



Understanding How Grit Shapes Learning Motivation

Siti Mariam Mohammad Ilyas^{1*}, norhafizah Amir², Dia Widyawati Amat³, Zuraidah Sumery⁴, Siti Zariikh Sofiah Abu Bakar⁵, Siti Aishah Taib⁶, Siti Norfauziana Mohd Sah⁷

^{1,2,6}Akademi Pengajian Bahasa, Universiti Teknologi MARA Cawangan Johor Kampus Pasir Gudang

^{3,4,5}Akademi Pengajian Bahasa, Universiti Teknologi MARA Cawangan Johor Kampus Segamat

⁷Jabatan Pengajian Bahasa, Institut Pendidikan Guru Kampus Tawau

*Corresponding Author

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ABSTRACT

Grit and learning motivation are essential psychological drivers of academic achievement; however, the mechanism through which perseverance shapes underlying motivation requires further clarification. This quantitative study investigated the influence of grit on learning motivation among 234 Malaysian undergraduate students using a 5-point Likert scale survey adapted from Martin et al. (2022). Descriptive results revealed high perseverance of effort, moderate consistency of interest, high intrinsic value, moderate-to-high self-efficacy, and strong reliance on self-regulated learning strategies. Hypothesis testing showed no significant gender differences across constructs. However, the field of study varied significantly with grit and self-regulated learning, whereas motivation remained consistent across disciplines. Crucially, strong positive relationships were established among all three constructs: grit, motivation, and self-regulated learning. These findings demonstrate that grit serves as a vital anchor for learning motivation, which directly energizes self-regulated learning strategies across academic domains. To enhance student engagement, academic departments should integrate discipline-specific study skills and resilience modules that utilize scaffolded tasks, immediate formative feedback, and learning activities designed for deep cognitive processing instead of surface memorization.

Keywords: Grit, Learning Motivation, Self-Regulated Learning

INTRODUCTION

Background of Study

Grit and motivation have been widely recognized as key affective factors influencing learners' academic success, particularly in language learning contexts. Previous studies indicate that both constructs contribute significantly to students' performance and learning behaviors. For instance, Wu et al. (2022) found that motivation and grit are positively correlated with English language performance, with grit emerging as the strongest predictor. Similarly, Guo et al. (2023) revealed that grit plays a crucial role in shaping self-regulated learning (SRL) strategies, while self-efficacy significantly predicts critical thinking and achievement outcomes. These findings suggest that learners who demonstrate perseverance and sustained effort are more likely to engage in effective learning strategies, leading to improved academic performance. Additionally, studies on self-regulated learning highlight that grit enhances learners' engagement and resilience when facing challenges (Wang, 2021), further reinforcing its importance in sustaining motivation.

Despite these findings, several issues remain underexplored. While existing research establishes the relationships between grit, motivation, and academic achievement, there is limited understanding of how grit specifically shapes learners' motivation in the learning process. Moreover, some studies present mixed findings, as grit does

not always directly predict achievement but may act through mediating variables such as self-regulation (Tiatra & Sari, 2020). Although grit has been linked to classroom engagement and persistence (Babiera & Quirap, 2024), the mechanisms through which it influences motivation are still insufficiently examined. Therefore, a research gap exists in comprehensively understanding how grit interacts with and shapes learning motivation, highlighting the need for further investigation into this relationship across different educational contexts.

Objective of the Study and Research Questions

This study is done to explore the influence of grit on learning motivation. Specifically, this study is done to answer the following questions;

- Is there a significant difference for grit across gender, and field of study?

H₀₁: There is no significant difference for grit across gender, and field of study

- Is there a significant difference for motivation across gender, and field of study?

H₀₂: There is no significant difference for motivation across gender, and field of study

- Is there a significant difference for self-regulated learning across gender, and field of study?

H₀₃: There is no significant difference for self-regulated learning across gender, and field of study

- How do learners perceive grit in learning?
- How do learners perceive motivation in learning?
- How do learners perceive self-regulated learning strategies in learning?
- Is there a relationship between Grit and Motivation?

H₀₄ There is no significant relationship between Grit and Motivation

- Is there a relationship between Motivation and self-regulated learning?

H₀₅ There is no significant relationship between Motivation and self-regulated learning

- Is there a relationship between self-regulated learning and Grit?

H₀₆: There is no significant relationship between self-regulated learning and Grit

LITERATURE REVIEW

Theoretical Framework of the Study

This study is anchored on three major theories: Grit, self-determination, and self-regulated learning.

Grit

Duckworth et al. (2007) introduced the theory of Grit, defining it as an individual's perseverance and passion for achieving long-term goals despite challenges, setbacks, and failures. According to the theory, grit consists of two key components: consistency of interests and persistence of effort over time. Unlike talent or intelligence alone, grit emphasizes sustained commitment and resilience in pursuing objectives. In educational settings, grit is closely linked to motivation in learning because it enables students to remain focused and engaged even when learning tasks become difficult or progress is slow. Learners with high levels of grit are more likely to

demonstrate intrinsic motivation, maintain effort, and overcome obstacles in their academic journey. They view challenges as opportunities for growth rather than reasons to give up, which fosters a positive learning mindset. Furthermore, gritty students tend to set long-term educational goals and work diligently toward achieving them, contributing to improved academic performance and persistence. Therefore, the theory of grit highlights the importance of sustained motivation, determination, and resilience as essential factors for successful learning and academic achievement.

Self-Determination Theory

Self-Determination Theory (SDT), developed by Deci and Ryan (1985), explains human motivation by emphasizing the fulfilment of three fundamental psychological needs: autonomy, competence, and relatedness. Autonomy refers to an individual's sense of control over their actions, competence involves feeling capable of achieving desired outcomes, and relatedness reflects a sense of connection and belonging with others. According to SDT, when these needs are satisfied, individuals are more likely to develop intrinsic motivation, engaging in activities because they find them meaningful, enjoyable, or personally valuable. In educational contexts, intrinsically motivated learners tend to show greater persistence, engagement, and academic achievement. SDT is closely linked to learners' grit, as students who feel autonomous, competent, and supported are more likely to persevere through challenges and remain committed to long-term learning goals. This sustained effort and passion for achievement are key characteristics of grit. Furthermore, intrinsically motivated learners are better able to overcome setbacks, maintain focus, and continue working toward success despite difficulties. Therefore, Self-Determination Theory provides a valuable framework for understanding how motivation can foster grit, resilience, and long-term academic success.

Self-Regulated Learning

Zimmerman's (2000) theory of Self-Regulated Learning (SRL) describes learning as an active process in which learners take control of their own learning through goal setting, strategic planning, self-monitoring, and self-reflection. According to Zimmerman, self-regulated learners are not passive recipients of information; instead, they proactively manage their cognitive, motivational, and behavioral processes to achieve academic goals. The theory consists of three cyclical phases: forethought, performance, and self-reflection. In the forethought phase, learners set goals and plan strategies; during the performance phase, they implement and monitor these strategies; and in the self-reflection phase, they evaluate their progress and make adjustments for future learning. Self-Regulated Learning is closely linked to learner motivation because motivated students are more likely to engage in these self-regulatory processes and persist when facing challenges. Motivated learners often use effective self-regulated learning strategies such as time management, goal setting, self-assessment, help-seeking, and progress monitoring to enhance their learning outcomes. By fostering greater autonomy, persistence, and responsibility for learning, self-regulated learning contributes significantly to academic achievement, lifelong learning, and sustained motivation.

Past Studies

Past Studies on the influence of Grit on learning motivation

Studies have been conducted to investigate grit, motivation, and self-regulated learning. The important role of non-cognitive factors in student outcomes is well-documented in literature linking grit, motivation, and self-regulated learning (SRL). A study by Obeng et al. (2025) investigated these connections among 190 high school students in Ghana by using a variety of standardized measures, including the Motivated Strategies for Learning Questionnaire (MSLQ). Their findings showed that grit plays a significant role in academic engagement, operating both directly and indirectly through motivation and SRL. Similarly, Martin, Craigwell, and Ramjarrie (2021) examined these variables alongside academic achievement within a specialized cohort of 101 civil engineering students. Relying on the MSLQ as well, their analysis showed that the relationship between grit and academic success was mediated by students' engagement in SRL practices. However, Martin et al. found that motivational beliefs exerted a more pronounced effect on academic achievement than grit alone, suggesting that

while grit is foundational, immediate motivation and self-regulatory habits may carry greater weight in determining specific performance outcomes.

Similarly, Tavakoli et al. (2020) investigated the correlations among motivational beliefs (self-efficacy, internal appraisal, and test anxiety) and self-regulated learning, including academic performance among students at Kerman University of Medical Sciences. Utilizing the Cochran's formula, the researchers randomly sampled approximately 460 participants, assessing their academic performance through cumulative GPA and measuring their motivational constructs via the Motivated Strategies for Learning Questionnaire (MSLQ). The findings demonstrated a strong, positive relationship between students' academic achievement and their motivational perspectives. Notably, the study revealed no statistically significant differences ($p < 0.05$) in motivational beliefs based on gender. Based on these outcomes, the authors suggest that cultivating self-motivational abilities and self-monitoring strategies is vital for enhancing student learning, motivation, and self-esteem, pointing to a clear institutional pathway for universities to support achievement by actively teaching self-regulation.

In conclusion, these studies collectively underscore the critical, interconnected impact of non-cognitive factors, specifically grit, motivation, and self-regulated learning (SRL) on student success across diverse educational contexts. A consistent thread across the literature is the foundational role of SRL and motivational constructs, as measured by the MSLQ, in directly driving academic engagement and performance. While grit serves as a vital baseline trait, the findings of Martin et al. (2021) and Tavakoli et al. (2020) suggest that immediate motivational beliefs and active self-monitoring strategies may exert an even stronger, more direct influence on specific academic outcomes regardless of gender.

Past studies on grit and self-regulated learning

A number of studies have been carried out to explore the relationship between grit, self-efficacy, motivation and SRL strategies among English learners. Among these, one was done by Teng (2024) to investigate how motivational beliefs and confidence determine SRL strategies in English writing while Guo et al. (2023) explored gender factors in grit, motivation and SRL strategies in English learning.

The study by Teng (2024) was conducted to explore how motivational beliefs and self-efficacy determine the preferences of multidimensional SRL strategies in writing among English as a Foreign Language (EFL) learners. The data collection involved 389 undergraduates of six academic disciplines from four medium-ranking universities in China using the Writing Strategies for Self-Regulated Learning Questionnaire (WSSRLQ) and focus group interviews. From the study, it is notable that motivation and confidence determine the effectiveness and engagement of SRL strategies in English writing. Another equally substantial discovery is intrinsically goal-driven learners have the tendency to actively involve themselves in SRL English writing. Thus, it is imperative that language educators and practitioners understand how grit determines the strategies in SRL so that writing activities may be redesigned and fine-tuned to maximise the capacity of these strategies.

In seaming gender factors into the relationship between motivation, grit and SRL strategies in English learning achievement, Guo et al. (2023)'s findings are worthy of discussion. The study involved 723 school students with 42% of male and 58% of female students. A set of questionnaires on motivation and grit were distributed, and an English proficiency test was administered. It was found that grit has a significant positive relationship with SRL strategies equally among both male and female learners. However, the differences between genders show when it comes to motivation. Growth mindset and intrinsic motivation have positive correlations with the English performance among male learners only. In contrast, a growth mindset only has a positive correlation with the critical thinking strategy used by female learners. This signifies that curriculum developers, English educators and practitioners should instill intrinsic motivation in designing the lesson so it may be the push factor for male students to potentially perform better in English learning. Meanwhile, when catering to female learners, they should cultivate the growth mindset which will affect the female learner's critical thinking strategy positively.

All in all, the two studies here show varied patterns in grit, motivation and SRL strategies. While Teng (2004) is more consistent with other studies in the literature, Guo et al. (2003) reveals counterintuitive results when

gender is a determiner. It is commonly believed that grit is a catalyst for motivated learners but understanding these underlying mechanisms and the role of gender in this process is paramount.

Conceptual Framework of the Study

Figure 1 presents the conceptual framework of the study and positions grit as a foundational personal trait that sustains learners' motivation through long-term challenges and supports effective self-regulated learning behaviours. Grounded in Grit Theory, grit is defined as the combination of passion and perseverance toward long-term goals (Duckworth et al., 2007). This construct is operationalised through two core components; consistency of interest and perseverance of effort which explain how learners maintain focus and persistence despite obstacles (Martin et al., 2022). Within the framework, grit is linked to learning motivation by drawing on evidence that learners' motivation is shaped by how much they value learning outcomes and how supported they feel in the learning process (Rahmat, 2025). To explain the motivational mechanisms underlying grit, the framework integrates Self-Determination Theory, which emphasises autonomy, competence, and intrinsic motivation as drivers of sustained engagement (Deci & Ryan, 1985). These motivational needs align with learners' motivational beliefs, including self-efficacy, intrinsic task value, and test anxiety, which influence how grit translates into motivated learning behaviour (Martin et al., 2022). Furthermore, the framework incorporates Self-Regulated Learning Theory, which conceptualises learning as an active cycle of goal setting, strategic action, monitoring, and reflection (Zimmerman, 2000). Grit is proposed to strengthen the continuity of self-regulated learning by supporting cognitive strategy use and self-regulation, enabling learners to persist, adapt strategies, and remain motivated over time (Martin et al., 2022). Collectively, the framework explains how grit interacts with motivational beliefs and self-regulated learning processes to shape sustained learning motivation.

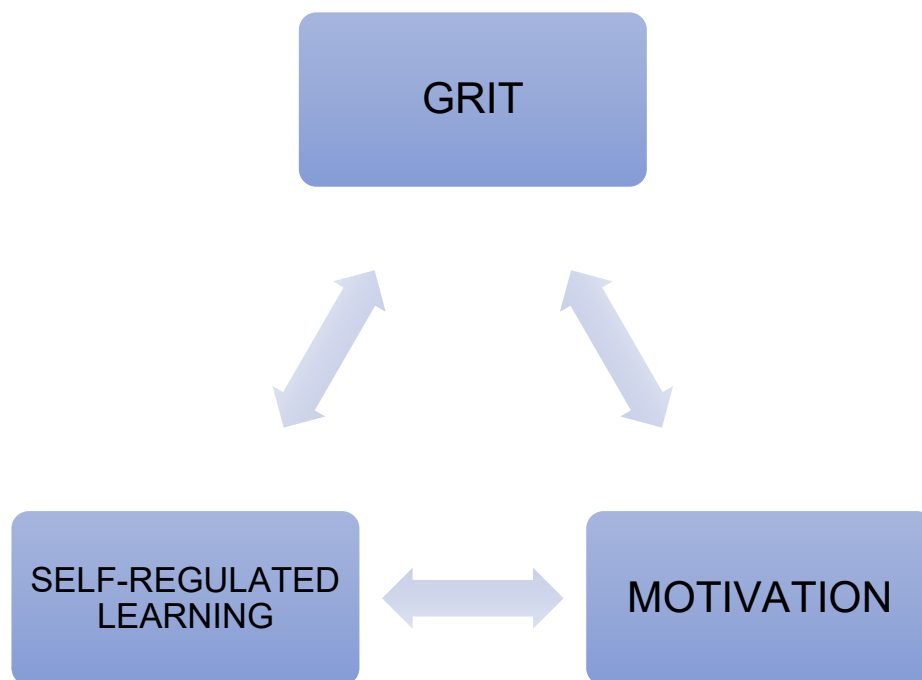


Figure 1- Conceptual Framework of the Study

Grit and Its Influence on Learning Motivation

METHODOLOGY

This quantitative study is done to explore the influence of grit on learning motivation. A convenient sample of 234 participants responded to the survey. The instrument used is a 5 Likert-scale survey and is rooted from Martin,et.al. (2022) to reveal the variables in table 3 below. Table 1 below shows the categories used for the Likert scale; 1 is for never, 2 is for rarely, 3 is for sometimes, 4 is for very often and 5 is for always.

Table 1- Likert Scale Use

1	Never
2	Rarely
3	Sometimes
4	Very Often
5	Always

Table 2- Distribution of Items in the Survey

PART	VARIABLE		CONSTRUCT	No Of Items/ INDICATOR	Total Items
TWO	GRIT	i	CONSISTENCY OF INTEREST	6	12 (.729)
		ii	PERSEVERANCE	6	
THREE	MOTIVATIONAL BELIEFS	i	SELF-EFFFCACY	6	17(.810)
		ii	INTRINSIC VALUE	7	
		ii	TEST ANXIETY	4	
FOUR	SELF-REGULATED LEARNING STRATEGIES	i	COGNITIVE STRATEGY USE	7	14(.841)
		ii	SELF-REGULATION	7	
	TOTAL NO OF ITEMS				43(.902)

Table 2 shows the distribution of items in the survey. Reference/citation for the survey chosen. Explain in detail each section- how many items, total number of items.

Table 3 - Reliability Levels, Cronbach's Alpha Ranges, and Their Interpretations

Reliability Level	Cronbach's Alpha range	Interpretation
Excellent	0.9 and above	Indicates very high internal consistency
Good	0.80-0.89	Reflects strong internal consistency
Acceptable	0.70-0.79	Indicates acceptable internal consistency
Questionable	0.60-0.69	Reflects questionable internal consistency
Poor	Below 0.6	Indicates poor internal consistency

In order to determine the internal reliability of the instrument, reliability analysis is conducted. Table 3 above shows the distribution and interpretation of Cronbach Alpha range. According to Ahmad,et.al. (2024), Cronbach Alpha scores between 0.7 to 0.9 is considered acceptable to excellent.

Table 2 also shows the reliability of the survey. The analysis shows a Cronbach alpha of .729 for Grit, .810 for Motivation, and .841 for Self-Regulated Learning. The overall Cronbach alpha for all 43 items is .902; thus,

revealing a good reliability of the instrument used. Further analysis using SPSS is done to present findings to answer the research questions for this study.

FINDINGS

Demographic Analysis

According to Zienefuss, et.al (2021), researchers report demographic data in percentages to establish sample representatives and allow for generalizability to a larger population. The reporting also provides an overview of participants' characteristics. Percentages offer a clear and understandable picture of the sample makeup.

Table 4- Percentage for Demographic Profile

Question	Demographic Profile	Categories	Percentage (%)
1	Gender	Male	35%
		Female	65%
2	Field of Study	Science & Technology	29%
		Social Sciences	16%
		Business & Management	55%

Table 4 indicates the demographic profile of the respondents according to their gender and field of study. From the analysis, it is observed that females constitute the majority of the respondents accounting for 65%, whereas males account for 35%. With respect to the field of study, the majority of the respondents are in Business and Management, which accounts for 55% of the total respondents. This is followed by Science and Technology, which accounts for 29% of the total respondents. Social Sciences has the least number of respondents, accounting for 16%. Overall, the sample was mainly female and comprised mostly Business and Management students.

Inferential Statistics

According to He (2024), there are three main functions of a T-test and ANOVA. Firstly, both are done to compare means. This test is also done to determine if the average scores (mean) or values of two groups, or one group against a known value, are different enough to be considered statistically meaningful and are not just due to random chance. Secondly, T-test and ANOVA are done to test hypotheses. Researchers use t-tests and ANOVA to test hypotheses about means, such as whether a new treatment significantly impacts a variable or if there's a difference in performance between two distinct groups. Lastly, T-test and ANOVA are done to identify significant differences. The output of a t-test provides a p-value (significance value). If this p-value is below a predetermined threshold (often 0.05), it indicates a statistically significant difference, allowing researchers to draw conclusions about the populations from which their samples were drawn. A one-way ANOVA (Analysis of Variance) is a statistical method used to compare the means of three or more independent (unrelated) groups to determine if there is a statistically significant difference between them. It is a parametric test that evaluates the effect of a single independent variable (the factor) on a dependent variable.

Findings for Differences for Grit across Gender and Field of study

This section presents data to answer research question 1: Is there significant difference for grit across gender, and field of study?

H_{01} : There is no significant difference for grit across gender, and field of study

Table 5- T-Test/ANOVA for Grit across Gender and Field of Study

		MEAN	SD	T/F-Statistics <i>df</i>	p-value	OUTCOME
Gender	Male	3.39	0.47	t(232)=-.012	0.991	H ₀ Accepted
	Female	3.39	0.44			
Field of Study	Science & Technology	3.27	0.46	F(2,231)=5.490	0.005	H ₀ Rejected
	Social Sciences	3.31	0.45			
	Business & Management	3.39	0.41			

With reference to Table 5, a T-test & one way ANOVA were conducted to examine the effects of Grit across Gender and Field of Study. The analysis shows there is no significant difference for gender. However, there is a significant difference for the field of study. The null hypothesis for H₀₁ is accepted for gender but rejected in the field of study.

Findings for the Difference between Motivation across Gender and Field of Study

This section presents data to answer research question 2: Is there a significant difference for motivation across gender and field of study?

H₀₂: There is no significant difference for motivation across gender and field of study

Table 6- T-Test/ANOVA for Motivation across Gender and Field of study

		MEAN	SD	T-Statistics <i>df</i>	p-value	OUTCOME
Gender	Male	3.62	0.43	t(232)=.829	0.408	H ₀ Accepted
	Female	3.66	0.40			
Field of Study	Science & Technology	3.59	0.41	F(2,231)=1.311	0.271	H ₀ Accepted
	Social Sciences	3.59	0.38			
	Business & Management	3.68	0.42			

With reference to Table 6, a T-test & one way ANOVA were conducted to examine the effects of Motivation across Gender and Field of Study. The analysis shows there is no significant difference for both genders and field of study. Null hypothesis for H₀₂ is accepted.

Findings for the Difference between Self-Regulated Learning across Gender and Field of Study

This section presents data to answer research question 3: Is there a significant difference for self-regulated learning across gender and field of study?

H₀₃: There is no significant difference for self-regulated learning across gender and field of study

Table 7- T-Test/ANOVA for Self-Regulated Learning across Gender and Field of study

		MEAN	SD	T-Statistics <i>df</i>	p-value	OUTCOME
Gender	Male	3.59	0.49	t(232)=-1.360	0.088	H ₀ Accepted

	Female	3.68	0.64			
Field of Study	Science & Technology	3.48	0.41	$F(2,231)=1.311$	0.03	H_0 Rejected
	Social Sciences	3.64	0.53			
	Business & Management	3.73	0.48			

With reference to Table 7, a T-test & one way ANOVA were conducted to examine the effects of Grit across Gender and Field of Study. The analysis shows there is no significant difference for gender. However, there is a significant difference for the field of study. Null hypothesis for H_{03} is accepted for gender but rejected for the field of study.

Descriptive Statistics

According to Vetter (2017), there is a need to report the mean and standard deviation as Mean (M) represents the average, or centre of a data set while standard deviation (SD) indicates the typical distance of individual observations from the mean which shows the data's variability or spread. A low SD means data points are clustered close to the average, while a high one means they are spread out. SD indicates they are more spread out. Thus, it is good to have a high SD.

Findings for Grit

This section presents data to answer research question 4: How do learners perceive grit in learning? In the context of this study, this is measured by (i) consistency of interest and (ii) perseverance.

Table 8- Mean (M) and Standard Deviation (SD) for CONSISTENCY OF INTEREST

ITEM	M	SD
GCIQ1 I often set a goal but later choose to pursue a different one.	3.21	0.81
GCIQ2 New ideas and new projects sometimes distract me from previous ones.	3.23	0.91
GCIQ3 I become interested in new pursuits every few months.	3.33	0.93
GCIQ4 My interests change from year to year.	3.33	1.09
GCIQ5 I have been obsessed with a certain idea or project for a short time but later lost interest.	3.04	0.98
GCIQ6 I have difficulty maintaining my focus on projects that take more than a few months to complete.	3.17	1.05

Table 8 presents the descriptive statistics; mean (M) and standard deviation (SD) for consistency of interest. Overall, the mean scores ranged from 3.04 to 3.33, indicating a moderate level of consistency of interest among the respondents. The highest scores are represented by GCIQ3 ($M = 3.33$, $SD = 0.93$) and GCIQ4 ($M = 3.33$, $SD = 1.09$), suggesting the respondents' tendency to experience changes in their interests over time and were inclined to explore new pursuits. In the meantime, for item GCIQ2; the respondents are easily distracted by new ideas and projects while pursuing their current ideas, scored the second highest mean ($M = 3.23$, $SD = 0.91$). The following mean is GCIQ1 ($M = 3.21$, $SD = 0.81$) for respondents who always set their goal but ended up pursuing a different one. Next, for item GCIQ6 ($M = 3.17$, $SD = 1.05$) suggesting a moderate response among the respondents who have difficulty in maintaining their focus on projects that take more than a few months for

completion. Finally, the lowest mean score was observed for GCIQ5 ($M = 3.04$, $SD = 0.98$) where respondents were losing interest after working on their projects even for a short time.

Table 9- Mean (M) and Standard Deviation (SD) for PERSEVERANCE OF EFFORT

ITEM	M	SD
GCPQ1 I have achieved a goal that took years of work.	3.32	0.93
GCPQ2 I have overcome setbacks to conquer an important challenge.	3.46	0.77
GCPQ3 Setbacks don't discourage me.	3.34	0.88
GCPQ4 I finish whatever I begin.	3.87	0.79
GCPQ5 I am a hard worker.	3.71	0.84
GCPQ6 I am diligent.	3.58	0.76

Table 9 shows the result on how Grit affects their perseverance of effort. Based on the table, GCPQ4 is the highest ($M=3.87$, $SD=0.79$), where grit makes students finish whatever they begin. This is followed by GCPQ5 ($M=3.71$, $SD=0.84$), where students believe that grit helps them to become a hard worker. Next, students believe grit makes them diligent, which is shown in GCPQ6, ($M=3.58$, $SD=0.76$). The item that receives the lowest mean is GCPQ11 ($M=3.32$, $SD=0.93$) where students believe grit makes them achieve a goal that took years of work. Overall, it can be seen through the findings that through grit, students do show a high perseverance of effort in learning.

Findings for Motivation

This section presents data to answer research question 5: How do learners perceive motivation in learning? In the context of this study, this is measured by (i) self-efficacy, (ii) intrinsic value, and (iii) test anxiety.

Table 10- Mean (M) and Standard Deviation (SD) for SELF-EFFICACY (9 items)

ITEM	M	SD
MBSEQ1 Compared with others in this class, I think I'm a good student	3.41	0.86
MBSEQ2 I'm certain I can understand the ideas taught in this course	3.80	0.77
MBSEQ3 I expect to do very well in this class.	3.89	0.73
MBSEQ4 Compared with others in this class, I think I'm a good student	3.25	0.87
MBSEQ5 I am sure I can do an excellent job on the problems and tasks assigned for this class.	3.66	0.71
MBSEQ6 I know that I will be able to learn the material for this class	3.86	0.70

Table 10 shows the mean (M) and standard deviation (SD) scores for the items of self-efficacy. Based on Table 10 above, MBSEQ3 has the highest ($M=3.89$; $SD=0.73$), where students were confident about their performance in the class. This was followed by MBSEQ6 ($M=3.86$, $SD=0.70$), where students were aware and able to learn about the topics in this class. The lowest mean and standard deviation for self-efficacy is item MBSEQ4 ($M=3.25$; $SD=0.87$), where students do not think they are good students compared with others in the class. Overall, the findings for Table 10 show that students demonstrated moderate to high levels of self-efficacy, particularly in learning new materials, understanding the course content, and performing well academically.

Table 11- Mean (M) and Standard Deviation (SD) for INTRINSIC VALUE (9 items)

ITEM	M	SD
MBIVQ1 I prefer class work that is challenging so I can learn new things.	3.40	0.81
MBIVQ2 It is important for me to learn what is being taught in this class.	3.92	0.75
MBIVQ3 I like what I am learning in this class.	4.03	0.71
MBIVQ 4 I think I will be able to use what I learn in this class in other classes.	3.99	0.78
MBIVQ 5 Even when I do poorly on a test I try to learn from my mistakes.	4.23	0.71
MBIVQ6 I think that what I am learning in this class is useful for me to know.	4.23	0.71
MBIVQ 7 I think that what we are learning in this class is interesting.	4.23	0.73

Next, Table 11 presents the Mean (M) and Standard Deviation (SD) values associated with intrinsic motivation. It can be seen from the table that MBIVQ5, MBIVQ6, and MBIVQ7 had the highest mean ($M=4.23$ for all three items) and low standard deviations (0.71, 0.71, 0.73 respectively) signifying a reasonably strong consensus regarding the willingness to persevere through mistakes, along with the usefulness as well as the interest in what is being taught. Meanwhile, item MBIVQ1 had the lowest mean as compared to the other items ($M=3.92$, $SD=0.81$). Despite the lowest mean, it still reflects an overall positive attitude regarding challenging class activities. In short, the overall results indicate that students exhibited high levels of intrinsic values when it comes to learning.

Table 12- Mean (M) and Standard Deviation (SD) for TEST ANXIETY (4 items)

ITEM	M	SD
MBTAQ1 I am so nervous during a test that I cannot remember facts I have learned.	3.08	1.01
MBTAQ 2 I have an uneasy, upset feeling when I take a test.	2.78	1.02
MBTAQ 3 I worry a great deal about tests.	3.05	0.99
MBTAQ 4 When I take a test I think about how poorly I am doing.	3.02	1.08

Table 12 signifies the descriptive statistics, specifically the mean (M) and standard deviation (SD), across four items measuring test anxiety among respondents. Item 1, assessing cognitive interference through nervous memory blockage, exhibited the highest mean score ($M=3.08$, $SD=1.01$), followed closely by Item 3 regarding pervasive worry ($M=3.05$, $SD=0.99$) and Item 4 concerning negative performance appraisals ($M=3.02$, $SD=1.08$). Conversely, Item 2, capturing somatic unease and emotional distress during examinations, reported the lowest mean ($M=2.78$, $SD=1.02$). These findings collectively indicate that cognitive disruption and generalised test apprehension are more pronounced than somatic manifestations.

Findings for self-regulated learning

This section presents data to answer research question 6: How do learners perceive self-regulated learning strategies in learning? In the context of this study, this is measured by (i) cognitive strategy use, and (ii) self-regulation.

Table 13- Mean (M) and Standard Deviation (SD) for COGNITIVE STRATEGY USE

ITEM	M	SD
SRLSCSUQ 1 When I study, I put important ideas into my own words.	3.85	0.72
SRLSCSUQ 2 I always try to understand what the teacher is saying even if it doesn't make sense.	3.79	0.86
SRLSCSUQ 3 When I study for a test, I try to remember as many facts as I can.	3.91	0.81
SRLSCSUQ 4 When studying, I copy my notes over to help me remember material.	3.61	0.92
SRLSCSUQ 5 When I study for a test, I practice saying the important facts over and over to myself.	3.79	0.87
SRLSCSUQ 6 When I am studying a topic, I try to make everything fit together.	3.85	0.72
SRLSCSUQ 7 When reading I try to connect the things I am reading about with what I already know.	3.96	0.75

Table 13 presents the descriptive statistics; mean (M) and standard deviation (SD) for the use of cognitive strategy. The findings demonstrate a consistently high reliance on cognitive strategies among the students, as evidenced by mean scores across all items exceeding 3.60. The highest score ($M = 3.96$, $SD = 0.75$) represented by SRLSCSUQ 7, suggesting a strong preference for elaboration strategies that connect prior knowledge and new information. In the meantime, when preparing for a test, item SRLSCSUQ 3 scored the second highest mean ($M = 3.91$, $SD = 0.81$) for memorising strategy and followed by verbal repetition for item SRLSCSUQ 5 ($M = 3.79$, $SD = 0.87$). Next, sharing the same mean score with item 5 is SRLSCSUQ 2 ($M = 3.79$, $SD = 0.86$) where the respondents tried their best to understand everything uttered by the teachers. This is closely complemented by SRLSCSUQ 1 ($M = 3.85$, $SD = 0.72$), highlighting paraphrasing practice, and synthesising skills with the same score ($M = 3.85$, $SD = 0.72$) for item SRLSCSUQ 6. The last strategy SRLSCSUQ 4 which focuses on note-copying while studying, scored the lowest mean ($M = 3.61$, $SD = 0.92$). Overall, these results indicate that students proactively employ both deep processing (making connections and paraphrasing) and surface processing (rehearsal and memorization) strategies to support their learning and reading comprehension.

Table 14 - Mean (M) and Standard Deviation (SD) for SELF-REGULATION

ITEM	M	SD
SRLSSRQ1 I ask myself questions to make sure I know the material I have been studying.	3.68	0.78
SRLSSRQ 2 When work is hard I either give up or study only the easy parts.	3.10	0.92
SRLSSRQ 3 Even when study materials are dull and uninteresting, I keep working until I finish.	3.71	0.78
SRLSSRQ 4 Before I begin studying, I think about the things I will need to do to learn.	3.72	0.79
SRLSSRQ 5 I often find that I have been reading for class but don't know what it is all about.	2.92	0.96
SRLSSRQ 6 When I'm reading, I stop once in a while and go over what I have read.	3.57	0.84
SRLSSRQ 7 I work hard to get a good grade even when I don't like a class.	3.60	0.99



Table 14 shows the result of how learners perceive self-regulated learning strategies in learning through self-regulation. From the table, it is indicated that students generally exhibit moderate-to-high self-regulation throughout their study process. SRLSSRQ 4 has the highest mean score ($M=3.72$, $Sd=0.79$), where learners think about the things they will need to do to learn before they begin studying. This is closely followed by SRLSSRQ 3 ($M=3.71$, $SD=0.78$) where learners would keep on working until they finish, even though the study materials are dull and uninteresting. The third highest is SRLSSRQ1I ($M=3.68$, $SD=0.78$) where learners ask themselves questions to make sure they know the material they have been studying. A slightly lower mean was recorded for item SRLSSRQ 7 ($M=3.60$, $SD=0.99$). For this item, learners state that they work hard to get a good grade even when they don't like the class. Alongside this is item SRLSSRQ 6 ($M=3.57$, $SD=0.84$) where learners would stop reading once in a while to go over what they have read. Item SRLSSRQ 2 has the lowest mean that is quite lower than the previous mentioned item ($M=3.10$, $SD=0.93$), where learners would give up or study only the easy parts when work is hard. The item with the lowest mean is SRLSSRQ 5 ($M=2.92$, $SD=0.96$) where learners often find that they have been reading for class but don't know what it is all about. Overall, the results confirm that students actively regulate their learning by setting intentions, monitoring understanding, and persisting through uninteresting tasks.

Exploratory Statistics

According to He (2024), correlation is a statistical technique that shows how strongly two variables are related to each other or the degree of association between the two. It is a common tool for describing simple relationships without making a statement about cause and effect. This section presents data to answer the research question on correlation.

To determine if there is a significant association in the mean scores between metacognitive, effort regulation, cognitive, social and affective strategies data is analyzed using SPSS for correlations. Results are presented separately in Table 15 below.

According to He (2024), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0.

Table 15- Correlation for Grit, Motivation and Self-Regulated Learning

Correlations				
		GRIT	MOTIVATION	SELF REGULATED LEARNING
GRIT	Pearson Correlation	1	.546**	.513**
	Sig. (2-tailed)		<.001	<.001
	N	234	234	234
MOTIVATION	Pearson Correlation	.546**	1	.650**
	Sig. (2-tailed)	<.001		<.001
	N	234	234	234
SELF REGULATED LEARNING	Pearson Correlation	.513**	.650**	1
	Sig. (2-tailed)	<.001	<.001	
	N	234	234	234

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

Findings for Relationship between Grit and Motivation

This section presents data to answer research question 7: Is there a relationship between Grit and Motivation?

H₀₃ There is no significant relationship between Grit and Motivation

Table 15 shows there is an association between Grit and Motivation. Correlation analysis shows that there is a high significant association between Grit and Motivation ($r=.546^{**}$) and ($p<.001$). This means that there is also a strong positive relationship between Grit and Motivation. Null hypothesis is rejected for H₀₃.

Findings for Relationship between Motivation and self-regulated learning

This section presents data to answer research question 8: Is there a relationship between Motivation and self-regulated learning?

H₀₄ There is no significant relationship between Motivation and self-regulated learning

Table 15 also shows there is an association between Motivation and self-regulated learning. Correlation analysis shows that there is a high significant association between Motivation and self-regulated learning

($r=.650^{**}$) and ($p<.001$). This means that there is also a strong positive relationship between motivation and self-regulated learning. Null hypothesis is rejected for H₀₄.

Findings for Relationship between self-regulated learning and Grit

This section presents data to answer research question 9: Is there a relationship between self-regulated learning and Grit?

H₀₅: There is no significant relationship between self-regulated learning and Grit

Table 15 also shows there is an association between self-regulated learning and Grit. Correlation analysis shows that there is a high significant association between self-regulated learning and Grit ($r=.513^{**}$) and ($p<.001$). This means that there is also a strong positive relationship between self-regulated learning and Grit. Null hypothesis is rejected for H₀₅.

CONCLUSION

Summary of Findings and Discussions

Based on the hypothesis testing results, several distinct conclusions can be drawn regarding the influence of demographic variables, specifically gender and field of study on grit, learning motivation, and self-regulated learning (SRL). First, gender was found to have no significant difference with any of the three core variables (H₀₁, H₀₂, and H₀₃), indicating that male and female learners possess comparable levels of grit, motivational orientation, and self-regulatory strategy use. This is in line with the findings from Guo et al. (2023) and Tavakoli et al. (2020). Second, the field of study demonstrated a significant difference with both grit (H₀₁) and self-regulated learning (H₀₁), highlighting that academic disciplines exert a distinct influence on students' behavioral perseverance and strategic study habits. Interestingly, field of study showed no significant difference with learning motivation (H₀₁), suggesting that while motivational intensity is relatively uniform across academic majors, the behavioral expressions of that motivation, which is manifested through grit and self-regulatory mechanisms are heavily contextualized by the specific demands of a student's domain of study. Consequently, interventions aimed at enhancing grit and self-regulation should be tailored to discipline-specific contexts rather than segmented by gender.

Grounded in the study's findings, it can also be concluded that learners perceive grit, motivation, and self-regulated learning (SRL) strategies as interconnected psychological drivers throughout their learning process. Regarding grit, students demonstrate a high perception of perseverance of effort alongside a moderate consistency of interest, suggesting that their academic tenacity relies heavily on continuous behavioral effort rather than static interest alone. This behavioral persistence aligns with their motivational profile, where learners

exhibit moderate-to-high self-efficacy, high intrinsic value, and manageable, moderate test anxiety. Furthermore, this strong motivational and grit foundation manifests directly in their strategic execution, as evidenced by a consistently high reliance on both deep and surface cognitive strategies and a moderate-to-high engagement in overall self-regulation. Ultimately, these perceptions underscore that learners' perseverance (grit) serves as a vital framework that reinforces their intrinsic value and efficacy beliefs, driving active adoption of cognitive and self-regulatory strategies to navigate their academic demands. This is in accordance with Obeng et al. (2025) who highlight the significant role of grit in academic engagement.

Based on the correlation results for hypotheses H_{04} , H_{05} , and H_{06} , it can be concluded that grit, learning motivation, and self-regulated learning (SRL) operate as a highly interconnected, mutually reinforcing tripartite framework. First, the confirmed strong positive relationship between grit and learning motivation (H_{04}) demonstrates that learners who sustain effort and perseverance over time experience heightened drive and academic interest, establishing grit as a key psychological foundation for learning motivation. Second, the strong positive link between motivation and self-regulated learning (H_{05}) indicates that highly motivated students actively convert their internal drive into self-regulatory behaviors, utilizing both cognitive and metacognitive strategies to manage their studies. Finally, the strong positive correlation between self-regulated learning and grit (H_{06}) reinforces that gritty individuals inherently rely on self-regulated learning routines to maintain their academic momentum. Collectively, these findings reveal a synergistic process where grit directly energizes learning motivation, which is in accordance with the study by Teng (2024). This in turn fuels the deployment of self-regulated learning strategies, creating a robust cycle of academic engagement, as previously highlighted by Martin, Craigwell, and Ramjarrie (2021) in their study.

Implications and Suggestions for Future Research

Theoretical and Conceptual Implications

Overall, the findings indicate that grit, self-determined motivation, and self-regulated learning function as an interconnected system rather than isolated constructs. To illustrate this, the study proposes an integrated conceptual framework: grit serves as the essential non-cognitive foundation that energizes learning motivation (SDT), which in turn powers the active execution of self-regulated learning strategies (Zimmerman). Additionally, although learning motivation shows uniform stability across different academic majors, the expression of grit and the actual application of learning strategies are domain-dependent, varying significantly according to the student's field of study.

Pedagogical Implications

Based on the study, as the field of study yielded a significant relationship with both grit and self-regulated learning (SRL) strategies, educators should avoid "one-size-fits-all" workshops. Academic departments should embed tailored study-skills and resilience-building modules into discipline-specific coursework. For instance, STEM courses might emphasize iterative problem-solving strategies, while humanities courses focus on deep-processing online reading strategies. Moreover, as students reported high perseverance of effort but moderate consistency of interest, instructors can leverage this willingness to work hard by providing structured scaffolded tasks and immediate formative feedback. Celebrating small milestones of effort rather than final performance helps maintain interest consistency and reinforces learners' self-efficacy beliefs. Besides, given the strong positive relationships between grit, motivation, and SRL, educators should design learning activities that actively require deep processing; such as connecting new material with prior knowledge, paraphrasing, and synthesis, rather than relying on surface memorization. Doing so will provide the chance to gritty students with meaningful cognitive outlets that sustain intrinsic task value.

Suggestions for Future Research

Future studies could adopt a longitudinal approach to track how grit, motivation, and self-regulated learning (SRL) evolve over an entire academic degree. Additionally, incorporating qualitative methods (such as

interviews or reflective journals) would provide deeper insights into why consistency of interest remains at a moderate level while perseverance of effort stays high. Other than that, future research could also conduct comparative sub-group analyses between specific academic domains (e.g., STEM vs. Humanities vs. Social Sciences). Investigating discipline-specific learning environments, assessment modes, and instructional demands can clarify why certain fields foster higher levels of behavioral grit and self-regulation than others.

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APPENDIX

GRIT, MOTIVATION AND SELF- REGULATED LEARNING

PART	VARIABLE		CONSTRUCT	No Of Items/ INDICATOR	Total Items
TWO	GRIT	i	CONSISTENCY OF INTEREST	6	12
		ii	PERSEVERANCE	6	
THREE	MOTIVATIONAL BELIEFS	i	SELF-EFFFCACY	6	17
		ii	INTRINSIC VALUE	7	
		ii	TEST ANXIETY	4	
FOUR	SELF-REGULATED LEARNING STRATEGIES	i	COGNITIVE STRATEGY USE	7	14
		ii	SELF-REGULATION	7	
	TOTAL NO OF ITEMS				43

PART 2- GRIT

CONSISTENCY OF INTEREST

ITEM	1	2	3	4	5
GCIQ1 I often set a goal but later choose to pursue a different one.					
GCIQ2New ideas and new projects sometimes distract me from previous ones.					
GCIQ3I become interested in new pursuits every few months.					



GCIQ4My interests change from year to year.					
GCIQ5 I have been obsessed with a certain idea or project for a short time but later lost interest.					
GCIQ6 I have difficulty maintaining my focus on projects that take more than a few months to complete.					

PERSEVERANCE OF EFFORT

ITEM	1	2	3	4	5
GCPQ1I have achieved a goal that took years of work.					
GCPQ2 I have overcome setbacks to conquer an important challenge.					
GCPQ3 Setbacks don't discourage me.					
GCPQ4 I finish whatever I begin.					
GCPQ5 I am a hard worker.					
GCPQ6 I am diligent.					

PART 2- MOTIVATIONAL BELIEFS

SELF-EFFICACY (9 items)

ITEM	1	2	3	4	5
MBSEQ 1Compared with others in this class, I think I'm a good student					
MBSEQ2I'm certain I can understand the ideas taught in this course					
MBSEQ 3I expect to do very well in this class.					
MBSEQ 4Compared with others in this class, I think I'm a good student					
MBSEQ5I am sure I can do an excellent job on the problems and tasks assigned for this class.					
MBSEQ6I know that I will be able to learn the material for this class					

INTRINSIC VALUE (9 items)

	1	2	3	4	5
MBIVQ1I prefer class work that is challenging so I can learn new things.					
MBIVQ2It is important for me to learn what is being taught in this class.					
MBIVQ3I like what I am learning in this class.					
MBIVQ 4I think I will be able to use what I learn in this class in other classes.					
MBIVQ 5Even when I do poorly on a test I try to learn from my mistakes.					
MBIVQ6 I think that what I am learning in this class is useful for me to know.					
MBIVQ 7I think that what we are learning in this class is interesting.					

TEST ANXIETY (4 items)

ITEM	1	2	3	4	5
MBTAQ1I am so nervous during a test that I cannot remember facts I have learned.					



MBTAQ 2I have an uneasy, upset feeling when I take a test.					
MBTAQ 3I worry a great deal about tests.					
MBTAQ 4When I take a test I think about how poorly I am doing.					

PART THREE- SELF-REGULATED LEARNING STRATEGIES

COGNITIVE STRATEGY USE

ITEM	1	2	3	4	5
SRLSCSUQ 1 When I study, I put important ideas into my own words.					
SRLSCSUQ 2 I always try to understand what the teacher is saying even if it doesn't make sense.					
SRLSCSUQ 3 When I study for a test, I try to remember as many facts as I can.					
SRLSCSUQ 4 When studying, I copy my notes over to help me remember material.					
SRLSCSUQ 5 When I study for a test, I practice saying the important facts over and over to myself.					
SRLSCSUQ 6 When I am studying a topic, I try to make everything fit together.					
SRLSCSUQ 7 When reading I try to connect the things, I am reading about with what I already know.					

SELF-REGULATION

ITEM	1	2	3	4	5
SRLSSRQ1I ask myself questions to make sure I know the material I have been studying.					
SRLSSRQ 2 When work is hard I either give up or study only the easy parts.					
SRLSSRQ 3 Even when study materials are dull and uninteresting, I keep working until I finish.					
SRLSSRQ 4 Before I begin studying, I think about the things I will need to do to learn.					
SRLSSRQ 5 I often find that I have been reading for class but don't know what it is all about.					
SRLSSRQ 6 When I'm reading, I stop once in a while and go over what I have read.					
SRLSSRQ 7 I work hard to get a good grade even when I don't like a class.					