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STUDENTS' ACADEMIC PERFORMANCE AND THEIR ATTITUDES TOWARDS SELF-LEARNING MODULES IN SCIENCE vis-à-vis FACE-TO-FACE LEARNING MODALITIES

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Abstract

This study examined students' academic performance and attitudes toward self-learning modules (SLMs) vis-à-vis face-to-face learning in science using a descriptive research design. Data were collected through a structured questionnaire adapted from related studies. Statistical tools included frequency and percentage distribution, mean, standard deviation, weighted mean, Spearman's rho, t-test, and ANOVA. The findings revealed that most respondents were female and aged 12–13 years. Students generally expressed positive attitudes toward face-to-face learning, particularly regarding academic and emotional support, teacher interaction, and classroom comfort. However, they expressed uncertainty about the physical health and financial implications of returning to in-person classes. Most students demonstrated fairly satisfactory to very satisfactory academic performance, while only a few achieved outstanding ratings. There was no significant difference in overall attitudes toward face-to-face learning and SLMs between male and female respondents (\(p = .177\)). However, a significant gender difference was observed in the emotional aspect. Age was significantly associated with differences in attitudes, with students aged 12–13 showing more positive attitudes than those aged 14 and above (\(H = 21.184, p < .01\)). Furthermore, no significant relationship was found between students' attitudes and academic performance. The study concludes that students generally favor face-to-face learning because of its academic and emotional benefits. Nevertheless, their academic performance is not significantly related to their attitudes toward the learning modalities. These findings highlight the importance of supportive teaching practices and targeted interventions to improve students' academic achievement.

Keywords: Academic performance, students' attitudes, Science education, self-learning modules, face-to-face learning modalities

Introduction

Background of the Study

The Philippine education system underwent significant changes during the COVID-19 pandemic, prompting the Department of Education (DepEd) to implement alternative learning modalities to ensure educational continuity. One of these approaches was the use of Self-Learning Modules (SLMs), which are instructional materials designed to help students learn independently, particularly in areas with limited internet connectivity. Although face-to-face classes have resumed, SLMs remain relevant during class suspensions caused by emergencies, natural disasters, and extreme weather conditions.

In April 2024, extreme heat associated with El Niño conditions prompted numerous schools across the Philippines to suspend in-person classes, requiring students to continue learning at home through alternative arrangements, including SLMs (Reuters, 2024). These circumstances highlight the importance of understanding how students adjust to different learning modalities and how educational institutions can maintain effective instruction during disruptions.

Previous studies have examined students' experiences with modular learning. Mercado (2024) found that students appreciated the structure and support provided by SLMs but encountered difficulties maintaining self-discipline during independent study. Bacomo et al. (2022) reported an association between students' attitudes toward SLMs and their academic achievement. Meanwhile, Crisostomo (2023) found that younger learners often required parental assistance when using SLMs. These findings suggest that students' experiences with modular learning may vary according to

their developmental needs and learning environments. Furthermore, Statista (2021) reported continuing concerns among Filipino respondents regarding the ability of distance learning to match face-to-face instruction, emphasizing the importance of examining students' perceptions of both modalities.

In this study, academic performance refers to students' general average, while attitudes refer to their perceptions and feelings toward face-to-face learning and SLMs in science. Face-to-face learning provides direct teacher guidance, immediate feedback, classroom interaction, and opportunities for social and emotional development. In contrast, SLMs allow students to engage in independent learning using instructional materials aligned with the prescribed learning competencies. Examining these modalities provides insight into students' academic experiences and the support they may need in different learning situations.

Understanding students' attitudes and academic performance is important for improving educational practices and ensuring continuity of learning. The findings may guide school principals in developing appropriate policies, help teachers improve instructional strategies, assist parents in supporting learning at home, and inform community partners about the resources students need during class suspensions. The study may also contribute to existing literature and provide a reference for future researchers examining modular learning, face-to-face instruction, and student achievement.

Therefore, this study aims to examine students' academic performance and attitudes toward Self-Learning Modules vis-à-vis face-to-face learning in science. Specifically, it seeks to determine students' attitudes toward these learning modalities, describe their academic performance, and examine differences in attitudes according to sex and age, as well as the relationship between attitudes and academic performance.

Theoretical/Conceptual Framework

This study is anchored on two major theories: Constructivist Learning Theory and Self-Directed Learning Theory, which both emphasize how learners actively engage with their educational experiences and environments. These theories are directly relevant to the context of this study, which examines students' academic performance and attitudes toward face-to-face learning and the use of Self-Learning Modules (SLMs) during times when regular classes are disrupted.

Constructivist Learning Theory (Piaget, 1972; Vygotsky, 1978)

According to the Constructivist Learning Theory, students construct their own meaning and their own body of knowledge by engaging in experiences and reflecting upon them. Students do not passively absorb new information. Instead, they are active participants in a learning process during which they create connections from new information to existing knowledge.

In the context of this study, face-to-face learning provides students with structured learning experiences, immediate feedback from teachers, and an opportunity to interact with peers, which are all key components in developing a deep level of scientific knowledge. When unforeseen events such as typhoons or extreme heat lead to the suspension of classes, students shift to using Self-Learning Modules (SLMs). These modules, though lacking the immediate support of teachers and classmates, still require students to make an effort to be active learners with respect to the subject matter. In addition, students had to establish relationships between what was being taught in the SLMs and the previous material they learned.

Thus, regardless of whether it is in a face-to-face setting or a Self-Learning Mode (SLM) within a student's home, students are always engaging in a continuous Constructivist Process of learning. Examining students' perceptions of both types of learning environments may provide insight into how they have adapted and continue to develop their knowledge when the educational environment has changed.

Self-Directed Learning Theory (Knowles, 1975)

Self-Directed Learning Theory emphasizes the importance of the learner taking an active role and being responsible for his/her own learning. According to Knowles, learners become more self-directed as they mature, assuming full responsibility for planning the learning, executing, and assessing the plan.

In this study, the use of Self-Learning Modules during suspended classes demands a higher level of independence and self-directedness from students. Unlike face-to-face classes where teachers closely monitor and guide students' progress, learning through SLMs requires students to manage their own time, read the instructional materials independently, and motivate themselves to complete assigned tasks. Their success or struggle with SLMs depends significantly on their self-directed learning abilities.

Therefore, by studying students' attitudes toward Self- Learning Modules (SLMs) and analyzing their academic performance while using them, and whether or not there are differences based on gender or age, we can better understand what is required to be a self-directed learner and whether some students have an advantage over others.

Integration to the Study

By grounding this research in Constructivist and Self-Directed Learning theories, the study acknowledges that students learn through multiple forms of instruction. While traditional face-to-face instruction provides a method for students to interact with teachers and other peers directly and receive help when needed, Self-Learning Modules (SLMs) place the responsibility of learning solely upon the student. Because both types of learning occur within two very different structured environments—face-to-face instruction and self-learning modules—it is essential to understand students' attitudes and academic successes as they transition between these types of learning situations based on needs.

The conceptual framework in this study is focused on the learner's attitude towards self-learning modules and face-to-face learning, their learning performance in both modalities, and other factors like age and sex in Figure 1.

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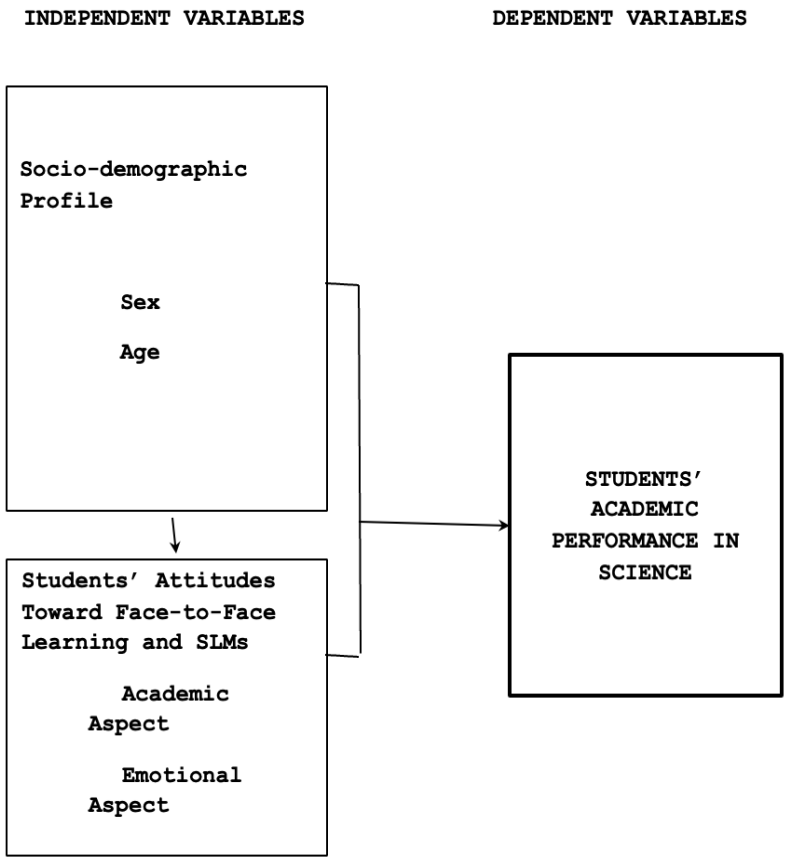


Figure 1.Schematic Diagram showing the Relationship of Variables mentioned in the Study.

Literature Review

This chapter presents the different studies conducted or previous works and related readings, reviews, findings and articles of the past research that would guide the author in conducting and expounding the study.

Science Education and Academic Performance

The value of science education stems from its impact on students' development of their own ability to think critically about problems, to solve them, and to become scientifically literate. Oftentimes, a student's academic success in science is viewed as the means to determine how well they understand basic scientific concepts, and how effectively they can use those concepts to answer questions or solve problems in a variety of situations. Research has indicated that a number of factors influence a student's academic achievement in science; these include instructional strategies, available resources for learning, motivational levels of the learner, the quality of the classroom environment, and the level of teacher support provided. When students receive effective science instruction, they acquire conceptual understanding, develop skills related to inquiry and exhibit positive attitudes toward learning through the study of science.

Researchers have identified academic success as an appropriate method for determining if educational programs are successful. It has been found that when students are involved in meaningful learning experiences that foster active engagement with content area material, there exists a strong relationship between high levels of academic success and

an increased understanding of content area subject matter. In response to this need for effective ways to promote student learning and academic success while schools experience disruptions due to lack of funding, educators continue to search for alternative instructional methods.

Self-Learning Modules as an Alternative Learning Modality

Self- Learning Modules (SLMs) are becoming increasingly significant within learning continuity programs in the Philippines' public school system. In response to emergency situations — including but limited to natural disasters such as typhoons or earthquakes, extreme temperatures, etc. — the Department of Education has implemented SLMs as an alternative learning platform; during which time students continue their education through SLMs. Each module contains lesson plans, activities, exercises and assessments created to assist with independent student learning.

Rodriguez et al. (2023) have found that while teachers had high expectations for the quality of content within self-directed learning modules, they were concerned with the reliability of assessments given through those modules, and their perception of the quality of learning provided by modular class formats. These concerns ultimately impacted teachers' perceptions of the effectiveness of teaching using modular instructional formats. As a result, teachers still consider the traditional classroom to be the most superior format for student learning. The results of this study highlight the need for educators to focus on providing a methodical approach to instructional delivery; developing reliable methods of assessing student performance; and fostering meaningful communication between teachers and learners to support successful student learning.

Additionally, Alicabo & Cacharo (2025) further defined how self-learning modules provide an opportunity to minimize the impact of instructional interruptions; by offering access to applicable learning materials that students may utilize from outside of the classroom. Nevertheless, the success of modular-based learning will be determined based upon a variety of factors that include the quality of available learning materials, student motivation and access to academically related resources.

Students' Learning and Their Attitudes Towards Self-Learning Modules and Face-To-Face Learning

The movement away from traditional classroom-based instruction toward instructional methods based on modules has been an area of interest for many researchers over the past several years. The impact of this movement was even more pronounced by the COVID-19 pandemic and its effects on the way education is provided. Modular learning utilizes pre-prepared self-study materials that are designed to be completed at the student's own pace. Boholano, et al., (2022), found that teachers felt it was important to have a way to guide and be present with students through modular distance learning. The research indicated that many students had trouble understanding lesson content and being able to complete the module activities without clear directions or the opportunity to ask questions. Likewise, Meniano & Tan (2022), reported students using the printed self-learned modules faced several challenges including difficult subjects, problems with understanding how to follow the written instruction provided, and an inability to get help from other people. As such, while the print modules do provide the opportunity for students to learn independently and at your own pace, lack of instructional guidance and/or assistance will impede a learner's ability to understand and advance in his/her learning.

In addition to this, face-to-face learning environments have shown strong evidence that students who attend class in person are generally more engaged with their studies. In addition to this, face-to-face learning provides opportunities for students to interact directly with their teachers and classmates, which may contribute to their academic and social development. Nuñez et al. (2022) found that most Filipino students preferred returning to traditional classroom instruction rather than continuing with distance learning. Similarly, Ligan et al. (2023) established a significant relationship between social interaction and student learning, emphasizing the importance of teacher-student and student-student relationships in promoting connectedness and social-emotional development. These findings highlight the value of classroom interaction and the supportive learning environment provided by face-to-face instruction.

Comparative studies have shown that Filipino students generally value the opportunities for interaction and engagement provided by face-to-face instruction. Nuñez et al. (2022) found that the majority of Filipino students preferred returning to traditional classroom learning rather than continuing with distance education. Similarly, Collado et al. (2022) reported that students perceived virtual classes as less motivating because of the absence of physical interaction with their teachers and classmates. These findings suggest that direct classroom interaction and social connections play an important role in students' learning experiences and preferences. Although distance learning offers flexibility, the lack of physical interaction may present challenges to student motivation and engagement.

Although face-to-face instruction provides opportunities for direct interaction between teachers and students, modular learning remains an important alternative for learners who experience difficulties accessing regular classroom instruction. Chan et al. (2021) highlighted how modular learning can serve students in remote communities, although challenges such as poor internet access, module distribution, and limited learning resources may affect its implementation. Similarly, Cabardo et al. (2022) emphasized the importance of regular communication between teachers, parents, and students in addressing difficulties encountered in modular distance learning. Pastor et al. (2022) also recommended providing instructional support and counseling to help teachers and learners adjust to this modality. These findings suggest that combining the flexibility of module-based learning with teacher guidance, adequate learning resources, and opportunities for face-to-face interaction may help address the diverse learning needs of students.

When a school is disrupted due to an emergency or disaster, continuing education is a major issue. As stated in the DepEd's "Learning Continuity Measures" report (DepEd Order No. 12, s 2020): "It is essential to develop measures for learning continuity so that the delivery of teaching and learning activities continues even before, during and after the occurrence of emergencies such as Typhoon, Flood, Earthquake and Extreme Heat Condition." As per the same document: Alternative Learning Modalities are important to minimize the effect of extended school closure on students' performance.

Self-Learning Modules (SLM) are among the most widely utilized alternatives for promoting learning continuity in the Philippines. Rodriguez, et al., (2023), stated that SLM's were developed to allow students to be able to take control of their own learning through learning at their own pace and in their chosen learning environment; thereby supporting individualized learning.

Additionally, Rodriguez, et al., (2023) said that self-learning modules are instructional materials which are intended to support student learning outside of a traditional classroom setting. They noted that they are particularly useful during times of school closures due to emergencies. Alicabo & Cacharo (2025), discussed the importance of utilizing SLMs as an effective tool for maintaining educational continuity during calamities. Results from their research revealed that SLMs can continue to support learning continuity by providing students with easily accessible learning materials which encourage students to engage in self-learning and learner independence, regardless of whether it is due to earthquakes, typhoons, etc. Alicabo & Cacharo (2025) also mentioned that while the content provided in the modules are important factors for determining the success of students using modular learning; they believe that access to and availability of module content, as well as clarity of module content should also be considered.

Omo (2026) conducted a similar type of research evaluating students' perspectives on Self-Learning Modules as a method for maintaining educational continuity during times of disasters. The researcher assessed students' opinions on the accessibility of the modules, quality of module content, ability to work independently through self-directed learning and ultimately students' experiences with regard to maintaining continuity in their education. Results showed that Self-Learning Modules can assist students in progressing academically during interruptions but that issues associated with comprehension, motivation and accessing needed information and resources may hinder students' experiences with modular learning.

Reflective of current DepEd policies with respect to class cancellations, DepEd has stated that when face-to-face classes are suspended because of natural disasters, calamities, and extreme temperature conditions, schools can utilize modular distance learning. Additionally, DepEd stated that modular distance learning is available as an alternative way for schools to maintain educational competency and achievement (DepEd Order No. 12, s 2020); thus,

highlighting the continued applicability of modular learning in maintaining educational continuity during emergencies.

Collectively, the results from these studies indicate that Self-Learning Modules will likely continue to serve as an important component of efforts made to maintain educational continuity for all public-school students within the Philippines. Although SLM's offer students the opportunity to pursue independent learning when there is no physical classroom available due to various types of emergencies; student attitudes towards utilization of self-learning modules will impact their effectiveness. Therefore, assessing students' attitudes towards self-learning modules is crucial to understanding how students perceive and respond to this alternative learning modality during extended periods of class cancellation due to typhoons, earthquakes, extreme temperatures and other emergencies.

Face-To-Face Learning Modality in Terms of Emotional Aspects

Students participating in face-to-face learning experiences are provided the opportunity to build an ongoing relationship with their teacher and peers. This will create a positive class atmosphere for students and may promote a desire among students to participate in learning. Alfonga & Napil (2022), reported a significant association between the students' motivational learning and both their relationships with their teachers and the social climate of their classrooms. Furthermore, Nuñez et al. (2022), reported that many Filipino students would prefer to return to a traditional classroom setting as opposed to continued distance learning. As such, these studies support the notion that student classroom interaction as well as a conducive and supportive learning environment is vital in creating conditions where students feel motivated and experience positive learning.

Students' emotional health has been recognized as a critical element of the learning experience since their emotional health can affect whether they are able to participate in class or focus on their schoolwork. As such, both their self-confidence and anxiety levels can affect how successful they are in completing their coursework. According to research conducted by Mamolo (2022), students experienced significant declines in motivation and confidence with regards to math throughout a six-week term using synchronous remote learning, while maintaining a higher level of anxiety. Research completed by Barrot et al. (2021) also indicated that anxiety, boredom, loneliness and feelings of isolation were detrimental to the ability of college students to be motivated and engaged in their own learning when they were involved in remote learning. Therefore, it is necessary for educators to provide students with access to instructors who will guide them through their course work and provide opportunities for students to receive help from peers and other resources, as well as create positive learning environments. In terms of creating these types of environments, having opportunities for students to interact directly with their teachers and classmates during traditional classroom time may allow students the opportunity to have questions clarified immediately, receive encouragement from others and feel supported emotionally.

Social/Emotional Skills are developed with face-to-face classes as students interact in classrooms and work collaboratively. In addition to developing cognitive skills, social and emotional skills are developed when teachers and students interact in classrooms and engage in collaborative learning experiences. The research of Ligan et al. (2023), reported a statistically significant correlation between students' social interaction and their learning; therefore, the partnership of both the teacher and student is important in providing students an opportunity to connect socially/emotionally. Also, Fragata & Limpot (2023) also noted a statistically significant relationship between cooperative learning and motivation of students. As such, these studies demonstrate how group learning and sharing ideas among peers helps promote students' social development, ability to cooperate with others, and their desire to learn.

Classroom environments provide students with an opportunity to build connections with others within the classroom environment; such as peers and instructors. Developing these connections may help to encourage student's participation in class, and their level of engagement in class. According to Datu and Noltemeyer (2024), relatedness to science teachers had a direct correlation to three types of engagement in science learning (cognitive, behavioral and emotional) for Filipino high school students. In addition to this, according to Ligan et al. (2023), there is a significant relationship between social interaction and student learning. This research also highlighted the importance of

developing teacher/student and peer/peer partnerships in order to foster a sense of connection and promote social/emotional development.

In addition, Fredricks et al. (2004) found emotional engagement as one of three dimensions of student engagement in addition to behavioral and cognitive engagement. Emotional engagement refers to a student's feelings towards their learning experience; teachers; classmates; and school environment. Science classes may provide opportunities for students to develop interest, enjoyment, and positive relationships through active participation with laboratory experiments, group projects and hand-on investigations. These experiences can help create an interesting environment for learning, and encourage students to participate more fully in the learning process.

While there are many examples of new forms of instructional methods such as modular or online instruction; research consistently indicates that traditional face-to-face instruction fosters stronger systems for supporting the emotional needs of students through immediate interaction/social support/connection and formalized classroom structure. Each of these elements makes a strong contribution to improving student motivation/participation/experience in science education.

Face-To-Face Learning Modality in Terms of Physical Health Aspect

Students' learning experiences and academic success can be influenced by their physical health. The face-to-face environment of a traditional school is conducive to developing healthier habits because of its structure. Regularity of school attendance creates consistency in the learner's daily routine, with regular sleeping, eating times and time spent being physically active during travel and other activities at school. Because of this, students who attend school regularly tend to have better health overall. This can then result in them having the focus and ability to complete their academic work.

Physical activity is another way that schools promote students' physical health through the use of formal programs like physical education classes and school sports. Regular participation in these types of programs has been shown to help students both physically and cognitively. For example, according to Hills, et al. (2015), there is evidence that students who participate in structured physical education programs exhibit improved cognitive function and improved concentration in the classroom. Additionally, the Centers for Disease Control and Prevention (CDC) stated that regular physical activity is beneficial to the physical fitness of school aged children, while also improving their energy levels, decreasing their fatigue, and enhancing their engagement in the academic process.

Another key function of schools is promoting health education and reinforcing healthy lifestyles. Langford et al. (2014) showed that school-based health promotion programs successfully promoted students' knowledge and behavior about hygiene, nutrition, and wellness. Schools reinforce healthy behaviors in their students through the daily routine, guidance from teachers, and social interactions with peers. All these elements would be harder to implement in a self-paced modular program where most of the learning takes place at home.

Therefore, research indicates that the benefits of attending school in person include developing good physical habits through structured routines, using the educational system to monitor your health, providing opportunities to be physically active throughout the day, and continuously reinforcing positive behaviors.

Face-To-Face Learning Modality in Terms of the Financial Aspect

The costs associated with learning modalities have a large impact on how students view and experience education. Students and their families pay daily fees for traveling to school, purchasing food and clothing for school, and school-related supplies. Levin (2009) stated that there are indirect costs, beyond tuition fees, including costs of travel and living expenses while attending school, that put pressure on the family's budget, particularly if they come from low-income families.

These types of costs can negatively impact students' ability to attend and participate in face-to-face classrooms. Tilak (2002) identified opportunity costs and direct costs of schooling as key factors affecting students' access to education

and continued enrollment in school; especially in developing countries where household incomes tend to be very limited. Therefore, some students may experience less than optimal learning conditions due to financial constraints.

Although face-to-face learning can create financial challenges for students and their families, it can also create opportunities for students to receive higher quality educational experiences. Research has shown that high-quality in-person instructional settings create better student learning outcomes. When students perform well academically, they are less likely to require repeating grades or continue into further years of schooling. Ultimately, this will save families money over time since they will not be paying for extended years of education.

Face-to-face learning environments do not require students to use or purchase items in order to learn that would normally be purchased outside of the classroom setting using their own funds. Families may find themselves needing to purchase paper products to print homework assignments, mobile data or internet connections to assist students completing online lessons, etc. Dube (2020) found that families experience increased "out-of-pocket" expenditures when implementing distance learning models because students and/or parents need to acquire specific technologies and resources necessary for remote learning.

While face-to-face learning does involve ongoing daily expenses for things like transportation to and from school, food for lunch, school uniforms, etc., students have access to a variety of resources available within the school that are designed to aid in student success. These resources help to mitigate some of the long-term financial impacts on students and their families as a whole.

Students' Learning and Their Attitudes Towards Learning Modules Versus Face-To-Face Learning Modalities in Terms of Academic Performance.

The comparison of Self-Learning Modules (SLM) to face-to-face learning methods for assessing academic performance has been studied extensively. With the implementation of modular-based learning as an alternative to traditional learning models during times of educational interruption, there are numerous studies showing that learning results differ from those obtained through face-to-face learning. As stated by Bao (2020), students' academic success in autonomous learning settings will rely heavily upon students being able to effectively regulate themselves within these environments, utilize their time effectively and be capable of learning independently. These factors, based upon the degree of autonomy exhibited by individual students will result in either enhanced or diminished academic attainment relative to learner preparation.

Face-to-face learning continues to positively correlate to students achieving higher academic scores due to the structured format of instruction and instant feedback as well as the opportunity for students to engage with their teacher and classmates. Kuhfeld et al. (2020) suggested that face-to-face instruction provides teachers with opportunities to immediately recognize when a student is misinterpreting a material and provide corrective feedback. This process enhances a student's comprehension of content and increases their chances of performing successfully on assessments. Additionally, Hattie (2009) identified that teacher feedback is one of the most powerful variables affecting student achievement. Therefore, the interaction between teachers and students in a face-to-face setting is critical to enhancing student learning.

In addition to the format of the learning method used by students, their attitudes towards learning formats also impact their academic performance. Zimmerman (2002) indicated that self-directed learning has a strong correlation to motivation and students' confidence in their abilities to complete academic tasks independently. When students exhibit positive attitudes towards independent study, they are more likely to be actively involved in completing assignments and demonstrating better engagement with course content. This increased engagement tends to lead to enhanced academic outcomes for students.

While some research identifies barriers to successful implementation of modular-based learning, other research demonstrates that SLMs can promote satisfactory academic performance if implemented correctly. For example, a study conducted by Barrot et al. (2021) found that many students continued to perform at acceptable levels academically using SLMs. Specifically, this outcome occurred when SLMs were clearly defined, presented in a logical sequence and included supportive feedback from teachers and parental involvement. The authors concluded that

modular-based learning can serve as a viable means of providing continuity of education, especially in instances where students do not possess reliable access to digital technology.

Aguilar and Arrieta (2022) found similar results with respect to student performance utilizing modular-based learning. Their findings indicated that when students participating in modular-based learning received continuous monitoring, regular feedback and high-quality instructional resources, they performed adequately academically. The authors suggested that the use of modular-based learning fosters independence and accountability among students. Both traits are essential for students to achieve academically.

Despite these positive outcomes related to modular-based learning, Adnan and Anwar (2020) indicated that students typically exhibit greater motivation and satisfaction with face-to-face learning due to real-time interaction with teachers, structural support from instructors and collaborative activity participation. However, regardless of whether or not a particular mode of delivery is utilized, its overall effectiveness relies on the level of support provided by teachers as well as the student's ability to adjust to the type of learning environment.

Research indicates that while face-to-face learning often produces superior academic outcomes due to direct instruction and immediate feedback, SLMs can produce comparable or even enhanced academic outcomes when implemented appropriately and supported effectively. Additionally, students' attitudes toward both modes of delivery have a significant effect on their academic performance. Therefore, assessment of both cognitive outcomes as well as learner perception should occur when comparing the effectiveness of both forms of delivery.

Local Studies

The current state of modular distance learning is one of the primary reasons why Self-Learning Modules have become a topic of interest in the Philippines. The Philippines has historically suffered from problems around internet connectivity and infrastructure. As an example, the country ranks poorly in terms of global rankings for internet speeds. Despite the limitations in technology accessibility for fully online learning, approximately 39.6% of students in the Philippines preferred modular distance learning. This indicates that for most Filipino students, SLMs represent the most viable method of distance learning for them.

Modular Distance Learning in the Philippines makes use of Self-Learning Modules, specifically those that align with the Department of Education's Most Essential Learning Competencies (MELC). In general, teachers work remotely to keep track of how well students understand material and assist their students via cell phone texts, email messages, etc. (FlipScience, 2020).

While this approach does allow for continued schooling, numerous studies show that success in utilizing Self-Learning Modules is dependent upon several variables including but not limited to; teacher support, student autonomy, and availability of resources.

Studies conducted locally have provided mixed results concerning whether or not modular learning has had a positive effect on students' academic achievement. Cavanaugh et al. (2004) stated that "distance learning can be just as successful as traditional classroom instruction if the students' needs are met appropriately." Consistent with this, Ali et al. (2010) demonstrated that modular-based instruction produces better student academic achievement when compared to traditional instructional methodologies. Similar to Ali et al., (2010) Sadiq and Zamir (2014) showed that modular-based instruction increases students' ability to learn efficiently due to its flexible scheduling format allowing students to work independently at their own rate.

Several studies were conducted within the Philippine setting that indicated that modular learning is superior to traditional forms of instruction. Gonzales (2015) discovered that when there is no option for face-to-face classes then modular-based instructional methodology can be even more successful than traditional methodologies. Likewise, Aksan (2021) found that despite being placed into a situation where they could not meet in person, modular-based distance learning did successfully enhance students' mathematical performance.

These results indicate that when utilized effectively and supplemented by teachers and quality instructional materials SLMs can continue to facilitate learning opportunities for students.

On the other hand, however, some researchers have identified several challenges associated with implementing modular distance learning. For example, Dargo & Dimas (2021) found that students performed academically worse using modular-based learning formats due to the decreased frequency of interactions with teachers, overabundance of instructional assignments, and difficulty in understanding lesson content. Additionally, Olivo (2021) observed that parents felt inadequate when assisting their children with completing instructional assignments due to complexity of modules and constraints imposed by time demands.

Therefore, while modular-based learning may ensure that students will continue their education, it cannot always guarantee optimal levels of student performance. Agarin (2021) concluded that the absence of face-to-face contact between teachers and students decreases student academic performance and engagement. Agarin (2021) noted that physical proximity facilitates guidance for students and maintains school discipline.

In conclusion, studies completed in the Philippines regarding Self-Learning Modules reveal conflicting opinions about their utility in facilitating continuity of learning and developing independent learning habits among students. Studies have demonstrated potential for SLMs in providing support for continuing learning despite various types of obstacles including comprehension challenges, excessive amounts of assignments, and reduced amount of interaction with teachers.

Research Methodology

This chapter presents the research design, the locale of the study, and the respondents of the study, the data-gathering instrument, the data-gathering procedures, and the data analyses.

Research Design

The researcher used the descriptive design, specifically the descriptive research method that is considered the most suitable in this study. This design is appropriate for studies which aim to find out relationships or differences as to what prevails in the present situation.

This study is made to measure, articulate, and explain the current situation of a social construct, organization, or topic in this study design. It is a process for gathering information that takes into account the most recent events, current strategies, and market dynamics. It is not only interested in learning about or being familiar with any of them; it also searches for differences between variables, investigates the causes of events, evaluates hypotheses, and then develops generalization theories or concepts in light of the findings.

To examine the students' academic performance in science through modular learning and their attitudes towards self-learning modules vis-à-vis face-to-face learning modalities as described by the nature of the situations that exist in Mabinay District I, Mabinay, Negros Oriental.

Locale of the Study

This study was conducted in all secondary schools in Mabinay District I, Mabinay, Negros Oriental, under the supervision of the Department of Education. The area was selected as the locale of the study because students in these schools experienced both face-to-face learning and Self-Learning Modules (SLMs), particularly during class suspensions caused by typhoons, earthquakes, and extreme weather conditions.

The study focused on students' attitudes toward SLMs and face-to-face learning modalities, as well as their academic performance in Science. It included questions and statements designed to assess students' attitudes toward these learning modalities and their academic performance. The participating schools provided an appropriate setting for

examining students' experiences with both approaches. The accessibility of the area also facilitated data collection from student-respondents who had experienced both learning modalities.

Respondents of the Study

The respondents of this study are students from public secondary schools in Mabinay District 1 who have experienced both face-to-face learning and the use of Self-Learning Modules (SLMs) during the current academic year.

Behavioral issues hold into account to guarantee the respondents' safety and security during the research system. Foreground that every individual has the potential to participate voluntarily and to withdraw at any time in order to prevent coercion into participating.

Sampling Techniques

This study employed a random sampling technique in selecting student-respondents from public high schools in Mabinay District I, Mabinay, Negros Oriental. Random sampling was used to ensure that all students within the population had an equal chance of being selected as respondents, thereby reducing bias and increasing the representativeness of the sample. This method is appropriate for obtaining reliable data on students' academic performance in Science and their attitudes toward Self-Learning Modules (SLMs) vis-à-vis face-to-face learning modalities.

Data Gathering Instruments

A structured questionnaire was used in this study to assess students' attitudes toward face-to-face learning and the use of Self-Learning Modules (SLMs), as well as their academic performance in Science. Part I of the questionnaire gathered the respondents' sociodemographic profiles in terms of sex and age. Part II assessed their attitudes toward the learning modalities in terms of emotional, physical health, and financial aspects, as well as science learning. The respondents' academic performance in Science was measured using their self-reported general averages for School Year 2024–2025, as indicated in the questionnaire.

The validity of the research instrument was established using the criteria of Good and Scates. Three jurors evaluated the questionnaire, each giving a validity rating of 3.89, resulting in an overall validity index of 3.89, interpreted as very good. This result indicated that the questionnaire was considered appropriate based on the evaluators' assessment.

The reliability of the instrument was assessed using Cronbach's alpha to determine the internal consistency of its four subscales. The Science Learning Areas and Emotional subscales each obtained a Cronbach's alpha of 0.781, while the Physical Health subscale obtained 0.705 and the Financial subscale obtained 0.897. Each subscale consisted of 10 items. All four subscales exceeded the commonly accepted threshold of 0.70, indicating acceptable to good internal consistency. The Financial subscale demonstrated the highest reliability, while the Physical Health subscale had the lowest, although it remained within the acceptable range. These results indicated that the questionnaire demonstrated satisfactory reliability for measuring the dimensions examined in the study.

Data Gathering Procedure

Upon the approval of the research, a letter of request was sent to the Dean of Graduate Studies of Central Philippines State University asking permission to conduct the study. The researcher sent another letter of request to the university president through the Dean of Graduate Studies to conduct the study. Afterwards, a letter of the same purpose was sent to the College/University president of Central Philippines State University, Kabankalan City, Negros Occidental, asking permission to get the data on the gathered instruments. The data accessed were retrieved immediately, tabulated, analyzed, and interpreted.

Data Analyses Procedure

The data gathered in this study were analyzed using appropriate statistical tools to address the research questions. Frequency and percentage distribution were used to describe the respondents' sociodemographic profiles in terms of sex and age. Mean and standard deviation were used to describe students' attitudes toward face-to-face learning and Self-Learning Modules (SLMs) in Science in terms of emotional aspects, physical health, and financial aspects. The responses were interpreted using the following numerical and adjectival descriptions: 4.21–5.00 (Strongly Agree), 3.41–4.20 (Agree), 2.61–3.40 (Neither Agree nor Disagree), 1.81–2.60 (Disagree), and 1.00–1.80 (Strongly Disagree). Frequency and percentage distribution were used to describe students' academic performance in Science according to the grading descriptors: Outstanding (90–100), Very Satisfactory (85–89), Satisfactory (80–84), Fairly Satisfactory (75–79), and Did Not Meet Expectations (below 75). The Mann–Whitney U test was used to determine whether significant differences existed in students' attitudes toward face-to-face learning and SLMs when respondents were classified according to sex. The Kruskal–Wallis H test was used to examine significant differences in attitudes among age groups. Finally, Spearman's rank correlation coefficient (Spearman's rho) was used to determine whether a significant relationship existed between students' attitudes toward face-to-face learning and SLMs and their academic performance in Science.

RESULTS AND DISCUSSION

This chapter presents the results, analyses of the results, and interpretation of the data gathered by the researcher. This includes the number of the chosen respondents, the performance of the respondents, and their interpretations.

The Socio-Demographic Profile of the Respondents in Terms of Sex and Age

Table 1 below shows the socio-demographic profile of the respondents in terms of sex and age, computed with frequency and percentage distribution.

Table 1
Socio-demographic Profile of the Respondents as of Sex and Age

Profile	Frequency	Percentage
Sex		
Male	121	38.4
Female	194	61.6
Age		
12 to 13 y.o.	130	41.3
14 to 15 y.o.	126	40.0
16+ y.o.	59	18.7
Total	**315**	**100.0**

This table shows that 61.6% were female and 38.4% were male. Thus, the majority of the respondents were female.

The percentage of each age category is as follows: The largest percentage of the respondents who have an age range of 12-13 years old accounts for 41.3%, followed by those who have an age range of 14-15 years old, which accounts for 40.0%, and lastly those who have an age of 16 years or older, which accounts for only 18.7%. Therefore, the majority of the respondents fall into the pre-adolescent and early adolescent categories. At this developmental stage, learners may benefit from structured learning environments that provide opportunities for direct teacher guidance, immediate feedback, and peer interaction. These features of face-to-face instruction can facilitate classroom participation, promote learner engagement, and provide opportunities for collaborative learning. Nevertheless, the extent to which learners benefit from these features may vary depending on their individual needs, learning experiences, and circumstances.

Furthermore, the results also indicate that some factors associated with learners' perceptions of face-to-face instruction (opportunities for direct social contact, structured class time, and/or immediate teacher support) will influence how they perceive returning to face-to-face instruction as well. The structured classroom experience allows the learner to take part in discussion(s), work collaboratively with other students, and have questions about the content clarified immediately after it is introduced. Since there was a larger portion of the survey participants who were in the 12-15 years old category; this could help explain why so many of them had positive feelings about returning to face-to-face learning. However, because the participants' age distribution did not show that their perceptions of returning to face-to-face instruction would improve their grades.

The Students' Attitude Towards Face-To-Face Learning Modality and SLMs In Science

Table 2 shows the students' attitude towards face-to-face learning modality and SLMs in science, mean and standard deviation were used.
This was interpreted by the following numerical and adjectival descriptions:

4.21 – 5.00: Strongly Agree
3.41 - 4.20: Agree
2.61 – 3.40: Neither Agree nor Disagree
1.81 – 2.60: Disagree
1.00 – 1.80: Strongly Disagree

Table 2
Student's attitude towards face-to-face learning modality and SLMs in science

	Mean	SD	Int
1. Face to face classes are more effective for understanding complex scientific concepts compared to online classes.	4.72	0.62	Strongly agree
2. Interacting with teachers in person enhances my learning experience in science subjects.	4.38	0.70	Agree
3. Collaborating with classmates in a physical classroom environment is beneficial for my understanding of scientific topics.	4.29	0.77	Agree
4. Face to face discussions facilitate better comprehension of scientific theories and principles.	4.43	0.83	Agree

5. The availability of hands-on experiments and demonstrations in face-to-face classes enhances my learning in science.	4.39	0.79	Agree
6. I understand Science lessons clearly when using Self- Learning Modules (SLMs).	4.41	0.77	Agree
7. I stay focused while studying Science through SLMs at home.	4.47	0.83	Agree
8. I can complete my Science activities successfully using SLMs.	4.30	0.95	Agree
9. I find it easy to learn new Science topics independently through SLMs.	4.30	0.82	Agree
10. I perform well in Science even when using SLMs instead of attending classes.	4.34	0.84	Agree
Student Attitude towards F2F	**4.40**	**0.50**	**Positive Attitude**

1.00 – 1.49 Strongly disagree (Highly negative attitude)
1.50 – 2.49 Disagree (Negative attitude)
2.50 – 3.49 Neutral (Neutral attitude)
3.50 – 4.49 Agree (Positive attitude)
4.50 – 5.00 Strongly agree (Highly positive attitude)

This table shows the students' attitude towards face-to-face learning modality and SLMs in science was evaluated using a structured questionnaire, with responses from 315 students. The results are summarized in terms of mean scores and standard deviations, with an interpretation of in each statement.

The students' attitude toward face-to-face and SLMs in science in terms of the academic aspect in the statement "*Face to face classes are more effective for understanding complex scientific concepts compared to online classes*" has a mean of 4.72 and a standard deviation of 0.62; this was interpreted as "strongly agree," indicating an extremely positive attitude toward face-to-face learning. In addition, the students' attitudes toward face-to-face learning (and SLMs) in science, when considered from an academic perspective, had a range of means associated with the statements related to collaborative learning. As such, the highest mean was 4.47, with a standard deviation of 0.83. It was found that there were five other statements related to collaborative learning that followed closely behind this high mean, including 4.43, 4.41, 4.39, 4.38, and 4.34. Each of these statements had a standard deviation of 0.83, 0.77, 0.79, 0.70, 0.84, and 0.95, and 0.82, respectively. When looking at all six means and their respective standard deviations for the students' attitudes toward face-to-face learning modality and SLMs in science (from an academic point-of-view), the overall composite mean was 4.40. Furthermore, the overall composite standard deviation for all six items was .50. Overall, when considering the students' attitudes toward both the face-to- face learning modality and SLMs in Science from an academic viewpoint, they showed a very strong agreement.

The majority of students believe that face-to-face learning is more effective at assisting them in developing an understanding of scientific concepts that are difficult to comprehend. This may be due to several reasons including; teacher-led instruction, the use of structure and organization within the classroom, and the use of instructional support from teachers. As such this belief by students can indicate a desire for in-class learning experiences rather than those

that are Self-Learning Module (SLM)-based or online. There appears to be less emphasis placed on interacting with peers to develop an understanding of how they learn and what supports them academically in Science.

Aguilera-Hermida (2020) stated that when learning occurs through face-to-face interactions students have a higher level of motivation, participation and achievement. In addition to the social aspect of learning, students also benefit from having the ability to interact directly with teachers. Face-to-face interactions allow students to ask questions, receive feedback immediately, and enhance student learning. Modular and/or online learning requires more self-regulation from the learner which can create challenges for some students when dealing with course material that is highly technical and content-based, such as Science.

Bączek et al. (2021) reported that even though collaborative learning is beneficial for many aspects of the learning process, there are still many instances where students rely heavily upon teacher guidance. For example, in technical areas like Science, students seem to place more value on receiving clear information from a teacher versus collaborating with peers. Therefore, it seems that the instructional clarity provided by a teacher, in conjunction with the explanations provided by the teacher, are two of the most significant influences on whether or not students feel successful during face-to-face learning opportunities.

The Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science in Terms of Emotional Aspect

Table 3 shows the students' attitude towards face-to-face learning modality and SLMs in science in terms of emotional aspect, mean and standard deviation were used.
This was interpreted by the following numerical and adjectival descriptions:

4.21 – 5.00: Strongly Agree
3.41 - 4.20: Agree
2.61 – 3.40: Neither Agree nor Disagree
1.81 – 2.60: Disagree
1.00 – 1.80: Strongly Disagree

Table 3

The Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science in Terms of Emotional Aspect

	Mean	SD	Int
1. I am comfortable with face-to-face learning with my teacher.	4.53	0.75	Strongly agree
2. I am confident to face my teacher and classmates.	4.28	0.82	Agree
3. I am enthusiastic about the tasks during face-to-face classes.	4.14	0.85	Agree
4. I am happy to see my teachers and classmates in school.	4.50	0.77	Agree

5. I feel active to participate during face-to-face classes.	4.32	0.83	Agree
6.* I feel stressed when completing Science activities through SLMs.	4.09	0.93	Agree
7.* I feel anxious when I have to learn Science using SLMs.	4.16	0.88	Agree
8.* I feel lonely while studying Science through SLMs.	4.05	0.95	Agree
9. I am motivated to complete my Science SLMs independently.	4.26	0.88	Agree
10. I feel a sense of accomplishment after finishing my Science SLMs.	4.20	0.83	Agree
Attitude in terms of emotional aspect	**3.59**	**0.28**	**Positive attitude**

**Negatively stated items were reverse scored before computing the overall mean*

This table demonstrates the students' feelings about the face-to-face learning model and use of SLMs in science based on an emotional basis. In the survey item "I am comfortable with face-to-face learning with my teacher," there was a mean of 4.53, and the standard deviation was .75. It was rated as "Strongly Agree" or very positive. A similar rating occurred with respect to the other nine items with the exception of the statement "I am comfortable with face-to-face learning with my teacher." The ratings were: 4.50, 4.32, 4.28, 4.26, 4.20, 4.16, 4.14, and 4.09; and the standard deviations for all ten items were:.77, .83,.82,.88,.83,.88,.85 and .93. Similarly, in relation to the statement "I feel lonely while studying Science through SLMs," there was a low mean of 4.05 and a high standard deviation of .95. Both of these statistics indicate that students expressed a positive emotion related to this statement although it was presented in a negative way. Students' attitudes regarding the emotional aspects of face-to-face learning with their teacher as reflected in the composite mean score of 3.59 and the standard deviation of .28 were both positive.

Therefore, it appears that students feel emotionally safe and encouraged during face-to-face instruction with their teacher.

Student-teacher relationships are an important factor in providing a sense of security and encouragement for students in learning environments. The students' strong preference for face-to-face learning with a teacher indicates that the relationship of students to their teacher is an essential component of students' positive emotional responses in learning situations. The relatively low level of agreement on the statement indicating that they felt lonely while using SLM's suggests that, although self-study may provide little opportunity for interaction with others, students do not perceive their emotional well-being as being substantially impacted relative to the perceived benefits associated with having a teacher to guide them in their studies.

Recent research has emphasized the significance of emotional support in learning environments. For example, Pokhrel & Chhetri (2021) found that students generally report higher levels of emotional safety and motivation in traditional classrooms than in non-traditional classrooms because of the physical presence of the teacher. The presence of a teacher provides students with encouragement, assurance, and assistance immediately upon request.

Students reported the least amount of agreement on the statement "I feel lonely while studying science through SLMs". Thus, although students recognize the limitations of SLM's in regard to creating a socially supportive environment,

many students develop ways to cope with the lack of social interaction while engaged in modular learning. Research conducted by Aristovnik et al. (2020) demonstrated that extended use of isolated learning formats such as SLMs results in decreased engagement and disconnection from one's emotional state, particularly among young learners who benefit greatly from social interactions. Although students did not express overwhelming feelings of loneliness, they clearly prefer learning in a more emotionally rich face-to-face format.

Zimmerman (2002) has provided evidence supporting the notion that students' affective states have a profound effect on their academic performance. Comfortable and supportive learning environments created by teachers can increase motivation and persistence in students. Data collected for this study suggest that, consistent with these findings, emotional wellness plays a major role in influencing students' learning preferences and ultimate success in science education.

The Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science in Terms of Physical Health Aspect

Table 4 shows the students' attitude towards face-to-face learning modality and SLMs in science in terms of physical aspect; the mean and standard deviation were used.
This was interpreted by the following numerical and adjectival descriptions:

4.21 – 5.00: Strongly Agree
3.41 - 4.20: Agree
2.61 – 3.40: Neither Agree nor Disagree
1.81 – 2.60: Disagree
1.00 – 1.80: Strongly Disagree

Table 4
The Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science in Terms of Physical Health Aspect

	Mean	SD	Int
1. I am physically healthy to attend face-to-face classes.	4.35	0.83	Agree
2. I am well oriented with the proper health protocols to avoid spreading the virus.	4.16	0.99	Agree
3. I don't have any existing illnesses or diseases associated with COVID-19 Virus.	4.14	1.12	Agree
4. I am COVID-19 fully vaccinated.	2.55	1.71	Neutral
5. I know the proper hand-washing method.	4.41	0.91	Agree
6.* I experience eye strain when reading Science lessons from SLMs.	4.47	0.76	Agree
7.* I feel physically exhausted after completing Science SLMs at home.	4.44	0.85	Agree

8.* I find it uncomfortable to study Science using SLMs.	4.26	1.05	Agree
9.* I experience headaches when working on Science SLMs for long periods.	3.97	0.96	Agree
10.* I lack a comfortable space at home for studying SLMs effectively.	4.21	0.91	Agree
Attitude in terms of physical health	**2.83**	**0.34**	**Neutral**

**Negatively stated items were reverse scored before computing the overall mean*

This table shows the students' attitude towards face-to-face learning modality and SLMs in science in terms of physical health aspect in the statement *"I experience eye strain when reading Science lessons from SLMs"* had the mean of 4.47 and with the standard deviation of 0.85 and interpreted as "*agree*" which means positive attitude of emotional aspect even it was negatively stated items in the statement and it follows the mean of 4.44, 4.41, 4.35, 4.26, 4.21, 4.16, 4.14 and 3.97 respectively and with the standard deviation of 0.85, 0.91, 0.83, 1.05, 0.91, 0.99, 1.12 and 0.96. Meanwhile, in terms of the statement "*I am COVID-19 fully vaccinated"* had the lowest mean of 2.55 and with the standard deviation of 1.71 interpreted as "*neutral"* which also means have neutral attitude in physical health aspect even if there were negatively stated items in the statement. This students' attitude towards face to face in physical health aspect with the composite mean of 2.83 and with the standard deviation of 0.34 interpreted as "*neutral*" which means have neutral attitude.

Therefore, the results indicate that generally students have a positive attitude toward face-to-face learning from a physical health perspective and feel both safe and secure enough to return to a classroom-based learning environment. The neutral responses to being fully vaccinated against COVID-19 suggest some degree of doubt or unimportance for students with respect to receiving vaccinations. This indicates a possible divide in awareness/availability of health information that will be able to affect students' perceptions of their own physical security in in-classroom learning environments.

Students' positive attitudes toward face-to-face learning from a physical health aspect reflect increasing confidence on behalf of students returning to traditional classroom settings where schools provide appropriate safety protocol measures. These findings correlate with those reported by Kapasia et al. (2020); students were very optimistic about returning to traditional classroom settings as long as institutions implemented adequate health measures. Students also report feeling comfortable and confident that they can learn safely in a school setting since most students do not believe the COVID-19 risks exist within their age group.

However, the neutral attitude toward the statement "I am COVID-19 fully vaccinated" reveals a level of hesitation or lack of engagement with vaccination efforts among students. According to the study by Solís Arce et al. (2021), such neutrality may stem from limited access, vaccine misinformation, or a perceived low risk of infection among the youth. This neutral stance is crucial because, while students may feel physically well and ready for face-to-face learning, their vaccination status could still impact public health safety and influence policy decisions in educational institutions.

As previously noted, Kecojevic et al., (2021) found similar results demonstrating that students' physical preparation for face-to-face learning does not necessarily coincide with their public health practices (e.g., receiving a COVID-19 vaccine). Even if students do not consider their vaccination status as important to them personally or to their ability to complete academic assignments successfully, it is an essential component of many school districts' safe reopening plans. Therefore, educators must take steps to address this gap via education regarding health and by using open communication strategies so that students understand why receiving a vaccination is necessary for creating a safe environment in which to conduct learning.

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The Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science in Terms of Physical Health Aspect

Table 5 shows the students' attitude towards face-to-face learning modality and SLMs in science in terms of physical aspect, mean and standard deviation were used.
This was interpreted by the following numerical and adjectival descriptions:

4.21 – 5.00: Strongly Agree
3.41 - 4.20: Agree
2.61 – 3.40: Neither Agree nor Disagree
1.81 – 2.60: Disagree
1.00 – 1.80: Strongly Disagree

Table 5
The Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science in Terms Financial Aspect

	Mean	SD	Int
1. My parents are ready financially to send me back to school for f2f classes.	4.42	0.86	Agree
2. My parents can afford to buy me medicines for f2f classes.	4.19	0.99	Agree
3. My parents can afford my daily transportation expenses.	4.08	1.03	Agree
4. My parents have enough funds to sustain my daily need for the f2f classes.	4.14	0.93	Agree
5. My parents can afford to provide me with nutritious food.	4.24	0.92	Agree
6.* Using SLMs increases our electric bills at home.	4.15	0.97	Agree
7.* Completing Science activities in SLMs sometimes requires buying extra school supplies.	4.22	0.90	Agree
8.* I need to spend more on internet or mobile data when clarifying lessons from my Science SLMs.	3.90	1.04	Agree
9.* SLM-based learning is financially challenging for my family.	4.07	0.95	Agree

10.* Learning through SLMs is more costly for my family compared to face-to-face learning.	4.12	0.90	Agree
Attitude in terms of financial aspect	**3.06**	**0.30**	**Neutral**

**Negatively stated items were reverse scored before computing the overall mean*

This table shows the students' attitude towards face-to-face learning modality and SLMs in science in terms of financial aspect in the statement *"My parents are ready financially to send me back to school for f2f classes"* had the mean of 4.42 and with the standard deviation of 0.86 and interpreted as "*agree*" which means positive attitude of financial aspect and it follows the mean of 4.24, 4.22, 4.19, 4.15, 4.14, 4.12, 4.08 and 4.07 respectively and with the standard deviation of 0.92, 0.90, 0.99, 0.97, 0.93, 0.90, 1.03 and 0.95. Meanwhile, in terms of the statement "*I need to spend more on internet or mobile data when clarifying lessons from my Science SLMs"* had the lowest mean of 3.90 and with the standard deviation of 1.04 interpreted as "*agree"* which also means have positive attitude in financial aspect even it was negatively stated items in the statement. This students' attitude towards face to face in the financial aspect with the composite mean of 3.06 and with the standard deviation of 0.30 interpreted as "*neutral*" which means have neutral attitude.

Therefore, these findings indicate that students perceive themselves to be financially well-supported by their families so that they can return to face-to-face learning; thus, fewer financial barriers exist in order for them to do so. The lower agreement concerning having to spend more on Internet or mobile data for clarifying SLM lessons indicates that online or modular learning exists with less expense concerning connectivity. Despite the overall results showing that students prefer face-to-face learning, although they believe it is costly, because it provides them greater academic and emotional benefits.

Findings suggested that most students viewed their family's finances as sufficient to assist them when they returned to campus. This was evident through the high mean score (4.42) and low standard deviation (.86) for the statement "my parents are ready financially to send me back to school for face-to-face classes." Likewise, students agreed that their parents would be able to cover the cost of daily transportation (mean 4.08; sd=1.03). Nonetheless, a composite mean (3.06) for the total financial aspect had an extremely low standard deviation (.30), indicating that even though students felt that their families could cover costs associated with school attendance, there were still financial concerns regarding both face-to-face learning and self-learning module options. Thus, these results indicate that student perception of their families' capability to fund educational needs should be evaluated with consideration for the expense of each type of instructional delivery.

Students worry over having to spend extra money on internet or cell phone data when asking about clarifying details of science SLM are probably related to barriers in gaining access to other digital sources of learning. Bustillo & Aguilos (2022), investigated some problems which were faced by the students at a university located in rural Philippines; these included difficulties using Internet, lack of adequate resources for learning, and insufficient access to technology for completion of modular tasks. This study showed that socio-economic/technological constraints can limit students' ability to gain access to learning support. Therefore, though printed copies of SLMs could be used as alternatives for students who do not have access to the internet; students still would possibly encounter difficulty when trying to ask teachers questions or get answers immediately.

Student's Overall Attitude Towards Face-To-Face Learning Modality and SLMs in Science

Table 6 shows the students' overall attitude towards face-to-face learning modality and SLMs in science, mean and standard deviation were used.
This was interpreted by the following numerical and adjectival descriptions:

1.00 – 1.49 Strongly disagree (Highly negative attitude)
1.50 – 2.49 Disagree (Negative attitude)
2.50 – 3.49 Neutral (Neutral attitude)

3.50 – 4.49 Agree (Positive attitude)
4.50 – 5.00 Strongly agree (Highly positive attitude)

Table 6
Student's Overall Attitude Towards Face-To-Face Learning Modality and SLMs in Science

	Mean	SD	Int
Academic aspect	4.40	0.50	Positive attitude
Emotional aspect	3.59	0.28	Positive attitude
Physical health	2.83	0.34	Neutral attitude
Financial aspect	3.06	0.30	Neutral attitude
Overall Attitude	**3.47**	**0.21**	**Neutral attitude**

This table shows the student's overall attitude towards face-to-face learning modality and SLMs in Science in terms of the academic aspect had the highest mean of 4.40 with a standard deviation of 0.50 interpreted as a positive attitude and it follows the emotional aspect had a mean of 3.59 with a standard deviation of 0.28 interpreted as positive attitude. Meanwhile, the physical health and financial aspects had a mean of 2.83 and 3.06 with standard deviations of 0.34 and 0.30, which had the same interpretation as a neutral attitude. Overall attitude had a mean of 3.47 and a standard deviation of 0.21, which means a neutral attitude.

This implies that while students show a positive attitude toward face-to-face learning and SLMs in science in terms of academic and emotional support, they remain uncertain about the physical health and financial implications of returning to school. Their neutral ratings in these latter aspects suggest concerns about safety and economic readiness that may affect their overall confidence in the learning setup. As a result, their overall attitude being rated as neutral reflects a balanced but cautious stance, with strong support for learning effectiveness but reservations about external factors impacting their education.

The students' overall positive attitude toward the academic and emotional aspects of face-to-face learning and SLMs in science indicates a strong appreciation for direct instruction and teacher interaction, which are essential for understanding complex concepts and fostering emotional well-being. This is supported by the findings of Aguilera-Hermida (2020), who emphasized that students were more engaged and motivated when learning environments provided emotional support and academic structure, both of which are more effectively delivered in face-to-face settings. The emotional comfort associated with classroom interaction also enhances students' focus and learning outcomes, reinforcing their preference for in-person modalities.

However, the neutral ratings in physical health and financial aspects suggest lingering concerns about the risks and costs of returning to school. According to Aristovnik et al. (2020), many students and their families still face uncertainty about health safety in schools post-pandemic and the financial burden of education-related expenses. These concerns can temper students' overall enthusiasm for in-person learning, resulting in a neutral overall attitude despite strong academic and emotional support. This indicates that while students are ready and willing to learn, external factors like health security and financial preparedness remain crucial to fully supporting their educational engagement.

The Academic Performance of The Students

Table 7 shows the academic performance of the students, weighted mean was utilized.

This was interpreted by the following numerical and adjectival descriptions:

Descriptors	Grading Scale	Remarks
Outstanding	90-100	Passed
Very Satisfactory	85-89	Passed
Satisfactory	80-84	Passed
Fairly Satisfactory	75-79	Passed
Did Not Meet Expectations	Below 75	Failed

Table 7
Academic Performance of the Students

	Frequency	Percent
Outstanding	17	5.4
Very Satisfactory	100	31.7
Satisfactory	83	26.3
Fairly Satisfactory	115	36.5
Total	**315**	**100.0**

This table shows the academic performance of the students among of 315 students as stated only 17 students got the outstanding with the percent of 5.4 followed by very satisfactory had the frequency of 100 with 31.7% and for the satisfactory had the frequency of 83 or 26.3% and lastly, most of the students had fair satisfactory with the frequency of 115 or 36.5%.

This implies that most students are performing within the mid-range levels, with the highest concentration in the "fairly satisfactory" and "very satisfactory" categories. The low number of students who achieved an "outstanding" rating suggests that academic excellence is limited to a small portion of the population. This distribution may indicate the need for improved teaching methods, targeted interventions, or support systems to help more students reach higher levels of academic achievement.

The overall student performance was characterized by a very small percentage (5.40%), only 17 of 315, that received an Outstanding score; this indicates a relatively small number of students scored at the top of the scale. Many students were concentrated in the Satisfactory and Fairly Satisfactory areas, which would indicate that many students performed at a moderate level. Overall, there are a need for improved instruction, appropriate supplemental learning materials, as well as different forms of support for the students in order to enhance their ability to achieve higher academic success, especially in Science.

This indicates that a large majority of students are at the middle level of performance; there is a larger proportion of students that have been rated "fairly satisfactory" or "very satisfactory". With less than half of all participating students being rated as "outstanding", it may be beneficial to strengthen instruction by adding specific academic intervention(s) so that additional students can achieve at a higher level of performance. Tanucan et al. (2023) also suggested that effective printed modular distance learning would require good design of teaching material(s); collaboration among

teachers, family members, community organizations, and social-emotional/academic support from schools to assist with overcoming students' academic challenges.

The Significant Difference on Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science When Classified by Sex

Table 8 shows the significant difference in students' attitude towards face-to-face learning modality and SLMs in science when classified by sex.

Table 8

Significant Difference on Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science When Classified by Sex

Variable	Mean Rank	Test Stat	p-value	Decision for Ho	Conclusion
Academic aspect		11039.500	.374	Do not	Not
Male	152.24			Reject Ho	significant
Female	161.60				
Emotional aspect		10203.500	.050	Reject Ho	Significant
Male	145.33				
Female	165.90				
Physical health		11563.500	.825	Do not	Not
Male	159.43			Reject Ho	significant
Female	157.11				
Financial aspect		11558.000	.818	Do not	Not
Male	156.52			Reject Ho	significant
Female	158.92				
Overall Attitude		10675.500	.177	Do not	Not
Male	149.23			Reject Ho	significant
Female	163.47				

Mann-Whitney test at 5% level of significance revealed a no significant difference on the overall attitude towards face-to-face learning modality and SLMs in science between male and female respondents, $U = 10675.500$, $p = .177$. Therefore, do not reject Ho. As stated on the table that the emotional aspect revealed that had significant difference between male and female because the p-value of 0.05. Therefore, reject Ho.

This implies that male and female students generally share similar attitudes toward face-to-face learning and SLMs in terms of academics, physical health, finances, and overall perception. However, the significant difference in the emotional aspect suggests that gender may influence how students emotionally respond to learning environments, with one sex potentially feeling more supported or comfortable than the other.

The finding that there is no significant difference between male and female students in terms of academic, physical health, financial aspects, and overall attitude reflects a broader trend observed in recent studies, where gender has a limited effect on students' general perceptions of learning modalities. According to the study by Al-Samarraie et al. (2018), both male and female students tend to respond similarly to academic challenges and logistical concerns such as health safety and financial readiness when given equal access to educational resources. This suggests that the core components of learning, like comprehension, access, and physical well-being, are not heavily influenced by sex in many educational contexts.

The significant differences identified in terms of the emotional experience are consistent with those documented by Besser et al., (2022) for females' reporting of greater emotional sensitivity and stress relating to learning environment transition (e.g., from hybrid to modular or back to face-to-face). Psychological and social factors typically influence emotional engagement in learning, particularly for female students, whose sense of belonging may be closely tied to their perceptions of support from teachers and quality of interactions within classrooms. In this way, there exists a clear need for educators to develop emotionally responsive teaching methods tailored to meet the unique emotional needs of each gender to foster an inclusive learning environment that promotes student success.

The Significant Difference on Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science When Classified by Age

Table 9 shows the significant difference in students' attitude towards face-to-face learning modality and SLMs in science when classified by age.

Table 9
Significant Difference on Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science When Classified by Age

Variable	Mean Rank	Test Stat	p-value	Decision for Ho	Conclusion
Academic aspect		8.965	.011	Reject Ho	significant
12 to 13 y.o.	176.23a				
14 to 15 y.o.	146.24b				
16+ y.o.	142.96b				
Emotional aspect		19.131	.000	Reject Ho	significant
12 to 13 y.o.	183.63a				
14 to 15 y.o.	145.39b				
16+ y.o.	128.46b				
Physical health		1.388	.499	Do not	Not

12 to 13 y.o.	152.38			Reject Ho	significant
14 to 15 y.o.	165.29				
16+ y.o.	154.81				
Financial aspect		18.795	.000	Reject Ho	significant
12 to 13 y.o.	183.46a				
14 to 15 y.o.	135.31b				
16+ y.o.	150.36b				
Overall Attitude		21.184	.000	Reject Ho	significant
12 to 13 y.o.	185.57a				
14 to 15 y.o.	142.94b				
16+ y.o.	129.42b				

Kruskal-Wallis test at 5% level of significance revealed a significant difference on the overall attitude towards face-to-face learning modality and SLMs in science when respondents are classified by age, $H = 21.184, p < 0.01$. Students aged 12 to 13 years have a more positive attitude towards face-to-face learning modality and SLMs in science than students' aged 14 and above. Therefore, reject Ho.

This implies that students across different age groups share similar attitudes toward face-to-face learning and SLMs in all measured aspects, including academic, emotional, physical health, financial, and overall perspective. It suggests that age does not significantly influence how students perceive and respond to various components of their learning experience.

The findings revealed significant differences in the respondents' attitudes toward self-learning modules and face-to-face learning when grouped according to age in terms of academic, emotional, and financial aspects, as well as their overall attitudes. This indicates that age plays a significant role in how students perceive and respond to different learning modalities. However, no significant difference was observed in the physical health aspect ($p = .499$), suggesting that students across different age groups have similar perceptions regarding the physical health implications of the two learning modalities. For instance, the research of Panigrahi, Srivastava, and Sharma (2018) demonstrated that whether students learn in-person or through modular learning methods tend to have very similar perceptions about the two types of learning modalities when both are presented within the same environment and/or with comparable resources. Therefore, these researchers indicated that age itself would likely not have an enormous effect on how students interact with or respond to learning difficulties as long as the way children were educated remained equal in its support of them.

Additionally, a research paper authored by Gonzalez et al. (2020) found that elements like teacher ability to teach effectively; availability to students of the tools necessary to complete assignments; and emotional support provided to the students had a significantly greater impact upon the development of students' attitudes toward school and their education than did the age of the students. Thus, the findings of this study further substantiate the premise that schools/educational institutions need to focus on enhancing the quality of instruction; increasing accessibility to educational resources; etc., instead of developing educational programs tailored exclusively to meet individualized educational needs based upon students' ages. Therefore, implementing a common strategy for meeting the educational

requirements of all students at every age level could be successful as long as those strategies address each factor that affects ALL learners in an identical manner.

The Significant Relationship Between the Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science and Academic Performance

Table 10 shows the significant relationship between the students' attitude towards face-to-face learning modality and self-learning modules and academic performance.

Table 10
Significant Relationship Between the Students' Attitude Towards Face-To-Face Learning Modality and SLMs in Science and Academic Performance

Variable	Spearman's rho	p-value	Decision for Ho	Conclusion
Academic aspect & academic performance	-.051	.364	Do not Reject Ho	Not significant
Emotional aspect & academic performance	-.098	.084	Do not Reject Ho	Not significant
Physical health & academic performance	.023	.681	Do not Reject Ho	Not significant
Financial aspect & academic performance	-.030	.591	Do not Reject Ho	Not significant
Overall Attitude & academic performance	-.071	.212	Do not Reject Ho	Not significant

Spearman rank correlation test at 5% level of significance revealed no significant relationship between attitude and academic performance, $r_s = -0.071,\ p = .212$. Therefore, do not reject Ho.

This implies that students' attitudes toward face-to-face learning and SLMs in science are not significantly related to any single aspect—academic, emotional, physical health, financial, or overall—at the 0.05 level of significance. In other words, no specific attitude factor strongly predicts or influences their general preference or response to the learning modalities. This suggests that students' attitudes are shaped by a combination of various factors rather than being driven by just one dimension of their experience.

The finding that there is no significant relationship between students' attitudes toward face-to-face learning and SLMs in science across academic, emotional, physical health, financial, and overall aspects aligns with recent research highlighting the multifaceted nature of student engagement. According to Barrot, Llenares, and del Rosario (2021), learners' attitudes during the shift to blended or modular modalities were influenced by a complex interaction of home environment, school support, and personal motivation, rather than any single factor. This suggests that no one domain—whether academic performance or emotional readiness—can independently explain or predict students' overall attitude toward learning modalities.

The research conducted by Adnan and Anwar (2020) also determined that although students reported various perceptions regarding online and modular delivery methods, students' attitudes toward these formats were largely independent of specific individual characteristics such as age, health-related issues, and/or socioeconomic status. As opposed to this, a larger number of contextual elements — e.g., access to quality instruction, teacher/peer support, and flexibility with respect to multiple learning environment options — played a much more important role in determining student attitude. The data collected in this study are consistent with the concept of students' attitudes being formed through a composite experience instead of separate variables — which may explain why no statistically significant relationship was observed at the 0.05 confidence level.

Conclusions

Based on the data collected from this research and taking into consideration the limits of the research, the following conclusions were drawn. Most of the participants responding to this survey consisted of females in the 12-13 years old category. Overall, students have indicated they are overwhelmingly favorable towards the idea of attending school using face-to-face methods as well as learning science by means of self-directed modules (SLM). Additionally, in terms of providing both academic and emotional support, students believed that face-to-face delivery provided them better opportunities to understand scientific concepts. Students further believed that having a personal connection with their teachers made them feel emotionally supported. Thus, it can be concluded that a student's confidence and level of interest is greatly enhanced when they receive emotional support from their teacher. Further, in terms of the physical health and economic benefits associated with going back to face-to-face schooling, students had an overall positive response; however, there is still a considerable amount of concern associated with each area. Such concerns indicate that schools would benefit from strengthening the teacher/student relationship while at the same time being cognizant of the learner's potential physical health risks and financial burdens. Most students performed academically within the fairly good to excellent rating range, and only a few received an exceptional rating. It appears that several instructional techniques could be employed to improve student performance. Specifically, improving instructional techniques, utilizing more diverse teaching techniques, and employing more specific academic support techniques would be beneficial. As stated previously, the responses to the survey did not reveal a statistically significant difference in the overall attitude of males vs. females toward face-to-face delivery of science education and use of SLMs. However, the data indicated that a statistically significant difference existed concerning the emotional aspect. This indicates that gender may influence certain emotional experiences when students learn. There was also a statistically significant difference related to age in how students responded to the question concerning whether they would prefer to attend school using face-to-face delivery and/or utilize SLMs to deliver science education. Specifically, younger students (i.e., 12-13 years old) reported a greater preference than older students (i.e., 14+ years old) toward the use of face-to-face delivery of science education. Consequently, educational programs and materials will likely need to consider the developmental needs of children as well as age-related differences when implementing instructional strategies and delivering learning supports. Lastly, no statistical correlation was identified between student attitudes toward various forms of learning and academic performance. This result indicates that possessing positive attitudes toward different types of learning does not automatically mean that a child will perform better academically. Therefore, schools will need to implement programs designed to address both student attitudes and learning preferences as well as other variables that may impact a child's academic success (e.g., quality of instruction; availability of learning resources; individual learning needs).

Recommendations

1. Teachers need to use the traditional method (face-to-face) when teaching difficult scientific concepts that require a lot of interaction because it is the best way to ensure all students understand and remain engaged. There are many ways to provide additional tutoring or enrichment to those students struggling with independent learning.

2. Students were much more comfortable socially/ psychologically in face-to-face classrooms, so there should be consistent communication by the teacher to students, and there should be an effort made by each school to create a physically/emotionally safe environment. To further support this, schools could offer one-on-one guidance counseling, peer support groups, etc. for students feeling isolated, which could be very important if schools transitioned to online SLMs.

3. School administrators and health officials must work together to increase awareness of school safety procedures and strengthen these school safety initiatives to help alleviate fears of both students and parents. The administration at schools can also do their part to encourage all students' parents to get their children vaccinated against Covid-19 via informational campaigns and collaborations with local health units. This would likely make parents feel safer sending their kids back to school.

4. Both local government entities and schools should continue providing financially assisted programs such as; tuition/subsidies for transportation and/or internet access for blended learning models. Additionally, institutions can identify and reduce hidden costs associated with either modality to decrease the economic burden placed on families.

5. Ultimately, to promote positive attitudes toward education, schools should implement a variety of differentiated instruction based on students' individual needs as determined by ongoing assessment. Schools must regularly monitor and solicit feedback from students regarding their learning experiences to tailor instruction to meet their individual needs and contribute to both educational achievement and well-being.

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