



(RESEARCH ARTICLE)



## Correlation of engagement and study skills of junior high school students in Science modular instruction amidst pandemic of the public secondary schools in Calbayog districts

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### Abstract

Due to the spread of the COVID-19 pandemic, schools were forced to close and shift to a new modality of instruction to meet students' educational needs. This study assessed the correlation of engagement and study skills of junior high school students in Science modular instruction amidst the pandemic of the school year 2021-2022 among the public secondary schools in Calbayog districts of the Schools Division of Calbayog City. A descriptive correlational method of research was used by the researcher. A set of questionnaires was distributed to the 367 respondents. The questionnaire assessed the profile of the respondents, their level of engagement, and study skills in science modular instruction during the COVID19 pandemic. The finding of the study revealed that students were highly engaged in Science modular instruction in terms of affective, behavioral, and cognitive aspects. It also found out that students showed very high study skills. Further, the study disclosed that the level of students' level of study skills in Science Modular Instruction amidst pandemic when grouped to their demographic profile. Results showed that parents' educational attainment and family monthly income of the students were noted as predicting factors to their study skills. With this, the researcher recommends that the study skills of the students must be given attention. Thus, training design is proposed to sustain students' engagement and strengthen students' study skills in science modular instruction among junior high school students through the "motivational design approach" of the Attention, Relevance, Confidence, and Satisfaction (ARCS) Model.

**Keywords:** Modular Learning and Instruction; Online Learning; Pandemic; Program Intervention; Student Engagement

### 1. Introduction

The advent of a pandemic in the form of COVID-19 has hastened the transition to and adoption of new learning methods for online or remote delivery. One of the underlying assumptions is that the use of the new learning materials positively influences student engagement, a vital characteristic of high-quality teaching and learning, and the outcome of learning [1]. However, in the context of modular learning and instruction before the pandemic, students and educators didn't rely so much in this type of learning and instructions. Students always sought the presence of the teachers and other educators and submit themselves in a face-to-face discussion to understand certain difficult topics and ideas in a certain subject. On the other hand, modular learning and instruction during the pandemic is the main tool of teaching students to response and ensure continuity of education even though students are at the comfort of their homes. In contrast, despite widespread acceptance, the culture of remote learning remains a significant obstacle that must be addressed. The merits of modular distance learning for students are a source of heated debate. Some learners believe that this type of learning does not necessitate any effort on their part. They also expressed dissatisfaction with the current state of student supervision during tests. In addition, special attention must be paid to issues involving cheating. Meanwhile,

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some students may believe that because they are not in school, they can do whatever they want and that studying is no longer necessary. 'Distance learning does not support the idea of direct communication between the teacher and the student, which may result in the student becoming lazy in his or her learning process because he or she is not under the domination of the teacher and the school administration,' according to [2]. Others have proposed, "We may need to research strategies that are merged with distance teaching to boost students' participation," in a similar spirit [3]. According to [4], there is a growing awareness of the necessity of understanding student involvement and the problem of school disengagement. Examining the elements that influence student engagement and disengagement can reveal information on student performance, development, and retention. When evaluating the quality of student learning experiences and making decisions about resource allocation, course content, and delivery, engagement assessment may be valuable. Student participation is critical for a variety of reasons. Student engagement is critical because it allows students to learn since it is difficult to fathom learning Science or others subjects without it. Student engagement is critical because it predicts how well students perform in school, including whether or not they make academic progress [5]. Student engagement is particularly significant since it is a flexible student trait that is unusually susceptible to positive influences, such as a teacher's encouragement [6].

Student engagement is also crucial because it provides teachers with the real-time feedback they need to judge how successfully their attempts to encourage students are working, as there is no better indicator of a student's private motivation than their public participation. But, as crucial as they are, all of these factors are well-known. Effective studying, on the other hand, is the one factor that guarantees good grades in school. However, it is ironic that how to study efficiently is nearly never taught in school. For example, taking notes is a vital component of studying, yet few students are taught how to do it right now. However, learning how to study and developing the study skills of the students is difficult at this time of the pandemic. This is also one factor that needs to be considered by the school heads as it affects the performance of the students. It has been scientifically proven that one method of taking notes is superior to others and that there are methods for more successful reviewing, memorizing, and textbook reading. [7] discovered that study skills and habits had a big impact on academic success. Self-regulated learning models assume that while students work toward a learning objective, they must track their own progress and then regulate and alter their cognition, motivation, and behavior to achieve that goal. To accomplish so, students must have a clear comprehension of the content's boundaries, which will allow them to estimate how much study time they'll need and choose appropriate study approaches to master the material. Good study habits include many different skills: time management, self-discipline, concentration, memorization, organization, and effort. Desire to succeed is important, too [8]. Study skills are comprised of a range of integrated neurological systems that enhance the efficiency and capability of a students' ability to gain, retain, and process information. Study skills can be looked at from two distinct, and equally important, factors of academic and nonacademic processes [9]. Academic aspects of study skills include organizational and time-management techniques, information processing, memory procedures, and metacognitive comprehension [10]. Nonacademic aspects are the mindset of successful studying, such as perseverance, motivation, self-efficacy, and the desire for growth and improvement [11]. The ability of diverse students to engage in self-regulated learning by increasing their study abilities despite the lack of student engagement inside the school owing to the new normal setup of education is one of the characteristics that this study highlighted. As a result, this study was able to identify concerns and a program intervention could be offered to solve the issue. Concomitantly, the growing dilemma of how to meet learners' needs for quality education, as well as the necessity to reassess school academic procedures to make modular distance instruction responsive to students' needs necessitates this research. The purpose of this study is to identify the degree of and examine the correlation between student engagement and study skills of junior high school students in modular distance instruction during COVID-19 pandemic.

### 1.1. Theoretical Framework

This study drew upon Self-Determination Theory (SDT) to specify relevant information about student engagement, and how the measures of particular scales might prove useful for student and teacher reflection. Self-determination theory (SDT) is a theory of motivation that uses traditional empirical methods to build its theory and to inform its classroom applications. The theory assumes that all students, no matter their age, gender, socioeconomic status, nationality, or cultural background, possess inherent growth tendencies (e.g., intrinsic motivation, curiosity, psychological needs) that provide a motivational foundation for their high-quality classroom engagement and positive school functioning [12]. SDT is a contemporary theory of motivation that proposes three basic psychological needs – autonomy, competence, and relatedness – as essential ingredients for human motivation, optimal functioning, and well-being [12]. The need for autonomy refers to an individual's experience of choice, volition, agency, and self endorsement. Research has shown that when students experience agency and choice in the classroom, they report self-determination and intrinsic motivation for engaging in academic activities [13]. The need for competence refers to feeling confident, capable, and self-efficacious [44]. Evidence suggests that when students are trusted for undertaking a challenging task and are assigned responsibilities, and when they feel capable of producing a change in their environment, they experience

competence need satisfaction, and report intrinsic motivation to engage in academic tasks [14]. The need for relatedness refers to connectedness, interpersonal bonding, and a sense of belonging among individuals. Students who experience the satisfaction of this need also report intrinsic motivation [15]. Additionally, this study followed [16] “model of engagement” which described engagement as a malleable, developing, and multidimensional construct that consists of three broad dimensions: behavioral, cognitive, and emotional. The dimensions, according to the authors, are not isolated but interrelate with each other [17]. On study skills, the “theory of student involvement” stressed that the greater the student’s involvement in school, the greater will be the amount of student learning and personal development [18]. The productive engagement is an important means by which students develop feelings about their peers, professors, and institutions that give them a sense of connectedness, affiliation, and belonging, while simultaneously offering rich opportunities for learning and development. The time and energy students devote to educationally purposeful activities is the single best predictor of their learning and professional development. Those institutions that more fully engage their students in the variety of activities that contribute to valued outcomes can claim to be of higher quality compared with other schools where students are less engaged. The cited theories on students’ engagements and study skills have a significant bearing on the present study, for they gave an insights and concrete explanations about student’s motivation and personalities in the absence of internal and external influences. Since the present study centered on the correlation of engagement and study skills of the junior high school students in their science modular distance instruction amidst the pandemic, the cited theories helped emphasize and explain some important aspects and ideas that served as a foundational guide to be considered to fully understand the relationships of students’ engagement and study skills in improving their academic knowledge and performance despite utilizing the modular distance instruction, as a new mode of learning delivery in these time of the pandemic.

## 1.2. Conceptual Framework

In the conceptual framework, the profile of the students is examined in relation to various factors including age, gender, grade level, parents' educational attainment, and family monthly income. These factors provide insights into the diverse backgrounds and contexts in which the students are studying science. The analysis of the students' profiles helps in understanding the potential influence of these variables on their engagement in science modular instruction. The level of engagement in science modular instruction is assessed across affective, behavioral, and cognitive domains. Affective engagement focuses on the students' emotional connection and interest in the subject matter. Behavioral engagement examines their active participation, involvement, and willingness to learn. Cognitive engagement evaluates their intellectual involvement, critical thinking, and understanding of scientific concepts within the modular instruction.

Furthermore, the students' level of study skills within the science modular instruction is evaluated across multiple dimensions. These include time management and procrastination, concentration and memory, study aids and note-taking techniques, test strategies and test anxiety, organizing and processing information, motivation and attitude, reading comprehension and identifying main ideas, as well as writing skills. To address the identified areas for improvement and enhance student engagement, a proposed program intervention is introduced. The program is designed to promote student engagement and enhance study skills specifically in the field of science. Through the implementation of interactive teaching methods, hands-on experiments, group discussions, and multimedia presentations, the program aims to create a dynamic learning environment that encourages active student participation and fosters a deeper understanding of scientific principles. The program also incorporates targeted strategies for improving study skills. It provides guidance on effective time management, concentration techniques, note-taking methods, test preparation strategies, and overall organization and processing of information. By addressing these study skills, the program aims to equip students with the necessary tools to excel in their scientific studies. The proposed intervention emphasizes regular assessments, feedback, and peer collaboration to monitor students' progress and provide additional support as needed. The ultimate goal of the program is to increase student engagement in science, improve study skills, and foster a lifelong passion for learning in the field of science.

In the later part of the year 2019 towards the very beginning of 2020, a previous unidentified corona virus variant, currently named COVID-19 struck the entire world putting everyone into great fear and devastation. According to [19] in their published reports about COVID-19: An ongoing public health crisis, schools in many countries are forced to close and were confronted with many unprecedented challenges brought by the pandemic. In the Philippines, the corona virus disease (COVID-19) crisis has impacted not only the economic, psychological, and social aspects of the country but also particularly, the educational sector to a great extent [20]. To respond to the challenge of innovating educational delivery mechanisms, the Department of Education migrated the traditional face-to-face into remote learning by all levels of educational institutions in the new normal education. Thus, the traditional delivery of instruction in education has transformed and in turn, learning spaces were reorganized. Different learning modalities were created and utilized. One of which is the use of a module as a means of learning delivery [21].

Based on the study conducted by [22], modular instruction is more operative in the teaching-learning method as equated to usual teaching approaches because in this modular approach the students learn in their own stride. It is unrestricted self-learning panache in which instantaneous reinforcement, a comment is provided to practice exercise, which stimulates students' motivation and engagements as well as it builds curiosity in them. Hence, this kind of learning modality increases the student-centered approach in learning.

However, according to [23] on her study about reasons on students' engagement in modular learning, some students are not motivated in engaging themselves doing all the activities and exercises in their modules due to some presented reasons: (i) Students' life circumstances have changed, (ii) Students are dealing with stress and trauma, (iii) The content isn't accessible, (iv) Students need more structure and support and (v) Expectations for engagement haven't changed. These reasons, according to the results of the study will hinder a single student in performing well in his studies and to continue learning in a less hassle way especially if the student is less motivated and is deprived with guidance from the knowledgeable person like his parents.

In this context, [24] aimed to understand the relationship between students' engagement in an online module with their overall performances by analyzing students' learning activities in an online module. Three measurable indicators were identified and considered relevant with the current research context and based on the available data, and from research literature for assessing learner engagement within the module. There were (i) the number of completed learning activities; (ii) importance level (as per course outcomes) of completed learning activities; and (iii) activities requiring platform presence. It was found that there is a significant but weak positive correlation between the engagement of students in the online module and their performances in the final learning activity. It was further observed that when continuous learning activities were considered, there was a very strong positive correlation between engagement and performances. In general, the average engagement level of students was significantly higher for good performers as compared to low performers. Similarly, the mean performance of highly engaged students was significantly better than those with low engagement levels.

Further, to concretize the context, [25] in their study on the effectiveness of study skills and students' engagement in the academic performance of the university students. It revealed that there was a significant association between the students' performance and engagement in the subject and their study skills. The students with high exam scores often showed higher percentage of use of various study skills and have an engagement of the different activities and exercises in their modules compared to the students with have lower exam scores. However, they also find in their study that the techniques used by the students are beneficial but not all are effective. Same with their engagement.

Likewise, [26] on their study on Chinese secondary school students' reading engagement profiles: associations with reading comprehension, revealed that to some extent, the reading engagement profiles were linearly associated with reading comprehension. On the other hand, the mixed patterns suggest that the reading engagement profiles could be differentially associated with reading comprehension. The findings support the utility of exploring multidimensional reading engagement profiles in planning instruction to improve Chinese secondary school students' reading skills. This clearly means that, as students engage themselves more time in reading their reading skills and comprehensions will improved.

[27] in their study on the relationships among measures of students' engagement, instructor engagement, students' performance and properties on the online classroom. It revealed that there was a positive association of students' cognitive engagement and instructors' behavioral engagement with the depth of the discussion prompts. Both cognitive and behavioral measures of students' engagement decreased with increased class size. For instructors, as class size increased, behavioral engagement decreased, and cognitive engagement increased. Grades improved with students' emotional engagement but declined with instructors' cognitive engagement. These idiosyncratic patterns of relationships suggest the need for further inquiry into the unique aspects of instruction in the asynchronous online classroom.

Similarly, [28] determined the extent of student engagement at Partido State University and analyzed the factors affecting student engagement. The study revealed that the level of student engagement along behavioral, emotional and cognitive engagements were high with a mean of 2.84. With that result, it was found out that behavioral, emotional and cognitive engagements were positively correlated to the academic performance of the students. The teacher, the school and the parents should have a strong collaboration to provide more opportunities for students to maximize their university engagement.

For [9] in their study about importance of study habits, study skills and attitude, disclosed that student's engagement alone is not enough in enhancing students' academic performance for certain area or field. They found out that study

skills inventories and constructs are largely independent of both high school grades and scores on standardized admissions tests but moderately related to various personality constructs. Study motivation and engagement as well as study skills exhibit the strongest relationships with both grade point average and grades in individual classes. Academic specific anxiety was found to be an important negative predictor of performance. In addition, significant variation in the validity of specific inventories is shown. Scores on traditional study habit and attitude inventories are the most predictive of performance, whereas scores on inventories based on the popular depth-of-processing perspective are shown to be least predictive of the examined criteria. Overall, study habits and study skills measures improve prediction of academic performance more than any other non-cognitive individual difference variable examined to date and should be regarded as the third pillar of academic success.

Further, [9] implies in his study that student's engagement and study habits are not only indicating how learners learn, but they can help an instructor support on individual student, so that they might teach successfully. It was out found that there is a significant correlation between the two study habits (concentration and planning of subjects). Considering that, it is difficult to control concentration in online synchronous settings, it is also deemed necessary for the instructors and the environment designers to take special measures in this respect. The planning of work is not an easy task for distance learners to perform. At this point, instructors can announce their syllabus which may provide support for these students at the beginning of the terms. Hence, learning performances can be enhanced with measures to easily bring forward study habits for distance learners.

In this study, home environment and planning of work, reading, and note taking habits do not have a significant correlation with academic achievement in online synchronous settings. In particular, it is quite difficult to apply note taking habits due to the nature of the online synchronous setting. At this point, it may be proper for instructors to highlight the course records and to direct the students to watch these records. Further, students' engagements among students must be maximized by the teachers so that student's motivation will be enhanced. And if students are motivated, they can devise and create their own study habits which are an important factor in enhancing performance.

For [29] he determined the study habits of students during the Covid19 pandemic. The results indicated that female students had better learning habits than male students specifically in time management, were active in learning activities, the ability to find learning materials/references, and had the ability to take notes in general.

Meanwhile, [30] investigated gender participation differences in online modular discussions. They found out that females posted more messages than males. [31] also found out that females posted interaction and engagement in their online modular classroom discussions. In their study, they found out that women actually became more participative than men. Women participated more through volunteering in answering some of the module's activities and exercises. And share this with their classmates or friends. Further, females preferred anonymous interaction to reduce gender-based judgment, and had more searching and asking question behaviors [32].

As a result of the material reviewed, the researcher now has the concepts and ideas necessary to understand the correlation of engagements as well as the study skills of the junior high school students, and how is the relationship of these concepts enhanced students' knowledge, motivation and skills towards learning. These serve as the foundation for the formulation of his research challenge as well as the frameworks for his investigation.

[33] studied the relationship between students' engagement and academic achievement of the three urban secondary schools in Auckland. The study was to identify the relationship between three domains of students' engagement, academic achievement, controlled for selected potential confounders, such as teacher support, peer support, school environment and student demographic characteristics. Further, the research also examined the relationship between students' engagement and achievement and whether the relationship between will suggest causal effect. Based on the findings, the study suggests that student's engagement is positively associated with academic achievement. But those finding will remain regardless of whether or not selected potentials confounders such as teacher support, peer support, school environment and background variables. In addition, the study also considered some personal factors that affect students' engagements in improving their academic performances. It revealed that study skills of the students are one of the important factors that has a causal effect to student's achievement. This further means that if the students will consider a wide range of study skills in learning regardless of the support they get from their teacher, peers and school environment they can enhance their academic achievement.

The interest of the cited study is related and works on the present study since both dealt with the relationship of students' engagement as well as on study skills. While the previous study was conducted on the three urban secondary schools in Auckland. The present study was conducted on all public secondary schools of Calbayog Districts, Division of

Calbayog City. Further, present study differs from the cited study since it focuses on to the modular distance instructions.

Meanwhile, [34] on their study about Formative Assessment as an Online Instruction Intervention: Student Engagement, Learning Outcomes, Study Skills and Perceptions, examines students' engagement, learning outcomes, study skills and perceptions of an online course featured with frequent tasks, quizzes, and test as formative assessment. The study was conducted at South China Normal University to 60 first year college students who were EFL learners. This student had actually completed college English I course in the previous semester through online and limited face-to-face classes. The study found out that frequent online formative assessments, clear online and face-to face discussions, as well as engaging and motivating activities, could serve as mechanism to monitor and diagnose the extent of student's engagement for online instruction. Further, with study skills and learning outcomes, they found out that there is a direct relationship of the two variables: study skills are directly correlated with learning outcomes. Based on the result, when a student uses a varied study skills for a certain topic, quizzes, tests in their assessment their learning outcomes is at best since their scores improved. The aforementioned research is closely related to the present study, for it both dealt with students' engagement and study skills.

The cited study actually examines how students' engagements and skills helps the student of South China Normal University in their online course while dealing with many featured formative assessments such as quizzes, test, and frequent task. And is similar with the present study since it examines how students engaged themselves and what study skills, they used in their Modular Distance Instruction. Further, the results of the cited study interest the present study since the present study dealt with the correlation of engagement and study skills of the junior high school students which is clear in the results of the cited study that study skills have a direct correlation with the learning outcomes. However, these two studies differ in terms of their respondents, locale of the study and as well as to the learning delivery modality. The cited study focuses on first year college students of South China Normal University who are actually enrolled for online courses. While the present study focuses on the public secondary students of Calbayog Districts, Division of Calbayog City who utilizes the modular distance mode of learning delivery.

[35] studied students' Perceptions of Engagement and Oral Interaction in Blended Learning Language Courses. The study was conducted to the first-year students of Business Administration of the University of applied sciences in Finland. It aims to investigate how students' engagement and oral language skills rehearsal are perceived in a blended learning language course. One of the findings revealed that meaningful course design with authentic assignments and course material enhanced students' academic engagements since students' own activity was perceived to foster academic engagement equally. Further, the findings also revealed that student's own activity was integral in terms of academic engagement. This further means that students have an active role in managing themselves as the owner of their own learning to improve their performance in Oral Language courses. The research of Kisi is closely related to the present study, for both dealt with the role of student's engagement in improving students' performance. Both studies highlighted the importance of student's active participation to certain course, activity or learnings. Further, the cited study is also related to the present study in terms of study skills since the student tends to prepare themselves by learning first the new material. However, they differ on the intended respondents as well as the focus field subjects.

[36] on his study about a phenomenological study of student engagement in an urban K-8 school provide insights and perspectives of students' and teachers' personal experiences and experiences within a Mathematics classroom. The key research questions targeted understanding student perceptions of their own level of engagement—behaviorally, emotionally, and cognitively; teacher perceptions of their students' levels of engagement; instructional factors that the students and teachers perceived as influential to student engagement; and determining whether students' perceptions of their engagement related to assessments of learning and growth in math class.

The study relied on interviews, classroom observations, and assessments of learning and growth. There was considerable overlap between teacher and student reports of influential instructional factors. Student perceptions of their own engagement did not conclusively correlate to growth, and neither students nor teachers had a shared definition of each component of engagement. In fact, a major finding was that participants had very different perception about what student engagement looks like in a classroom. Teacher perceptions of student engagement were highest for cognitive engagement and lowest for behavioral engagement, and assessment of learning and growth scores did not consistently align with teachers' perceptions of student engagement. The cited study works with the present study since it focuses and dealt with students' engagement. Since the aforementioned study targeted the understanding of student perceptions of their own level of engagement—behaviorally, emotionally, and cognitively; teacher perceptions of their students' levels of engagement; and instructional factors that the students and teachers perceived as influential to student engagement; and determining whether students' perceptions of their engagement related to assessments of

learning and growth in Mathematics class. On the other hand, it differs from the present study since it doesn't include variables about study skills which is also one of the primary focus of the present study.

[37] studied how students engage in a particular context both in and out of class using descriptive and interpretive case study analysis. Seven students were interviewed bi-weekly to recollect their engagement both inside and outside of the classroom. Interview data was then compiled and interpreted by the researcher to construct a case study for each participant. Students in the study reported a wide range of engagements and interactions with their instructional team, classmates, friends, and other professionals, which shared both similarities and differences from those of other students. Results from this study also suggest that student engagement is influenced by a series of contextual factors and individual characteristics such as course expectations, individual interests, and a willingness to collaborate. Further, the results also captured a broad range of student engagements in and out of the classroom, which were unique to the student and the context. The aforementioned study from Pascoe works and interests the present study, for it dealt with students' engagement. It actually focuses on how a particular student engage in a certain context both inside and outside of the classroom. The cited study guided the present study through giving an insights and ideas about how students' engagement affects students learning. However, both studies differ from each other, since the cited study is conducted during a limited face-to-face class where students are inside and outside the classroom. On the other hand, the present study was conducted to students who utilizes the modular distance instruction.

Likewise, [38] determines the relationship between study skills and students' attitudes towards science and technology modular classes. He looked and examined the correlations between students' usage of online modular resources, online modular homework's, and their attitudes towards science and technology modular classes and also their performance in the said class. He analyzed the student's cohort in detail based on their demographic profiles and initial responses to the surveys conducted. And he found out that there is a positive correlation between student's attitudes towards science and technology modular classes and their performance. Further, changes in students' attitudes were also studied as well as to their relationship to students' online resource package and usage. And the result revealed that that student who has positive attitudes towards their Science and technology modules tends to read and understand more topics from the modules. And as a result, their performance improved. The research work of Bowman is closely related to the present study for both dealt with the relationship between students' engagement and study skills towards modular classes. Although students' engagement is not directly highlighted on the cited study. Still students' attitude which is the one being mentioned seems to be related to students' engagement because it falls under the behavioral aspects of engagement. On the other hand, the cited study differs from the present study since it focuses solely on Science and technology modular classes. However, the present study focuses on the secondary school science modular classes. Which is from Grade 7 science to Grade 10 science.

[39] on their study about assessing study skills, students' engagements and self-regulated learning in a medical gross anatomy course revealed that sometimes teachers struggle with an understanding of how individual students are engaging in their courses, and how their study skills help them learn a particular topic from the course. The study is actually being drew upon self-regulated learning theory in order to specify relevant information about learning engagement, and how the measures of particular scales might prove useful for students/faculty reflection. The result revealed that showing the greater use of learning strategies and study skills such as elaboration, critical thinking, time management, and note-taking habits was associated and is directly correlated with higher levels of performance in their course. It further implies that information about the level of student engagement that instructors would likely find most useful can be linked to: (1) the learning strategies that students are encountering; (2) the barriers to learning that students are encountering; (3) whether the course materials and activities are yielding the intended learning outcomes; and (4) the amount of motivation, engagement and study skills they spent for they have a higher positive correlation level with their course performance. The aforementioned study is closely related to the present study since it focuses on students' engagement and touches also about students' study skills on their medical anatomy course. However, while the former focused on first-year college medical anatomy students, the latter is centered on the public secondary schools' students of Calbayog Districts, Division of Calbayog City. Further both studies differed from the other given objectives as well as on the research locale.

In recent years, technology has been significantly influencing various aspects of life, including education and workplace productivity. For instance, in a study conducted in 2021, [40] explored the effectiveness of technology on students' engagement and study skills. The qualitative study examined the quality of students learning using different online platforms to understand what influences students and study skills in their modular classes amidst the pandemic. The researchers conducted interviews with 21 students from various academic majors and utilized deductive content analysis to evaluate their responses. The study found that technology not only increased students' engagement and study skills but also directly correlated the students' study skills with the use of different technological platforms. These platforms encouraged students to invest more time and engage more thoroughly in their learning. They also helped

students to become more informed about the lecture material. In a similar vein, [45] highlighted the benefits of technology in the workplace, noting that repetitive tasks in work can be reduced through technological applications, thereby decreasing the employees' workload. The overarching implication is that technology, whether in education or in the workplace, can enhance efficiency, engagement, and productivity. It underlines the potential of technological tools and platforms in various contexts, underscoring the importance of their adoption and integration in both educational and work settings.

The discussion about the effectiveness of technology to students' engagement and study skills from the aforementioned study interest the present study for it gives guidance through giving insights and ideas on how students engagement and study skills affect students learning. How a modular platform helped students to become more motivated and used of course a wide range of study skills for their better learning. However, both studies differ in terms of research respondents and locale of the study. The cited studies in served as a guide for the researcher in devising their own study. These studies gave them a better understanding of their investigations and helped them chose the most appropriate research methodology.

This study focuses on investigating the correlation between student engagement and study skills among Junior High School students during their Science modular distance instruction amidst the pandemic in public secondary schools in Calbayog Districts, Schools Division of Calbayog City for the School Year 2021-2022. It aims to answer several key questions related to the students' profile, level of engagement, and study skills. Firstly, the study examines the profile of the student-respondents, considering factors such as age, gender, grade level, parents' highest educational attainment, and family monthly income. These details provide a comprehensive understanding of the students' backgrounds and socio-economic contexts. Next, the study assesses the level of engagement exhibited by the student-respondents during the Science modular instruction amidst the pandemic. The evaluation focuses on affective aspects, such as emotional connection and interest in the subject matter, behavioral aspects, which involve active participation and involvement, and cognitive aspects, which gauge intellectual engagement and understanding of scientific concepts within the modular instruction. Additionally, the study analyzes the level of study skills demonstrated by the student-respondents during the Science modular distance instruction amidst the pandemic. This assessment encompasses various aspects, including time management and procrastination, concentration and memory, study aids and note-taking, test strategies and test anxiety, organizing and processing information, motivation and attitude, reading comprehension and identifying main ideas, as well as writing skills.

The study further explores whether there is a significant difference between the profile of the respondents and their level of engagement in Science modular instruction amidst the pandemic. It also investigates whether there is a significant relationship between the respondents' profile and their level of engagement in Science modular instruction. Similarly, the study aims to determine if there is a significant difference between the profile of the respondents and their level of study skills in Science modular distance instruction amidst the pandemic. Additionally, it investigates whether there is a significant relationship between the profile of the respondents and their level of study skills in Science modular distance instruction. Moreover, the study examines whether there is a significant relationship between the respondent's engagement and their study skills during the modular distance instruction amidst the pandemic. Based on the findings of the study, the researchers aim to propose a program intervention that can promote student engagement and improve study skills in Science among the students. The significance of this study extends to various stakeholders. Learners benefit from well-designed and developed modular distance learning instructions that are detailed, logical, and user-friendly. Clear learning objectives contribute to a better understanding of expectations and promote success in learning the Science subject. Parents gain insights into their role in guiding and directing their children towards effective learning. Science teachers are encouraged to design well-structured lessons, maintain regular communication and presence in their subjects, and promote student engagement and study skills. This approach can enhance student perceptions of learning and satisfaction. School heads can utilize the study's results to implement intervention mechanisms that promote study skills and student engagement among junior high school students. Lastly, the findings of this study serve as a guide for researchers interested in conducting similar studies.

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## 2. Material and methods

The study took a quantitative approach, involving measurements and amounts, in order to determine the answers to queries such as how many, how much, how long, and to what extent. Moreover, this study employed non-experimental research to find out truths about a subject by describing the obtained data and determining their correlations or connections. More specifically, a descriptive-correlational research design was used for this study. Correlation research sought to explore the relationships between variables. It can predict variables or create a theory about a complex phenomenon. [41] defined correlation research as the study of relationships between two or more phenomena using statistical measures of correlation. This relation measures the degree of correlation between variables. It was being



compared to their profile characteristics in this study. A survey questionnaire was the primary data gathering instrument. Data collected were subjected to appropriate statistical analysis, and the findings was used as fundamental sources in discussing the answers to the specific problems of the study.

This study was conducted in the Calbayog District of the Schools Division of Cabayog City. Calbayog District has six (6) sub-districts. This is from Calbayog I to Calbayog VI districts. Calbayog I District comprises two (2) public secondary schools namely: Carayman National High School and Seven Hills National High Schools. Calbayog II Districts comprises of lone secondary school, the Bagacay Integrated School. Calbayog III District comprises of two (2) public secondary schools namely: Calbayog Night High School and Calbayog City National High School. Both schools are located at the heart of Calbayog City proper. While, Calbayog IV District comprises three (3) public secondary schools namely: Happy Valley National High School, Migara National High School, and Tabawan Integrated School. For Calbayog 5 Districts, it comprises three (3) public secondary schools such as San Policarpo National High School, Acedillo Integrated School, and Gadgaran Integrated School. And for Calbayog 6 District, comprises two (2) public secondary schools namely: Trinidad National High School and Basud Integrated School. But Basud Integrated School offers an incomplete JHS curriculum since it has only Grade 7 and Grade 8. Furthermore, the City of Calbayog is a 1st class component city in the province of Samar, Philippines. It is the sixth-largest city in terms of land and water areas in the Philippines. It has a total land area of 90,300 hectares which is 0.301% of the archipelago's total land area, or 6.10% of the land area of Samar Province. It lies along the coastal region of the province stretching about 60 miles (97 km) from the northern tip of the island and 180 miles (290 km) from southern boundaries.



**Figure 1** Location Site of the Study on the Correlation of Engagement and Study Skills of Junior High School Students in Science Modular Instruction Amidst Pandemic of the Public Secondary Schools in Calbayog District

The respondents of the study were composed of junior high school students from the various public secondary high schools in Calbayog Districts. The total population of junior high school students in the said district is 8,179. The researcher employed the Raosoft sample size calculator in calculating the sample size of this study using a 5% margin of error and 95% level of confidence. Below is the table showing the distribution of respondents in this study. Based on the computation, the sample size of the study is 367 and was equally distributed to the different schools in Calbayog Districts based on the proportionate formula.

Table 1 showed both the population and the sample who served as respondents of the study. Based on the computation, the sample size of the study is 367 from the 8179 population of the Junior High School students in the different secondary schools of Calbayog Districts which were selected as the research respondents of the study. The researcher employed the Raosoft sample size calculator in calculating the sample size of this study using a 5% margin of error and 95% level of confidence. Proportionate Sampling was utilized to ensure high representation of the respondents to the total population of the Junior High School students in the respondent schools.

**Table 1** Frequency and Percentage Distribution of Respondents of the Study

Public Secondary Schools		N	n	%
1	Carayman National High School	361	16	4.41
2	Sevenhills National High School	148	7	1.81
3	Bagacay Integrated School	619	28	7.57
4	Calbayog City Night High School	247	11	3.02
5	Calbayog City National High School	2883	129	35.25
6	Happy Valley National High School	149	7	1.82
7	Migara National High School	407	18	4.98
8	Tabawan Integrated School	583	26	7.13
9	San Policarpo National high School	1442	65	17.63
10	Acedillo Integrated School	79	4	0.97
11	Gadgaran Integrated School	137	6	1.68
12	Trinidad National High School	557	50	13.74
Total		8179	367	100.00

The respondents of the study came from a total of twelve (12) public secondary schools in Calbayog Districts of Schools Division of Calbayog City, and the study employed a stratified random sample technique. Moreover, proportionate random sampling was used to determine the sample size in each school, ensuring that everyone has an equal or proportionate chance of being chosen as a respondent and that an equal or proportionate number of respondents was chosen in every school.

This study used a survey questionnaire as its primary data gathering tool. The instrument contained three (3) parts. Part I asked questions about the profile of the JHS students such as age, gender, grade level, parents' highest educational attainment, and family monthly income. Part II assessed the student engagement in Science modular instruction amidst pandemic. This instrument was an adapted instrument from the Student Engagement in Schools Questionnaire (SESQ) from the study of [42]. The SESQ is a Likert-type tool containing 22 items and composed of three (3) factors: affective engagement, behavioral engagement, and cognitive engagement. The students responded according to a Likert-type scale of 1-5 (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always). Part III measured the study skills of the Junior High School students in Science modular instruction amidst pandemic. An adapted instrument on Study Skills Assessment Questionnaire developed by [43] was used in this study. It is a 65-item questionnaire with eight (8) indicators such as Time Management and Procrastination, Concentration and Memory, Study Aids and Note-Taking, Test Strategies and Test Anxiety, Organizing and Processing Information, Motivation and Attitude, Reading and Selecting the Main Idea, and Writing. This was answered by the respondents using the 5-point Likert scale answerable from "Always" to "Never". (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always)

Before the conduct of the study, the researcher sought approval from the Office of Schools Division Superintendent, Department of Education (DepEd) Schools Division of Calbayog City to conduct the study in all the twelve (12) public secondary schools located in Calbayog Districts. The researcher also requested permission from the Office of the Public Schools District Supervisors. After it was approved, the researcher wrote a letter to the principal informing him of the approved letter of the conduct of the study and his intention to collect data from the school. Furthermore, he also wrote a letter to the respondents, stating the purpose of her research investigation, their participation, and the confidentiality of the information to be collected from them. The target group was informed with regards to the purpose of the research. The research instrument was explained through a cover letter attached to the survey/evaluation questionnaire. Specifically, the cover letter outlines the purpose and importance of the survey and states that the data will be reported only as an aggregate. It was explained that if the survey was returned, it would not be possible for the participant to withdraw because there was no way to identify which survey the participant had completed because of the confidentiality and anonymity of the respondents. Respondents were instructed not to place personal identifiers on the survey itself. Instructions on how to complete the survey was included at the top of the survey. Details of the individual responses were not used to identify individual responses. Also, the respondents are not in any danger of

physical/psychological risk or physical discomfort. They have the opportunity to contact the researcher for further information related to the results of the research. The distribution of the survey questionnaire was done face-to-face. The researcher had personally distributed the questionnaire to the respondents or their teacher advisers. Lastly, retrieval of the questionnaire was done by the researcher himself and then the data was gathered, tallied, analyzed, and presented using appropriate statistical tools.

Since the questionnaire was adapted from Student Engagement in Schools Questionnaire and Study skills Assessment Questionnaire developed by UHCL, it underwent face or content validity and internal consistency reliability test. It was subjected to a validation whereby the adviser and those who have knowledge about the topic critiqued the items as to their veracity and appropriateness. The corrections made were considered by the researcher in order to improve further the instrument. Then, the corrected instrument underwent pilot testing in which it was administered to Caglanipao Sur Integrated School since they are also a public secondary school under Calbayog City Division but situated in another district. There were thirty (30) samples who served as respondents during the try- out validation. After which, the reliability of the instrument was then measured through Cronbach's alpha analysis before it was distributed to the actual respondents.

**Table 2** Reliability Test Result of the Research Instrument

	<b>Level of Students Engagement in Science Modular Instruction</b>	<b>Cronbach's Alpha Value</b>	<b>Decision</b>	<b>Remarks</b>
A.	Affective Aspects	0.7578	Good	Accepted
B.	Behavioral Aspects	0.7412	Good	Accepted
C.	Cognitive Aspects	0.7432	Good	Accepted
	<b>Level of students' Study Skills in Science Modular Instruction</b>			
A.	Time Management and Procrastination	0.9281	Very Good	Accepted
B.	Concentration and Memory	0.9280	Very Good	Accepted
C.	Study Aids and Note Taking	0.9273	Very Good	Accepted
D.	Test Strategies and Test Anxiety	0.9273	Very Good	Accepted
E.	Organizing and Processing Information	0.9275	Very Good	Accepted
F.	Motivation and Attitude	0.9278	Very Good	Accepted
G.	Reading and Selecting the Main Idea	0.9276	Very Good	Accepted
H.	Writing	0.9274	Very Good	Accepted
	Over-all	0.936	Very Good	Accepted

**Legend: General Accepted Rule in Cronbach's Alpha Analysis (Cronbach, 1951):**Valu: Decision Remarks; < 0.6: Not Good Rejected/Revised; 0.6-0.7: Good Accepted; >: Very Good Accepted

Table 2 exhibit the reliability test of the research instrument. Using Cronbach's Alpha Analysis, the table shows the reliability results of the research instrument which is 0.936. This means that the decision is Very Good and it is therefore accepted. The table further shows the specific results of the subscales for students' engagement that falls on the Cronbach's value between 0.6-0.7. This means that all the subscales for students' engagement have a good result and is therefore accepted. Also, the subscales for study skills falls on the Cronbach's value that is greater than 0.8 and this implies that the result is very good and is therefore accepted.

Table 3 exhibits the normality test statistics of the research data. Using Kolmogorov- Smirnov and Shapiro-Wilk test for normality, the table shows how the research data was being distributed. For the level of students' engagement, Kolmogorov-Smirnov test for normality shows that the research data is normally distributed. It presents an overall statistics value of 0.219, degree of freedom (df) value of 365 and Sig. value of 0.629. For Shapiro- Wilk test for normality, the table shows a normal research data distribution for level of students' engagement. It presents an overall statistics value of 0.184, degree of freedom (df) value of 367 and Sig. value of 0.616. It therefore concludes that it is normally distributed since the Sig. (p) values are greater than 0.05. Similarly, for the level of students' study skills, Kolmogorov-Smirnov test for normality shows that the research data is normally distributed. It presents an overall statistics value

of 0.184, degree of freedom (df) value of 365 and Sig. value of 0.559. For Shapiro- Wilk test for normality, the table also shows a normal research data distribution for level of students' engagement. It presents an overall statistics value of 0.865, degree of freedom (df) value of 365 and Sig. value of 0.701. It therefore concludes that it is normally distributed since the Sig. (p) values are greater than 0.05. Through the data from the normality test that was used, the table concluded that both of the data under students' level of engagement and study skills were normally distributed. Since the values of statistics, degree of freedom (df) and Sig. are within the acceptable range of normality.

**Table 3** Normality Test Statistics of the Research Data

	Dimensions	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
	<b>Level of Students' Engagement in Science Modular Instruction</b>						
A.	Affective Aspects	0.235	365	0.615	0.878	365	0.645
B.	Behavioral Aspects	0.267	365	0.627	0.895	365	0.612
C.	Cognitive Aspects	0.156	365	0.649	0.947	365	0.593
	Over-all	0.219	365	0.629	0.879	365	0.616
	<b>Level of students' Study Skills in Science Modular Instruction</b>						
A.	Time Management and Procrastination	0.167	365	0.415	0.895	365	0.674
B.	Concentration and Memory	0.232	365	0.514	0.831	365	0.785
C.	Study Aids and Note Taking	0.159	365	0.497	0.867	365	0.689
D.	Test Strategies and Test Anxiety	0.286	365	0.485	0.893	365	0.717
E.	Organizing and Processing Information	0.256	365	0.478	0.798	365	0.656
F.	Motivation and Attitude	0.226	365	0.557	0.816	365	0.678
G.	Reading and Selecting the Main Idea	0.262	365	0.615	0.945	365	0.717
H.	Writing	0.151	365	0.428	0.719	365	0.695
	Over-all	0.184	365	0.559	0.865	365	0.701

In analyzing the data collected for this study, several statistical measures were employed to provide meaningful insights and draw conclusions. To describe the profile of the respondents, frequency and percentage distributions were utilized. These measures helped to present the demographic characteristics of the students, such as age, gender, grade level, parents' highest educational attainment, and family monthly income. To assess the students' level of engagement and study skills, mean and standard deviation were used. Likert scale responses were employed to gauge the students' engagement in terms of affective aspects, behavioral aspects, and cognitive aspects. Similarly, these statistical tools were used to determine the students' level of study skills in Science modular distance instruction during the pandemic. To measure the significant difference between the profile of the respondents and their level of engagement in Science modular distance instruction, as well as their level of study skills, analysis of variance (ANOVA) was employed. This statistical technique helped to identify any noteworthy differences between the respondents' profiles and their engagement or study skills. Furthermore, Pearson's correlation coefficient (Pearson's  $r$ ) or regression analysis was employed to determine the significant relationship between the respondents' profile and their level of engagement in Science modular distance instruction, as well as their level of study skills. This analysis aimed to establish whether a meaningful association existed between the respondents' characteristics and their engagement or study skills. The same statistical treatment was applied to explore the significant relationship between the respondents' engagement and their study skills in the context of modular distance instruction during the pandemic. By utilizing these statistical measures and analyses, the study aimed to provide a comprehensive understanding of the relationship between student engagement, study skills, and their profile characteristics in the Science modular distance instruction during the pandemic. These statistical treatments allowed for meaningful interpretations and the identification of potential associations and differences.

### 3. Results and discussion

#### 3.1. Demographic Profile of the Respondents

Table 4 presents the profile of the respondents. Age. In terms of age, as shown in Table 3, 199 or 54.2 percent of the 367 respondents are 14-16 years old, 141 or 38.4 percent of the respondents are 11-13 years old; and, twenty- seven (27) or 7.4 percent of the respondents are 17-19 years old. And a mean value of 14. This means that majority of the students are within 14-16 years old. The data also indicates that these students are in Grade 8-10 level in the secondary education. Gender. In terms of gender, there are 194 or 52.9 percent of the respondents are females and 173 or 47.1 percent of the respondents are males. The table clearly exhibits, that most of the respondents are female students. This further indicates that females outnumbered males in terms of student population. Grade Level.

**Table 4** Frequency Distribution of the Profile of the Respondents (n=367)

Profile of the Respondents in terms	f	%
Age (years old)		
11-13	141	38.4
14-16	199	54.2
17-19	27	7.4
Mean = 14		
Gender		
Male	173	47.1
Female	194	52.9
Grade Level		
Grade 7	95	25.9
Grade 8	91	24.8
Grade 9	91	24.8
Grade 10	90	24.5
Parent's Highest Educational Attainment		
Elementary Level	42	11.4
Elementary Graduate	49	13.4
High School Level	36	9.8
High School Graduate	97	26.4
College Level	13	3.5
College Graduate	102	27.8
Technical Vocational	18	4.9
Post Graduate Studies	10	2.7
Monthly Family Income		
Php 1,000-10,999	231	62.9
Php 11,000-20,999	100	27.2
Php 21,000-30,999	33	9.0
Php 41,000-50,999	3	0.8
Mean = 10,550		

In terms of grade level, out of 367 respondents, ninety-five (95) or 25.9 percent are Grade 7; ninety-one (91) or 24.8 percent of the respondents are Grade 8 and Grade 9, respectively; and, ninety (90) or 24.5 percent of the respondents are Grade 10. This indicates that most of the respondents are in the Grade 7 level of education who belongs to the first level of secondary curriculum.

### 3.1.1. Parent's Highest Educational Attainment

In terms of parent's highest educational attainment, the table shows that out of 367 respondents, 102 or 27.8 percent of them are college graduates; ninety-seven (97) or 26.4 percent are high school graduate; forty-nine (49) or 13.4 percent are elementary graduates; forty-two (42) or 11.4 percent are elementary level; thirty-six (36) or 9.8 percent are high school level; eighteen (18) or 4.9 percent are graduates of technical vocational courses; thirteen (13) or 3.5 percent are college level; and, only ten (10) or 2.7 percent are post-graduates. The table clearly shows that most of the parents of the respondents are college graduates indicating further that their parents obtained higher level of education.

### 3.1.2. Monthly Family Income

In terms of monthly income, the table shows 231 or 62.9 percent out of 367 respondents have parents whose income ranged from Php 1,000.00 - 10,999.00; 100 or 27.2 percent of them have parents who earned Php 11,000 - 20,999.00 per month; thirty-three (33) or 9.0 percent of them have parents who earned Php 21,000.00 - 30,000.00 per month; and, only three (3) or 0.8 percent of them have parents who earned Php 41,000 -50,999.00 per month. And a mean value of 10,550 This clearly indicates and shows that most of the respondents' parents earned a monthly income of Php1,000.00 to 10,999.00, which means further that they received the minimum salary level every month.

## 3.2. Students' Level of Engagement in Science Modular Instruction Amidst Pandemic

Table 5 presents the mean and standard deviation of students' level of engagement in science modular instruction amidst pandemic in terms of affective aspects, behavioral aspects and cognitive aspects.

**Table 5** Mean and Standard Deviation on Students' Level of Engagement in Science Modular Instruction Amidst Pandemic in Terms of Affective Aspects, Behavioral Aspects, and Cognitive Aspects

	Students' Level of Engagement in terms of:	WM	SD	Interpretation
<b>Affective Aspects</b>				
1.	I am very interested in learning.	4.46	0.079	Very Highly Engaged
2.	I think what I am learning is interesting.	4.31	0.091	Very Highly Engaged
3.	I like what I am learning in my Science modules.	4.40	0.090	Very Highly Engaged
4.	I think learning is boring.	2.43	0.069	Less Engaged
5.	I am proud to be using Science modules in learning.	4.38	0.082	Very Highly Engaged
	GRAND TOTAL	4.00	0.055	Highly Engaged
<b>Behavioral Aspects</b>				
1.	I ask questions in group chat regarding the topics found in the modules.	4.13	0.090	Highly Engaged
2.	I do all the homework problems.	4.28	0.084	Very highly Engaged
3.	When I run into a difficult homework problem, I keep working at it until I think I've solved it.	4.199	0.087	Highly Engaged
4.	I receive prompt written or oral feedback from faculty on my academic performance.	4.041	0.098	Highly Engaged
5.	I make sure to study on a regular basis.	4.218	0.087	Very highly Engaged
	GRAND TOTAL	4.174	0.060	Highly Engaged
<b>Cognitive Aspects</b>				
1.	When I study, I try to understand the material better by relating it to things I already know.	4.232	0.086	Very highly Engaged

2.	When I study, I figure out how the information might be useful in the real world.	4.136	0.092	Highly Engaged
3.	When learning new information, I try to put the ideas in my own words.	4.188	0.089	Highly Engaged
4.	When I study, I try to connect what I am learning with my own experiences.	4.191	0.090	Highly Engaged
5.	I make up my own examples to help me understand the important concepts I learn from the activities found in my Science modules.	4.185	0.092	Highly Engaged
6.	When learning things from my Science modules, I try to see how they fit together with other things I already know.	4.153	0.088	Highly Engaged
7.	When learning things, I often try to associate them with what I learnt in other subjects about the same or similar things.	4.079	0.092	Highly Engaged
8.	I try to see the similarities and differences between things I am learning and things I know already.	4.207	0.092	Very highly Engaged
9.	I try to understand how the things I learn fit together with each other.	4.253	0.089	Very highly Engaged
10	I try to match what I already know with things I am trying to learn.	4.272	0.089	Very highly Engaged
11	I try to think through topics and decide what I'm supposed to learn from them, rather than studying topics by just reading them over.	4.155	0.092	Highly Engaged
12	When studying, I try to combine different pieces of information from course material in new ways.	4.289	0.051	Very highly Engaged
GRAND TOTAL		4.195	0.051	Highly Engaged

Legend:

Scale	Interpretation	Scale	Interpretation
4.20-5.00	Very Highly Engaged	1.80-2.59	Less Engaged
3.40-4.19	Highly Engaged	1.00-1.79	Not Engaged
2.60-3.39	Moderately Engaged		

### 3.2.1. Affective Aspects

In terms of affective aspects, the table shows a grand total weighted mean ( $\mu$ ) value of  $\mu=4.00$  and standard deviation (SD) value of  $SD=0.055$  and is interpreted as “highly engaged”. The table further shows the specific mean ( $\mu$ ) values and standard deviation (SD) values of every statements. The respondents perceived themselves as “very highly engaged” on statements such as “I am very interested in learning” ( $\mu=4.46$ ,  $SD=0.079$ ); “I think what I am learning is interesting” ( $\mu=4.31$ ,  $SD=0.091$ ); “I am proud to be using science modules in learning” ( $\mu=4.38$ ,  $SD=0.082$ ); and “I like what I am learning in my science modules” ( $\mu=4.40$ ,  $SD=0.090$ ); while, the respondents are “less engaged” when they perceived that learning is boring ( $\mu=2.43$ ,  $SD=0.069$ ). This clearly perceived in the table that the students are highly engaged in science modular instructions as to affective aspects which entail that the students have more interest on learning than thinking that learning boring. And further asserts the findings of [37] which found that student engagement is influenced by a series of contextual factors and individual characteristics such as course expectations, individual interests, and a willingness to collaborate. As such, the factor like willingness to learn is more closely related with the study of Pascoe.

### 3.2.2. Behavioral Aspects

In terms of behavioral aspects, the table exhibits the grand total mean ( $\mu$ ) value of  $\mu=4.174$  and standard deviation (SD) value of  $SD=0.060$ . This clearly interpreted as “highly engaged”. Further, the table shows the specific mean ( $\mu$ ) values and standard deviation (SD) values for every statements. Specifically, the respondents perceived themselves as “very highly engaged” on statements such as “I do all the homework problems” ( $\mu=4.28$ ,  $SD=0.084$ ) and “I make sure to study on a regular basis” ( $\mu=4.218$ ,  $SD=0.087$ ); while, the respondents are “highly engaged” on the statements such as “When I run into a difficult homework problem, I keep working at it until I think I've solved it” ( $\mu=4.199$ ,  $SD=0.087$ ); “I always ask questions in group chat regarding the topics in the modules” ( $\mu=4.13$ ,  $SD=0.090$ ); and, “I receive prompt written or oral feedback from faculty on your academic performance” ( $\mu=4.041$ ,  $SD=0.098$ ). The values can be perceived from the table that the students are highly engaged in science modular instructions as to behavioral aspects particularly in terms

of doing homework and assignments. This is particularly true because the modular distance approach in the COVID-19 pandemic prompts the learners to do their academic tasks at home.

### 3.2.3. Cognitive Aspects

In terms of cognitive aspects, Table 4 presented the grand total mean ( $\mu$ ) value of  $\mu=4.195$  and standard deviation (SD) value of  $SD=0.051$ . It is clearly interpreted as “highly engaged”. Specifically, the respondents perceived themselves as “very highly engaged” on statements such as “When I study, I try to understand the material better by relating it to things I already know” ( $\mu=4.232$ ,  $SD=0.086$ ); “I try to see the similarities and differences between things I am learning and things I know already” ( $\mu=4.207$ ,  $SD=0.092$ ); “I try to understand how the things I learn fit together with each other” ( $\mu=4.253$ ,  $SD=0.089$ ); “I try to match what I already know with things I am trying to learn from my science modules” ( $\mu=4.272$ ,  $SD=0.089$ ); and, “When studying, I try to combine different pieces of information from course material in new ways” ( $\mu=4.289$ ,  $SD=0.086$ ); “I make up my own examples to help me understand the important concepts I learn from the activities found in my Science modules” ( $\mu=4.185$ ,  $SD=0.092$ ).

On the other hand, the respondents are “highly engaged” on the statements such as “When I study, I figure out how the information might be useful in the real world” ( $\mu=4.136$ ,  $SD=0.092$ ); “When learning new information, I try to put the ideas in my own words” ( $\mu=4.188$ ,  $SD=0.089$ ); “When I study, I try to connect what I am learning with my own experiences” ( $\mu=4.191$ ,  $SD=0.090$ ); “I make up my own examples to help me understand the important concepts I learn from school” ( $\mu=4.185$ ,  $SD=0.092$ ); “When learning things, I try to see how they fit together with other things I already know” ( $\mu=4.153$ ,  $SD=0.088$ ); “When learning things, I often try to associate them with what I learnt in other subjects about the same or similar things” ( $\mu=4.079$ ,  $SD=0.092$ ); and, “I try to think through topics and decide what I’m supposed to learn from them, rather than studying topics by just reading them over” ( $\mu=4.155$ ,  $SD=0.092$ ). As perceived in the table, this can clearly say that the students are highly engaged in cognitive aspects particularly in terms of trying to combine different pieces of information from course material in new ways.

### 3.3. Students’ Level of Study Skills in Science Modular Instruction Amidst Pandemic

Table 6 presents the data on the study skills of the students in terms of time management and procrastination, concentration and memory, study aids and note-taking, test strategies and anxiety.

**Table 6.** Mean and Standard Deviation on Students’ Level of Study Skills in Science Modular Instruction Amidst Pandemic in Terms of Time Management and Procrastination, Concentration and Memory, Study Aids and Note-Taking, Test Strategies and Test Anxiety

Students’ Level of Study Skills in terms of:	WD	SD	Interpretation
<b>Time Management and Procrastination</b>			
I answer my Science modules activities and other things on time.	4.166	0.092	Highly Engaged
I devote sufficient study time to each of my modules.	4.104	0.086	Highly Engaged
I schedule definite times and outline specific goals for my study time.	4.128	0.088	Highly Engaged
I prepare a “to do” list daily.	4.112	0.019	Highly Engaged
I avoid activities which tend to interfere with my planned schedule.	4.014	0.095	Highly Engaged
I use prime time when I am most alert for study	4.144	0.090	Highly Engaged
At the beginning of the term, I make up daily activity and study schedules.	4.210	0.083	Very Highly Engaged
I begin major course assignments well in advance.	4.109	0.094	Highly Engaged
I study in a place free from auditory and visual distractions.	4.139	0.090	Highly Engaged
GRAND TOTAL	4.125	0.052	Highly Engaged
<b>Concentration and Memory</b>			
I find that I am able to concentrate - that is, give undivided attention to the task for atleast 20 minutes.	4.071	0.092	Highly Engaged
I am confident with the level of concentration I am able to maintain	4.087	0.091	Highly Engaged



I have an accurate understanding of the material I wish to remember.	4.202	0.091	Very Highly Engaged
I learn with the intention of remembering	4.166	0.096	Highly Engaged
I practice the materials I am learning by reciting out loud.	4.106	0.098	Highly Engaged
I recall readily those things which I have studied.	4.161	0.083	Highly Engaged
GRAND TOTAL	4.132	0.059	Highly Engaged
<b>Study Aids and Note-Taking</b>			
While I am taking notes, I think about how I will use them later.	4.259	0.085	Very Highly Engaged
I understand the discussions I'm reading from my Science module while I am taking notes.	4.300	0.079	Very Highly Engaged
I organize my notes in some meaningful manner (such as outline format).	4.180	0.091	Highly Engaged
I review and edit my notes systematically.	4.123	0.095	Highly Engaged
I take notes on supplementary reading materials	4.230	0.092	Very Highly Engaged
I have a system for marking textbooks.	4.142	0.098	Highly Engaged
When reading, I mark or underline parts I think are important.	4.248	0.091	Very Highly Engaged
I write notes in the book while I read.	4.183	0.095	Highly Engaged
GRAND TOTAL	4.209	0.057	Very Highly Engaged
<b>Test Strategies and Test Anxiety</b>			
I try to find out what the exam will cover and how the exam is to be graded.	4.300	0.082	Very Highly Engaged
I feel confident that I am prepared for the exam	4.253	0.086	Very Highly Engaged
I try to imagine possible test questions during my preparation for an exam	4.308	0.082	Very Highly Engaged
I take time to understand the exam questions before starting to answer.	4.357	0.079	Very Highly Engaged
I follow directions carefully when taking an exam.	4.379	0.080	Very Highly Engaged
I usually get a good night's rest prior to a scheduled exam.	4.172	0.091	Highly Engaged
I am calmly able to recall what I know during an exam.	4.256	0.086	Very Highly Engaged
I understand the structure of different types of tests, and am able to prepare for each type.	4.210	0.084	Very Highly Engaged
GRAND TOTAL	4.279	0.047	Very Highly Engaged

Legend:

Scale	Interpretation	Scale	Interpretation
4.20-5.00	Very Highly Engaged	1.80-2.59	Less Engaged
3.40- 4.19	Highly Engaged	1.00-1.79	Not Engaged

### 3.3.1. Time Management and Procrastination

In terms of time management and procrastination, the table shows a grand total mean ( $\mu$ ) value of  $\mu=4.125$  and standard deviation (SD) value of  $SD=0.052$ . And this clearly interpreted as "highly engaged". Specifically, the respondents perceived themselves as "very highly engaged" on statement such as "At the beginning of the term, I make up daily activity and study schedules" ( $\mu=4.210$ ,  $SD=0.083$ ); while, "highly engaged" on statements such as follows: "I answer my science modules activities and other things on time" ( $\mu=4.104$ ,  $SD=0.086$ ); "I schedule definite times and outline specific goals for my study time" ( $\mu=4.128$ ,  $SD=0.088$ ); "I prepare a "to do" list daily" ( $\mu=4.112$ ,  $SD=0.019$ ); "I avoid activities which tend to interfere with my planned schedule" ( $\mu=4.104$ ,  $SD=0.086$ ); "I use prime time when I am most alert for study" ( $\mu=4.144$ ,  $SD=0.090$ ); "I begin major course assignments well in advance" ( $\mu=4.109$ ,  $SD=0.094$ ); "I devote

sufficient study time to each of my modules" ( $\mu=4.104$ ,  $SD=0.086$ ) and, "I study in a place free from auditory and visual distractions" ( $\mu=4.139$ ,  $SD=0.090$ ). The table further conclude that the students had been observed to have high study skills in terms of time management and procrastination particularly in terms of making up daily activities and study schedules. This is because the students have the freedom to do anytime their daily activities due to their school works are done at home.

### 3.3.2. Concentration and memory

In terms of concentration and memory, the table shows the grand total mean ( $\mu$ ) value of  $\mu=4.132$  and standard deviation (SD) value of  $SD=0.059$ . And this is clearly interpreted as "highly engaged". Specifically, the respondents perceived themselves as "very highly engaged" on statement such as "I have an accurate understanding of the material I wish to remember" ( $\mu=4.202$ ,  $SD=0.091$ ); while, "highly engaged" on statements as follows: "I find that I am able to concentrate - that is, give undivided attention to the task for at least 20 minutes" ( $\mu=4.071$ ,  $SD=0.092$ ); "I am confident with the level of concentration I am able to maintain" ( $\mu=4.166$ ,  $SD=0.096$ ); "I practice the materials I am learning by reciting out loud" ( $\mu=4.106$ ,  $SD=0.098$ ); and, "I recall readily those things which I have studied" ( $\mu=4.161$ ,  $SD=0.083$ ). The values can be perceived that the students have high study skills in terms of concentration and memory particularly in terms of having an accurate understanding of the material they wish to remember. This could be attributed with the amount of time given to the students to concentrate on their modules at home.

### 3.3.3. Study Aids and Note-Taking

In terms of study aids and note-taking, it was exhibited in the table that the grand total mean ( $\mu$ ) value is  $\mu=4.209$  and standard deviation (SD) value of  $SD=0.057$  and is interpreted as "very highly engaged". Specifically, the respondents perceived themselves as "very highly engaged" on statements such as "While I am taking notes, I think about how I will use them later" ( $\mu=4.259$ ,  $SD=0.085$ ); "I understand the lecture and classroom discussion while I am taking notes" ( $\mu=4.300$ ,  $SD=0.079$ ); "I take notes on supplementary reading materials." ( $\mu=4.240$ ,  $SD=0.092$ ); "When reading, I mark or underline parts I think are important." ( $\mu=4.248$ ,  $SD=0.091$ ); while, "highly engaged" on statements as follows: "I organize my notes in some meaningful manner (such as outline format)" ( $\mu=4.180$ ,  $SD=0.091$ ); and, "I review and edit my notes systematically." ( $\mu=4.123$ ,  $SD=0.095$ ); "I have a system for marking textbooks" ( $\mu=4.142$ ,  $SD=0.098$ ); "I write notes in the book while I read" ( $\mu=4.183$ ,  $SD=0.095$ ). Therefore, it can be concluded from the values the table shows that the students have a very high engagement in their study skills specifically in terms of study aids and note taking. This could be attributed to the self-learning modules provided for them to study at home. The self-learning modules are deemed as a viable tool for learning at home. This asserts the study of Pezzementi and Axelson (2015) who found out that the greater use of learning strategies and study skills such as elaboration, critical thinking, time management, and note-taking habits was associated and is directly correlated with higher levels of performance in their course.

### 3.3.4. Test strategies and test anxiety

In terms of test strategies and test anxiety, it is presented in the table the grand total mean ( $\mu$ ) value of  $\mu=4.279$  and standard deviation (SD) value of  $SD=0.047$ . And it is interpreted as "very highly engaged". Specifically, the respondents perceived themselves as "very highly engaged" on statements such as "I try to find out what the exam will cover and how the exam is to be graded" ( $\mu=4.300$ ,  $SD=0.082$ ); "I feel confident that I am prepared for the exam" ( $\mu=4.253$ ,  $SD=0.086$ ); "I try to imagine possible test questions during my preparation for an exam" ( $\mu=4.308$ ,  $SD=0.082$ ); "I take time to understand the exam questions before starting to answer" ( $\mu=4.357$ ,  $SD=0.079$ ); "I follow directions carefully when taking an exam" ( $\mu=4.379$ ,  $SD=0.080$ ); "7. I am calmly able to recall what I know during an exam" ( $\mu=4.256$ ,  $SD=0.086$ ); "I understand the structure of different types of tests, and am able to prepare for each type" ( $\mu=4.210$ ,  $SD=0.084$ ); while, "highly engaged" on statements as follows: "I usually get a good night's rest prior to a scheduled exam" ( $\mu=4.172$ ,  $SD=0.091$ ). From the values presented, the table clearly concluded that the students have engaged themselves on their study skills very highly in terms of test strategies and test anxiety because tests conducted by the teachers in Science modular instructions can be done at home. This could have been and easy task for the students to answer in as much as they can and ask other members of the family when they need so.

Table 6.2 presents the mean and standard deviation on students' level of study skills in Science Modular Instruction Amidst Pandemic in terms of organizing and processing information, motivation and attitude, reading and electing the main idea and writing.

### 3.3.5. Organizing and processing information

In terms of organizing and processing information, demonstrated in table 6 the grand total mean ( $\mu$ ) value of  $\mu=4.248$  and standard deviation value (SD) of  $SD=0.049$ . And it clearly interpreted as "very highly engaged". Specifically, the respondents perceived themselves as "very highly engaged" on statements such as "When reading, I can distinguish

readily between important and unimportant points" ( $\mu=4.218$ ,  $SD=0.084$ ); "I maintain a critical attitude during my study - thinking before accepting or rejecting" ( $\mu=4.215$ ,  $SD=0.078$ ); "I relate material learned in one module to materials of other science modules" ( $\mu=4.221$ ,  $SD=0.086$ ); "I try to organize facts in a systematic way" ( $\mu=4.226$ ,  $SD=0.083$ ); "I use questions to better organize and understand the material I am studying" ( $\mu=4.221$ ,  $SD=0.082$ ); "I try to find the best method to do a given job" ( $\mu=4.343$ ,  $SD=0.084$ ); "I solve a problem by focusing on its main point" ( $\mu=4.376$ ,  $SD=0.080$ ); while, "highly engaged" on statements as follows: "I break assignments into manageable parts" ( $\mu=4.166$ ,  $SD=0.085$ ). The table clearly perceived from the presented values that the students have a very high study skills in terms of organizing and processing of information. This could be attributed to the amount of time given to the students in answering their Science modules. And further concluded that the students could be able to process and analyze the information given to them. This actually further asserts the findings of Alhammadi (2021) who revealed that students study skills have a direct correlation to the use of the different technological platforms. This different technological platform helps students spend more time and will engage themselves thoroughly. With the use also of these technological platforms, students are becoming more informed about the lecture material.

### 3.3.6. Motivation and attitude

In terms of motivation and attitude, the table exhibits a grand total mean ( $\mu$ ) value of  $\mu=4.217$  and standard deviation (SD) value of 0.052. And is interpreted as "very highly engaged". Specifically, the respondents perceived themselves as "very highly engaged" on statements such as "I answer my science module activities regularly" ( $\mu=4.398$ ,  $SD=0.079$ ); "I take the initiative in group activities" ( $\mu=4.251$ ,  $SD=0.086$ ); and "I use a study method which helps me develop an interest in the material to be studied" ( $\mu=4.322$ ,  $SD=0.082$ ); while, "highly engaged" on statements as follows: "I sit near a well ventilated and calm area when answering my science module activities" ( $\mu=4.177$ ,  $SD=0.098$ ); "I am alert and motivated in answering my Science modules activities." ( $\mu=4.188$ ,  $SD=0.089$ ); "I ask the instructor questions when clarification is needed" ( $\mu=4.131$ ,  $SD=0.090$ ); and "I do and answer my modules in a meaningful way" ( $\mu=4.177$ ,  $SD=0.082$ ). The table clearly shows that the students have a very high study skills in terms of motivation and attitude towards studies. This could be attributed to the degree of interest and the study methods used which helps them develop an interest in the material to be studied in science. This study confirms the study of Bowman (2018) which found out that those students who has positive attitudes towards their Science and Technology modules tends to read and understand more topics from the modules, just as this study have found out.

**Table 7** Mean and Standard Deviation on Students' Level of Study Skills in Science Modular Instruction Amidst Pandemic in Terms of Organizing and Processing Information, Motivation and Attitude, Reading and Selecting the Main Idea and Writing

	Students' Level of Study Skills in terms of:	WD	SD	Interpretation
<b>Organizing and Processing Information</b>				
1.	When reading, I can distinguish readily between important and unimportant points.	4,166	0.092	Highly Engaged
2.	I break assignments into manageable parts.	4.106	0.086	Highly Engaged
3.	I maintain a critical attitude during my study - thinking before accepting or rejecting.	4.128	0.088	Highly Engaged
4.	I relate material learned in one module to materials of other Science modules.	4.112	0.019	Highly Engaged
5.	I try to organize facts in a systematic way.	4.014	0.095	Highly Engaged
6.	I use questions to better organize and understand the material I am studying.	4.144	0.090	Highly Engaged
7.	I try to find the best method to do a given job.	4.210	0.083	Very Highly Engaged
	I solve a problem by focusing on its main point.	4.109	0.094	Highly Engaged
	GRAND TOTAL	4.248	0.049	Highly Engaged
<b>Motivation and Attitude</b>				
1.	I sit near a well ventilated and calm area when answering my Science module activities	4.177	0.098	Highly Engaged

2.	I am alert and motivated in answering my Science modules activities.	4.188	0.089	Highly Engaged
3.	I ask the instructor questions when clarification is needed.	4.131	0.090	Highly Engaged
4.	I volunteer answers to questions posed by instructors in our Group Chat for enrichment.	4.101	0.096	Highly Engaged
5.	I do and answer my modules in a meaning way.	4.177	0.082	Highly Engaged
6.	I answer my science module activities regularly.	4.398	0.079	Very Highly Engaged
7.	I take the initiative in group activities.	4.251	0,086	Very Highly Engaged
8.	I use a study method which helps me develop an interest in the material to be studied.	4.322	0.082	Very Highly Engaged
	GRAND TOTAL	4.217	0.052	Very Highly Engaged
<b>Reading and Selecting the Main Idea</b>				
1.	I survey each chapter before I begin reading.	4.221	0.093	Very Highly Engaged
2.	I follow the author/writer's organization to increase meaning.	4.229	0.090	Very Highly Engaged
3.	I review reading material several times before answering some of the activities posted.	4.237	0.087	Very Highly Engaged
4.	When learning a unit of material, I summarize it in my own words.	4.311	0.083	Very Highly Engaged
5.	I am comfortable with my reading rate.	4.332	0.082	Very Highly Engaged
6.	I look up parts I don't understand.	4.332	0.085	Very Highly Engaged
7.	I am satisfied with my reading ability.	4.302	0.079	Very Highly Engaged
8.	I focus on the main point while reading.	4.368	0.082	Very Highly Engaged
	GRAND TOTAL	4.291	0.048	Very Highly Engaged
<b>Writing</b>				
1.	I find that I am able to express my thoughts well in writing.	4.330	0.081	Very Highly Engaged
2.	I write rough drafts quickly and spontaneously from notes	4,327	0.083	Very Highly Engaged
3.	I put aside a written assignment for a day or so, then rewrite it.	4.240	0.085	Very Highly Engaged
4.	I review my writing for grammatical errors.	4.327	0.087	Very Highly Engaged
5.	I have someone else read my written work and consider their suggestions for improved writing.	4.278	0.090	Very Highly Engaged
6.	I am comfortable using library or online resources for research.	4.428	0.079	Very Highly Engaged
7.	I am able to narrow a topic for an essay, research paper, etc	4.335	0.079	Very Highly Engaged
8.	I allow sufficient time to collect information, organize material, and write the assignment	4.411	0.084	Very Highly Engaged
	GRAND TOTAL	4.334	0.051	Very Highly Engaged

Legend:

Scale	Interpretation	Scale	Interpretation
4.20-5.00	Very Highly Engaged	1.80-2.59	Less Engaged
3.40- 4.19	Highly Engaged	1.00-1.79	Not Engaged

### 3.3.7. Reading and selecting the main idea

In terms of reading and selecting the main idea, Table 6 exhibits the grand total mean ( $\mu$ ) value of  $\mu=4.291$  and a standard deviation (SD) value of  $SD=0.049$ . And is clearly interpreted as "very highly engaged". Specifically, the respondents perceived themselves as "very highly engaged" on all the statements such as follows: "I survey each chapter before I begin reading" ( $\mu=4.221$ ,  $SD=0.093$ ); "I follow the author/writer's organization to increase meaning" ( $\mu=4.237$ ,

SD=0.087); “When learning a unit of material, I summarize it in my own words” ( $\mu=4.311$ , SD=0.083); “I am comfortable with my reading rate” ( $\mu=4.332$ , SD=0.082); “I look up parts I don’t understand” ( $\mu=4.332$ , SD=0.085); “I am satisfied with my reading ability” ( $\mu=4.302$ , SD=0.079); and, “I focus on the main point while reading” ( $\mu=4.368$ , SD=0.082). The table revealed that the students had a very high study skills in terms of reading and selecting the main idea of the topic. This could be attributed to the ability of the students to feel comfortable with the topic they read and that they also tried to find ways in looking up terms and concepts in Science that they do not understand.

### 3.3.8. Writing

In terms of writing, it shows from the table the grand total mean ( $\mu$ ) value of  $\mu=4.334$  and standard deviation (SD) value of SD=0.51. It is actually interpreted as “very highly engaged”. Specifically, the respondents perceived themselves as “very highly engaged” on all of the statements such as follows: “I find that I am able to express my thoughts well in writing” ( $\mu=4.330$ , SD=0.081); “I put aside a written assignment for a day or so, then rewrite it” ( $\mu=4.240$ , SD=0.085); “I review my writing for grammatical errors” ( $\mu=4.327$ , SD=0.083); “I review my writing for grammatical errors” ( $\mu=4.327$ , SD=0.087); “I have someone else read my written work and consider their suggestions for improved writing” ( $\mu=4.278$ , SD=0.090); “I am comfortable using library or online resources for research” ( $\mu=4.428$ , SD=0.079); “I am able to narrow a topic for an essay, research paper, etc.” ( $\mu=4.335$ , SD=0.079); and, “I allow sufficient time to collect information, organize material, and write the assignment” ( $\mu=4.411$ , SD=0.084). The findings based from the values revealed that the students had a very high study skills in terms of writing particularly on allowing sufficient time to collect information, organize material, and write the assignment. This could be attributed to the time spent by the students at home wherein they could write their assignments at any time.

**Table 8** Mean and Standard Deviation of the Summary of the Study Skills of the Students in Science Modular Instruction Amidst Pandemic

	<b>Test Strategies and Test Anxiety Study Skills of the Students</b>	<b>Weighted Mean</b>	<b>Std. Deviation</b>	<b>Interpretation</b>
A.	Time Management and Procrastination	4.125	0.052	Highly Engaged
B.	Concentration and Memory	4.132	0.059	Highly Engaged
C.	Study Aids and Note Taking	4.209	0.057	Very Highly Engaged
D.	Test Strategies and Test Anxiety	4.279	0.047	Very Highly Engaged
E.	Organizing and Processing Information	4.248	0.049	Very Highly Engaged
F.	Motivation and Attitude	4.217	0.052	Very Highly Engaged
G.	Reading and Selecting the Main Idea	4.291	0.048	Very Highly Engaged
H.	Writing	4.334	0.051	Very Highly Engaged
	GRAND TOTAL	4.230	0.052	Very Highly Engaged

Legend:

Scale	Interpretation	Scale	Interpretation
4.20-5.00	Very Highly Engaged	1.80-2.59	Less Engaged
3.40- 4.19	Highly Engaged	1.00-1.79	Not Engaged
2.60-3.39	Moderately Engaged		

Table 8 exhibits the summary of the mean and standard deviation of the students’ study skills in their **Science** modular instruction amidst pandemic. The table shows a grand total mean ( $\mu$ ) value of 4.230, standard deviation (SD) value of SD=0.052. These results are interpreted as “very highly engaged”. Specifically, the respondents perceived themselves “very highly engaged” on subscales that follows: Study Aids and Note-Taking ( $\mu=4.209$ , SD=0.057); Test Strategies and Test Anxiety ( $\mu=4.279$ , SD=0.047); Organizing and Processing Information ( $\mu=4.248$ , SD=0.049); Motivation and Attitude ( $\mu=4.217$ , SD=0.052); Reading and Selecting the Main Idea ( $\mu=4.291$ , SD=0.048); Writing ( $\mu=4.334$ , SD=0.051). And “highly engaged” on the subscales that follows: Time Management and Procrastination ( $\mu=4.125$ , SD=0.052); and Concentration and Memory ( $\mu=4.132$ , SD=0.052). The table concluded that the students use varied study skills when they are engaging themselves to the different activities and exercises in their science modules. Further, for better and easy studying of the different Science topics and lessons in their Science modules, they use different study skills.

### 3.4. Test of Difference Between the Profile of the Respondents and Their Level of Engagement in Science Modular Instruction Amidst Pandemic

Table 9 present the test of difference on the level of engagement in science modular instruction amidst pandemic when grouped according to their profile.

**Table 9** Test of Difference on the Level of Students' Engagement in Science Modular Instruction Amidst Pandemic When Grouped According to Their Profile

Profile	Respondents	F	Significance Value	Interpretation
Age	Between groups	1.302	0.044	Significant
	Within groups			
Gender	Between groups	1.233	0.086	Not Significant
	Within groups			
Grade Level	Between groups	0.978	0.562	Not Significant
	Within groups			
Parents educational attainment	Between groups	1.379	0.041	Significant
	Within groups			
Family monthly income	Between groups	1.360	0.045	Significant
	Within groups			
Overall Findings	Between groups	1.250	0.056	Significant
	Within groups			

Table 9 exhibits that among the profile aspects of the respondents, it is the age ( $F=1.302$   $\alpha=0.044$ ), parent's educational attainment ( $\beta=1.379$   $\alpha=0.041$ ) and the family monthly income ( $\beta=1.360$   $\alpha=0.045$ ) which came out to have a significant difference on the level of students' engagement in their modular distance instruction amidst pandemic. On the other hand, gender ( $F=1.233$ ,  $\alpha=0.086$ ) and grade level ( $F=0.978$ ,  $\alpha=0.562$ ) are proven to have no significant difference. The table also shows the overall findings ( $F=1.250$ ,  $\alpha=0.056$ ) which interpreted as not significant. This further concluded, that the level of students' engagement has a significant difference to their profile. This means that, the null hypothesis is rejected. Specifically, the level of students' engagement in their modular instructions differed across age, hence, a younger student may have different view on science modular instruction than those with students on an older age. This is because, though they all are considered as adolescents, they personal views towards Science modular instructions matters. Further, the table also shows that on parent's highest educational attainment, it has been proven that there is a significant difference between parents who obtained higher level of education than those who obtained lower level of education. Thus, those students' parents who obtained higher level of education have different perceptions than those students with parents who had lower level of education. Meanwhile, as the table shows on family monthly income, it has been proven that there is a significant difference between students whose family monthly income is high with those students with lower family income. Therefore, those students whose family monthly income is high have different views on science modular instructions than those students with higher family income. The findings confirm the study of [36] which argues that there is very different perception about student engagement between teachers and the students themselves. In this study, there is a slight similarity in that it did not involve the teachers as respondents, rather it used student's profile to test the significant differences which in the same manner, the same conclusion had been established between this study and that of Gesualdi.

### 3.5. Test of Relationship between the Profile of the Respondents and Their Level of Engagement in Science Modular Instruction Amidst Pandemic

Table 10 presents the test of relationship between the profile of the respondents and their level of engagement in science modular instruction amidst pandemic.

**Table 10** Analysis of Variance to Test the Relationship Between the Profile of the Students and Their Level of Engagement in Science Modular Instruction Amidst Pandemic

Model	Sum of Squares	Df	Mean Square	F	Sig.	Interpretation
Regression	1.459	5	0.292	1.589	0.162	Not Significant
Residual	66.108	360	0.184			
Total	67.567	365				

Presented in Table 10 is the test of relationship between the perception of the respondents and their level of engagement in Science modular instruction amidst pandemic using the test of Analysis of Variance. Generally, the overall findings reveal with an F-value of 1.589, and significance value of 0.162, of which variance is interpreted as not significant, thus, the null hypothesis is accepted. Findings reveal that there is a significant relationship between the profile of the respondents as to age, parent's educational attainment and family monthly income and their level of engagement in Science modular instructions. This means that the profile of the respondents influences their level of engagement in science modular instruction amidst pandemic.

**Table 11** Test of Relationship Between the Profile of the Students and Their Level of Engagement in Science Modular Instruction Amidst Pandemic

Independent Variables	$\beta$	Significance Value	Interpretation
Age	0.155	0.042	Significant
Gender	0.007	0.870	Not Significant
Grade level	0.030	0.438	Not Significant
Parent's highest educational attainment	0.037	0.029	Significant
Family monthly income	-1.525	0.028	Significant

Table 11 exhibits that among the profile aspects of the respondents, it is the age ( $\beta = -0.155$   $\alpha = 0.042$ ), parent's highest educational attainment ( $\beta = 0.037$   $\alpha = 0.029$ ) and the family monthly income ( $\beta = -1.525$   $\alpha = 0.028$ ) which came out to have significant relationship on the students' level of engagement in Science modular instruction amidst pandemic. On the other hand, gender ( $\beta = 0.007$ ,  $\alpha = 0.870$ ) and grade level ( $\beta = 0.030$ ,  $\alpha = 0.438$ ) are proven to have no significant relationship with the students' level of engagement in Science modular instruction amidst pandemic. Specifically, it had been proven that there is a significant relationship between age and the level of engagement of the students in science modular instructions. Thus, a younger student may have high level of engagement than those older students, or vice versa. Further, the table shows that on parent's highest educational attainment, it had been proven that there is a significant relationship between parents' highest educational attainment and the level of engagement of the students in Science modular instructions. Hence, those students whose parents obtained higher level of education are more likely to have higher level of engagement than those with lower level of education. This could be attributed by the fact the parents with higher level of education had better understanding towards modular instructions. Meanwhile, as the table exhibits on family monthly income, it was proven that there is a significant relationship between students whose family monthly income and their level of engagement. Therefore, those students with higher family monthly income are more likely to have a higher level of engagement than those with lower family monthly income. This could be attributed by the fact that a family who can afford their financial support the academic needs of the students can establish engagement in the science modular instructions.

### 3.6. Test of Difference Between the Profile of the Respondents and Their Level of Study Skills in Science Modular Instruction Amidst Pandemic

Table 12 shows that among the profile aspects of the respondents, all the profile variables such as age ( $F = 1.559$   $\alpha = 0.046$ ), gender ( $F = 1.810$   $\alpha = 0.014$ ), grade level ( $F = 1.681$   $\alpha = 0.025$ ), parent's highest educational attainment ( $F = 1.777$   $\alpha = 0.015$ ) and the family monthly income ( $F = 1.2336$   $\alpha = 0.001$ ) came out to have a significant difference on the student's study skills. The data tell that the null hypothesis is rejected which means that there is a significant difference in the study skills of the respondents in terms of age, gender, grade level, parent's highest educational attainment, and the family monthly income.

**Table 12** Test of Difference on the Level of Study Skills of the Students in Science Modular Instruction Amidst Pandemic When Grouped According to Their Profile

Profile	Respondents	F	Significance Value	Interpretation
Age	Between groups	1.559	0.046	Significant
	Within groups			
Gender	Between groups	1.810	0.014	Significant
	Within groups			
Grade Level	Between groups	1.681	0.025	Significant
	Within groups			
Parents Educational Attainment	Between groups	1.777	0.015	Significant
	Within groups			
Family Monthly Income	Between groups	2.336	0.001	Significant
	Within groups			
Overall Findings	Between groups	1.8326	0.020	Significant
	Within groups			

### 3.7. Test of Relationship Between the Profile of the Respondents and their Level of Study Skills in Science Modular Instruction Amidst Pandemic

**Table 13** Analysis of Variance to Test the Relationship Between the Profile of the Students and Their Level of Study Skills in Science Modular Instruction Amidst Pandemic

Model	Sum of Squares	Df	Mean Square	F	Significance Value	Interpretation
Regression	1.684	5	0.337	2.718	0.020	Significant
Residual	44.616	360	0.124			
Total	46.300	365				

Presented in Table 13 is the test of relationship between the profile of the students and their level of study skills in Science modular instruction amidst pandemic. Using Analysis of Variance, the overall findings reveal with an F-value of 2.718, and significance value of 0.020, of which variance is interpreted as significant, thus, the null hypothesis is rejected. This means that the profile of the respondents influences their level of study skills in Science modular instruction amidst pandemic. This implies that the study skill of the students is affected by their profile such as parent's highest educational attainment and monthly family income.

**Table 14** Test of Relationship Between the Profile of the Students and Their Level of Study Skills in Science Modular Instruction Amidst Pandemic

Independent Variables	$\beta$	Significance Value	Interpretation
Age	-0.008	0.936	Not Significant
Gender	-0.045	0.394	Not Significant
Grade level	-0.128	0.195	Not Significant
Parent's Highest Educational Attainment	0.172	0.032	Significant
Family Monthly Income	-0.180	0.015	Significant



Table 14 exhibits that among the profile aspects of the respondents as shown in table 13, the profile variables such as parent's highest educational attainment ( $\beta = 0.023$   $\alpha = 0.032$ ) and the family monthly income ( $\beta = 8.36$   $\alpha = 0.015$ ) came out to have a significant relationship with the level of student's study skills in Science modular instruction amidst pandemic. The data tell that the null hypothesis is rejected which means that there is a significant relationship in the study skills and the profile of the respondents in terms of parent's highest educational attainment, and the family monthly income. Thus, those students whose parents have higher level of education are more likely to have higher degree of study skills than those with parents whose level of education is lower. Likewise, those students who have higher level family monthly income are more likely to obtain higher degree of study skills than those families with lower-level income.

### 3.8. Test of Relationship Between the Respondent's Engagement and their Study Skills on the Modular Distance Instruction Amidst Pandemic

**Table 15** Analysis of Variance to Test the Relationship Between Student's Study Skills and Their Level of Engagement in Science Modular Instruction Amidst Pandemic

Independent Variables	$\beta$	Significance Value	Interpretation
Level of Engagement	0.470	0.000	Significant

Table 15 shows analysis of variance to test the relationship between the student skills and their level of engagement in Science modular instruction amidst pandemic. Generally, the overall findings reveal with a  $\beta$  -value of 0.389, and significance value of 0.000, of which variance is interpreted as significant, thus, the null hypothesis is rejected. This means that the level of engagement of the students in Science modular instruction amidst pandemic is affected by their study skills, or vice versa. This further signifies that a student with high study skills can have higher level of engagement in Science modular instructions. And this confirmed the study of [33] and [34] that the level of engagement is related with the study skills of the students.

## 4. Conclusion

Based on the study's findings, it can be concluded that the public secondary schools in Calbayog District, Calbayog City Division have a student population primarily consisting of female students aged 14-16 in Grade 7. These students come from families with parents who possess higher levels of educational attainment and have a minimum monthly income. Furthermore, the study reveals that the students display a high level of engagement in science modular instructions, influencing affective, behavioral, and cognitive aspects of their learning development. This suggests that despite the challenges posed by the COVID-19 pandemic, the students exhibit a remarkable ability to remain academically engaged. Additionally, the students demonstrate exceptional study skills across various areas, such as study aids and note-taking, test strategies and anxiety, information organization and processing, motivation and attitude, reading comprehension and identifying main ideas, as well as writing skills. This indicates that despite facing adversities in life and education, the students have managed to develop highly effective study skills. Furthermore, the level of engagement in Science modular instruction during the pandemic differs based on factors such as age, parents' highest educational attainment, and family monthly income. Younger students may have a different perspective and may not engage as thoroughly as older students. Similarly, students with parents who have higher educational attainment and higher monthly income tend to exhibit higher levels of engagement compared to those from lower-income households or with parents who attained a lower education. The profile of the respondents, including age, parents' educational attainment, and family monthly income, plays a significant role in determining the level of student engagement in Science modular instructions. It can be concluded that as students age, they become more academically involved, parents with higher educational degrees are more likely to have children engaged academically, and families with higher monthly incomes are more likely to have academically engaged children. Based on these conclusions, several recommendations are proposed. It is suggested to sustain the high level of student engagement in Science by implementing various teaching strategies and methods that enhance their interest in the subject. Additionally, efforts should be made to strengthen students' study skills through academic activities that foster positive attitudes, interest, and motivation, even during the pandemic. Science teachers should attend training and seminars that encourage the use of pedagogical approaches suited to the needs of learners in the new normal. Teachers should also incorporate the Attention, Relevance, Confidence, and Satisfaction (ARCS) Motivational Model of teaching in creating quality Science modules, ensuring activities align with students' current capacities and skills. Moreover, teachers should acquire sufficient knowledge about different teaching pedagogies and techniques, as well as educational delivery methods, to effectively support students under modular learning. Students are encouraged to develop study skills that are responsive to their current profiles and tailor their approach when dealing with different activities in their modules for better understanding of the lessons. Strengthening

weak study skills will enable them to adapt and utilize appropriate techniques when encountering new activities. Parents are advised to promote and educate students about the importance of study skills and the various techniques available, considering the positive relationship between students' engagement and study skills identified in the study. Lastly, it is recommended for future researchers to conduct a study on the school's level of instruction and its direct correlation with students' performance in Science on a broader scale. This will validate the need for implementing educational programs, particularly in the Science curriculum, and provide valuable insights for educational improvements.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The author declares that there is no conflict of interest regarding the publication of this study. The author conducted this research with integrity and impartiality, ensuring that personal biases or competing interests did not influence the design, methodology, analysis, or interpretation of the findings. The author's primary objective was to contribute to the existing knowledge in the field and provide an unbiased perspective on the subject matter. The author's commitment to academic integrity and transparency guided the entire research process, ensuring the validity and reliability of the results presented in this study.

### *Statement of informed consent*

The participant has been thoroughly informed about the study's purpose, methods, and potential risks. They understand their participation is voluntary, and they reserve the right to withdraw at any time without repercussions. All personal data collected will be kept confidential and used solely for this study.

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