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STUDENT'S ATTITUDES, STUDY HABITS, AND ACADEMIC PERFORMANCE IN SCIENCE USING SELF-LEARNING MODULES

R. C. Mutya*[1], G. A. Alcantara[1], A. M. V. Sala[1], I. C. Carascal[1], C. C. Terana[1], M. S. C. Presbitero[2]

[1]College of Education, Arts and Sciences, Cebu Technological University-Danao Campus, Cebu, Philippines
[2]Junior High School Department, Mambaling National High School, DepEd-Cebu City, Philippines

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ABSTRACT

This study examined students' attitudes, study habits, and academic performance in science using self-learning modules. This type of research is a descriptive-correlational design utilizing a standardized survey questionnaire. The research subjects were 174 secondary students in a public school. Data analysis used descriptive techniques, Pearson's correlation coefficient, and multiple regression analysis. Findings revealed that students have a positive attitude toward science and have fair study habits. Students are very satisfactory in time management, concentration, goal setting preparation and follow-up, comprehension, and use of resources. Hence, students positively perceive that Science teachers in distance learning using the SLMs make science enjoyable and present material. This study concluded that using the self-learning modules, students have positive attitudes toward science, very satisfactory study habits, and most of the students have satisfactory academic performance. No correlation was found between students' academic performance and attitudes toward science using self-learning modules and between academic performance and study habits in science. However, a positive correlation existed between students' attitudes toward science and study habits using self-learning modules. This study will have important implications for education in the new normal, including improving student engagement and motivation by understanding the relationship between attitudes, study habits and academic performance will help educators to design self-learning modules that support students in developing positive attitudes, study habits, leading to improved engagement and motivation.

Keywords: academic performance in science; distance learning; self-learning modules

INTRODUCTION

The post-COVID-19 pandemic and the new normal learning significantly impact education delivery, leading to the widespread adoption of different modalities in distance learning (Liu et al., 2020; Anzaldo, 2021; Castroverde & Acala, 2021; Damuri et al., 2021). This shift requires students to become more self-directed in their learning (Loeng, 2020; Robinson & Persky, 2020), emphasizing the importance of positive attitudes, effective study skills, and good habits in academic success using self-learning modules (Tus, 2020; Abid et al., 2023). Self-learning modules (SLMs) are systematic instructions that facilitate students' mastery of knowledge or a complex process (Maile & Cooper, 2018). They are designed so students can choose what, when, how, and where to learn (Cudillo et al., 2022). SLMs' content incorporates collaborative, constructivist, inquiry-based, reflective, and integrative pedagogical techniques (Auditor & Mutya, 2022).

Studies consistently show that attitudes play a significant role in academic success. Positive attitudes toward learning are associated with higher motivation and engagement in academic

***Correspondence Address**
E-mail: romel.mutya@gmail.com

activities, leading to improved academic performance (Xie et al., 2020; Sakata, 2022; Tutal & Yazar, 2022). On the other hand, negative attitudes toward learning negatively impact motivation and academic performance (Fong Lam et al., 2015; Khalaila, 2015). Study skills and habits are critical components of academic success. Effective study skills like time management and note-taking can help students retain information and improve their overall performance (Magulod Jr., 2019; Mukingambeho et al., 2019; Tus et al., 2020). Good study habits are also linked to improved academic performance (Wolters & Hussain, 2015; Rashid & Asghar, 2016). In contrast, poor study skills and habits can negatively affect academic performance (Bickerdike et al., 2016; Hyseni Duraku & Hoxha, 2018).

Academic performance is influenced by various factors, including attitudes, study skills, habits, family background, socioeconomic status, and school culture (Li & Qiu, 2018; Rodriguez-Hernandez et al., 2020; Wulandari et al., 2021). Self-learning modules are instructional materials designed to support independent learning and have become increasingly popular in the new normal education (Auditor & Mutya, 2022). These modules are designed to be accessible and interactive, allowing students to learn at their own pace and engage with the material meaningfully. Self-learning modules can positively impact students' engagement and motivation and improve academic performance (Bakar et al., 2017).

The problem involves investigating the connection between students' attitudes, study habits, study skills, and academic success. Despite numerous studies demonstrating the importance of various factors, such as intelligence, socioeconomic background, and teaching quality, students' attitudes are overlooked as a significant contributor to academic outcomes. The literature review shows that attitude affects academic success, study habits, and skills. However, no literature explicitly analyzes students' attitudes and study habits using self-learning modules and how these variables affect their academic performance. Therefore, an in-depth study is needed on this matter. The widespread adoption of online learning due to the pandemic has emphasized the importance of positive attitudes, effective study skills, and good habits for academic success.

This study examines students' attitudes and study habits in science, determines their academic performance, and the relationship between these factors and academic performance in secondary students using self-learning modules in the new normal education.

This study is important in advancing our understanding of the dynamic interplay between students' attitudes, study techniques, and academic success, particularly within self-directed learning modules. With the educational landscape rapidly shifting towards personalized and independent learning approaches (Apriani et al., 2020; Hatip, 2020; Sukirman et al., 2022), this research assumes a sense of urgency in addressing the need for evidence-based strategies to optimize self-learning tools' effectiveness. The findings from this study can inform educators, curriculum designers, and policymakers, guiding them toward tailored interventions that can positively impact science education outcomes and contribute to the holistic development of students in an increasingly self-guided learning environment. It can inform the development of educational policies and practices that promote self-directed learning and help students achieve their full potential in the new normal education.

The study was anchored on Self-Directed Learning Theory by Garrison (1997). This theory emphasizes students' autonomy in planning, executing, and evaluating their learning process. By employing this theory, this study aims to investigate how students' attitudes and study habits in science education, facilitated through self-learning modules, influence their academic performance. The theory guided the research in exploring the interplay between students' self-directed learning behaviors and their achievements in the science subject.

METHODS

In order to investigate the relationship between attitudes, study habits, and academic performance of secondary students using self-learning modules in the new normal education, the study used a descriptive correlational design. The respondents' study habits, attitudes, and academic performance levels were examined before determining their relationship. Studies that use descriptive correlational design to present static images of situations and establish the relationship between several variables (Stangor, 2014; Curtis et al., 2016).

The research procedures began by securing a certificate from the principal to conduct the study. Upon approval, researchers handed out survey questionnaires to the students. Once data collection was complete, the gathered information was subjected to statistical analysis, yielding valuable insights into the research topic. Finally, the findings were presented, contributing to a deeper understanding of the topic. A total of 174 secon-

dary students in a public secondary school in Cebu City, Philippines, participated in the study and were recruited using a convenience sampling technique. The sample size was determined based on the availability of students using self-learning modules in the new normal education.

An adapted survey questionnaire was utilized in collecting the data. The questionnaire consisted of three sections: attitudes toward science learning, study habits, and academic performance. A Modified Attitudes Towards Science Inventory (mATSI) by Weinburgh and Steele (2000) was utilized and modified to fit the Philippine context to determine students' attitudes toward science learning. There were five components of attitudes: perception of the science teachers, anxiety towards science, value of science in society, self-concept of science, and desire to do science, and rated on a five-point Likert scale ranging from "*very negative*" to "*very positive*." Four statements were stated negatively, and the other twenty-one were constructed positively. A lower number score suggests a more positive attitude (less anxiety), while a higher numerical score reflects more position attitudes in all categories except anxiety. An adapted survey questionnaire from the Learning Strategies Development of Queen's University was used for the study habits. The study habits section measures the student's study habits and practices. There were six components of study habits: time management, concentration, goal setting, preparation and follow-up, comprehension, and use of resources, and rated on a five-point Likert scale ranging from "*rarely or never like me*" to "*a lot or always like me*." Items that did not fit the Philippine context during the pandemic were modified or removed. The academic performance section measures the student's academic performance based on grades obtained from the school registrar's office.

An expert conducted and verified the validity of the instrument's content. The final draft took into account the evaluator's feedback and suggestions. Through peer and pilot participants' feedback, the instrument's reliability was tested and established using Cronbach's alpha coefficient test. Cronbach's alpha coefficient for attitudes toward science learning was 0.756, and the study habits and attitudes were 0.787 for the instrument.

Descriptive statistics such as mean and standard deviation were used to determine the students' attitudes and study habits using self-learning modules. Frequency was utilized to determine students' academic performance in science. Pearson's correlation coefficient was used to examine the relationships between attitudes, study habits, and academic performance. This tool tests whether there is a significant relationship between variables (Nettleton, 2014; Turney, 2023). Multiple regression analysis was conducted to determine the relative contribution of attitudes and study habits to academic performance. This statistical technique was utilized to estimate the relationship between variables with reason and result relation (Uyanık & Güler, 2013; Keith, 2019).

The study followed the ethical principles of confidentiality, informed consent, and voluntary participation. Participants were informed of the purpose of the study, the voluntary nature of their involvement, and their right to withdraw from the study at any time. All names remained anonymous, while data obtained from the study were kept private and confidential and used only for the study.

RESULTS AND DISCUSSION

Students' attitudes toward science using the self-learning modules in the new normal are shown in Table 1. Students have a positive attitude toward science. It suggests that students positively perceive that science teachers in distance learning using the SLMs make science enjoyable, present material clearly, and are willing to help students individually. They also positively value science in society, such as the use of science in helping to solve the problems in everyday life, helpful in understanding today's world, and for the country's development. Moreover, students positively perceived their desire to do science by doing extra science-related readings. They enjoyed the different learning in science, reading ahead in their science SLMs, and understanding their work in science. On the other hand, anxiety towards science and self-concept of science were perceived as moderate.

These results are in line with Simons et al. (2018), who came to the conclusion that students' enthusiasm for encouraging future students to "just do it" rather than fret about studying reflects their positive opinion toward their experience on the module. In addition, Aznam (2022) and Geverola et al. (2022) believe that science educators assist students in developing a positive attitude toward science. One of the most crucial objectives of science education is to develop students' positive attitudes toward science (Darling-Hammond et al., 2019). Studies conducted in several nations, however, show that as students advance through the educational system, their positive at-

titudes toward science tend to deteriorate (Egalite & Kisida, 2017). The main causes of this issue are believed to be deficiencies in the school environment and the science curriculum, ineffective teaching methods and techniques, the perception of science course difficulty, and elements related to family or social life.

Table 1. Students' Attitudes Toward Science Using Self-Learning Modules

Indicators	MeanSD	Qualitative Description
Perception of the Science Teacher	4.04±0.89	Positive
Anxiety Towards Science	2.80±1.04	Moderate
Science Value in Society	3.93±0.99	Positive
Self-concept of Science	3.00±0.96	Moderate
Desire to do Science	3.59±0.95	Positive
Composite Mean	3.47±0.97	Positive

Legend: *1.00-1.80 (Strongly Disagree); 1.81-2.60 (Disagree); 2.61-3.40 (Undecided); 3.41-4.20 (Agree); 4.21-5.00 (Strongly Agree)*

Table 2 presents the perceived students' study habits using self-learning modules. Students performed fairly in their study habits. The finding suggests a considerable relationship between students' study habits in science learning using self-learning modules. Students who exhibit adeptness in areas such as time management, concentration, goal setting, preparation and follow-up, comprehension, and utilization of resources tend to perform well academically in science when utilizing self-directed learning modules. It underscores the pivotal role of these habits in maximizing the benefits of self-learning modules, contributing to a deeper understanding of scientific concepts, and ultimately enhancing students' overall performance in the subject.

The findings align with Pentang et al. (2022), who revealed that the students favored feelings and doing towards study skills and habits. They have adaptors as their primary learning styles and have a modest level of time management, concentration, and goal setting. They also have a high level of preparation, comprehension, and use of resources. Ultimately, the factors had significant relationships with one another. The study's results can assist educators in creating and implementing successful educational interventions.

According to Bulent et al. (2015), study skills are approaches applied to learning that assist students to be successful in school by passing an exam or even obtaining good grades. Effective study skills are the one element guaranteed to produce good grades in school. Moreover, giving more attention to a subject is as important as studying (Putri et al., 2020). Brown-Kramer (2021) said that in terms of concentration, the more alert you are while studying, the more you will learn. Thus, Kočiský et al. (2018) stated that one popular technique for evaluating comprehension is to demonstrate that they can answer questions concerning documents they have read, like how reading comprehension is assessed in children while they are learning to read. Comprehension is a process in which readers make meaning by interacting with a text through the combination of prior knowledge and previous experience, information in the text, and the views of readers related to the text.

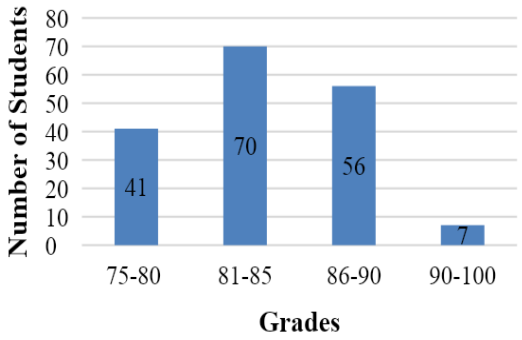
Table 2. Students' Study Habits Using Self-Learning Modules

Indicators	MeanSD	Qualitative Description
Time Management	3.43±0.94	Fairly Like Me
Concentration	3.51±0.90	Fairly Like Me
Goal Setting	3.51±0.94	Fairly Like Me
Preparation and Follow-up	3.53±0.91	Fairly Like Me
Comprehension	3.70±0.89	Fairly Like Me
Use of Resources	3.77±0.87	Fairly Like Me
Composite Mean	3.58±0.91	Fairly Like Me

Legend: *1.00-1.80 (Rarely or Never Like Me); 1.81-2.60 (Not Often Like Me); 2.61-3.40 (Sometimes Like Me); 3.41-4.20 (Fairly Like Me); 4.21-5.00 (A Lot or Always Like Me)*

The academic performance of the students is shown in Figure 1. It can be gleaned from the data that forty-one students got fairly satisfactory grades; seventy students got satisfactory grades. Moreover, fifty-six students got a very satisfactory performance academically, and seven got outstanding grades. Nonetheless, most students' academic performance fell in the satisfactory classification. Using self-learning modules effectively promotes satisfactory academic performance in science among students.

The result is supported by Hernando-Malipot (2020), that self-learning modules are designed to allow students to learn at their own pace and according to their individual learning styles. One of the benefits of self-learning modules is that they can give students the flexibility to study when and where they want (Anzaldo, 2021). It can help students with busy schedules or without access to traditional classroom-based instruction due to geographic or other constraints. Additionally, self-learning modules can provide students with opportunities to develop independent learning skills, such as self-regulation and self-motivation, which are essential for lifelong learning (Gueta & Janer, 2021). Self-learning modules can lead to satisfactory academic performance in science (Bacomo et al., 2022).



Legend: *75-80 (Fairly Satisfactory); 81-85 (Satisfactory); 86-90 (Very Satisfactory); 90-100 (Outstanding)*
Figure 1. Students' Academic Performance Using Self-Learning Modules

However, it is essential to note that the effectiveness of self-learning modules can depend on various factors, such as the quality of the modules, the level of students' engagement, and the level of support for students (Auditor & Mutya, 2022). Therefore, it is essential to carefully design and implement self-learning modules to ensure they effectively promote satisfactory academic performance in science.

Table 3 presents the relationship between students' academic performance and attitudes toward science. For students in modular distance learning, no relationship was found between their academic performance and their attitudes toward science. In other words, students who showed positive attitudes toward science did not necessarily perform better academically than those who did not show it, and vice versa. It suggests that factors beyond students' attitudes toward science may be more influential in determining their academic performance in modular distance learning. While a positive attitude often signifies enthusiasm and interest, academic success is only possible due to factors like learning style variations, study habits, external circumstances, and the depth of conceptual understanding. Likewise, individuals who lack positive attitudes towards science might still excel in academics if they possess effective study strategies, a firm grasp of fundamental concepts, and the ability to perform well under academic assessments. Attitude is just one facet of academic performance, influenced by myriad interconnected elements, making the correlation between attitude and performance less direct and predictable.

The relationship between academic performance and students' attitudes toward science is complex. Positive attitudes towards science education could support academic achievement (Narmadha & Chamundeswari, 2013). The fact that attitudes are simply one factor impacting academic performance is one explanation for the lack of a substantial correlation between academic performance and attitudes toward science. Academic success is also greatly influenced by other variables, including prior knowledge, motivation, and the learning environment (Garcia & Pintrich, 2023). Students might, for instance, have a positive attitude toward science, but if they lack the requisite knowledge and skills or have bad study habits, their academic performance may still need to be improved.

Another possible explanation for the need for a significant relationship between academic performance and attitudes toward science is the complexity of measuring attitudes. Attitudes toward science are multifaceted and can be influenced by several factors, such as personal experiences, family background, cultural and societal factors, and teaching methods (Chowdhury, 2018). Moreover, attitudes toward science can be context-specific (Steel et al., 2017). Therefore, attitudes are more complex and require valid and reliable instruments.

Table 3. Relationship between Students' Academic Performance and Attitudes in Science

Indicators	Pearson r	Strength	p-value	Results
Perception to Teacher	-0.033	no correlation	0.665	Not significant
Anxiety Towards Science	-0.043	no correlation	0.573	Not significant
Value of Science in Society	-0.016	no correlation	0.834	Not significant
Self-concept of Science	0.086	no correlation	0.259	Not significant
Desire to do Science	0.000	no correlation	1.000	Not significant

The relationship between academic performance and study habits in science is illustrated in Table 4. The two variables do not significantly relate to one another. Despite the common belief that study habits are directly related to academic performance (Protassov, 2021), some studies have shown no significant relationship between these two variables. It may seem surprising, as good study habits are associated with better academic performance. However, several factors may explain the need for a significant relationship between academic performance and study skills and habits (Saeid & Eslaminejad, 2017).

One possible explanation is that many factors beyond study habits influence academic performance. These other factors include prior knowledge, natural aptitude, motivation, and the learning environment. Therefore, while good study habits can help a student succeed academically, other factors may be at play (Owusu-Acheaw & Larson, 2014).

There may be some variability in how different studies measure these variables, which could make it challenging to identify a clear relationship between them. It is also important to note that the lack of a significant relationship does not necessarily mean that study habits are not crucial for academic success. Good study skills and habits are still critical for effective learning and may be necessary for some students to achieve their full academic potential (Ebele & Olofu, 2017).

Table 4. Relationship between Academic Performance and Study Habits in Science

Academic Performance and Study Habits	Pearson r	Strength	p-value	Results
Time Management	0.0998	no correlation	0.19	Not significant
Concentration	0.1138	no correlation	0.13	Not significant
Goal Setting	0.0240	no correlation	0.75	Not significant
Preparation and Follow-Up	0.03632	no correlation	0.63	Not significant
Comprehension	0.03451	no correlation	0.65	Not significant
Use of Resources	0.0408	no correlation	0.59	Not significant

The relationship between students' attitudes toward science and their study habits with self-learning module is shown in Table 5. Two variables are significantly correlated. It implies that students who use self-learning modules and have a positive attitude toward science are more likely to have good study habits. It might also imply that students who practice good study habits are more likely to have positive attitudes toward science.

Wibrowski et al. (2017) found that the most significant relationships between grade point average and grades in individual classes are between study motivation and study skills. Attitude is important when learning science (Zeidan & Jayosi, 2015). Furthermore, Bal-Taştan et al. (2018) said positive attitudes toward science can also affect how students approach learning. Students with positive attitudes approach learning as a process of exploration and discovery rather than simply memorizing information (Annansingh, 2019). This approach can lead to more effective study skills and habits, such as seeking additional resources, asking questions, and experimenting with different learning strategies (Akçayır et al., 2016). However, they posited that these attitudes still need to be improved. Moreover, these attitudes do not vary across the genders of the students.

It is crucial to understand the complex relationship between attitudes toward science and study habits and skills that several variables can influence, including prior knowledge, the learning environment, and instructional strategies (Jafari et al., 2019). Therefore, it is essential to consider these factors when developing strategies to promote positive attitudes toward science and effective study habits.

Table 5. Relationship between Students' Attitudes Toward Science and Study Habits in Science

Variables	Pearson-r	Strength	p-value	Results
Attitudes and Study Habits	0.80741	strong positive correlation	.000	Significant

The results of this study will have important implications for education in the new normal, including improving students' engagement and motivation by understanding the relationship between attitudes, study habits, and academic performance. It will help educators design self-learning modules that support students in developing positive attitudes and study habits, leading to improved engagement and motivation. Also, by identifying the factors that impact academic performance in secondary students using self-learning modules, educators can design programs and interventions to help students achieve their full potential.

The results of this study will provide insights into the challenges and opportunities that teachers face in the new normal, helping them better support their students in the new normal education. The findings of this study will inform policy decisions related to education in the new normal, including the design of educational programs and policies that support student success. By understanding the factors contributing to academic success in the new normal education, teachers can help students develop positive attitudes and study habits, contributing to their overall well-being.

Hence, promoting a supportive and inclusive learning environment within self-learning modules can foster a sense of belonging and community, which are crucial factors for student motivation and engagement. Encouraging peer collaboration, providing constructive feedback, and acknowledging students' progress can boost their confidence and drive them to excel academically. Moreover, this study emphasizes the need for educators to recognize the critical role of attitudes and study habits in students' academic performance during the new normal. By leveraging this knowledge, educators can design self-learning modules that cater to individual students' needs, enhance their study habits, and foster positive attitudes toward learning. As a result, students are more likely to be engaged, motivated, and successful in their academic pursuits in the rapidly evolving educational landscape.

CONCLUSION

The study indicates that students using self-learning modules have positive attitudes toward science and fair performance in their study habits, and most of the students have satisfactory academic performance. No correlation was found between students' academic performance and attitudes toward science using self-learning modules and between academic performance and study habits in science. However, a positive correlation existed between students' attitudes toward science and study habits using self-learning modules. The research reveals that students who consistently demonstrated self-directed learning behaviors performed satisfactorily in science subjects. Furthermore, the study identified a noteworthy shift in students' attitudes toward science, indicating increased enthusiasm and self-confidence because of their mastery of self-directed learning techniques. The study provided valuable insights into the factors contributing to academic success in the new normal education. It underlined the potential of self-learning modules to foster not only improved academic outcomes but also a more positive learning experience in the field of science education. The study results can inform educational policies and practices and help students achieve their full potential in the new normal education.

Future studies should investigate the long-term effects of self-learning modules on student attitudes and academic performance through longitudinal studies that track students over multiple academic years. Additionally, exploring the impact of personalized self-learning modules tailored to individual student needs and preferences could provide insights into optimizing these tools for diverse student profiles. Finally, given the rapid technological advancements and shifts in educational paradigms, future studies should investigate the scalability and sustainability of self-learning modules in diverse educational settings.

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