Self-Regulated Learning Strategies on Students' Academic Performance in Mathematics Through Flexible Learning

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Abstract: Students use self-regulated learning, a self-directed process, to evaluate their learning as they work toward academic objectives. This study aims to determine the degree of self-regulated learning strategy in a flexible learning environment with regard to affective, cognitive, metacognitive, and motivational strategy; ascertain the level of students' academic performance in flexible learning; assess if there is a significant relationship between the students' academic performance and the self-regulated learning strategies; and find out which variable, singly or in combination, predicts students' academic performance. The study used a descriptive quantitative correlational design. The study is conducted at Valencia National High School, Valencia City, Bukidnon. The research respondents were 150 Grade 10 students. The reseachers used descriptive statistics to determine the level of each sub-variable of self-regulated learning strategies and the students' academic performance. The relationship involving self-regulated learning and students' mathematical performance is examined using Pearson Product Moment Correlation. Finally, to predict which sub-variables predict students' academic performance, it utilizes regression analysis. Results showed that students are indicated positive about self-regulated learning. The student's academic performance is rated as very satisfactory. Henceforth, there is a significant correlation between students' academic performance and their use of a self-regulated learning strategy. Lastly, the sub-variable that predicts students' academic performance is the metacognitive strategy.

Keywords: self-regulated learning strategies, academic performance, flexible learning

1. Introduction

One of the global issues we're facing is the Covid-19 pandemic. It has infected and even claimed the lives of people around the world. The sudden lockdowns, the closing of borders, malls, churches, schools, and other non-essential establishments due to the Covid-19 pandemic had greatly affected the nation. The pandemic also brought adverse effects to our country, specifically in the Education sector, where there is a sudden transition from face-to-face classes to distance learning. Distant learning is a form of education in which the main elements include the physical separation of teachers and students during instruction and the use of various technologies to facilitate learning. Several schools are implementing distance learning through online classes and modular instructional approaches. These modalities limit not only the interaction of the teacher and the learner but also the assistance and guidance that a teacher could give in the teaching and learning process. We are all aware that in order to understand mathematics, one must possess analytical skills. It takes time to develop specific skills and perform what they have learned in real-life. Most students find mathematics a complicated subject. Now, teachers are faced with the challenge of properly delivering the lesson without having a physical class. The adaptation of distance learning may have affected the students' performance in mathematics.

Several students have struggled in dealing with and learning mathematics even before the pandemic. In this new standard setup in education, students are experiencing more hardships because teachers are not physically present in the teaching-learning process. With this, students are learning on their own. It is difficult to learn mathematics if the

students are not that good at understanding the concept. The disruption of face-to-face classes may impact the students' performance in mathematics.
Self-regulated learning (SRL) talks about students setting personal learning goals to achieve desired learning outcomes (Lim & Yeo, 2021). It means that students are self-directed to learn and achieve academic goals. In this research, Self-regulated learning (SRL) has four components, namely: affective strategy, cognitive strategy, metacognitive strategy, and motivation Strategy.

Affective strategy refers to how students worry about the tests and how often they have distracting thoughts when taking an exam. Cognitive strategy refers to how students often use study strategies such as rereading class notes and memorizing lists of keywords and concepts. The cognitive strategy also refers to how often students attempt to summarize or paraphrase the material they read in their textbooks and how often they try to relate the material to what they already know or have learned. A cognitive strategy is where students have the ability to select the main ideas from their readings as well as their attempts to organize and put together what they need to learn from the lessons. Similarly, the term "cognitive strategy" describes how students use prior knowledge to make decisions, solve issues, or perform critical analysis in accordance with criteria of competence (Tseng, Gardner, & Yeh, 2016). Metacognitive strategy refers to the awareness, knowledge, and control of cognition. Motivation is the students' interest in their lesson, which promotes success and confidence in the learning process.

The use of self-regulated learning has shown a significant relationship (0.80) with students' academic achievement (Boroomand, Saad, & Sardareh, 2012). By this, we can probably say that responsible students perform well in class and achieve desired learning outcomes. SRL was developed and defined as regulating one's self to successfully self-reflect, time-manage, and socially regulate (Zimmerman and Risemberg, 1997). Thus, students are driven to learn best on their own. As a result, students have higher academic achievement.

Flexible learning is a set of educational philosophies that are concerned with providing learners with increased choice, convenience, and personalization to suit the learner (Shurville et al. 2008). In particular, flexible learning gives learners choices about where, when, and how learning occurs.

Students are not yet allowed to go to school because of the pandemic. The researcher seeks to find out the students' performance in mathematics with the integration of a self-regulated learning strategy through flexible learning. With that, researchers seek to answer how students become responsible for their learning amidst the COVID-19 crisis.

2. Materials and Methods

The study investigated self-regulated learning strategies on students' academic performance in mathematics through flexible learning, specifically modular distance learning at Valencia National High School SY 2021-2022. The study utilized a quantitative research, specifically descriptive-correlational design. A descriptive-correlational design was employed to determine the significant relationship between the sub-variables of self-regulated learning strategies and students' academic performance.

There were two (2) instruments used to gather the quantitative data, namely, the adapted Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, et al. 1991) and adopted summative test from the Department of Education (DepEd). In MSLQ, a 40-item survey questionnaire was answered on a five-point Likert scale, from strongly agree to strongly disagree. The survey consists of 4 sub-variables: affective, cognitive, metacognitive, and motivation, with ten (10) items each. The validated summative test, on the other hand, is a 40-item multiple choice test. To measure the students' academic performance during the second quarter, the summative test score was used. A pilot test was administered to examine the reliability of the survey questionnaire and summative test. Cronbach's Alpha coefficients for the self-regulated learning strategy survey and summative test were 0.883 and 0.856, respectively.

The study's respondents were the 150 randomly selected Grade 10 students of Valencia National High School enrolled in SY 2021-2022.

Google forms were then utilized to collect the students' responses to determine the level of sub-variables of the self-regulated learning strategies. The summative scores of the students were also collected in this form to determine the level of students' academic performance.

The collected data were tabulated and analyzed using appropriate statistical tools. Descriptive statistics such as mean, standard deviation, frequency, and percentage were employed to answer the questions about the level of self-regulated learning strategies and students' academic performance. To determine the significant relationship between the sub-variables of self-regulated learning strategies and students' academic performance, a Pearson correlation was used. Lastly, to determine which sub-variables best predicted students' academic performance, regression analysis was being done.

3. Results and Discussions

This section explains how the data collected from respondents was analyzed and interpreted to test the study's assumptions. This chapter also includes tables and computations to facilitate data analysis. The presentation is organized in accordance with the study's objectives.

3.1 Self-Regulated Learning Strategy

Personal satisfaction, regulation of cognition and intellectual processes, parental participation, and social component are all factors that encourage students to actively participate in the learning process. In addition, for improved academic performance, self-regulated learning is required [25].

a. Affective Strategy

Table 1. Mean distribution of Students' Self-Regulated Learning Strategy in terms of Affective strategy

Indicator	Mean	Descriptive Rating	Qualitative Interpretation
I welcome feedback for the improvement of my performance.	4.02	Agree	Positive
I check my own progress by reviewing and reflecting on my previous performances.	3.62	Agree	Positive
Considering the difficulty of this module, the teacher, and my skills, I think I will do well in this class.	3.52	Agree	Positive
I'm certain I can master the skills being taught in this class.	3.35	Neutral	Moderately Positive
I have an uneasy, upset feeling when I take an exam.	3.21	Neutral	Moderately Positive
I'm certain I can understand the most difficult material presented in the readings for this module.	3.18	Neutral	Moderately Positive
When I take the summative test, I think about how poorly I am doing compared with other students.	2.72	Neutral	Moderately Positive
When I take a test, I think about items on other parts of the test I can't answer.	2.54	Disagree	Negative
When I take summative tests, I think of the consequences of failing.	2.45	Disagree	Negative
If I don't understand the module, it is because I didn't try hard enough.	2.32	Disagree	Negative
Overall Mean	3.09	Neutral	Moderately Positive

Table 1 demonstrates the mean distribution of students' self-regulated learning strategy in terms of affective strategy. The data shows an overall mean of (M=3.09) indicates that students are Moderately positive on self-regulated learning strategy in terms of affective strategy.

On the other hand, partial indicators on self-regulated learning strategy in terms of affective strategy were rated as positive. These indicators were: "I welcome feedback for the improvement of my performance" (μ=4.02); "I check my own progress by reviewing and reflecting on my previous performances" (μ=3.62); and "Considering the difficulty of this module, the teacher, and my skills, I think I will do well in this class" (μ=3.52). It means that students are positive about their affective strategy, which is to be open-minded to any feedback in order to learn from others. In order to plan their future goals, they analyze their development by reviewing and reflecting on their previous performance. They also believe that regardless of the subject, teacher, or skill level, they can accomplish well in class. Students will be motivated to accomplish tasks and make sensible decisions as a result of this consideration of their dread of the subject.

However, some of the affective indicators for self-regulated learning strategy were rated as moderately positive. These indicators were: "I'm certain I can master the skills being taught in this class" (μ=3.35); "I have an uneasy, upset feeling when I take an exam" (μ=3.21); "I'm certain I can understand the most difficult material presented in the readings for this module" (μ=3.18); and "When I take the summative test, I think about how poorly I am doing compared with other students" (μ=2.72). The reason for this is that while comparing their selves to others can make students remain focused on a subject at times, it can also bring them under strain. Students are fragmented on whether or not they can master the skills taught in class and are anxious when taking the exam, because there are times when students do not feel optimistic about the subject, particularly if they performed poorly in the prior activity, which can lead to anxiety when taking the further test.

Furthermore, some of the affective indicators for self-regulated learning strategy were rated as negative. These indicators were: "When I take a test, I think about items on other parts of the test I can't answer" (μ=2.54); "When I take summative tests, I think of the consequences of failing" (μ=2.45); and "If I don't understand the module, it is because I didn't try hard enough" (μ=2.32). It's because students don't want to put too much pressure on themselves during exams, which usually leads to poor results. And students do not yet have the maturity to recognize that they do poorly in the subject because they do not take their modules seriously.

These findings were confirmed, indicating that emotion or affective strategy empowers every individual to immediately comprehend things that are above their capacity and to let their emotions decide, which occasionally leads to constructive decisions (Larue, West, Rosenbloom, Dancy, Samsonovich, Petters, & Juvina, 2018). Affective self-regulation increases an individual's ability to deal with real-life situations (Rozen & Kramarski, 2013). Emotions are crucial for dealing with real-life circumstances because they allow an individual to choose the appropriate response to the problem without being unfair, disrespectful, or harming themselves or others. Additionally, having emotional intelligence enables students to avoid feeling of anxiety, leading to a self-controlled personality (Maraichelvi & Rajan, 2013).

b. Cognitive Strategy

Table 2. Mean distribution of Students' Self-regulated learning strategy in terms of Cognitive strategy

Indicator	Mean	Descriptive Rating	Qualitative Interpretation
I usually study in a place where I can concentrate on reading my module.	4.07	Agree	Positive
When I become confused about something I'm reading for this module, I go back and try to figure it out.	3.87	Agree	Positive
When I study for my module, I go through the lessons and my class notes and try to find the	3.68	Agree	Positive

most important ideas.			
I write down information so I could easily remember them.	3.66	Agree	Positive
I treat the module as a starting point and try to develop my own ideas about it.	3.65	Agree	Positive
I write reflective journal after accomplishing a task.	3.54	Agree	Positive
When I study for my mathematics subject, I outline my module to help me organize my thoughts.	3.43	Neutral	Moderately Positive
I plan my daily tasks.	3.35	Neutral	Moderately Positive
When studying for my mathematics subject, I often set aside time to discuss the module with my classmates.	3.12	Neutral	Moderately Positive
When I study for this class, I set goals for myself in order to direct my activities in each study period.	3.09	Neutral	Moderately Positive
Overall Mean	3.55	Agree	Positive

Table 2 reveals the mean distribution of students' self-regulated learning strategy in terms of cognitive strategy. The data shows an overall mean of (M=3.55) indicates that students are positive on self-regulated learning strategy in terms of cognitive strategy.

Almost all of the indicators on self-regulated learning in terms of cognitive strategy were evaluated as positive. These indicators were: "I usually study in a place where I can concentrate on reading my module" (μ=4.07); "When I become confused about something I'm reading for this module, I go back and try to figure it out" (μ=3.87); "When I study for my module, I go through the lessons and my class notes and try to find the most important ideas" (μ=3.68); "I write down information so I could easily remember them" (μ=3.66); "I treat the module as a starting point and try to develop my own ideas about it" (μ=3.65); and "I write reflective journal after accomplishing a task" (μ=3.54). When reading their module, student prefers to study in a peaceful atmosphere so that they can easily reflect and organize their thoughts and avoid being distracted by the surroundings. Students are more inclined to go over their class notes, review what they've read, or writes down information since it allows them to recall ideas and connect prior concepts to grasp the new concept. Students are creative thinkers, which may support them improve their critical thinking skills and keeping them motivated to complete the modules. Students also are like the idea of keeping a reflective journal after completing a task since as it will assist them to learn more efficient and remember it for a long time.

Furthermore, some of the indicators on self-regulated learning in terms of cognitive strategy were rated as moderately positive. These indicators were: "When I study for my mathematics subject, I outline my module to help me organize my thoughts" (μ=3.43); "I plan my daily tasks" (μ=3.35); "When studying for my mathematics subject, I often set aside time to discuss the module with my classmates" (μ=3.12); and "When I study for this class, I set goals for myself in order to direct my activities in each study period" (μ=3.09). The reason for this is that students are given limited time to answers activities, hence they don't have time to outline ideas from the module, and it isn't always necessary because they can understand the topic without it. They are not always in favor of discussing the topics with classmates because doing so might sometimes distract their concentration and cause them to miss deadlines. And students don't always establish goals in doing their modules because they assume it's just for compliance or that they won't learn anything from it

This study, was approved, shows that students have different cognitive strategies, which could assist them comprehend information (Saidalvi, Mohamed, & Tashiron, 2019). Some students prefer to work alone, while others

prefer to collaborate with their peers. Accordingly, (Diaco, 2014) the environment influences students' cognitive function, which might have a detrimental impact when noise distracts students' concentration. As a result, students' performance will suffer. Clearly, when a student knows their preferred cognitive strategy, they have a better chance of attaining better results and achieving the desired outcome (Dostál, Klement, & Marešová, 2014). This implies that teachers must be aware with their students and assist them in being aware with themselves.

c. Metacognitive Strategy

Table 3. Mean Distribution of Student's Self-regulated Learning Strategies in terms of Metacognitive Strategy

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
I read instructions carefully before doing any task.	4.11	Agree	Positive
I apply my previous learnings and experiences to understand my modules in mathematics.	3.77	Agree	Positive
I group similar information according to their category.	3.68	Agree	Positive
I ask myself questions to make sure I understand the module I have been studying in this subject.	3.65	Agree	Positive
For better comprehension, I try to illustrate my ideas through graphic organizers.	3.64	Agree	Positive
I try to relate ideas in this subject to those in my other subjects whenever possible.	3.61	Agree	Positive
I am very particular about task conditions.	3.50	Agree	Positive
If I get confused taking notes while studying my module in math, I make sure I sort it out afterwards.	3.38	Neutral	Moderately Positive
I evaluate my own performance based on determined criteria.	3.31	Neutral	Moderately Positive
I take down notes using my own words in writing my notes.	2.91	Neutral	Moderately Positive
Overall Mean	3.56	Agree	Positive

Table 3 demonstrates the mean distribution of students' self-regulated learning strategy in terms of metacognitive strategy. The data shows an overall mean of (μ=3.56); it shows that students agree, and the qualitative description of their self-regulated learning strategy in terms of metacognitive strategy is positive.

Moreover, partial indicators on self-regulated learning strategy in terms of metacognitive strategy were rated as agree. These indicators were: "I read instructions carefully before doing any task" with a mean of (μ=4.11); "I apply my previous learnings and experiences to understand my modules in mathematics" with a mean of (μ=3.77); "I group similar information according to their category" with a mean of (μ=3.68); "I ask myself questions to make sure I understand the module I have been studying in this subject" with a mean of (μ=3.65); "For better comprehension, I try to illustrate my ideas through graphic organizers" with a mean of (μ=3.64); "I try to relate ideas in this subject to those in my other subjects whenever possible" with a mean of (μ=3.61); and "I am very particular about task conditions" with a mean of (μ=3.50). This suggests that students are making use of their areas of strength to advance their understanding of mathematics. By identifying the factors that they believe will make it

difficult for them to learn and developing alternative solutions to help them become more engaged in the learning process. Students will have an edge in answering their modules if they can establish strong points.
The remaining metacognitive indicators for self-regulated learning strategy has been classified as neutral. The indicators include: "If I get confused taking notes while studying my module in math, I make sure I sort it out afterward" with a mean of (μ=3.38); "I evaluate my performance based on determined criteria" with a mean of (μ=3.31); and "I take down notes using my own words in writing my notes" with a mean of (μ=2.91). When students' modules cause them confusion, the results show that they rarely organize their thoughts. Additionally, the difficulty with which students are responding to their modules may be due to the fact that they frequently just consider the criteria that have been offered to them. The impact of the teacher's physical presence on the students' academic achievement has been significant (Agarin, 2021). To fully understand the Self-Learning Material (SLM) given by the Department of Education (DepEd), They must be able to compose notes in their own thoughts.

The results of this study were approved, and revealed that metacognitive strategy has a long-term effect on students' academic performance (de Boer, et al., 2018). Students will benefit if they have applied wisely their metacognition by finding ways how to use their strong and weak points when completing tasks.

d. Motivation Strategy

Table 4. Mean Distribution of Student's Self-regulated Learning Strategies in terms of Motivation Strategy

Indicators	Mean	Descriptive Rating	Qualitative Interpretation
I need to study mathematics so that I can improve my critical thinking skills.	4.25	Strongly Agree	Highly Positive
The most important thing for me right now is improving my grade in mathematics, so my main goal is to study hard.	4.24	Strongly Agree	Highly Positive
I want to do well in my mathematics subject because it is important to show my ability to my family, friends, & teacher.	3.94	Agree	Positive
I want to study mathematics because I can apply it in solving real-life problems.	3.94	Agree	Positive
The most satisfying thing for me in this module is trying to understand the content as thoroughly as possible.	3.87	Agree	Positive
I study my mathematics module so that I will not be scolded by my parents.	3.86	Agree	Positive
If I can, I want to get better grade in mathematics than most of the other students.	3.79	Agree	Positive
I want to study mathematics so that I will be successful in my chosen career path.	3.69	Agree	Positive
I am eager to learn my lessons in mathematics so that it will be easier for me to understand the next lesson.	3.55	Agree	Positive
I prefer a module that really challenges me so I can learn new things.	3.47	Agree	Positive
Overall Mean	3.86	Agree	Positive

Table 4 demonstrates the mean distribution of students' self-regulated learning strategy in terms of motivation. The data shows an overall mean of (μ=3.86); it shows that students agree, and the qualitative description of their self-regulated learning strategy in terms of motivation strategy is positive.

Moreover, partial indicators on self-regulated learning strategy in terms of motivation strategy were rated as strongly agree. These indicators were: "I need to study mathematics so that I can improve my critical thinking skills" with a mean of (μ=4.25) and "The most important thing for me right now is improving my grade in mathematics, so my main goal is to study hard" with a mean of (μ=4.24). This suggests that students are highly driven to learn mathematics to enhance their capacity for higher-order thinking and receive good grades. Learners grew more autonomous due to the pandemic, which is why they are trying harder to grasp their modules even when their teacher is not physically present.

The remaining motivational factors for the self-regulated learning technique also received an agree rating. These indicators include: "I want to do well in my mathematics subject because it is important to show my ability to my family, friends, & teacher" with a mean of (μ=3.94); "I want to study mathematics because I can apply it in solving real-life problems" with a mean of (μ=3.94); "The most satisfying thing for me in this module is trying to understand the content as thoroughly as possible" with a mean of (μ=3.87); "I study my mathematics module so that I will not be scolded by my parents" with a mean of (μ=3.86); "If I can, I want to get better grade in mathematics than most of the other students" with a mean of (μ=3.79); "I want to study mathematics so that I will be successful in my chosen career path" with a mean of (μ=3.69); "I am eager to learn my lessons in mathematics so that it will be easier for me to understand the next lesson" with a mean of (μ=3.55); and "I prefer a module that challenges me so I can learn new things" with a mean of (μ=3.47). This shows that they are motivated to pick up new information and abilities to become better students. It will be easier for them to apply what they have learned in a real-world context. Learners can comprehend other disciplines because they learn how to apply arithmetic to several fields, which eventually serve as a stepping stone for their future careers.

The findings of this study were approved, demonstrating that motivation plays a vital role in the teaching and learning process (Gbollie & Keamu, 2017). Academic success requires a strong sense of motivation. Internal and external variables inspire students' desire and enthusiasm to remain engaged and devoted to answering the material handed to them to achieve their goals.

e. Summary of Self-Regulated Learning Strategies

Table 5. Summary of Self-Regulated Learning Strategies

Indicators	Mean	Qualitative Interpretation
Affective Strategy	3.09	Moderately Positive
Cognitive Strategy	3.55	Positive
Metacognitive Strategy	3.55	Positive
Motivation Strategy	3.86	Positive

Table 5 displays the summary of the self-regulated learning strategies of the students. Overall, students' self-regulated learning strategy in terms of affective strategy is moderately positive with μ=3.09; students' self-regulated learning strategy in terms of cognitive strategy is positive with μ=3.55; students' self-regulated learning strategy in terms of metacognitive strategy is positive with μ=3.55; and students' self-regulated learning strategy in terms of motivation strategy is positive with μ=3.86. The highest indicator among self-regulated learning strategies is the motivation strategy, with μ=3.86. On the other hand, the lowest indicator is the affective strategy, with μ=3.09. Therefore, the students are more self-regulated with their eagerness to learn new knowledge and skills.

Students who were motivated were more willing to find learning opportunities and achieved higher in mathematics than their counterparts (Hammoudi, 2019), (Abín, Núñez, Rodríguez, Cueli, García & Rosário, 2020). Hammoudi added that although both extrinsic and intrinsic motivation is positively related to perceived competence for mathematics, intrinsic motivation is related to higher enjoyment of mathematics, higher effort displaced (García,

Rodríguez, González-Castro, Torrance & Gonzalez Pineda, 2016a), and higher success rates, even when the difficulty level is high.

3.2 Performance of Students in Mathematics

The second grading academic performance of grade 10 mathematics students for the school year 2021-2022 is shown in the following table. Out of the 150 students, 27.34% whose performance ranges from 34 to 40 are considered "outstanding," 31.33% whose performance ranges from 27 to 33 are considered "very satisfactory," also 31.33% whose performance ranges from 20 to 26 are considered as "satisfactory". Furthermore, 8% whose performance ranges from 13 to 19 are considered "fairly satisfactory" and 2% whose performance ranges from 20 to 26 are students who "need improvement." The overall mean percentage of 28.12 is considered "very satisfactory."

Table 6. Students' Level of Performance in Mathematics

Students' Performance Range	Frequency	Percent	Qualitative Description
34-40	41	27.34	Outstanding
27-33	47	31.33	Very satisfactory
20-26	47	31.33	Satisfactory
13-19	12	8	Fairly Satisfactory
6-12	3	2	Needs improvement
Overall Mean Percentage		28.12	Very Satisfactory

According to Khalil & Yousuf (2020), the scores of the students in the modular approach are higher. Also, students using the modular learning approach significantly increased their academic performance (Betlen, 2021).

The results contradict the study, which found that most students cannot study independently. Seventy percent (70%) of them cannot easily follow instructions in the modules (Dangle & Sumaoang, 2020). Thus, modules were often submitted late, and most answer sheets were blank.

3.3 Correlation of Self-Regulated Learning Strategies towards Academic Performance of Students in Mathematics

In this study, the correlation analysis of self-regulated learning strategies towards the performance of students in mathematics is presented.

Table 7. Correlation analysis of self-regulated learning strategies towards the academic performance of students in mathematics.

VARIABLES	PERFORMANCE	
	Correlation Coefficient	p-value
Self-Regulated Learning Strategies	.349	.000**
Metacognitive Strategy	.363	.000**
Cognitive Strategy	.304	.000*
Motivation Strategy	.302	.000**
Affective Strategy	.120	.000**

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

Table 7 shows that self-regulated learning strategies is moderately correlated to students' academic performance in mathematics with a p-value of .000 and correlation coefficient of 0.349. The result shows that a high significant relationship exist between student's academic performance in mathematics towards self-regulated learning strategies namely cognitive strategy with correlation coefficient of 0.304 and motivation strategy with correlation coefficient

of 0.302. Affective strategy on the other hand has a correlation of 0.120 and it is the lowest correlation coefficient among other domains of self-regulated learning strategies. While metacognitive strategy has a correlation coefficient of 0.363 which irrefutably has the highest correlation coefficient among all self-regulated learning strategies.

Prior studies had proved that metacognitive strategy plays an important role in the academic performance of students. A study stated that a failure in metacognitive skills ensures the corresponding failure in mathematical thinking and problem solving (Goos, Galbraith & Renshaw, 2000). Moreover, metacognition is an essential part of a student's learning progression (Bransford, Brown & Cocking, 2000). Having prior knowledge and understanding one's own strengths and weaknesses in the learning process; as well as aspects of self-regulation such as a student's ability to organize their own learning and plan for the successes and failures that will come and learn from them all together are indispensible for purposeful student learning (Bransford, Brown & Cocking, 2000), (Paris & Winograd, 1990). The significance of metacognition is allowing students to understand their own personal thinking and work to be independent learners.

3.4 Regression Analysis of the Relationship between Self-Regulated Learning Strategies and Students' Academic Performance in Mathematics in a Flexible Learning

The influence of the independent variable, which is self-regulated learning strategies, and its sub-variables, affective, cognitive, metacognitive, and motivation, on students' academic performance is presented.

Table 8. Regression analysis showing the extent of influence of the Self-Regulated Learning Strategies on the Students' Academic Performance in Mathematics.

Indicators	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	Beta		
(Constant)	13.682	3.093		4.424	.000
Metacognitive	4.063	.856	.363	4.747	.000
R = .363	R square = .132		F = 22.532	Sig. 0.000	

a. Dependent Variable: Students' Academic Performance

Table 8 shows the independent variable found to be a significant predictor of students' academic performance. The variables under self-regulated learning strategies are affective, cognitive, metacognitive, and motivation. The indicator of self-regulated learning strategies that significantly predict students' academic performance is the metacognitive strategy. As shown, the metacognitive strategy with a beta weight value of $\beta = 0.363$ greatly influenced students' academic performance. Among all the predicting variables, metacognitive strategy with a beta weight value of 0.363, portrays the best influence on students' academic performance in mathematics.

The R squared value or the degree of multiple determinations for students' academic performance in mathematics was 0.132. It indicates a 13.2% of the variation in performance is attributed to metacognitive. In contrast, the remaining 86.8% can be interpreted by other variables which are not part of the study. Likewise, the F ratio revealed that the overall regression model is a good fit for the data with an F-value of 22.532 and a p-value of 0.000.

The regression model is illustrated by:

$$Y = 13.682 + 4.063X_1$$

Where:

Y = Students' Academic Performance in Mathematics

X_1 = Metacognitive

The result suggests that if the student applies a metacognitive strategy in studying and learning mathematics, then students' academic performance will be improved.

The study's findings revealed that the metacognitive strategy for self-regulated learning is the best predictor of students' academic performance in mathematics. It is revealed in the study that it has the potential to be a tool for teachers and program developers to understand students' learning strategies in different contexts and thereby

determine how best to scaffold their learning, and it used to help students reflect upon their strategies (Ellqvist, 2020). And it is supported by another SRL study that concerning timely assignment submission, students with metacognitive skills managed their time better and hence achieved better learning performance (Goda, Kato, Matsuda, Miyagawa, Saito & Yamada, 2014). Thus, students who set goals for their learning and manage their time correctly in studying and learning mathematics perform well in their academics.

4. Conclusions and Recommendations

Based on the results, the following conclusions are drawn:
The students' self-regulated learning strategy in terms of affective strategy is positive with a mean score of $\mu=3.84$, the cognitive strategy is also positive with a mean score of $\mu=3.55$. Furthermore, the metacognitive strategy and motivation strategy is positive with a mean score of $\mu=3.56$ and $\mu=3.86$, respectively.

The level of performance of the students is very satisfactory. Students' performance exceeded expectations. All goals, objectives, and targets were achieved above the established standards.

The result shows that a highly significant relationship exists between students' academic performance in mathematics towards self-regulated learning strategies, namely metacognitive strategy with a correlation coefficient of 0.363 and cognitive strategy with a correlation coefficient of 0.304. Motivation strategy, on the other hand, correlates 0.302, and is the lowest correlation coefficient among other domains of self-regulated learning strategies. In contrast, the affective strategy has a correlation coefficient of 0.377 irrefutably has the highest correlation coefficient among all self-regulated learning strategies.

It was shown that metacognitive strategy with a beta weight value of $\beta = 0.363$ is the predictor variable relative to students' academic performance in mathematics.

The following are recommendations based on the findings of the study:
Teachers must be acquainted with their students' learning styles to assist them and provide appropriate intervention based on their needs. Since mathematics is a challenging subject for some students, teachers must create an environment that is both peaceful and competitive, as well as engaging and informative.

Parents are encouraged to support their children to develop as autonomous learners, especially in light of today's lack of physical education classes. Furthermore, learners can boost themselves, which will aid their academic performance.

Students are encouraged to plan, monitor, and self-reflect on one's progress in learning, determine their strengths and weaknesse, and manage both emotions to achieve desired learning outcomes.

The researcher further recommends studying personal development, self-management, and ability to focus. In order to develop students' affective domain, these things have to be strengthened.

Teachers may give an activity that will help students enhance their perception of mathematics and develop their personal development, such as their feelings, attitudes, and the ability to focus on studying and learning the subject.

Finally, future researchers may add other sub-variables of self-regulated learning strategies to find any other predictor that affects students' academic performance.

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