engineering Foundation programme represented 34% of the respondents.

Table 5

*Percentage for Type of School*

Non-residential	47%
Residential	27%
SMKA (Islamic)	12%
MRSM	14%

Table 5 provides the distribution of respondents based on the type of school they attended before pursuing their studies at this Centre of Foundation Studies, UiTM Selangor. The data reveals that 57% of the respondents came from non-residential schools, while 27% came from residential schools. Additionally, 12% of the respondents came from Islamic schools (SMKA), and 14% came from Maktab Rendah Sains MARA (MRSM) or MARA Junior Science College.

**Section B: Findings for Motivational Elements**

This section presents the data analysis conducted to address the research question, "How do students perceive the motivational elements in their learning?" The study aims to gain insights into the factors that motivate learners during their learning process. These motivational elements encompass various aspects such as personal goals, interests, teacher support, rewards, and a sense of achievement. Understanding learners' perceptions of these motivational factors is crucial for comprehending their significance and influence.

In this study, the measurement of motivational elements encompasses three main components

1. Value components: These components include intrinsic goal orientation, extrinsic goal orientation, and task value beliefs. The data related to these components are presented in Table 4 (for intrinsic goal orientation), Table 5 (for extrinsic goal orientation), and Table 6 (for task value).
2. Expectancy components: These components involve students' perceptions of self-efficacy and control beliefs for learning. The analysis of these components contributes to understanding how learners perceive their capabilities and the level of control they have over their learning outcomes.
3. Affective components: This category captures the emotional aspects of motivation. While not explicitly mentioned in the provided text, affective components could be measured to explore the emotional experiences associated with motivation and their impact on learners' engagement and well-being.

By presenting the data and findings related to these components, the study offers valuable insights into learners' perceptions of motivational elements. The tables specified in the text (Tables 4, 5, and 6) provide a comprehensive overview of the data related to the value components, specifically intrinsic goal orientation, extrinsic goal orientation, and task value.



Table 6

*Mean for Intrinsic Goal Orientation*

	Mean
MSVCQ1: In Foundation Mathematics, I prefer class work that is challenging so I can learn new things.	3.4
MSVCQ2: In Foundation Mathematics, I prefer course materials that arouse my curiosity, even if they are difficult to learn.	3.4
MSVCQ 3: The most satisfying thing for me in this program is trying to understand the content of the courses	3.9
MSVCQ 4: When 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.	3.1

Table 6 displays the mean values for student intrinsic goal orientation. Students who demonstrate a comprehensive understanding of foundation mathematics exhibit high levels of satisfaction. This has a mean value of 3.9. These students display enthusiasm for acquiring new knowledge and willingly embrace the challenge of learning complex materials, as indicated by a mean value of 3.4. Additionally, students prioritise course assignments that offer valuable learning experiences, recognising their importance even if they do not guarantee a high grade, as reflected by a mean value of 3.1. The focus for these students lies in the opportunity to gain knowledge and skills rather than solely aiming for a good grade.

Table 7

*Mean for Extrinsic Goal Orientation*

	Mean
MSEGQ1: Getting a good grade in Foundation Mathematics is the most satisfying thing for me right now.	4.6
MSEGQ2: The most important thing for me right now is improving my overall grade point average, so my main concern in Foundation Mathematics is getting a good grade.	4.5
MSEGQ3: I want to do well in Foundation Mathematics because it is important to show my ability to my family, friends, or others.	4.4

Table 7 displays the mean values for extrinsic goal orientation toward learning Foundation mathematics. The highest mean value, 4.6, indicates that achieving a high grade in the subject brings students the greatest satisfaction. With a mean value of 4.5, it is evident that students prioritise improving their overall grades. Furthermore, the mean value of 4.4 suggests that students are concerned about demonstrating their abilities to their families, friends, and others.

Table 8

*Mean for Task Value Beliefs*

	Mean
MSTVQ1: I think I will be able to transfer what I learn from one chapter to other chapters in Foundation Mathematics.	3.5
MSTVQ2: It is important for me to learn the materials in Foundation Mathematics.	4.1
MSTVQ3: I think the material in Foundation Mathematics is useful for me to learn.	3.9
MSTVQ4: I like the subject matter of Foundation Mathematics.	3.8
MSTVQ5: Understanding the subject matter of Foundation Mathematics is very important to me.	4.1

The perceptions and attitudes of the students towards the subject are presented in Table 8. It is evident that students consider understanding and mastering the subject crucial for their academic growth and success, as indicated by a mean value of 4.1. Furthermore, students recognise the importance and relevance of the material, with a mean value of 3.9. Their positive response towards the subject matter reflects a genuine interest in learning the subject, as reflected by a mean value of 3.8. However, the mean value of 3.5 suggests that students place relatively less emphasis on the interconnectedness and continuity of the subject matter.

Table 9

*Mean for Students' Perception of Self-Efficacy*

	Mean
ECSEQ1: I believe I will receive excellent grades in Foundation Mathematics.	3.7
ECSEQ2: I'm confident I can understand the most complex materials presented by the lecturers in the Foundation Mathematics.	3.4
ECSEQ3: I'm confident I can do an excellent job on the assignments and tests in the Foundation Mathematics.	3.6
ECSEQ4: I'm certain I can master the skills being taught in Foundation Mathematics.	3.6
ECSEQ5: Considering the difficulty of the courses, the lecturers, and my skills, I think I will do well in Foundation Mathematics.	3.7

The students' confidence and expectations for the subject are presented in Table 9. Despite recognising the challenges of the course, the lecturers' teaching style, and their own skills, students maintain a positive mindset and anticipate performing well. The mean value of 3.7 indicates their belief in achieving excellent grades in the subject. Additionally, the students show confidence in their capacity to excel in assignments and tests, demonstrating their belief in their ability to apply their knowledge and skills effectively. This statement has a mean value of 3.6. With a mean value of 3.4, it is evident that the students exhibit confidence in their ability to understand even the most complex materials presented by the lecturers.

Table 10

*Mean for Control Beliefs for Learning*

	Mean
ECCBQ1: If I study in appropriate ways, then I will be able to learn the material in Foundation Mathematics.	4.3
ECCBQ2: If I try hard enough, then I will understand the course materials.	4.4

Table 10 illustrates the students' beliefs about learning the subject. The students exhibit confidence in their ability to learn the material, as indicated by a mean value of 4.3. They believe that with appropriate study methods, they will be able to grasp the subject effectively. Furthermore, with a mean value of 4.4, the students believe that they will understand the course materials if they put in sufficient effort.

Table 11

*Mean for Affective Components*

	Mean
ACQ1: When I take a test I think about how poorly I am doing compared with other students.	2.8
ACQ2: When I take a test, I think about items on other parts of the test I can't answer	2.4
ACQ3: When I take tests I think of the consequences of failing.	2.2
ACQ4: I have an uneasy, upset feeling when I take an exam.	2.5
ACQ5: I feel my heart beating fast when I take an exam.	2.4

Table 11 shows the mean scores for the affective components experienced by students during tests. The first item reveals that, on average, students think about their performance in comparison to other students, with a mean value of 2.8. Students frequently think about the test items they are unable to answer, with a mean value of 2.4. Considering the consequences of failing was another common thought, as indicated by a mean value of 2.2. The mean value of 2.5 signifies that students experience uneasy and upset feelings during exams. They believe that their heart often beats fast when taking an exam, as indicated by a mean value of 2.4.

Overall, this section provides an analysis of the data collected to address the research question, shedding light on how learners perceive and prioritise different motivational elements in their learning process.

**Section C: Findings for Causes of Burnout**

This section provides an analysis of the collected data to address the research question, "How do students perceive causes of burnout in their learning?" The study seeks to understand learners' views on the factors that contribute to burnout during their learning journey. These causes of burnout can encompass various aspects, including but not limited to excessive workload, high expectations, a lack of support, and monotony in learning tasks. Gaining insights into learners' perceptions of these burnout causes is crucial for identifying areas that require intervention and improvement.

Burnout, as identified in this study, can be attributed to two main factors:

1. Exhaustion: This factor refers to the feeling of being physically, mentally, and emotionally drained due to prolonged stress and demands in the learning environment.

Learners may perceive excessive workload, demanding assignments, or continuous pressure as contributors to their exhaustion.

2. Disengagement: This factor relates to learners' disconnection or withdrawal from their learning activities and experiences. Factors such as a lack of support from teachers or peers, feeling overwhelmed by high expectations, or experiencing monotonous and uninteresting tasks can lead to disengagement and ultimately contribute to burnout.

By recognising and understanding the causes of burnout from learners' perspectives, this study aims to provide valuable insights that can inform interventions and improvements to mitigate burnout in the learning environment.

Table 12

*Mean for Exhaustion*

	Mean
EQ1: There are days when I feel tired before the day begins	4
EQ2: After classes, I tend to need more time than in the past in order to relax and feel better	3.9
EQ3: I can tolerate the pressure of my studies very well	3.4
EQ4: During classes, I often feel emotionally drained	3
EQ5: After classes, I have enough energy for my leisure activities	3.2
EQ6: after classes, I usually feel energized	2.7
EQ7: after my classes, I usually feel worn out and weary	3.4
EQ8: Usually, I can manage the amount of my work well	3.4

The mean scores for burnout related to exhaustion are presented in Table 12. The data reveals the average responses for various statements related to feelings of tiredness and energy levels. The students' perception that there are days when they feel tired before the day begins received a mean value of 4, indicating that students often experience fatigue even before their day starts. Similarly, the students think that after classes, they tend to need more time than in the past in order to relax and feel better, with a mean value of 3.9, this statement suggest that students require additional time and effort to unwind and recover after their classes. Furthermore, the student can tolerate the pressure of their studies very well; after their classes, they usually feel worn out and weary, a statement that obtained a mean value of 3.4. This indicates that while students may handle academic pressure reasonably well, they still tend to feel fatigued and drained after their classes. Additionally, the student thinks that they can usually manage the amount of their work well. This statement received a mean value of 3, suggesting that students generally handle their workload effectively. Moreover, the students think that during classes, they often feel emotionally drained, with a mean value of 3.2, indicating that students frequently experience emotional exhaustion while attending classes. On the other hand, the students think that after classes, they have enough energy for their leisure activities. This statement obtained a mean value of 2.7, suggesting that students typically have sufficient energy for their leisure pursuits after completing their classes. These mean values provide insights into the levels of exhaustion experienced by the students, shedding light on their overall well-being and the potential impact on their academic performance and personal lives.

Table 13

*Mean for Disengagement*

	Mean
DQ1: I always find new and interesting aspects in my study	3.5
DQ2: It happens more and more often that I talk about my studies in a negative way	3
DQ3: Lately, I tend to think less during classes and attend classes almost mechanically	3
DQ4: I find my studies to be positive challenging	3.6
DQ5: Over time, students can become disconnected from this type of routine	3.5
DQ6: This is the only thing (studying) that I can imagine myself doing now	3.5
DQ7: I feel more and more engaged in my studies	3.5
DQ8: Sometimes I feel sickened by my study tasks	3.4

Table 13 presents the mean scores for burnout related to disengagement. The data reflects the average responses for various statements that capture the students' level of detachment and disconnection from their studies. The students always find new and interesting aspects in their study, a statement which obtained a mean value of 3.5, indicating that students generally maintain a sense of novelty and fascination in their academic pursuits. However, the students can become disconnected from this type of routine, which is learning foundational mathematics. The mean value for this was 3, suggesting that as time progresses, students may experience a growing disengagement from their studies. Furthermore, the students can imagine what they are doing then, and they feel more and more engaged in their studies. Statement related to this received a mean value of 3.6. This indicates that students perceive a sense of purpose and are increasing their involvement in their studies. On the other hand, the students think that it happens more and more often that they talk about their studies in a negative way. This is indicated by a mean value of 3, suggesting that students occasionally express negative attitudes or dissatisfaction when discussing their studies. Additionally, the students lately, tend to think less during classes and attend classes almost mechanically, as revealed by a mean value of 3, implying that students may experience reduced cognitive engagement during class sessions. Lastly, the statement that students who sometimes feel sickened by their study tasks received a mean value of 3.4, indicating that students occasionally experience negative emotions or an aversion towards their study-related tasks. These mean values provide insights into the students' level of disengagement and detachment from their studies, highlighting potential challenges that may affect their motivation and overall academic experience.

Overall, this section presents an analysis of the collected data, shedding light on how students perceive the causes of burnout in their learning experiences. By addressing these causes, educational institutions and stakeholders can work towards creating a more supportive and engaging learning environment that reduces the risk of burnout among students.

### **Findings for the Relationship Between Motivational Elements and the Causes of Burnout**

This section presents the data analysis conducted to address the research question, "Is there a relationship between motivational elements and the causes of burnout?" The study aims to examine whether there is a correlation between motivational elements and the causes of burnout among learners. By analysing the collected data, valuable insights can be gained into

how motivational elements may influence learners' susceptibility to burnout and their overall learning experience.

To investigate the potential relationships between these factors, statistical analysis using SPSS software was performed. Specifically, the mean scores of metacognitive, effort regulation, cognitive, social, and affective strategies were analysed for correlations. The analysis sought to determine if there is a significant association between these strategies and the causes of burnout.

Table 14

*Correlation between Motivational Elements and Causes of Burnout*

		Motivational Elements	Cause Burnout
Motivational Elements	Pearson Correlation	1	.532**
	Sig. (2 tailed)		.000
	N	119	199
Cause Burnout	Pearson Correlation	.532**	1
	Sig. (2 tailed)	.000	
	N	119	119

The analysis results are presented in Table 14, providing an overview of the correlations between the motivational elements and causes of burnout. The table includes Pearson correlation coefficients and significance levels, which quantify and interpret the relationship between these variables. Upon conducting the correlation analysis, it was found that there is a highly significant association between motivational elements and causes of burnout. The correlation coefficient ( $r = .532^{**}$ ) indicates a strong positive relationship between these variables. The significance level ( $p = .000$ ) further supports the statistical significance of the correlation. According to Jackson (2015), a correlation coefficient's significance at the .05 level suggests a significant relationship. The positive correlation is measured on a scale of 0.1 to 1.0, where a weak positive correlation falls within the range of 0.1 to 0.3, a moderate positive correlation falls within the range of 0.3 to 0.5, and a strong positive correlation falls within the range of 0.5 to 1.0. In this case, the strong positive correlation between motivational elements and the causes of burnout indicates a substantial relationship between these variables.

In conclusion, the analysis presented in Table 14 demonstrates a significant and strong positive relationship between motivational elements and the causes of burnout. These findings align with previous research, supporting the understanding that motivational factors can impact learners' susceptibility to burnout. The results have implications for educational practises and interventions, highlighting the importance of addressing motivational elements to prevent burnout and enhance the learning experience.

**Conclusion****Summary of Findings and Discussions**

Burnout in mathematics learning is triggered by excessive workload, high expectations, or a lack of understanding. It has adverse effects on students' intrinsic motivation, self-efficacy, goal orientation, engagement, and persistence. It diminishes their drive and passion for the

subject, making it challenging to engage with mathematical concepts and problem-solving. Reduced enjoyment and personal interest further contribute to declining intrinsic motivation. Students' self-efficacy suffers as burnout erodes their confidence in their mathematical abilities due to stress, perceived difficulty, or a lack of support. This can lead to decreased motivation and a sense of helplessness, impacting their willingness to tackle challenging tasks. Burnout can shift goal orientation from mastery-focused (seeking understanding) to performance-focused (seeking good grades), undermining intrinsic motivation and hindering conceptual understanding. Engagement in math learning declines as burnout causes students to disengage, become passive students, and lose enthusiasm. Lack of interest and motivation hinder active participation in discussions, problem-solving, and collaborative activities. Burnout negatively affects students' persistence, increasing the likelihood of them giving up when faced with difficulties. Reduced drive and energy contribute to lower tenacity and a greater inclination to abandon challenging problems. Addressing the root causes of burnout is crucial to promoting positive and motivated mathematics learning. Encouraging autonomy, emphasising real-world relevance, and recognising student achievements can foster intrinsic motivation, self-efficacy, goal orientation, engagement, and persistence in learning mathematics.

### Implications and Suggestions for Future Research

To advance research in the area of burnout and motivation in mathematics learning, several implementations and future research suggestions can be considered. These include conducting longitudinal studies to examine the long-term effects of burnout on motivation, exploring protective elements that mitigate the impact of burnout, evaluating the effectiveness of preventive interventions, investigating the influence of cultural and contextual factors, analysing the role of technology in mathematics learning, examining the impact of teacher training and support, studying academic transitions, promoting cross-disciplinary research collaborations, incorporating student perspectives, and conducting qualitative investigations. These research directions aim to enhance our understanding of burnout effects and develop practical strategies to support students' well-being and engagement in mathematics learning.

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