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Study Habits and Academic Performance of Senior High School STEM Students in General Mathematics

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Abstract

The aim of this research is to explore the level of study habits of senior high school STEM students in relation to their academic performance in General Mathematics for First Semester of the School Year 2025-2026. Quantitative data for this study were collected from 165 SHS STEM student-respondents using a researcher-developed questionnaire that underwent rigorous validity and reliability testing. The questionnaire focused on three areas of study habits namely, motivation, learning techniques, and learning environment. In addition, the respondents were classified according to key profile variables: sex, grade level, intended college courses, and average monthly family income. The ensuing analysis showed that most respondents were female, in Grade 12, wanted to pursue a medical course in college, and fall under higher-income category. Results discussed that they are students who appear to have high motivation, learning techniques, and experience conducive learning environment - with motivation identified as the area with the lowest mean. Eventually, the findings of this study found a significant difference in the STEM students' level of study habits on learning techniques and learning environment when grouped by average family monthly income. In contrast, no significant differences were found when grouped according to sex, grade level, and intended college courses. Furthermore, a non-significant relationship was found between study habits and academic performance in General Mathematics. Although study habits may be enviable, considerably, motivational factors and supportive systems need enhancement, as they determine the conditions of learning in spite of not showing any significant direct link to academic performance. Finally, teachers, school coordinators, and administrators are recommended to plan interventions in improving students' motivation and time management.

Keywords: *Study Habits, Academic Performance, Senior High School STEM Students, General Mathematics, Students' Motivation, Learning Techniques, Learning Environment, Descriptive Study*

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I. INTRODUCTION

A. Nature of the Problem

Attitude towards study has a great contribution to academic achievement. Good study habits lead to good grades, which in turn lead to admissions to better colleges and universities, possibly with a scholarship thrown in. This, in turn, will lead to a great career. Developing good study habits is crucial for every student, regardless of their level of education. It boosts students' ability to be self-disciplined, self-directed, and ultimately successful in their degree programs (Ebele & Olofu, 2017).

Most students perceive Mathematics as one of the most challenging subjects to learn. According to the latest Programme for International Student Assessment (PISA) 2022 results from the OECD, the Philippines ranked 75th out of 81 participating countries in Mathematics. This implies that the students performed poorly in the said subject.

Academic performance in General Mathematics is the degree of achievement that students reach in a certain subject, reflected by their grades, test performances, or academic standing. Generally, in most learning institutions, the grade in General Mathematics can serve as a basis for students' mastery of mathematical skills and overall academic achievement (Alova & Alova, 2019).

This research identified the learning behaviors and strategies used for academic achievement, specifically in Mathematics, among SHS STEM students, as these behaviors and strategies contribute to their comprehension and achievement and align with UNSDG 4. Through this research, students, teachers, and other members of the educational community can apply teaching methods and support systems to help learners develop constructive study habits. Expected to be highly competent in the mathematical aspect, many STEM students struggle with General Mathematics. With a variety of subjects to study as part of the STEM curriculum, students in this track find their plate full, and the ability to manage them effectively through good study habits may be key to excelling not only in other STEM-related subjects but also in General Mathematics. Observation has shown that some STEM students employ strategies such as cramming, poor time management, and the absence of specific study habits, thereby affecting their performance in General Mathematics. The researchers hence aimed to determine the relationship between study habits and general mathematics performance. The results may help educators identify key study habits that influence achievement and serve as a basis for developing academic support and study-skills interventions.

B. Current State of Knowledge

Many studies have been carried out by researchers on effective study habits. Lopez (2021), claimed that study habits affect students' performance in school. He believed that effective study habits can improve academic achievement. According to Sakirudeen and Sanni (2017), study habits are strongly related to students' academic performance. A student who cultivates certain study habits will perform differently from one who cultivates a different set of habits. It is believed that students who lack effective and efficient study methods are building on a shaky foundation and, consequently, have a weak foundation. A Nigerian study found that study habits are among the most important factors in students' learning and strongly influence their academic achievements (Ebele & Olofu, 2017). Hwang and Son (2021), found a significant relationship between students' attitudes toward mathematics and their academic achievement in the subject in their study. Students who like mathematics, value its importance, and have confidence in their mathematical abilities tend to achieve higher levels of mathematical performance. The study emphasizes that developing positive attitudes and confidence toward mathematics can help improve students' academic achievement in the subject.

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The drive to learn, which comes from both internal and external factors, is called academic motivation. It is that force which makes students actively engage, persevere, and strive for excellence in academic areas. This type of motivation can be helpful initially, but does not always lead to deep understanding (Jolly & Sethi, 2024). Bernardo (2020) explained in his work on the Motivation and learning strategies of Filipino students in secondary education that motivated students tend to demonstrate stronger engagement in their academic tasks. When students are highly motivated, they are more likely to use effective learning strategies and actively participate in classroom activities. Motivation encourages students to set learning goals and maintain focus on their academic responsibilities.

Research by Dunlosky et al. (2017) defined learning strategies as effective techniques for learning information that enhance comprehension and long-term retention. Techniques such as summarizing information and note review aid students in understanding the core information in the material, the information that needs to be memorized. Establishing good study habits requires awareness, prioritization, and effort, among other things, to keep study purposes in mind regardless of what is involved. With good study habits, students have an orderly plan for studying and managing other duties, without undermining their learning process or achieving good results (Pahilan & Comahig, 2025). Tus (2020) also identified help-seeking behaviors as crucial factors for students. When learners seek clarification and ask for help from teachers and classmates, they are more likely to overcome study difficulties. Moreover, Barcenas & Bibon (2022) conclude that creating self-reviewers can help learners develop their own understanding by summarizing lessons learned.

According to Morin (2022), creating a positive classroom provides the foundation for students' well-being. This factor extends beyond the acquisition of knowledge and achievement, contributing to emotional toughness and the development of strong social bonds. Mohamad (2024) explained that students learn more effectively when they study in environments that reduce distractions and support concentration. In an orderly, quiet classroom environment, students can focus on their studies and effectively comprehend what they are learning.

Performance assessment in mathematics, particularly through problem-solving and problem-posing tasks, has been shown to provide significant benefits in students' learning and achievement. More directly, students with high metacognitive ability showed better math achievement on problem-solving tasks than on problem-posing tasks. Students with medium or low metacognition showed no differences in achievement across two types of assessment, and their scores were low (Kadir, 2023). A study by Palumar (2024) on the strategies employed by senior high school students in learning mathematics shows that following a set timeframe for reviewing different learning tasks helps students avoid procrastination. The result of his study suggests that students can effectively assess their knowledge and enhance their learning. A Research by Capuno et al., (2023), indicated that attitudes towards the importance of math are negative, while attitudes towards the importance of self-confidence, interest, and motivation are only neutral; as such, their correlation to mathematics achievement is insignificant to weak. Results indicated that student profiles significantly affected students' mathematics achievement, especially their gender, socio-economic background, and parents' level of education. Apart from other factors, psychological factors, such as students' attitudes toward mathematics and self-efficacy, significantly affect their mathematics achievement (Mengullo & Fuentes, 2025).

With good study habits, including motivation, learning strategies, and a learning environment, students can achieve a deep understanding and comprehension of mathematics

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concepts. Students who understand and learn mathematics by exploring and solving problems rather than memorization may achieve higher performance in mathematics.

C. Theoretical Underpinnings

Self-Regulated Learning (SRL) theory is a psychological framework that emphasizes learners' active role in controlling their learning processes and achieving their goals. Developed by Zimmerman (2002), SRL asserts that successful learners are self-motivated, strategic, and reflective in their learning practices.

This study is anchored on the Self-Regulated Learning Theory, which posits that learners actively construct knowledge through meaningful learning experiences and self-directed engagement. In the context of academic performance in general mathematics learning among Senior High School STEM students, learners are required to practice regularly, solve problems independently, and reflect on their understanding. These actions align with the principles of self-regulated learning. According to this theory, a student's academic performance is determined by how effectively they study.

Meanwhile, Behavioral Learning Theory, developed by Skinner (1938), explains that learning is developed and strengthened through reinforcement and repetition. It is based on the idea that behaviors are acquired through conditioning, which is a process of reinforcement and punishment. According to this theory, learning is a change in observable behavior that results from experience.

This study is grounded principally in Behaviorist learning theory, which explains how learners actively plan, monitor, control, and reflect on their own study behaviors to reach academic goals. Study habits are treated as proximal behavioral indicators, concrete practices students use regularly, such as time management, study techniques, and learning environment, that reflect their regulatory skills. This theory supports the idea that effective study habits are enhanced through consistent practice and reinforcement, making it appropriate for students to build and maintain productive routines.

D. Objectives of the Study

This study aimed to determine the levels of study habits and academic performance of senior high school STEM students in General Mathematics in one of the private schools in Negros Island Region during the first semester of the school year 2025-2026. Specifically, it aimed to determine 1) the profile of respondents according to the variables sex, grade level, intended college courses, and average monthly family income; 2) level of study habits of senior high school STEM students in the areas motivation, learning techniques, and learning environment; 3) the level of academic performance of Senior High School STEM students in General Mathematics during the First Semester of School Year 2025-2026; 4) whether a significant difference exists between the levels of study habits of Senior High School STEM students when grouped and compared according to the aforementioned variables; 5) whether a significant difference exists between the academic performance of Senior High School STEM students when grouped and compared according to the aforementioned variables; and 6) whether a significant relationship exists between the levels of study habits and the academic performance of Senior High School STEM students.

II. RESEARCH METHODOLOGY

This portion presents a discussion of the research methodology used, the subjects and respondents of the study, the research instruments used, the validity and reliability of the instruments, the procedure for data gathering, conduct of the study and the statistical tools and procedures for data analysis.

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A. Research Design

This study aimed to explore the study habits and academic performance of senior high school STEM students in one of the private schools in Negros Island Region. The goal of descriptive research is to precisely and methodically characterize a population, circumstance, or phenomenon. It can respond to inquiries about what, where, when, and how, but not why (McCombes, 2023).

In this study, the descriptive research design helped the researchers obtain the profile of the respondents in analyzing and interpreting the results on the levels of study habits and academic performance of senior high school STEM students as respondents of this study in the following selected variables: sex, grade level, intended college course, and family average monthly income.

B. Study-Respondents

The respondents of the study were the 165 out of the total 288 Senior High School STEM students in one of the private schools in Negros Island Region during the first semester of the school year 2025-2026. The Cochran formula was applied to find the sample size. Also, in this study, stratified random sampling was employed. Stratified sampling involves dividing the population into sub-populations that may differ in important ways. It allows one to draw more precise conclusions by ensuring that every subgroup is properly represented in the sample. Every member of the population has an equal probability of being chosen in a basic random sample. The entire population should be included in the sampling frame (McCombes, 2023). The researchers identified the number of students per section and used proportionate sampling, where the number of respondents taken from each section was based on its size relative to the total population.

C. Instrument

The researchers gathered the necessary data for this study using a self-developed questionnaire. The questionnaire was divided into two parts: Part one consists of the respondents' profile—name, sex, grade level, intended college course, average family monthly income, and general mathematics grade. Part two was the respondents' study habits. This part assessed the level of the respondents' study habits in terms of motivation, learning techniques, and learning environment. Each part contains ten questions, with a total of 30 items. A five-point Likert scale was utilized for each item, with the response categories "Always", "Often", "Sometimes", "Rarely", and "Almost Never". This questionnaire measured the study habits of senior high school STEM students. Participants' mathematics achievement was determined by asking respondents to verify their grade in the school's online system. All information was kept strictly confidential and remained anonymous throughout the study.

D. Data Gathering and Procedure

The researchers collected the raw data through a questionnaire. Assent and consent forms were distributed to the respondents a week before the study. The assent form was used to ensure that ethical standards were strictly observed, particularly because the respondents were minors. It was also assured to both parents and students that the data collected, such as academic performance in General Mathematics, would be treated confidentially and used solely for research purposes. On the day of the study, the teacher gave the researcher 20-30 minutes to conduct the study. Of the researchers briefly introduced herself and the study, checked the respondents' assent and consent forms, explained the purpose of the study, distributed the study instrument, and collected the responses immediately afterward. The responses were processed manually and with a computer. Several statistical tools were developed based on the specific objectives of this investigation. Microsoft Excel and SPSS were used for data analysis.

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E. Data Analysis and Statistical Treatment

Objective No. 1 used the descriptive analytical scheme and frequency count and percentage scoring to determine the profile of the respondents. Objective No. 2 used the descriptive analytical scheme and mean to determine the level of respondents' study habits. Objective No. 3 used the descriptive analytical scheme and mean to determine the level of students' academic performance in general mathematics. Objective No. 4 used the comparative analytical scheme and Mann Whitney U-test to determine if a significant difference exists between the level of study habits of the respondents when grouped and compared to the aforementioned variables. Objective No. 5 used the comparative analytical scheme and independent samples t-test to determine if a significant difference exists between the academic performance of the respondents when grouped and compared to the aforementioned variables. And, objective No. 6 used a relational analytical scheme and Spearman rho to determine if a significant relationship exists between the study habits and academic performance of SHS STEM students.

F. Ethical Considerations

Respondent participation was voluntary. All respondents were informed in advance of the study's purpose and mechanics, and the researchers ensured they were fully informed. The respondents were notified in advance of their participation and given adequate time to review the study details. An assent form was provided to the respondents to signify their voluntary participation, and consent from their parents or guardians was also obtained before administering the questionnaire. The researchers ensured that all participants were not harmed or put in a precarious situation by ensuring the confidentiality of their responses and information. The anonymity protocol for respondents' identities was strictly followed, and after the necessary treatment, the raw data was appropriately destroyed. The data and results are used solely for this study and for no other purpose.

III. RESULT and DISCUSSIONS

A. Profile of the Respondents

Table 1
Profile of the Respondents

Variables	Categories	Frequency	Percentage
Sex	Male	51	30.90
	Female	114	69.10
Grade Level	Grade 11	72	43.60
	Grade 12	93	56.40
Intended College Course	Non-Medical	44	26.70
	Medical	121	73.30
Average Family Monthly Income	Lower (below Php 40,000.00)	78	47.30
	Higher (Php 40,000.00 and above)	87	52.70
	Total	**165**	**100**

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Table 1 summarizes the analysis aimed at determining the profile of teachers by sex, grade level, intended college course, and average monthly family income.

In terms of sex, out of 165 respondents, 51 or 30.90% are male, and 114 or 69.10% are female. Grade 11 respondents comprised 72, or 43.60%, while Grade 12 respondents comprised 93, or 56.40%. For the intended college course, non-medical is 44 (26.70%) while medical is 121 (73.30%). Among the average family's monthly income, 78 respondents (47.30%) have a monthly income below Php40,000, while 87 respondents (52.70%) have a monthly income of Php40,000 and above.

The data indicated that the majority of the respondents are female and in Grade 12. The data show that almost three-fourths of the respondents chose medical courses as their intended college major. For the average family's monthly income, respondents who earn Php40,000 or more are 5.40% higher.

A clear difference in the number of male and female respondents is evident. This aligns with the national report by Youth Statistics (2022), which shows that female enrollees in senior high school exceed male enrollees. The large gap between the medical and non-medical intended college courses of the respondents is understandable, given the study's location at a medical school. The data shows a slight difference between the lower and higher average family monthly income. According to Salimaco (2020), mathematics performance is influenced by family-related factors, including this variable. The higher percentage of respondents in the higher-income category indicates better access to learning resources and a better learning environment at home.

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Descriptive Analysis of the Level of Study Habits of Senior High School STEM Students

Table 2
Level of Study Habits of Senior High School STEM Students in Motivation

Items	Mean	Interpretation
As a student, I…		
1. exert effort to find out why I need to do a particular task.	3.71	High Level
2. see to it that I give myself regular breaks from schoolwork.	3.93	High Level
3. pay attention during the discussion.	3.85	High Level
4. set academic goals and work towards achieving them.	3.77	High Level
5. reward myself after I do my schoolwork.	3.80	High Level
6. stay positive and persistent despite academic challenges.	3.59	High Level
7. like mathematics as a subject.	2.84	Moderate Level
8. enjoy receiving praises from teachers.	3.58	High Level
9. become more motivated when teachers praise my performance.	3.78	High Level
10. engage in self-reflection to improve my study habits.	3.72	High Level
Overall Mean	3.66	High Level

Table 2 shows the level of study habits of the STEM students in terms of motivation. With an overall mean of 3.66, interpreted as a high level. Item 2, "As a student, I see to it that I give myself regular breaks from schoolwork," obtained the highest mean of 3.93, interpreted as a high level. In contrast, item 7, "As a student, I like mathematics as a subject," had the lowest mean of 2.84, indicating a moderate level of study habits.

The high overall mean suggests that most students are making an effort to achieve their goals.

This suggests that STEM students generally show strong motivation in their study habits. This also suggests that students are actively engaging and demonstrating positive behaviors that support their academic activities. Item 7 had the only moderate level among the 10 items; this indicates that their personal interest in mathematics is not as high as their general motivation.

Capuno et al. (2023) noted that although students recognize the value of mathematics, they often demonstrate neutral or moderate levels of enjoyment, confidence, and motivation toward the subject. This also implies that, while students are generally academically motivated, their personal liking for mathematics may not be as strong as their general academic motivation. This may be influenced by factors such as perceived difficulty with mathematics or anxiety about the subject matter. This also implies that teachers must use more engaging, learner-centered teaching methods and activities to boost students' appreciation for mathematics. Improving

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students' attitudes towards mathematics may motivate them and improve their academic performance.

Table 3
Level of Study Habits of Senior High School STEM Students in Learning Techniques

Items	Mean	Interpretation
As a student, I…		
1. seek clarification from others when I am in doubt.	3.86	High Level
2. use abbreviations, symbols, or highlights to emphasize key points.	3.94	High Level
3. make personal reviewers.	3.95	High Level
4. pay attention to key ideas when someone is speaking.	3.95	High Level
5. relate new information to prior knowledge for better retention.	3.82	High Level
6. set a specific study schedule and follow it consistently.	3.24	Moderate Level
7. prioritize tasks based on deadlines and importance.	3.84	High Level
8. avoid procrastination by breaking large tasks into smaller ones.	3.16	Moderate Level
9. allocate enough time for both studying and breaks.	3.55	High Level
10. compare my notes with textbooks or additional resources for accuracy.	3.76	High Level
Overall Mean	3.71	High Level

Table 4 shows the level of study habits among STEM students regarding learning techniques. With an overall mean of 3.71, interpreted as a high level. Items 3 and 4, "As a student, I make personal reviewers" and "As a student, I pay attention to key ideas when someone is talking," had the highest mean of 3.95, indicating a high level. In contrast, item 8, "As a student, I avoid procrastination by breaking large tasks into smaller ones," had the lowest mean of 3.16, interpreted as a moderate level.

The results indicate that STEM students primarily use effective learning techniques that enhance understanding, retention, and academic performance. The result also implies that students actively organize their learning materials and focus on essential information during discussions, which are important for effective and efficient learning. A low score on avoiding procrastination suggests that STEM students struggle with time management. Multiple academic requirements and social distractions might influence this result.

Magulod (2018) explains that learning strategies are techniques or deliberate actions students use to improve understanding and retention. While students take deliberate steps to learn well, they still struggle with time management and consistency. The result shows that STEM

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students are poor at time management and often procrastinate. This finding aligns with Silva and Ramos (2023), who state that procrastination is a widespread phenomenon. Even master's and doctoral students cannot escape this situation; unnecessary delays in important activities receive special attention in the academic field. Procrastination among senior high school STEM students is a common academic behavior. This tends to delay academic tasks for students across demographics, who may struggle to manage time and complete school requirements promptly.

Table 4
Level of Study Habits of Senior High School STEM Students in the Learning Environment

Items	Mean	Interpretation
As a student, I…		
1. have a place to work where I will not be disturbed.	3.66	High Level
2. ensure I have proper lighting and a comfortable study environment.	4.10	High Level
3. maintain good posture to avoid fatigue when studying.	3.45	Moderate Level
4. prepare snacks that boost my learning ability.	3.73	High Level
5. surround myself with people who can help with my studies.	3.78	High Level
6. get enough sleep to maintain focus during study sessions.	3.01	Moderate Level
7. avoid distractions while studying.	3.47	Moderate Level
8. take regular breaks to stretch and relax my body.	3.92	High Level
9. feel more confident learning in an environment where effort is appreciated.	4.15	High Level
10. learn better in a classroom where teachers provide positive feedback.	4.21	High Level
Overall Mean	3.75	High Level

Table 4 shows the level of study habits among STEM students in terms of the learning environment. With an overall mean of 3.75, interpreted as a high level. Item 10, "As a student, I learn better in a classroom where teachers provide positive feedback," had the highest mean of 4.21, indicating a high level. In contrast, item 6, "As a student, I get enough sleep to maintain focus during study sessions," had the lowest mean of 3.01, interpreted as a moderate level.

A high overall mean indicates that STEM students, in general, experience and maintain a learning environment that supports their academic activities. These also show that most students can adapt to or create conditions that enhance their focus and productivity. The result suggests that STEM students do not get enough sleep, which can reduce their concentration in class and lower their academic performance.

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This aligns with Pahilan and Comahig (2025), who state that although students may understand the importance of good study habits, they still face challenges such as distractions, fatigue, and competing responsibilities. When students do not get enough sleep, they can become easily distracted, feel fatigued in class, and struggle to handle school responsibilities, which eventually lowers their academic performance. In addition, a lack of sleep might lead to stress and harm students' mental health. In this instance, school stakeholders and family members at home should advocate balanced routines and raise awareness of the importance of students getting enough sleep.

Descriptive Analysis of the Level of Academic Performance of Senior High School Students

Table 5
Level of Academic Performance

Senior High School STEM Students	N	Mean	Interpretation
Mathematics Achievement	165	88.27	Very Satisfactory

Table 5 shows the academic performance of senior high school STEM students. The result shows that 165 senior high school STEM students achieved a mean score of 88.27 in General Mathematics.

According to the Department of Education's (DepEd) K–12 assessment and grading guidelines, student performance is commonly weighted through components such as written works, performance tasks, and quarterly assessments, with equivalent percentages based on their strand. The mean score of 88.27 indicates that senior high school STEM students perform well in general mathematics. According to the DepEd K-12 assessment and grading guidelines, students have nearly mastered the essential competencies in General Mathematics and require minimal guidance to apply their learning. This suggests that the group demonstrates a strong understanding and performance relative to curriculum expectations.

The results of this study are supported by those of Villaluz et al. (2026), which emphasized that, while students demonstrated strong engagement in academic, social, and emotional aspects, their performance remained at a commendable level, reflecting their ability to meet academic expectations. In parallel with the study by Villaluz et al. (2026), which indicates that senior high school students are generally competent enough to achieve very satisfactory academic performance. This implies that factors such as effective teaching methods, institutional support systems, and access to various learning resources may contribute to senior high school STEM students' success in general mathematics. This result supports Maculada et al. (2025), who found that learners' academic performance remained very good across different demographic variables such as age, sex, and grade level, suggesting that these factors do not significantly affect academic outcomes. Since respondents receive the same teaching strategies and instructional materials, their academic performance in general mathematics is influenced by their study behavior rather than by their personal background characteristics, as indicated by the given variables.

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Table 6
Difference in the Level of Study Habits of Senior High School STEM Students in Motivation According to Variables

Variable	Category	N	Mean Rank	Mann-Whitney U	p-value	*Sig. level*	Interpretation
Sex	Male	51	79.48	2727.50	0.526	0.05	Not Significant
	Female	114	84.57				
Grade Level	Grade 11	72	83.78	3291.50	0.853		Not Significant
	Grade 12	93	82.39				
Intended College Course	Non-Medical	44	91.65	2281.50	0.160		Not Significant
	Medical	121	79.86				
Average Family Monthly Income	Lower	78	87.85	3015.00	0.217		Not Significant
	Higher	87	78.66				

Table 6 shows the difference in the level of study habits of senior high school STEM students in motivation, by sex, grade level, intended college course, and average family monthly income. The p-value for sex is 0.526, for grade level is 0.853, for intended college course is 0.160, and for average family monthly income is 0.217. The result shows that there is no significant difference across all variables. Therefore, the null hypothesis that states, "There is no significant difference between the levels of study habits of Senior High School STEM Students when they are grouped and compared to the aforementioned variables," is accepted, suggesting that the STEM students' motivational study habits are in proportion to their demographic characteristics.

These overall findings suggest that students' motivation, as one segment of study habits, does not vary across demographic characteristics. This suggests that motivation is probably more influenced by internal factors, such as personal goals, self-discipline, and how one feels about the learning process, than by external factors. This finding is particularly relevant, as it underscores the need to strengthen school-based approaches, including guidance programs and motivation strategies, that are implemented consistently for all students.

These findings are consistent with a study by Calucag (2020), which indicates that study habits among senior high school STEM students are relatively similar across demographic characteristics. The result implies that study habits in terms of motivation among STEM students are fairly consistent; respondents tend to show similar levels of effort and interest in their studies regardless of sex, grade level, intended college course, or average family monthly income. According to Cottrell (2019), motivation can promote new trends and demands in students'

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learning processes. When STEM students understand how motivated they are to learn, they develop self-awareness that helps them perform better academically.

Table 7
Difference in the Level of Study Habits of Senior High School STEM Students in Learning Techniques according to Variables

Variable	Category	N	Mean Rank	Mann-Whitney U	p-value	*Sig. level*	Interpretation
Sex	Male	51	82.04	2858.00	0.863	0.05	Not Significant
	Female	114	83.43				
Grade Level	Grade 11	72	89.53	2877.50	0.122		Not Significant
	Grade 12	93	77.94				
Intended College Course	Non-Medical	44	82.89	2657.00	0.985		Not Significant
	Medical	121	83.04				
Average Family Monthly Income	Lower	78	92.45	2656.00	0.016		Significant
	Higher	87	74.53				

Table 7 shows the difference in the level of study habits of senior high school STEM students in learning techniques by sex, grade level, intended college course, and average family monthly income. The p-value for sex is 0.863, for grade level is 0.122, for intended college course is 0.985, and for average family monthly income is 0.016. The results show that there is no significant difference among the variables sex, grade level, and intended college course. Therefore, the null hypothesis that states, "There is no significant difference between the levels of study habits of Senior High School STEM Students when they are grouped and compared to the aforementioned variables," is accepted, suggesting that the STEM students' study habits in terms of learning techniques are directly proportional to their sex, grade level, and intended college course. The only variable that shows a significant relationship is the average family monthly income. Therefore, the null hypothesis that states, "There is no significant difference between the levels of study habits of Senior High School STEM Students when they are grouped and compared to the aforementioned variables," is rejected for average family monthly income.

The absence of significant differences indicates that, while students may differ in their personal and academic characteristics, the learning techniques used as part of their study habits are relatively similar. This suggests that students may be subjected to similar teaching strategies, learning environments, and academic expectations, leading to relatively uniform study practices. This emphasizes the universality of just instruction and curriculum, and the development of equitable learning techniques through standardized instruction. Thus, teachers can continue

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implementing their basic universal strategies that all students seem to benefit from, without much differentiation.

The significant difference suggests that family income may influence students' learning strategies. Students from lower-income families may be more likely to use effective and improvisational study strategies, such as self-discipline, repetition, and independent learning, out of necessity to supplement limited access to educational resources.

This result aligns with Qiu and Ye (2023), who state that family economic status can directly affect learning engagement. Qiu and Ye's (2023) study shows that students from higher socio-economic backgrounds are more likely to have access to learning resources. In addition, students from lower-income backgrounds may face limited access to study materials, increased life stressors, and familial responsibilities that can disrupt study routines and negatively affect learning outcomes. This result shows that STEM students' financial capability affects their mathematics achievement.

Table 8
Level of Study Habits of Senior High School STEM Students in Learning Environment according to Variables

Variable	Category	N	Mean Rank	Mann-Whitney U	p-value	*Sig. level*	Interpretation
Sex	Male	51	75.64	2531.50	0.185	0.05	Not Significant
	Female	114	86.29				
Grade Level	Grade 11	72	86.50	3096.00	0.407		Not Significant
	Grade 12	93	86.50				
Intended College Course	Non-Medical	44	89.86	2360.00	0.265		Not Significant
	Medical	121	80.50				
Average Family Monthly Income	Lower	78	92.31	2666.50	0.018		Significant
	Higher	87	74.65				

Table 8 shows the difference in study habits among senior high school STEM students in the learning environment, by sex, grade level, intended college course, and average monthly family income. The p-value for sex is 0.185, for grade level is 0.407, for intended college course is 0.265, and for average family monthly income is 0.018. The results show that there is no significant difference among the variables sex, grade level, and intended college course. Therefore, the null hypothesis that states, "There is no significant difference between the levels of study habits of Senior High School STEM Students when they are grouped and compared to the aforementioned variables," is accepted, suggesting that the STEM students' study habits in terms

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of learning environment are in proportion to their sex, grade level, and intended college course. It shows that the surroundings in which a STEM student learns do not affect their studies, whether they are male or female, in Grade 11 or Grade 12, and whether they are taking a non-medical or a medical course in college. The only variable that shows a significant relationship is the average family monthly income. Therefore, the null hypothesis that states, "There is no significant difference between the levels of study habits of Senior High School STEM Students when they are grouped and compared to the aforementioned variables," is rejected for average family monthly income.

The lack of significant differences suggests that the typical learning environment for students is consistent with variables such as sex, grade level, and intended college course. This indicates that schools offer fairly homogeneous learning environments, for example, in terms of the availability of study space, classroom environment, and academic support systems. This also indicates that efforts to ensure equity in educational provision, where students can avail of equal opportunities for learning regardless of circumstances and backgrounds.

The significant result suggests that family wealth is a key factor shaping students' learning environments. What is interesting is that students from lower-income families tend to report better or more effective learning environments, which may indicate their ability to adapt, create rigid study and homework routines, or squeeze the most value out of limited resources. This discovery underscores the importance of schools creating a support system that enables students to learn in an organized environment, especially since some students are not using all their home resources to complete their work.

This result aligns with Tenedero (2018), who noted both internal and external factors influencing academic engagement. The learning environment and average family monthly income are external factors in learning that affect the mathematics achievement of senior high school STEM students. This finding supports the study by Calucag (2020), which found that STEM students' study habits were not significantly related to their sex or background, suggesting that demographic characteristics do not necessarily determine students' study practices. Caay and Valle (2025) explained that when students are exposed to similar learning environments and instructional practices, differences in academic-related behaviors among learners tend to be minimal.

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Comparative Analysis in the Level of Academic Performance of Senior High School STEM Students

Table 9
Difference in the Level of Academic Performance of Senior High School STEM Students according to Variables

Variable	Category	N	Mean	t	p-value	*Sig. level*	Interpretation
Sex	Male	51	88.26	-0.037	0.970	0.05	Not Significant
	Female	114	88.28				
Grade Level	Grade 11	72	87.78	-1.299	0.196		Not Significant
	Grade 12	93	88.66				
Intended College Course	Non-Medical	44	88.80	0.837	0.406		Not Significant
	Medical	121	88.08				
Average Family Monthly Income	Lower	78	88.76	1.363	0.175		Not Significant
	Higher	87	87.84				

Table 9 shows the level of general mathematics achievement of senior high school STEM students by sex, intended college course, and average monthly family income. The p-value for sex is 0.970, for grade level is 0.196, for intended college course is 0.406, and for average family monthly income is 0.175. The result shows that there is no significant difference across all variables. Therefore, the null hypothesis that "There is no significant difference between the mathematics achievements of Senior High School STEM Students when they are grouped and compared according to the aforementioned variables" is accepted, suggesting that STEM students' mathematics achievement is directly proportional to their demographic characteristics.

The findings indicate that the academic performance of Senior High School STEM students is fairly uniform regardless of sex, grade level, and intended college course. It indicates that equal access to learning resources, consistent instructional practices, or similar academic environments may mitigate performance differences across student groups. In addition, the findings suggest that academic success in STEM is more likely to be influenced by individual factors than by demographic or socio-economic variables. This calls for educators to work towards improving effective teaching strategies and supporting personalized learning needs before making assumptions based on any of the aforementioned categories.

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The results of this study show that STEM students' mathematics achievement is not significantly influenced by sex, grade level, intended college course, or average monthly family income. Research on mathematics education by Bacabac (2017) indicates that demographic variables do not solely determine students' mathematics achievement. Teacher-related factors also contribute to students' mathematics achievement. This result differs from that of Mengullo and Fuentes (2025), who found that mathematics achievement is affected by learners' profiles, including sex, socio-economic background, and parents' highest educational attainment.

Relational Analysis Between the Levels of Study Habits and Academic Performance

Table 10

Relationship between the Level of Study Habits and the Level of Academic Performance of Senior High School STEM Students

Variables	**rho**	**p-value**	***Sig. level***	**Interpretation**
Study Habits Academic Performance	0.083	0.288	0.05	Not Significant

Table 10 shows the relationship between the level of study habits and the level of general mathematics achievement of senior high school STEM students. The rho value is 1, and the p-value is 0.288, indicating non-significance. Therefore, the null hypothesis that states "There is no significant relationship between the levels of the study habits and Mathematics achievement of Senior High School STEM students," is accepted.

Though study habits are assumed to affect academic performance, the findings suggest that here, differences in students' study habits do not translate into meaningful differences in their academic results. That might suggest that, despite differences in study habits, students tend to achieve roughly the same level of academic success. The lack of a meaningful correlation between these variables suggests that study habits alone may not accurately reflect academic performance among Senior High School STEM students. This implies that factors such as teaching quality, assessment methods, prior knowledge, cognitive ability, and external support systems actually have a much greater impact on students' academic outcomes.

This shows that the study habits of the senior high school STEM students do not necessarily affect their mathematics achievement. This result contradicts Lopez's (2021) claim that study habits affect students' performance in school. He believed that effective study habits can improve academic achievement. According to Sakirudeen and Sanni (2017), study habits are strongly related to students' academic performance. A Nigerian study found that study habits are among the most important factors in students' learning and strongly influence their academic achievements (Ebele & Olofu, 2017).

Meanwhile, this result also contradicts Hwang and Son (2021), who found a significant relationship between students' attitudes toward mathematics and their academic achievement in

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the subject. More and more studies show that study habits and mathematics achievement are significantly related, yet this study's results say otherwise. In other words, the study habits of senior high school STEM students in one of the private schools in Central Negros are somewhat related to their general mathematics achievement.

IV.CONCLUSION

STEM students demonstrated a high level of study habits in motivation, learning techniques, and learning environment, which indicates strong study habits that support their learning. Motivation has the lowest mean, suggesting that respondents may be less internally driven or less consistent in sustaining their interest and effort in their academic tasks. The level of academic performance of senior high school STEM students was very satisfactory, indicating that the respondents' performance is great.

In the domain of motivation, senior high school STEM students show no difference across the variables, indicating that this does not affect their demographic factors. In learning techniques and learning environment, while there is no significant difference when grouped by sex, grade level, or intended college courses, a significant difference exists when students are grouped according to average family monthly income. This implies that family income may influence the strategies and methods students use in their studies. This also implies that family income affects students' surroundings and learning resources. There is no significant difference in the academic performance of senior high school STEM students across sex, grade level, intended college courses, or average family monthly income, recommending that these demographic factors do not strongly affect their performance in General Mathematics.

To accentuate, a non-significant relationship between study habits and academic performance indicates that former alone did not generally influence the mathematics performance of senior high school STEM students.

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B. Conflict of Interest

We maintain that none of the authors of this paper have a financial obligation or personal relationship with any person(s) or organizations that could inappropriately influence/bias the paper's content. We do not receive funding from any person(s) or organization to carry out this research. Given this, we specifically state that "No Competing interests are at stake and there is No Conflict of Interest" with any person(s) or organizations that could inappropriately influence/bias the content of the paper.

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