Self-Regulation and How It Influences Grit, Motivational Beliefs, and Cognitive Strategy Use In Learning

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ABSTRACT

This study examines how self-regulation influences grit, motivational beliefs, and cognitive strategy use in learning among university students. Recognizing that academic success is shaped not only by cognitive ability but also by non-cognitive factors, the study focuses on how learners regulate their learning processes and how this relates to persistence, motivation, and learning strategies. A quantitative survey design was employed using a 5-point Likert scale instrument adapted from Martin et al. (2022). The instrument consisted of several sections measuring grit, motivational beliefs, and self-regulated learning strategies. A total of 61 university students participated in the study. Descriptive statistics and correlation analysis using SPSS were conducted to examine students' perceptions and the relationships among the variables. The findings reveal that students demonstrate generally high levels of self-regulation, particularly in planning, monitoring, and persisting in their learning tasks. Students also showed moderate to high levels of grit, motivational beliefs, and cognitive strategy use. Correlation analysis indicated significant positive relationships between self-regulation and grit, self-regulation and motivational beliefs, and self-regulation and cognitive strategy use. These results suggest that students who actively regulate their learning are more likely to demonstrate perseverance, maintain positive beliefs about their learning abilities, and apply effective cognitive strategies. Overall, the study highlights the important role of self-regulation in supporting students' motivation, persistence, and strategic learning behaviours. The findings also provide useful insights for educators in promoting self-regulated learning strategies to enhance students' engagement and academic performance.

Keywords: self-regulation, grit, motivational beliefs, cognitive strategy use, self-regulated learning

INTRODUCTION

In recent years, researchers have increasingly recognized that academic success is influenced not only by cognitive ability but also by non-cognitive factors such as self-regulation, grit, motivational beliefs, and cognitive strategy use**.** Self-regulated learning (SRL) refers to learners' ability to plan, monitor, and control their learning processes in order to achieve academic goals. Studies have shown that these factors interact to influence learning outcomes across various educational contexts. For instance, (Khairuddin et al., 2025) found that grit, motivational beliefs, and self-regulated learning strategies are positively correlated and collectively influence the learning process among Malaysian university students. Similarly, Mateo (2024) examined the relationship between grit, self-efficacy, and self-regulation among junior high school students in an online learning environment and reported that these variables significantly contribute to students' academic performance. In the context of language learning, (Mikami & Shiozawa, 2024) also found that psychological attributes supporting self-regulated learning play an important role in the development of grit and ultimately influence learners' academic achievement. These findings suggest that students who actively regulate their learning are more likely to demonstrate perseverance, maintain positive motivational beliefs, and apply effective learning strategies.

Previous studies further emphasize the interconnected role of self-regulation with motivational and cognitive aspects of learning. For example, (Martin et al., 2022) found that perseverance of effort predicted several self-regulated learning variables, such as intrinsic value, self-efficacy, and cognitive strategy use, among engineering students, while academic achievement was largely mediated by SRL engagement. Similarly, (Guo et al., 2023) reported that grit strongly predicts students' use of self-regulated learning strategies in English language learning, while (Townley-Flores et al., 2022) demonstrated that motivational beliefs such as growth mindset and academic self-efficacy interact with self-regulation to enhance academic achievement. Research also highlights the importance of SRL in supporting cognitive and strategic learning processes. For instance, Ha et al. (2023) found that metacognition and effort regulation significantly predict literacy and mathematics achievement among elementary school students. Despite these findings, there remains a research gap in understanding how self-regulation simultaneously influences grit, motivational beliefs, and cognitive strategy use within a unified framework. While many studies have examined these variables separately, limited research has explored their combined relationships in learning contexts. Therefore, this study seeks to address this gap by examining how self-regulation influences grit, motivational beliefs, and cognitive strategy use in learning. This study is guided by the following research questions and hypotheses.

- How do learners perceive their self-regulation in learning?
- How do learners perceive their grit in learning?
- How do learners perceive their motivational beliefs in learning?
- How do learners perceive their cognitive strategy use in learning?
- Is there a significant relationship between self-regulation and grit in learning?
- Is there a significant relationship between self-regulation and motivational beliefs?
- Is there a significant relationship between self-regulation and cognitive strategy use?

LITERATURE REVIEW

Theoretical Framework of the Study

- **Social Cognitive Theory**

Social Cognitive Theory, developed by Bandura (1971), explains learning as a dynamic interaction between personal factors, behaviour, and environmental influences, a concept known as reciprocal determinism. Within this framework, self-regulation is considered a central process that enables learners to actively control their thoughts, motivation, and actions to achieve learning goals. According to Bandura, learners are not passive recipients of knowledge; rather, they are active agents who guide their own learning through processes such as goal setting, self-monitoring, self-evaluation, and self-reinforcement**.** These processes allow learners to plan their learning activities, track their progress, and adjust strategies when necessary. A key component of self-regulation in Social Cognitive Theory is self-efficacy, which refers to individuals' beliefs in their capability to perform tasks successfully. Learners with strong self-efficacy are more likely to persist in challenging tasks, use effective learning strategies, and maintain motivation despite difficulties. Bandura also emphasized the importance of observational learning, where individuals learn by observing the behaviours, strategies, and outcomes of others, which can influence how they regulate their own learning behaviours. In educational contexts, self-regulated learners apply cognitive and motivational strategies such as organizing information, managing time, and controlling distractions to improve academic performance. Teachers and learning environments can further support this process by providing feedback, modelling effective strategies, and encouraging autonomy in learning. Overall, Social Cognitive Theory highlights that self-regulation is a crucial mechanism that empowers learners to take responsibility for their learning, adapt to challenges, and sustain effort toward achieving long-term academic goals.

- Self- determination theory

Self-Determination Theory (SDT), proposed by Ryan & Deci (2000), explains human motivation by emphasizing the importance of individuals' innate psychological needs in promoting engagement, persistence, and well-being in learning. According to SDT, motivation exists along a continuum from extrinsic motivation to intrinsic motivation, with the latter representing the most self-determined form of engagement. The theory identifies three fundamental psychological needs: autonomy, competence, and relatedness that must be satisfied for individuals to develop sustained motivation and commitment toward their goals. In the context of learning, these needs play a critical role in fostering grit, which refers to the perseverance and sustained passion for long-term goals. When learners experience autonomy, they feel a sense of control over their learning choices, which encourages them to remain committed even when faced with challenges. The need for competence enables students to develop confidence in their abilities, motivating them to exert continuous effort and persist through difficulties. Meanwhile, relatedness, or the sense of connection with teachers and peers, provides emotional support that helps learners maintain motivation over time. Through the satisfaction of these needs, SDT promotes internalized motivation, where students engage in learning not merely for external rewards but because they value the process and outcomes of learning. This internal motivation strengthens learners' resilience and determination, which are core elements of grit. Therefore, Self-Determination Theory provides a valuable framework for understanding how supportive learning environments that nurture autonomy, competence, and relatedness can cultivate gritty learners who demonstrate perseverance, dedication, and long-term commitment to their academic goals.

- Cognitive Constructivist learning theory

Cognitive Constructivist Learning Theory, proposed by, emphasizes that learners actively construct knowledge through mental processes rather than passively receiving information. According to Piaget (1936) learning occurs as individuals interact with their environment and attempt to make sense of new experiences using existing mental structures known as schemas. When learners encounter new information, they engage in cognitive processes such as assimilation, where new knowledge is integrated into existing schemas, and accommodation, where schemas are modified to incorporate new understanding. These processes highlight the importance of cognitive strategies in learning, as learners must actively organize, interpret, and apply information in meaningful ways. Cognitive constructivism suggests that effective learning occurs when students use strategies such as problem-solving, categorizing, summarizing, and connecting new knowledge with prior experiences. Through these strategies, learners are able to deepen their understanding and develop more complex cognitive structures. Piaget also emphasized the role of developmental stages in shaping how learners process information, indicating that cognitive abilities evolve as individuals mature and interact with their environment. In educational settings, this theory encourages teaching approaches that promote active engagement, exploration, and critical thinking rather than rote memorization. Activities such as inquiry-based learning, collaborative problem-solving, and reflective thinking support students in developing effective cognitive strategies. By encouraging learners to question, analyse, and reorganize information, Cognitive Constructivist Learning Theory highlights how strategic thinking and active knowledge construction enable students to build deeper understanding and improve their overall learning outcomes.

Past Studies

Self-regulation and Grit

Past studies have increasingly emphasized the role of non-cognitive factors, particularly grit, motivation, and self-regulated learning, in shaping students' academic success. For instance, (Khairuddin et al., 2025) examined Malaysian university students' perceptions of grit, motivational beliefs, and self-regulated learning strategies using a quantitative survey of 146 participants from four public universities. Their findings revealed that students generally showed moderate levels of perseverance and consistency of interest. However, variations were observed in self-efficacy, test anxiety, and confidence in using learning strategies. Importantly, the study identified a positive relationship between grit, motivation, and self-regulated learning, suggesting that these constructs interact to influence the learning process. Similarly, (Mateo (2024) investigated the relationship

between grit, self-efficacy, self-regulation, and Science academic performance among 216 junior high school students in an online learning context. Using path analysis, the study demonstrated that self-regulation and self-efficacy play significant roles in shaping students' academic performance, while also interacting with grit to support persistence and engagement in online learning environments.

Several studies have also explored these relationships in specific learning domains. (Mikami & Shiozawa, 2024) examined second language (L2) learning among 108 English majors in Japan and found that psychological attributes that support self-regulated learning contribute to the development of L able 14 shows the correlation between self-regulation and cognitive strategy use in learning. The results indicate a moderate positive correlation between the two variables ($r = .518$, $p < .001$), suggesting that students who demonstrate higher levels of self-regulation are more likely to use cognitive strategies during learning. The relationship is statistically significant at the 0.01 level (2-tailed), based on a sample of 61 participants. This finding implies that effective self-regulation is associated with greater use of strategies that support understanding and learning. 2 grit. Their results showed that behavioural self-regulation, particularly sustained learning effort, mediates the relationship between grit and language achievement. In the context of English as a Foreign Language (EFL), Guo et al. (2023) studied 723 primary school students in Hong Kong and reported that grit was the strongest predictor of students' self-regulated learning strategy use. Meanwhile, Martin et al. (2022) found among civil engineering students that perseverance of effort predicted several self-regulated learning variables such as intrinsic value, self-efficacy, and cognitive strategy use, although academic achievement was more directly influenced by motivational beliefs and SRL engagement. In addition, Chen & Alibakhshi (2026) highlighted the role of positive psychological constructs such as grit and self-efficacy in supporting motivation in second language learning, demonstrating that these variables are closely linked with learners' persistence and emotional regulation in academic tasks.

Overall, the literature consistently demonstrates that self-regulated learning plays a crucial role in strengthening grit in educational contexts. While grit reflects students' long-term perseverance and commitment to goals, self-regulation provides the practical strategies—such as goal setting, monitoring progress, and managing motivation that enable learners to sustain that perseverance. Across different contexts, including university learning, online education, and language acquisition, studies show that self-regulation often mediates or enhances the effects of grit on academic outcomes. Therefore, these findings collectively support the theme that self-regulation significantly influences the development and effectiveness of grit in learning, as it equips learners with the strategic behaviours and motivational control necessary to persist through challenges and achieve long-term academic goals.

Self-Regulation and Motivational Beliefs

Previous research has highlighted the close relationship between self-regulated learning (SRL**)** and motivational beliefs in shaping students' learning processes and academic outcomes. (Wang et al., 2025) investigated how goal attributes, motivational beliefs, creativity, and grit influence SRL in online ill-structured problem-solving contexts. Using a fuzzy-set qualitative comparative analysis (fsQCA) with 88 students participating in an educational design competition, the study found that motivational components such as self-efficacy, task value, and goal-setting behaviours contribute to higher levels of self-regulation. However, the findings indicated that no single factor alone predicts SRL; instead, a combination of motivational beliefs and learner characteristics determines how effectively students regulate their learning. Similarly, (Muhamad Yew et al., 2023) examined ESL undergraduates using the framework of Pintrich and DeGroot (1990). Their results revealed that motivational beliefs—particularly self-efficacy, intrinsic value, and test anxiety- strongly influence students' use of cognitive strategies and self-regulatory behaviours, emphasizing that motivation and SRL work together to shape students' learning strategies.

Further evidence is provided by Townley-Flores et al. (2022), who explored the relationship between motivational beliefs, self-regulation, and academic performance in mathematics and English Language Arts. The study showed that growth mindset and academic self-efficacy interact with students' self-regulation skills to improve academic outcomes, particularly among students facing economic risks. Specifically, higher levels of growth mindset contributed to better academic achievement only when students also demonstrated strong self-

regulation abilities. Synthesizing these findings, past studies consistently indicate that self-regulation plays a significant role in strengthening and activating motivational beliefs in learning. When students effectively regulate their learning through goal setting, monitoring, and strategy use, their motivational beliefs—such as self-efficacy, task value, and growth mindset are reinforced. Consequently, self-regulation not only supports learning strategies but also enhances students' motivation to persist and succeed in academic tasks.

Self-regulation and cognitive strategies

Past studies have highlighted the significant role of self-regulated learning (SRL**)** in supporting learners' use of cognitive strategies and improving learning outcomes across different educational contexts. (Peltzer et al., 2026) examined how cognitive load and self-regulation interact in immersive virtual reality (iVR) learning environments. Using data from 473 students, the study found that high levels of extraneous cognitive load (ECL) negatively affected both self-regulation and learning performance, indicating that excessive cognitive demands hinder students' ability to apply effective learning strategies. However, learner resources such as interest and self-efficacy supported the use of self-regulatory behaviours even under demanding conditions. Prior knowledge also played an important role in enabling learners to translate regulatory efforts into effective conceptual learning. The findings highlight that self-regulation becomes increasingly important in complex digital learning environments where learners must actively manage cognitive demands.

Similarly, Ha et al. (2023) investigated the relationship between self-regulated learning strategy use and academic achievement among 6th-grade students in South Korea using data from the Korean Educational Longitudinal Study (KELS). Through hierarchical linear modelling of data from 7,065 students across 446 schools, the study revealed that metacognition and effort regulation significantly predicted students' literacy and mathematics achievement at both individual and school levels. These findings suggest that students who actively monitor their understanding and regulate their learning efforts are more likely to apply effective cognitive strategies that enhance academic performance.

Synthesizing these findings, previous research demonstrates that self-regulation plays a crucial role in strengthening learners' cognitive strategies in learning. Through processes such as metacognitive monitoring, effort regulation, and strategic control of cognitive load, self-regulation enables learners to effectively process information and adapt strategies to different learning environments. Consequently, self-regulated learning serves as a key mechanism that supports the effective use of cognitive strategies and enhances overall learning outcomes.

Conceptual Framework of the Study

The conceptual framework of this study (Figure 1) examines self-regulation as a central factor influencing three important learning-related variables: grit, motivational beliefs, and cognitive strategy use in learning. As illustrated in the framework, self-regulation is positioned at the centre because it represents learners' ability to plan, monitor, and control their learning behaviours and motivation. This concept is anchored on (Bandura & National Inst of Mental health, 1986)Bandura's Social Cognitive Theory, which explains that learning occurs through the interaction of personal, behavioral, and environmental factors. Within this theory, self-regulation allows learners to set goals, monitor their progress, evaluate outcomes, and adjust strategies to achieve desired learning outcomes. When students develop strong self-regulatory skills, they become active agents in their own learning process, which can influence their persistence, beliefs about learning, and the strategies they use to process information.

Furthermore, the framework proposes that self-regulation influences grit**,** motivational beliefs, and cognitive strategies**.** The relationship between self-regulation and grit is anchored in Self-Determination Theory (Ryan & Deci, 2000), which emphasizes that fulfilling the psychological needs of autonomy, competence, and relatedness strengthens learners' intrinsic motivation and perseverance toward long-term goals. Learners who regulate their learning are more likely to sustain effort and maintain consistent interest in academic tasks, thereby demonstrating grit. In addition, self-regulation influences motivational beliefs, such as self-efficacy, intrinsic value, and task-related attitudes, which shape students' engagement in learning. The use of cognitive strategies is grounded in Piaget's Cognitive Constructivist Theory (Piaget, 1936)**,** which explains that learners actively

construct knowledge through mental processes such as organizing, connecting, and interpreting information. Students who effectively regulate their learning are more capable of applying strategies such as summarizing, elaborating, and problem-solving to enhance understanding. To measure these variables, this study adopts the instrument used by Martin et al. (2022), which includes scales assessing grit, motivational beliefs, and self-regulated learning strategies. Overall, the framework suggests that self-regulation plays a critical role in shaping learners' perseverance, motivation, and strategic learning behaviours, ultimately contributing to more effective and meaningful learning outcomes.

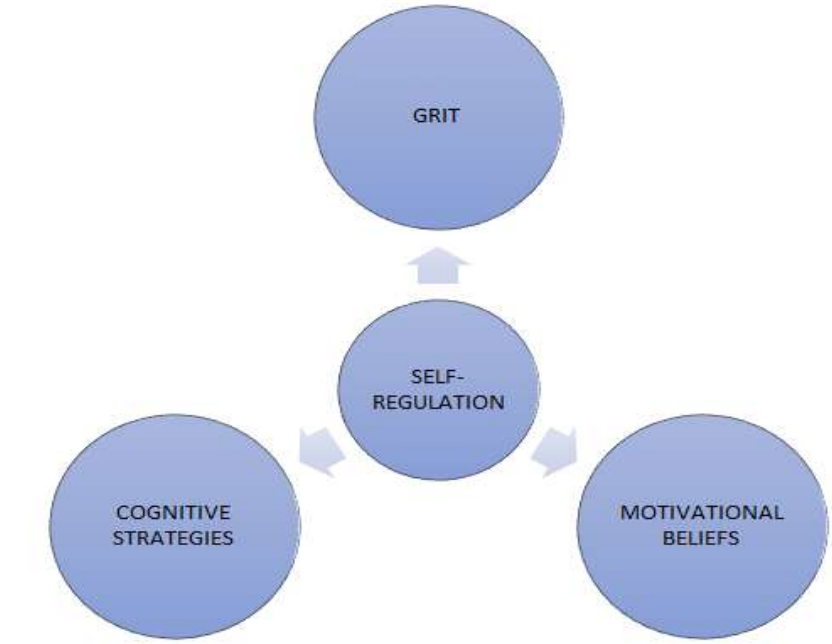

Figure 1 -Conceptual Framework of the Study

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METHODOLOGY

This quantitative study is done to explore the influence of self-regulation on learning strategies. A convenient sample of 61 participants responded to the survey. The instrument used is a 5-point Likert-scale survey and is rooted in 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 Strongly Disagree, 2 is for Disagree, 3 is for Undecided, 4 is for Agree, and 5 is for Strongly Agree.

Table 1- Distribution of Items in the Survey

PART	STRATEGY		SCALE	No Of Items	Total Items	CA
ONE	DEMOGRAPHIC PROFILE					
TWO	GRIT		CONSISTENCT OF INTEREST	6	12	.757
			PERSEVERANCE	6		
THREE	MOTIVATIONAL BELIEFS	A	SELF-EFFFICACY	9	22	.868

		B	INTRINSIC VALUE	9		
		C	TEST ANXIETY	4		
FOUR	SELF-REGULATED LEARNING STRATEGIES	D	COGNIVE STRATGY USE	13	22	.860
		E	SELF-REGULATION	9		.706
	TOTAL NO OF ITEMS				56	.924

Table 1 shows the distribution of items in the survey. Grit is measured by 12 items, motivational beliefs are measured by 22 items, and self-regulated learning strategies is measured by 22 items.

Table 2- 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

Table 2 presents the reliability levels based on Cronbach's alpha values as adapted from (Ahmad et al., 2024) . The table categorizes internal consistency into five levels. An alpha value of 0.9 and above is considered excellent, indicating very high internal consistency among items. Values between 0.80 and 0.89 are labelled good, reflecting strong reliability. Scores ranging from 0.70 to 0.79 are acceptable, showing adequate internal consistency. A range of 0.60 to 0.69 **is** questionable, suggesting potential reliability concerns, while values below 0.60 are classified as poor, indicating weak internal consistency in the measurement instrument.

Table 2 also shows the reliability of the survey. The analysis shows a Cronbach alpha of .757 for Grit, .868 for Motivational Beliefs, and .860 for Self- Regulated Learning Strategies. The overall Cronbach's Alpha for all 56 items is .924; thus, revealing a good reliability of the instrument chosen/used. Further analysis using SPSS is done to present findings to answer the research questions for this study.

FINDINGS

Demographic Analysis

According to (Ziegenfuss 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	20%

		Female	80%
2	Discipline	Science & Technology	11%
		Humanities & Social Sciences	77%
		Business	12%
	Semester	Part 1-4	79%
		Part 4 and above	21%

Table 4 shows the percentage for the demographic profile of the respondents. 61 respondents participated in this pilot study. 20% of the respondents are male, and 80% are female. Next, 11% of the participants are from Science & Technology, 77% are from Humanities & Social sciences, while 12 % are in the Business discipline. Lastly, 79% are studying in the 1-4 the semester while 21% are in semester 4 and above

Descriptive Statistics

Why is there a need to report the mean and standard deviation? According to (Vetter, 2017), Mean (M) represents the average, or centre of a data set. 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 the data points are clustered close to the mean, whereas a high. SD indicates they are more spread out. It is good to have a high SD.

Findings for Self-Regulation

This section presents data to answer research question 1: How do learners perceive their self-regulation in learning?

Table 5: Mean (M) and Standard Deviation (SD) for SELF-REGULATION (9 items)

ITEM	M	SD
SRLSSRQ1I ask myself questions to make sure I know the material I have been studying.	4.16	0.73
SRLSSRQ 2When work is hard I either give up or study only the easy parts.	3.11	1.20
SRLSSRQ 3I work on practice exercises and answer end of chapter questions even when I don't have to.	3.34	0.93
SRLSSRQ 4Even when study materials are dull and uninteresting, I keep working until I finish.	3.92	0.71
SRLSSRQ 5Before I begin studying, I think about the things I will need to do to learn.	4.10	0.75
SRLSSRQ 6I often find that I have been reading for class but don't know what it is all about.	3.11	0.95
I find SRLSSRQ 7that when the teacher is talking, I think of other things and don't really listen to what is being said.	2.74	1.13
SRLSSRQ 8When I'm reading, I stop once in a while and go over what I have read.	3.82	0.85
SRLSSRQ 91 work hard to get a good grade even when I don't like a class.	4.08	0.92

Table 5 presents the mean (M) and standard deviation (SD) for nine items measuring students' self-regulation. Overall, the results indicate a generally high level of self-regulatory behaviour among respondents. The highest mean score is for asking oneself questions to ensure understanding of studied material (M = 4.16, SD = 0.73), followed closely by planning what needs to be done before studying (M = 4.10, SD = 0.75) and working hard for good grades even when the class is disliked (M = 4.08, SD = 0.92). Moderate scores appear for persistence with dull materials and reviewing readings. Lower means are observed for distraction during lectures and difficulty understanding readings, suggesting some challenges in maintaining attention and comprehension.

Findings for Grit

This section presents data to answer research question 2: How do learners perceive their grit in learning? In the context of this study, this is measured by (i) consistency of interest and (ii) perseverance.

Table 6: Mean (M) and Standard Deviation (SD) for CONSISTENCY OF INTEREST (12 items)

ITEM	M	SD
GCIQ1 I often set a goal but later choose to pursue a different one.	3.05	0.99
GCIQ2New ideas and new projects sometimes distract me from previous ones.	3.26	1.09
GCIQ3I become interested in new pursuits every few months.	3.19	1.15
GCIQ4My interests change from year to year.	3.54	1.16
GCIQ5 I have been obsessed with a certain idea or project for a short time but later lost interest.	3.32	1.18
GCIQ6 I have difficulty maintaining my focus on projects that take more than a few months to complete.	3.28	1.14

Table 6 presents the mean (M) and standard deviation (SD) for six items measuring students' consistency of interest. The mean scores range from 3.05 to 3.54, indicating a moderate level of consistency in maintaining interests and goals. The highest mean is for interests changing from year to year (M = 3.54, SD = 1.16), suggesting that respondents frequently experience shifts in their interests over time. Other items, such as being distracted by new ideas or struggling to maintain focus on long-term projects, also show moderate means, reflecting some variability in sustaining long-term commitment. The standard deviations indicate a reasonable spread of responses among participants.

Table 7: Mean (M) and Standard Deviation (SD) for PERSEVERANCE OF EFFORT

ITEM	M	SD
GCPQ1I have achieved a goal that took years of work.	3.67	1.08
GCPQ2 I have overcome setbacks to conquer an important challenge.	3.89	0.91
GCPQ3 Setbacks don't discourage me.	3.67	0.94
GCPQ4 I finish whatever I begin.	4.08	0.74
GCPQ5 I am a hard worker.	3.97	0.80
GCPQ6 I am diligent	3.89	0.80

Table 7 presents the mean (M) and standard deviation (SD) for six items measuring perseverance of effort. The mean scores range from 3.67 to 4.08, indicating a relatively high level of perseverance among respondents. The highest mean is for finishing whatever one begins (M = 4.08, SD = 0.74), followed by being a hard worker (M = 3.97, SD = 0.80). Other items, such as overcoming setbacks and remaining diligent, also show strong mean values. Overall, the results suggest that participants generally demonstrate persistence and sustained effort when working toward their goals.

Findings for Motivational Beliefs

This section presents data to answer research question 3: How do learners perceive their motivational beliefs in learning? In the context of this study, this is measured by (i) Self-Efficacy, (ii) Intrinsic Value, and (iii) Test Anxiety

Table 8: Mean (M) and Standard Deviation (SD) for SELF-EFFICACY (9 items)

ITEM	M	SD
MBSEQ1Compared with other students in this class I expect to do well.	3.33	0.93
MBSEQ2I'm certain I can understand the ideas taught in this course.	3.97	0.71
MBSEQ 3I expect to do very well in this class.	4	0.66
MBSEQ 4Compared with others in this class, I think I'm a good student	3.26	0.97
MBSEQ5I am sure I can do an excellent job on the problems and tasks assigned for this class.	3.86	0.70
MBSEQ61 think I will receive a good grade in this class.	3.64	0.78
MBSEQ 7My study skills are excellent compared with others in this class.	3.03	0.97
MBSEQ8Compared with other students in this class I think I know a great deal about the subject.	3.35	0.94
MBSEQ9I know that I will be able to learn the material for this class	4	0.73

Table 8 presents the mean (M) and standard deviation (SD) for nine items measuring students' self-efficacy. The mean scores range from 3.03 to 4.00, indicating a generally positive level of confidence in academic abilities. The highest means are for expecting to do very well in the class and believing in the ability to learn the course material (M = 4.00), followed by confidence in understanding course ideas (M = 3.97). Lower means appear for perceptions of study skills compared with others (M = 3.03). Overall, the results suggest that students demonstrate moderately high academic self-efficacy.

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

ITEM	M	SD
MBIVQ1I prefer class work that is challenging so I can learn new things.	3.38	0.92
MBIVQ2It is important for me to learn what is being taught in this class.	4.21	0.61
MBIVQ3I like what I am learning in this class.	4.16	0.66
MBIVQ 4I think I will be able to use what I learn in this class in other classes.	4.10	0.65

MBIVQ 5I often choose paper topics I will learn something from even if they require more work.	3.56	0.89
MBIVQ 6Even when I do poorly on a test I try to learn from my mistakes.	4.33	0.65
MBIVQ7 I think that what I am learning in this class is useful for me to know.	4.33	0.60
MBIVQ 8I think that what we are learning in this class is interesting.	4.26	0.70
MBIVQ 9Understanding this subject is important to me.	4.49	0.57

Table 9 presents the mean (M) and standard deviation (SD) for nine items measuring students' intrinsic value toward learning. The mean scores range from 3.38 to 4.49, indicating a generally high level of intrinsic motivation. The highest mean is for the importance of understanding the subject (M = 4.49, SD = 0.57), followed by learning from mistakes and recognizing the usefulness of the class content (M = 4.33). Lower means appear for preferring challenging work (M = 3.38). Overall, the results suggest that students strongly value and are interested in what they are learning.

Table 10: Mean (M) and Standard Deviation (SD) for TEST ANXIETY (4 items)

ITEM	M	SD
MBTAQ1I am so nervous during a test that I cannot remember facts I have learned.	3.25	1.08
MBTAQ 2I have an uneasy, upset feeling when I take a test.	3.26	1.09
MBTAQ 3I worry a great deal about tests.	3.62	1.09
MBTAQ 4When I take a test I think about how poorly I am doing.	3.49	1.07

Table 10 presents the mean (M) and standard deviation (SD) for four items measuring students' test anxiety. The mean scores range from 3.25 to 3.62, indicating a moderate level of anxiety during tests. The highest mean is for worrying a great deal about tests (M = 3.62, SD = 1.09), followed by thinking about how poorly one is doing during a test (M = 3.49). Feelings of nervousness and uneasiness during tests also show moderate means. Overall, the results suggest that many students experience noticeable but not extreme levels of test anxiety.

Findings for Cognitive Strategy Use

This section presents data to answer research question 4: How do learners perceive their cognitive strategy use in learning?

Table 11: Mean (M) and Standard Deviation (SD) for COGNITIVE STRATEGY USE (13 items)

ITEM	M	SD
SRLSCSUQ1When I study for a test, I try to put together the information from class and from the book.	4.30	0.64
SRLSCSUQ 2When I do homework, I try to remember what the teacher said in class so I can answer the questions correctly.	4.25	0.67
SRLSCSUQ 3It is hard for me to decide what the main ideas are in what I read.	3.02	0.88
SRLSCSUQ 4When I study, I put important ideas into my own words.	4.20	0.75

SRLSCSUQ 5I always try to understand what the teacher is saying even if it doesn't make sense.	4.13	0.67
SRLSCSUQ 6When I study for a test, I try to remember as many facts as I can.	4.28	0.71
SRLSCSUQ 7When studying, I copy my notes over to help me remember material.	4.08	0.86
SRLSCSUQ 8When I study for a test, I practice saying the important facts over and over to myself.	4.30	0.72
SRLSCSUQ 9I use what I have learned from old homework assignments and the textbook to do new assignments.	4.25	0.67
SRLSCSUQ 10When I am studying a topic, I try to make everything fit together.	4.23	0.64
SRLSCSUQ 11When I read material for this class, I say the words over and over to myself to help me remember.	4.16	0.84
SRLSCSUQ 12I outline the chapters in my book to help me study.	3.89	1.03
SRLSCSUQ 13When reading I try to connect the things, I am reading about with what I already know.	4.28	0.66

Table 11 presents the mean (M) and standard deviation (SD) for thirteen items measuring students' cognitive strategy use. The mean scores range from 3.02 to 4.30, indicating generally high use of cognitive learning strategies. The highest means are for integrating information from class and textbooks and repeating important facts (M = 4.30), followed by applying prior knowledge and remembering teachers' explanations. The lowest mean is for difficulty identifying main ideas in reading (M = 3.02). Overall, the results suggest that students frequently apply various strategies to support their learning and understanding.

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's a common tool for describing simple relationships without making a statement about cause and effect.

Findings for the Relationship between self-regulation and grit in learning

This section presents data to answer research question 5: Is there a significant relationship between self-regulation and grit in learning? To determine if there is a significant association in the mean scores between self-regulation and grit in learning, data is analysed using SPSS for correlations. Results are presented separately in Table 12 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 12- Correlation between self-regulation and grit in learning

		SELF-REGULATION	GRIT
SELF-REGULATION	Pearson (Correlation	1	.583**
	Sig (2-tailed)		<.001
	N	61	61

GRIT	Pearson (Correlation	.583**	1
	Sig (2-tailed)	<.001	
	N	61	61

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

Table 12 shows the correlation between self-regulation and grit in learning. The results indicate a moderate positive correlation between the two variables ($r = .583$, $p < .001$), suggesting that students with higher levels of self-regulation tend to demonstrate greater grit in learning. The correlation is statistically significant at the 0.01 level (2-tailed), with a sample size of 61 participants. This finding implies that the ability to manage one's learning processes is positively associated with persistence and sustained effort in achieving academic goals

Findings for relationship self-regulation and motivational beliefs

This section presents data to answer research question 6: Is there a significant relationship between self-regulation and motivational beliefs? To determine if there is a significant association in the mean scores between self-regulation and motivational beliefs in learning, data is analysed using SPSS for correlations. Results are presented separately in Table 13 below.

Table 13- Correlation between self-regulation and motivational beliefs in learning

		SELF-REGULATION	MOTIVATIONAL BELIEFS
SELF-REGULATION	Pearson (Correlation	1	.550**
	Sig (2-tailed)		<.001
	N	61	61
MOTIVATIONAL BELIEFS	Pearson (Correlation	.550**	1
	Sig (2-tailed)	<.001	
	N	61	61

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

Table 13 presents the correlation between self-regulation and motivational beliefs in learning. The results show a moderate positive correlation between the two variables ($r = .550$, $p < .001$), indicating that students with higher levels of self-regulation tend to have stronger motivational beliefs toward learning. The correlation is statistically significant at the 0.01 level (2-tailed), based on a sample of 61 participants. This suggests that effective self-regulation is positively associated with students' motivation, confidence, and value placed on learning tasks.

Findings for the relationship between self-regulation and cognitive strategy use

This section presents data to answer research question 7: Is there a significant relationship between self-regulation and cognitive strategy use? To determine if there is a significant association in the mean scores between self-regulation and cognitive strategy use in learning, data is analysed using SPSS for correlations. Results are presented separately in table 134 below.

Table 14- Correlation between self-regulation and motivational beliefs in learning

		SELF-REGULATION	COGNITIVE STRATEGY USE
SELF-REGULATION	Pearson (Correlation	1	.518**
	Sig (2-tailed)		<.001
	N	61	61
COGNITIVE STRATEGY USE	Pearson (Correlation	.518**	1
	Sig (2-tailed)	<.001	
	N	61	61

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

Table 14 shows the correlation between self-regulation and cognitive strategy use in learning. The results indicate a moderate positive correlation between the two variables ($r = .518$, $p < .001$), suggesting that students who demonstrate higher levels of self-regulation are more likely to use cognitive strategies during learning. The relationship is statistically significant at the 0.01 level (2-tailed), based on a sample of 61 participants. This finding implies that effective self-regulation is associated with greater use of strategies that support understanding and learning.

CONCLUSION

Summary of Findings and Discussions

This study aimed to examine how self-regulation influences grit, motivational beliefs, and cognitive strategy use in learning. The findings indicate that students generally demonstrate a relatively high level of self-regulation, particularly in planning their learning, reviewing materials, and working persistently toward academic goals. In terms of grit, students showed moderate consistency of interest but relatively high perseverance of effort, suggesting that while their interests may change over time, they still demonstrate persistence in completing academic tasks. These findings support previous research indicating that self-regulation plays an important role in strengthening students' perseverance and sustained effort toward long-term goals. For instance, Khairuddin et al. (2025) reported that grit, motivation, and self-regulated learning strategies are positively related among university students. Similarly, Mikami and Shiozawa (2024) found that behavioural self-regulation contributes to the development of grit in language learning, while Mateo (2024) demonstrated that self-regulation significantly supports students' persistence and academic engagement.

The study also found that students demonstrate relatively strong motivational beliefs, particularly in terms of intrinsic value and confidence in learning, although moderate levels of test anxiety were observed. In addition, students reported high use of cognitive strategies, especially in integrating information, reviewing materials, and connecting new knowledge with prior understanding. Correlation analysis further revealed significant positive relationships between self-regulation and grit, self-regulation and motivational beliefs, and self-regulation and cognitive strategy use. These findings suggest that students who effectively regulate their learning processes are more likely to demonstrate persistence, stronger motivation, and more strategic approaches to learning. This result aligns with the findings of Martin et al. (2022), who reported that perseverance of effort predicts motivational beliefs and cognitive strategy use among engineering students. Similarly, Guo et al. (2023) found that grit strongly predicts students' use of self-regulated learning strategies, while Townley-Flores et al. (2022) highlighted that motivational beliefs such as self-efficacy interact with self-regulation to enhance academic outcomes. Furthermore, studies by Ha et al. (2023) and Peltzer et al. (2026) emphasize that self-regulation supports the effective use of cognitive and metacognitive strategies in different learning environments.

Implications and Suggestions for Future Research

The findings of this study have several important implications. From a theoretical perspective, the results support Social Cognitive Theory (Bandura, 1971; Bandura & National Institute of Mental Health, 1986), which emphasizes the role of self-regulation in guiding learners' behaviour and motivation. The findings also align with Self-Determination Theory (Ryan & Deci, 2000), suggesting that students who actively regulate their learning are more likely to maintain motivation and perseverance. Pedagogically, educators should incorporate teaching strategies that promote self-regulated learning, such as goal-setting activities, reflective learning practices, and strategy-based instruction to help students strengthen their motivation and persistence. Future research could expand this study by involving larger and more diverse samples across different academic disciplines and institutions. Longitudinal or mixed-method studies may also provide deeper insights into how self-regulation develops over time and how it influences students' motivation, grit, and strategic learning behaviours in different educational contexts.

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APPENDIX

Grit, Motivation, And Self- Regulated Learning

(This instrument is adapted from Martin et.al, 2022)

PART	STRATEGY		SCALE	No Of Items	Total Items
ONE	DEMOGRAPHIC PROFILE				
TWO	GRIT		CONSISTENCT OF INTEREST	6	12
			PERSEVERANCE	6	
THREE	MOTIVATIONAL BELIEFS	A	SELF-EFFFICACY	9	22
		B	INTRINSIC VALUE	9	
		C	TEST ANXIETY	4	
FOUR	SELF-REGULATED LEARNING STRATEGIES	D	COGNIVE STRATGY USE	13	22
		E	SELF-REGULATION	9	
	TOTAL NO OF ITEMS				44

part 2- grit

(i) CONSISTENCY OF INTEREST (12 Items)

ITEM
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.

(ii) PERSEVERANCE OF EFFORT

ITEM
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 (22 items)

(i) SELF-EFFICACY (9 items)

ITEM
MBSEQ1Compared with other students in this class I expect to do well.
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.
MBSEQ61 think I will receive a good grade in this class.
MBSEQ 7My study skills are excellent compared with others in this class.
MBSEQ8Compared with other students in this class I think I know a great deal about the subject.
MBSEQ9I know that I will be able to learn the material for this class

(ii) INTRINSIC VALUE (9 items)

ITEM
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 5I often choose paper topics I will learn something from even if they require more work.
MBIVQ 6Even when I do poorly on a test I try to learn from my mistakes.
MBIVQ7 I think that what I am learning in this class is useful for me to know.
MBIVQ 8I think that what we are learning in this class is interesting.
MBIVQ 9Understanding this subject is important to me.

(iii) TEST ANXIETY (4 items)

ITEM
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

(iv) COGNITIVE STRATEGY USE (13 items)

ITEM
SRLSCSUQ1When I study for a test, I try to put together the information from class and from the book.
SRLSCSUQ 2When I do homework, I try to remember what the teacher said in class so I can answer the questions correctly.
SRLSCSUQ 3It is hard for me to decide what the main ideas are in what I read.
SRLSCSUQ 4When I study, I put important ideas into my own words.
SRLSCSUQ 5I always try to understand what the teacher is saying even if it doesn't make sense.
SRLSCSUQ 6When I study for a test, I try to remember as many facts as I can.
SRLSCSUQ 7When studying, I copy my notes over to help me remember material.
SRLSCSUQ 8When I study for a test, I practice saying the important facts over and over to myself.
SRLSCSUQ 9I use what I have learned from old homework assignments and the textbook to do new assignments.
SRLSCSUQ 10When I am studying a topic, I try to make everything fit together.

SRLSCSUQ 11When I read material for this class, I say the words over and over to myself to help me remember.
SRLSCSUQ 12I outline the chapters in my book to help me study.
SRLSCSUQ 13When reading I try to connect the things, I am reading about with what I already know.

(v) SELF-REGULATION (9 items)

ITEM
SRLSSRQ1I ask myself questions to make sure I know the material I have been studying.
SRLSSRQ 2When work is hard I either give up or study only the easy parts.
SRLSSRQ 3I work on practice exercises and answer end of chapter questions even when I don't have to.
SRLSSRQ 4Even when study materials are dull and uninteresting, I keep working until I finish.
SRLSSRQ 5Before I begin studying, I think about the things I will need to do to learn.
SRLSSRQ 6I often find that I have been reading for class but don't know what it is all about.
I find SRLSSRQ 7that when the teacher is talking, I think of other things and don't really listen to what is being said.
SRLSSRQ 8When I'm reading, I stop once in a while and go over what I have read.
SRLSSRQ 91 work hard to get a good grade even when I don't like a class.