

Self-regulated Learning Strategies among SHS Strands in Mathematics-Related Subjects through Modular Distance Learning

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Abstract: Studies show that self-regulated learning (SRL) strategies play a vital role in students' lives and since the implementation of the modular distance learning took place because of the COVID-19 Pandemic, students were required to study independently. With that, this study determined the use of SRL strategies in mathematics-related subjects of Senior High School (SHS) students through modular distance learning. Stratified random sampling was used for the 125 respondents. Descriptive-comparative research design was employed, a descriptive design to assess the SRL of the students, and a comparative design to determine the differences in the use of SRL strategies of the respondents across strands. The use of descriptive statistics, specifically weighted mean and standard deviation, shows that SRL strategies are present on the SHS students of Sta. Cruz High Integrated School with a level of medium to high in terms of the strategies: Goal Setting, Help-seeking, Self-study Strategy, Managing Physical Environment, and Effort Regulation. Also, using One-way ANOVA, it was concluded that there is no difference in the SRL strategies in studying Mathematics-related subjects through the modular distance learning among the various strands of the respondents. Therefore, the students manifest the usage of SRL strategies in studying and answering their Mathematics-related modules.

Keywords— goal setting, help-seeking, self-study strategies, managing physical environment, effort regulation

INTRODUCTION

Year 2020 has been tough in the educational system worldwide. COVID-19 Pandemic has caused sudden changes to everything, even in the educational system. This gave an opportunity for the educational system to explore the distance learning modality. In the Philippines, the Department of Education (DepEd) implemented Modular Distance Learning (MDL) as it is one of the solutions for continuing education amidst the pandemic. This is a type of teaching approach that learners are allowed to learn at their own pace that is convenient and appropriate in their schedule and condition (Sadiq, 2019). The implementation of MDL includes all grade levels from Kindergarten to Senior High School (SHS) strands specifically the Accountancy, Business, and Management (ABM), General Academic Strand (GAS), Humanities and Social Sciences (HUMSS), Science, Technology, Engineering, and Mathematics (STEM), and Technical-Vocational Livelihood (TVL) where the study will be focussing on.

In this modality, modular learning, the DepEd provides students Self-Learning Modules that targets the most essential learning competencies in all subject areas and students are then required to accomplish the task indicated in the modules in a given period of time. This ensures that students learn how to be present in the learning process and as they learn at their own pace, they are expected to hone their self-regulated skills.

The concept of Self-Regulated Learning (SRL) was first proposed in the 1980s (Koçdar, 2015; Whipp & Chiarelli,

2004). SRL highlights that as students study lessons on their own, they should be autonomous, responsible, and independent of their learning.

Kocdar et al. (2018) revealed that SRL in open and distance learning modality includes the five strategies named as goal setting, help-seeking, self-study strategies, managing physical environment, and effort regulation. Goal-setting is the identification of a specific accomplishment to make for a specific field with observable results (Rowe et al., 2016). Help-seeking is a strategy where learners seek help from different people such as friends and subject experts or from different platforms like the internet (Kocdar et al., 2018). Self-study strategy is a learning method where learners focus their own learning outside the classroom and without the help of anyone (Schunk & Brandenburg, 2020). Zimmerman and Pons (1986) stated that managing physical environment is about designing and arranging a place dedicated for learning and avoiding distraction. Lastly, effort regulation is the ability of learners to continue performing tasks despite difficulties and distractions in achieving the goals (Sen, 2016).

In distance education, the ability to successfully use SRL techniques is more crucial than in face-to-face classes. In a distance learning environment, many students find it challenging to manage their learning (Artino & Stephens, 2009). Lim (2016) described that using modular distance learning in mathematics subjects shows that learners performed better than in traditional approaches. The modular distance learning also allows students to proceed at their march, have the chance to use the learning style of each learner (Malik, 2012). Ocak and Yamak (2013) said that the attitudes

of students to Mathematics are related to their metacognitive self-regulation which also serves as a predictor of students to have a positive outlook.

Students who are experiencing distance learning have a high level of self-regulation because they use their insight or knowledge. Students are the chief of their learning development, they should have the skills to develop their learning process that is why they say that SRL has a huge connection with distance learning (Kirmizi, 2013). Students who use self-regulating in learning through distance approach have more achievements than those who are less self-regulated when studying (Bothma & Monteith, 2004).

SRL improves the academic success of learners in Mathematics than in any other courses (Ergen & Kanadli, 2017). SRL behaviors are associated with academic performance in Mathematics and reading comprehension for high school learners (Harding et al., 2019). Darr and Fisher (2005) emphasized that SRL in Mathematics is being aware of how one’s own thinking can be utilized to give problem-solving options and strategies. SRL strategies also affect students' learning. Learners who possess SRL will be able to plan achievable goals, plan appropriate strategies for the lesson, manage the behaviors and attitude towards something, and evaluate their own improvement (Fauzi & Widjajani, 2018). Contrastingly, Eliserio (2012) states that SRL does not always result in higher achievement. Karademir and Deveci (2019) revealed that a negative relationship with low significance was discovered between Math and self-regulation skills.

Several studies show that self-regulated strategies play a pivotal role in a student’s life, it is the student’s will to take actions to learn, to make decisions and set motivations to be an effective learner. SRL strategies help students to have lifelong skills such as setting goals, taking responsibilities, and decision making. It is evident that there are a lot of struggles faced by students in the sudden shift of the learning approach: traditional to modular distance learning, the collaborative learning that the curriculum promotes changed into individual learning.

With these things in mind, the researchers were motivated to determine how SHS students take responsibility for their learning through the use of SRL strategies in mathematics-related subjects during the modular distance learning. The study aims to describe how SRL strategies are used by SHS students in studying their Mathematics-related subjects through modular distance learning. Also, it aims to find if there exist significant differences in the SRL strategies of SHS students in learning Mathematics-related subjects through the modular distance learning when grouped according to strands. **Ease of Use**

METHODS

The study employed a descriptive-comparative research design which was defined as “a design where the researchers consider two variables (not manipulated) and establish a

formal procedure to compare and conclude that one is better than the other if significant difference exists” (Villanueva, 2013). The descriptive research design was utilized to describe the SRL strategies used by the SHS students and their overall SRL strategies when studying Mathematics-related subjects through MDL. The comparative design was used to know whether the SRL strategies of the SHS students when studying Mathematics-related subjects through MDL differ significantly when grouped according to their strands.

The respondents of the study consisted of 125 SHS students from Sta. Cruz High Integrated School who took mathematics-related subjects through MDL. This sample size was calculated through GPower analysis with a large effect size of 0.40, a 95% confidence interval and a group of 5 representing the strands. Proportionate stratified random sampling was utilized in calculating the sample size for each strand.

The adapted questionnaire was developed by Kocdar et al. (2018) from the study Measuring Self-regulation in Self-paced Open and Distance Learning Environments. The instrument consisted of 35 questions and was tested for validity and reliability. The instrument has a validity rating 4.78 (very high validity) and it has an excellent internal consistency (Cronbach Alpha=0.919). The said instrument answered the objectives of the study in knowing the SRL strategies in studying mathematics-related subjects through the MDL of SHS students.

In the data collection process, the researchers sought permission from the school head and SHS focal person to conduct study at the provincial high school. The respondents were then asked to fill out the informed consent forms, were given briefing about the importance of their participation, and were requested to answer statements with all honesty. The questionnaire was disseminated via Google Form and the data were collected and tallied for interpretation right after. Subsequently, the data were treated using descriptive statistics and One-way ANOVA.

In analyzing the data, Descriptive statistics, specifically, mean and standard deviation, was employed to describe how SHS students used the SRL strategies in studying Mathematics-related subjects through the MDL.

Table 1. Mean rating for Self-regulated Learning Strategies

Scale	Mean Rating	Description Interpretation
5	4.50 – 5.00	Strongly agree (STA)
4	3.50 – 4.49	Agree (A)
3	2.50 – 3.49	Slightly agree (SLA)
2	1.50 – 2.49	Disagree (D)
1	1.00 – 1.49	Strongly disagree (SD)

The table above shows the mean rating for SRL strategies that will be used to provide a descriptive interpretation of values obtained.

Table 2. Mean Rating for the Overall Self-regulated Learning Strategies

Mean Rating	Description Interpretation
1.00 - 3.09	Low (L)
3.10 - 3.84	Medium (M)
3.85 - 5.00	High (H)

In order to provide a descriptive interpretation on the overall SRL of the SHS students when studying Mathematics-related subjects through MDL, the mean rating for the overall SRL strategies shown above was used, whose values were from the study of De la Fuente et al. (2020).

The Shapiro-Wilk test was utilized to determine the normality of data and the Levene's test was utilized to check homogeneity of data. One-way ANOVA has been utilized to determine whether the SRL strategies of SHS students when learning Mathematics-related subjects through MDL differ significantly when grouped according to strands, at 0.05 level of significance.

RESULTS AND DISCUSSION

The data that has been collected was interpreted and the results were as follow:

Table 3. Goal setting among strands of Senior High School

GS	Strands	mean	sd	VD
Q1	ABM	4.11	0.74	A
	GAS	4.03	0.74	A
	HUMSS	3.97	0.77	A
	STEM	4.40	0.51	A
	TVL	4.05	0.85	A
Q2	ABM	3.84	0.60	A
	GAS	3.87	0.83	A
	HUMSS	3.85	0.71	A
	STEM	4.20	0.56	A
	TVL	3.68	1.00	A
Q3	ABM	3.89	0.81	A
	GAS	3.72	0.92	A
	HUMSS	3.52	0.62	A
	STEM	4.13	0.52	A
	TVL	3.89	0.88	A
Q4	ABM	3.95	0.85	A
	GAS	3.92	0.87	A
	HUMSS	3.61	0.83	A
	STEM	4.27	0.80	A
	TVL	3.89	0.66	A
Q5	ABM	3.26	0.73	SL
	GAS	3.41	1.02	A
	HUMSS	3.42	1.00	SL
	STEM	3.13	0.64	A
	TVL	3.47	1.26	SL

				SL
				A
				SL
				A
total μ	ABM	3.81	0.32	A
	GAS	3.79	0.24	A
	HUMSS	3.67	0.23	A
	STEM	4.03	0.51	A
	TVL	3.80	0.22	A

Table 3 presents the use of goal setting strategy of Senior High School students in every strand. Data showed that all SHS students agreed in the first question which states that they set their study goals in answering their module based on the weekly home learning plan with highest mean of 4.40 with standard deviation of 0.51 from STEM. However, all SHS students slightly agreed in the fifth question saying that they do not compromise on the quality of what they do for their Mathematics-related written outputs or tasks with the lowest mean of 3.13 and a standard deviation of 0.64 from STEM.

In summary, all SHS students, regardless of their strand, agreed that they use goal setting strategy in studying their Mathematics-related subjects through MDL with the highest and lowest means of 4.03 with standard deviation of 0.51 and 3.67 with standard deviation of 0.23. This result, therefore, reflects the study of Ong'uti et al. (2019) that among the students in public secondary schools, the goal setting learning was found to be successful in enhancing mathematics performance.

Table 4. Help-seeking among strands of Senior High School

HS	Strands	mean	sd	VD
Q6	ABM	3.84	0.96	A
	GAS	3.41	1.04	SLA
	HUMSS	3.21	0.89	SLA
	STEM	3.53	0.83	A
	TVL	3.63	1.07	A
Q7	ABM	3.95	0.78	A
	GAS	3.82	1.02	A
	HUMSS	3.72	1.01	A
	STEM	4.13	0.83	A
	TVL	3.89	1.15	A
Q8	ABM	4.37	0.76	A
	GAS	3.79	1.08	A
	HUMSS	4.03	0.85	A
	STEM	4.07	0.88	A
	TVL	3.63	1.34	A
Q9	ABM	3.47	1.22	SLA
	GAS	3.46	1.29	SLA
	HUMSS	3.70	1.10	A
	STEM	3.80	0.94	A
	TVL	3.95	1.27	A
Q10	ABM	4.21	0.71	A
	GAS	3.92	0.96	A
	HUMSS	3.94	0.93	A

	STEM	4.13	0.99	A
	TVL	4.11	0.57	A
Q11	ABM	3.53	1.12	A
	GAS	3.64	1.04	A
	HUMSS	3.76	1.00	A
	STEM	3.80	1.01	A
	TVL	4.21	0.79	A
Q12	ABM	3.58	0.96	A
	GAS	3.28	1.23	SLA
	HUMSS	3.24	0.94	SLA
	STEM	3.40	0.83	SLA
	TVL	3.63	1.01	A
Q13	ABM	3.00	1.33	SLA
	GAS	2.46	1.02	D
	HUMSS	2.94	1.22	D
	STEM	2.60	0.91	SLA
	TVL	2.84	1.38	SLA
Q14	ABM	3.74	0.99	A
	GAS	3.31	1.06	SLA
	HUMSS	3.76	0.90	A
	STEM	3.93	0.80	A
	TVL	3.74	0.99	A
tota l μ	ABM	3.74	0.41	A
	GAS	3.46	0.44	SLA
	HUMSS	3.59	0.37	A
	STEM	3.71	0.49	A
	TVL	3.74	0.40	A

Table 4 presents the use of the help-seeking strategy of SHS students in every strand. The highest mean recorded was 4.37 with a standard deviation of 0.76 which was from the question 8 where ABM students agreed that when they do not understand the lesson in the Mathematics-related module, they ask another student for help. Further, with the lowest mean of 2.46 and standard deviation of 1.02, GAS students disagreed in question 13 that, if feasible, they try to discuss their understanding about Mathematics with their classmates face-to-face.

To sum up, ABM, HUMSS, STEM, and TVL students agreed that they use help-seeking strategy in studying their mathematics-related subjects through MDL including the highest means of 3.74 with standard deviations of 0.41 and 0.40, while GAS students slightly agreed with the lowest mean of 3.46 and a standard deviation of 0.44. Hence, to support the result, according to the study of Altun and Erden (2013), help-seeking affects mathematics achievement positively. Also, as they cited, for students to achieve better, they must know when and whom to consult for help (Paterson, 1996; Newman, 1994).

Table 5. Self-study Strategies among strands of Senior High School

SSS	Strands	mean	sd	VD
Q15	ABM	3.89	0.81	A
	GAS	3.87	0.83	A

	HUMSS	3.91	0.68	A
	STEM	4.00	0.65	A
	TVL	3.74	1.10	A
Q16	ABM	3.37	0.68	SLA
	GAS	3.69	0.83	A
	HUMSS	3.39	0.79	SLA
	STEM	3.60	0.74	A
	TVL	3.63	1.07	A
Q17	ABM	3.95	0.78	A
	GAS	3.72	0.86	A
	HUMSS	3.55	0.79	A
	STEM	4.00	0.93	A
	TVL	3.84	0.83	A
Q18	ABM	4.00	0.94	A
	GAS	4.05	0.83	A
	HUMSS	3.55	0.87	A
	STEM	4.20	0.86	A
	TVL	4.37	0.76	A
Q19	ABM	3.42	0.84	SLA
	GAS	3.64	1.09	A
	HUMSS	3.45	1.03	SLA
	STEM	3.53	0.99	A
	TVL	3.79	0.86	A
Q20	ABM	3.89	0.99	A
	GAS	3.85	0.93	A
	HUMSS	3.67	0.96	A
	STEM	3.80	0.86	A
	TVL	3.79	1.08	A
Q21	ABM	3.89	0.74	A
	GAS	3.92	0.96	A
	HUMSS	3.61	0.66	A
	STEM	3.67	0.98	A
	TVL	3.95	0.78	A
Q22	ABM	3.74	0.73	A
	GAS	3.64	0.93	A
	HUMSS	3.58	0.87	A
	STEM	3.67	1.05	A
	TVL	3.53	0.90	A
Q23	ABM	4.47	0.70	A
	GAS	4.44	0.91	A
	HUMSS	4.09	0.80	A
	STEM	4.53	0.64	STA
	TVL	4.05	0.78	A
Q24	ABM	3.84	1.07	A
	GAS	3.82	1.02	A
	HUMSS	3.88	0.99	A
	STEM	4.47	0.64	A
	TVL	3.74	0.93	A
tota l μ	ABM	3.85	0.31	A
	GAS	3.86	0.24	A
	HUMSS	3.67	0.22	A
	STEM	3.95	0.36	A
	TVL	3.84	0.24	A

Table 5 presents the use of self-study strategy of SHS students in every strand. Data showed that the highest mean was from the STEM students who strongly agreed in question 23 that they watch video tutorials in YouTube related to their mathematics-related lesson with a mean of 4.53 and standard deviation of 0.64. Meanwhile, ABM students slightly agreed in question 16 that they draw a draft of the mathematics-related module to organize their thoughts with the lowest mean of 3.37 and a standard deviation of 0.68.

Briefly, all SHS students, regardless of their strand, agreed that they use self-study strategy in studying their mathematics-related subjects through MDL with the highest and lowest means of 3.95 with standard deviation of 0.36 and 3.67 with standard deviation of 0.22 respectively. Thus, this finding was consistent with the study of Barbosa et al. (2017) that the longer the time spent on self-studying the better development of one's learning. In addition, students with more seniority able to fulfill their own needs and interests while they self-study (Van den Hurk et. al, 1999).

Table 6. Managing Physical Environment among strands of Senior High School

MPE	Strands	mean	sd	VD
Q25	ABM	4.68	0.48	STA
	GAS	4.28	0.83	A
	HUMSS	4.21	0.78	A
	STEM	4.40	0.74	A
	TVL	4.05	1.13	A
Q26	ABM	4.74	0.45	STA
	GAS	4.23	0.78	A
	HUMSS	4.15	0.83	A
	STEM	4.47	0.64	A
	TVL	4.21	0.92	A
Q27	ABM	3.68	1.00	A
	GAS	3.97	0.96	A
	HUMSS	3.91	0.88	A
	STEM	4.27	0.88	A
	TVL	4.42	0.84	A
Q28	ABM	4.58	0.51	STA
	GAS	4.33	0.84	A
	HUMSS	4.24	0.71	A
	STEM	4.40	0.91	A
	TVL	4.26	1.10	A
Q29	ABM	4.53	0.84	STA
	GAS	4.38	0.81	A
	HUMSS	4.12	0.86	A
	STEM	4.40	0.83	A
	TVL	4.58	0.77	ST A
Q30	ABM	3.79	1.08	A
	GAS	3.85	0.93	A
	HUMSS	3.67	0.92	A
	STEM	4.00	0.85	A
	TVL	4.63	0.68	ST A

total μ	ABM	4.33	0.47	A
	GAS	4.18	0.22	A
	HUMSS	4.05	0.22	A
	STEM	4.32	0.17	A
	TVL	4.36	0.22	A

Table 6 presents the use of managing physical environment strategy of SHS students in every strand. Data showed that ABM students strongly agreed in question 26 that they choose a comfortable place to study their mathematics-related modules with the highest mean of 4.74 and standard deviation of 0.45. However, HUMSS students agreed in question 30 that they have a regular place to study their mathematics-related modules with the lowest mean of 3.67 and a standard deviation of 0.92.

Altogether, all SHS students, regardless of their strand, agreed that they use managing physical environment strategy in studying their mathematics-related subjects through MDL with the highest and lowest means of 4.36 with standard deviation of 0.22 and 4.05 with standard deviation of 0.22 respectively. Accordingly, this finding was in agreement with the study of Earthman (2004) which found that the quality of the physical environment had a substantial impact on students' success. As well as in the study of Kirmizi (2013), it shows that with fairly high percentages, students can manage their study environment in distance education.

Table 7. Effort Regulation among strands of Senior High School

ER	Strands	mean	sd	VD
Q31	ABM	3.63	1.01	A
	GAS	3.67	0.98	A
	HUMSS	3.73	0.76	A
	STEM	3.80	0.94	A
	TVL	3.68	1.25	A
Q32	ABM	4.42	0.51	A
	GAS	3.90	0.88	A
	HUMSS	3.97	0.64	A
	STEM	4.20	0.77	A
	TVL	4.00	0.82	A
Q33	ABM	2.84	1.07	SLA
	GAS	3.23	1.06	SLA
	HUMSS	3.64	0.90	A
	STEM	2.87	1.25	SLA
	TVL	3.53	1.22	A
Q34	ABM	2.89	1.15	SLA
	GAS	3.00	1.21	SLA
	HUMSS	3.36	0.99	SLA
	STEM	2.47	1.19	D
	TVL	3.37	1.12	SLA
Q35	ABM	3.68	1.06	A
	GAS	3.46	1.14	SLA
	HUMSS	3.67	0.85	A
	STEM	3.40	1.30	SLA
	TVL	4.05	0.78	A

tota	ABM	3.49	0.65	SLA
l	GAS	3.45	0.35	SLA
μ	HUMSS	3.67	0.22	A
	STEM	3.35	0.70	SLA
	TVL	3.73	0.30	A

Table 7 presents the use of effort regulation strategy of SHS students in every strand. Data showed that the highest mean recorded of 4.42 with a standard deviation of 0.51 was from ABM in the question 32 wherein all students agreed that they make an effort to understand and answer their mathematics-related modules. In contrast, STEM students disagreed in question 34 which states that they often feel so lazy or bored when they study their mathematics-related modules that they quit before they finish what they planned to do with the lowest mean of 2.47 and a standard deviation of 1.19.

In conclusion, HUMSS and TVL students agreed that they use effort regulation strategy in studying their mathematics-related subjects through MDL with the highest mean of 3.73 and a standard deviation of 0.30, while ABM, GAS, and STEM students slightly agreed with the lowest mean of 3.35 and a standard deviation of 0.70. This is in connection to the findings of Kim et al. (2015), Muenks et al. (2017), and Pintrich (1999) that students that have a high level of effort regulation are said to obtain better academic results by sustaining their effort and persevering even if they faced setbacks, obstacles, distractions, and boredom.

Table 8. Self-regulated Learning Strategies among strands of Senior High School

SRL S	Strands	mean	sd	VD
GS	ABM	3.81	0.32	M
	GAS	3.79	0.24	M
	HUMSS	3.67	0.23	M
	STEM	4.03	0.51	H
	TVL	3.80	0.22	M
HS	ABM	3.74	0.41	M
	GAS	3.46	0.44	M
	HUMSS	3.59	0.37	M
	STEM	3.71	0.49	M
	TVL	3.74	0.40	M
SSS	ABM	3.85	0.31	H
	GAS	3.86	0.24	H
	HUMSS	3.67	0.22	M
	STEM	3.95	0.36	H
	TVL	3.84	0.24	M
MPE	ABM	4.33	0.47	H
	GAS	4.18	0.22	H
	HUMSS	4.05	0.22	H
	STEM	4.32	0.17	H
	TVL	4.36	0.22	H
ER	ABM	3.49	0.65	M
	GAS	3.45	0.35	M

	HUMSS	3.67	0.22	M
	STEM	3.35	0.70	M
	TVL	3.73	0.30	M
tota	ABM	3.85	0.31	H
l	GAS	3.75	0.30	M
μ	HUMSS	3.73	0.18	M
	STEM	3.87	0.37	H
	TVL	3.89	0.27	H

Table 8 shows how SHS students in each strand used self-regulated learning strategies. STEM students conformed a high use of goal setting strategy in studying their mathematics-related subjects through MDL with the highest mean of 4.03 and a standard deviation of 0.51. While the rest of the strands show medium use of it with the lowest mean of 3.67 and a standard deviation of 0.23 from HUMSS. In addition, all SHS students show medium use of help-seeking strategy in studying their mathematics-related subjects through MDL with the highest mean from ABM and TVL of 3.74 with standard deviations of 0.41 and 0.40 respectively and the lowest mean of 3.46 and a standard deviation of 0.44 from GAS. Also, students from ABM, GAS, and STEM show high use of self-study strategy in studying their mathematics-related subjects through MDL with the highest mean of 3.95 with standard deviation of 0.36, while students from HUMSS and TVL show medium use of it with the lowest mean of 3.67 with standard deviation of 0.22. Furthermore, all SHS students, regardless of their strand, show high use of managing physical environment strategy in studying their mathematics-related subjects through MDL with the highest and lowest means of 4.36 with standard deviation of 0.22 and 4.05 with standard deviation of 0.22 respectively. Similarly, all students show medium use of effort regulation strategy in studying their mathematics-related subjects through MDL with the highest mean of 3.73 and a standard deviation of 0.30 and the lowest mean of 3.35 and a standard deviation of 0.70.

Overall, SHS students from ABM, STEM, and TVL showed high use of the five strategies of SRL with the highest mean of 3.89 and a standard deviation of 0.27 from TVL, while GAS and HUMSS show medium use of it with the lowest mean of 3.73 and a standard deviation of 0.18 from HUMSS. Since the result shows a descriptive interpretation that ranges from medium to high, therefore, the study concludes that the SHS students use their SRL strategies in studying their mathematics-related subjects through MDL. Moreover, Harding et al. (2019) claim that self-regulated learning behaviors are associated with academic performance in Mathematics for high school learners. Also, this result was supported by the study of Fauzi and Widjajani (2018), as stated by them, SRL is a critical skill for learners to take control of their learning and learners who have self-regulated learning will be able to set goals, devise strategies, control behaviors, and assess their learning progress.

Table 9. Significant Difference of Self-regulated Learning Strategies among the Strands of Senior High School

Strands	F	P
Goal Setting ABM GAS HUMSS STEM TVL	1.06	0.38
Help-seeking ABM GAS HUMSS STEM TVL	1.07	0.38
Self-study Strategies ABM GAS HUMSS STEM TVL	1.07	0.38
Managing Physical Environment ABM GAS HUMSS STEM TVL	0.97	0.43
Effort Regulation ABM GAS HUMSS STEM TVL	1.08	0.37
TOTAL Self-regulated Learning	0.63	0.64

df1 = 4; df2 = 120; levene's > 0.05; *significant at the 0.05 level.

A Shapiro Wilk's test was utilized to determine if the data gathered are normally distributed. As assessed by Shapiro Wilk's test, the SRL scores for each strand of Senior High School were normally distributed (STEM = 0.461, ABM = 0.920, HUMSS = 0.726, GAS = 0.072, TVL = 0.581) at 0.05 level of significance. A test of homogeneity of variances was also utilized and as assessed by the Levene's test for equality of variances, there was homogeneity of variances with $p=0.587$. (Goal Setting = 0.195, Help-seeking = 0.399, Self-study Strategies = 0.824, Managing Physical Environment = 0.718, Effort Regulation = 0.514).

Table 9 shows the test of difference in the self-regulated learning strategies among strands of SHS students in learning mathematics-related subjects through the MDL. For the first strategy, goal setting, it was indicated that the SHS students under these 5 strands do not show significant

difference to the goal setting strategies when studying their mathematics-related module, $F(4,120) = 1.06$, $p = 0.38$. These results revealed that the goal-setting strategy is almost the same for every strand. As students move through higher levels, they become more responsible and goal-oriented, and through this they progress to become successful learners (Bloom,2013). Also, he added that students who are at Senior High School are goal-setters, for they are more aware of what is expected of them.

In the second strategy, there is no significant difference found in the help-seeking strategy of SHS students in studying their mathematics-related modules when grouped according to strands, $F(4,120) = 1.07$, $p = 0.38$. The result of the test also revealed that the Help-seeking strategy is almost identical across strands. The studies of Paterson (1996) and Newman (1994) shows that students who know when and who to approach for help do better than those who do not.

There is also no significant difference found in the self-study strategy of SHS students in studying their mathematics-related modules when grouped according to strands, $F(4,120) = 0.69$; $p = 0.60$. This result revealed that the self-study strategy is the same in all strands. In the study of Van den Hurk et. al (1999), it was discovered that learners who dedicate more time to self-study are more successful in their academics. Also, the study of Barbosa, et. al. (2017) reveals that as students devote more of their time in self-studying it progresses their learning.

For the fourth strategy, table 9 showed that there is no significant difference in managing the physical environment of different strands of SHS students in studying their mathematics-related modules, $F(4,120) = 0.97$, $p = 0.43$. Previous studies show the importance of managing your own physical environment creates a great impact on learning, setting up an environment that the student is comfortable and away from any distraction is a strategy needed to practice in distance learning (Yang, 2020). The study conducted by Escobedo et al. (2020), clearly shows students' academic performance can be affected by the environment that they are in, especially now that the world is in a global pandemic.

For the last strategy, table 9 indicated that there is no significant difference in the effort regulation strategy of different strands of SHS students in studying their mathematics-related modules, $F(4,120) = 1.08$, $p = 0.37$. Different studies show how having a high effort regulation helps students to have better academic results (Kim et al., 2015; Muenks et al., 2017; Pintrich, 1999). Students are having a hard time learning, especially in self-paced learning but with these hardships, they choose to persevere. In the study of Biwer et. al (2021), which aims to examine how and what the students do to adapt to the pandemic, findings show that generally, students have more difficulties in regulating their effort and time-management, students are more

unmotivated in distance learning compared to the traditional learning approach.

An analysis of variance showed that the Senior High School under these 5 strands does not show significant differences to the SRL strategies that they use in the mathematics-related subjects during the MDL, $F(4,120) = 0.63$, $p = 0.64$. Therefore, the hypothesis which was stated as there are significant differences in the SRL of SHS students in learning mathematics-related subjects when grouped according to strands is not accepted, this signifies that the SRL strategies of the respondents were not different among the 5 strands as displayed in the table.

CONCLUSIONS

Based on the findings of the study, the following conclusion are drawn:

The researchers concluded that the SHS students of the provincial high school use the SRL strategies in studying their Mathematics-related subjects through MDL. It was shown that the Goal Setting, Self-Study, and Managing Physical Environment strategies were agreed to be used by the SHS students across all strands. The Help-seeking strategy was agreed to be used by the ABM, HUMSS, STEM, and TVL students whereas slightly agreed to be used by the GAS students. The last strategy, Effort regulation, was agreed to be used by the HUMSS and TVL students while slightly agreed to be used by the ABM, GAS, and STEM students. In general, as the said SHS students are currently in MDL and are independent of their learning, they agreed that they use the SRL strategies in studying and answering their mathematics-related modules. This suggests that the students are really responsible and accountable for their learning despite having less to no guidance from their teachers because of the current situation brought by COVID-19 Pandemic.

The researchers also concluded that there is no difference in the SRL strategies in studying Mathematics-related subjects through MDL among the strands of Senior High School.

RECOMMENDATIONS

Based on the findings of the study and conclusion presented, the following recommendations are suggested:

With these findings, researchers encourage the teachers, students, along with the parents, to be aware of these SRL strategies to know how they can help students in learning their modules. These strategies are not only useful during the MDL modality but they are helpful on other learning modalities as well.

Teachers or schools can design a checklist containing the different SRL strategies that the learners can

do or perform, this will also help learners reflect and be mindful of their learning.

Since the study already showed no significant differences between the SRL strategies among the strands, the researchers recommend considering the mathematical achievement of the students in differentiating the SRL of each strand.

The study focused only on five major strategies of behavioral SRL which are Goal Setting, Help-seeking, Self-study Strategies, Managing Physical Environment and Effort Regulation, that is why the researchers recommend further study on other strategies in behavioral SRL like Time Management, Self-monitoring, Self-reinforcement, etc. or consider studying the strategies on the other type which is cognitive self-regulated learning.

Future researchers may also deal with other areas that were not addressed by this study like, self-regulated learning in other modalities of learning such as the online distance learning, blended learning and face-to-face approach.

Future researchers may also take into account the demographic profile of the students that may affect their self-regulation skills such as age, gender, social status, etc.

Another thing that future researchers can examine is the SRL of students in Junior High School, SRL in other subjects, as well as the SRL of students focusing on one strand only.

Future researchers can also consider studying the SRL strategies of college students in distance learning who are taking up programs that are Mathematics-related like Bachelor of Secondary Education major in Mathematics (BSEd Mathematics), Bachelor of Science in Engineering (BS Engineering), Bachelor of Science in Mathematics (BS Mathematics), Bachelor of Science in Statistics (BS Statistics), etc.

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