**International Journal of English Language Studies**
ISSN: 2707-7578
DOI: 10.32996/ijels
Journal Homepage: www.al-kindipublisher.com/index.php/ijels

IJELS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

**| RESEARCH ARTICLE**

# Mathematical Demands for Junior High Students During COVID-Induced Distance Learning

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**| ABSTRACT**
This research evaluated the engagement of Grade 7 and 8 learners of Liloan National High School on these Mathematical Demands in COVID-Induced Modular Distance Learning (MDL) during the last three (3) academic quarters of the school year 2020- 2021 as the basis for the Enhanced MDL Engagement Plan. Three hundred eleven respondents were asked to answer the survey questionnaires to assess their affective beliefs and engagement in the mathematical demands during the COVID-Induced. At the same time, their performance was evaluated using their math grades. The data gathered were treated using weighted mean, standard deviation, and Spearman Rank Order Correlation. Results revealed that the respondents have a positive affective belief and a high engagement in the mathematical demands, with satisfactory performance in mathematics. Furthermore, there were significant relationships between the attitudes and interests of the respondents with their performance; management of tasks and time and strong will and motivation and their performance; attitudes, interest, valuing mathematics and their focus in learning the lessons; attitudes, interest, valuing mathematics and their management of tasks and time; attitudes, interest, behaviour, valuing mathematics and working independently; attitudes, interest, valuing mathematics and their strong will and motivation. Thus, a proposed modular distance learning engagement plan is highly recommended for adoption.

**| KEYWORDS**

Teaching mathematics, affective belief, student engagement, math performance, modular distance learning, correlational study, descriptive research, junior high school, COVID-19 education, Philippines.

**| ARTICLE INFORMATION**

**ACCEPTED:** 01 May 2025 **PUBLISHED:** 24 May 2025 **DOI:** 10.32996/ijels.2025.7.2.2

## 1. Introduction

The COVID-19 pandemic has significantly disrupted traditional modes of education, prompting schools worldwide to adopt alternative learning modalities. In the Philippines, the Department of Education implemented Modular Distance Learning (MDL) to ensure continuity of learning while prioritizing safety. However, due to its abstract and sequential nature, mathematics remains one of the most challenging subjects to deliver effectively in remote settings.

Understanding students' engagement and attitudes toward mathematics during MDL enhances instructional strategies. While previous studies have explored general learner attitudes, few have examined how specific affective factors—such as interest, motivation, time management, and the ability to work independently—relate to students' academic performance in mathematics during this period.

This study was conducted at Liloan National High School and focuses on Grade 7 and 8 learners' engagement with mathematical tasks in COVID-induced MDL. By analyzing these affective variables and their relationship to students' mathematics performance, the research aims to contribute to the development of a more responsive and effective MDL Engagement Plan tailored to learners' needs.

## 2. Literature Review

This study is anchored on Moore's Transactional Distance Theory, which offers a foundational understanding of distance education beyond the physical separation of teachers and learners. Moore and Diehl (2019) assert that distance education involves structured and autonomous teaching and learning activities, and this separation can negatively influence learner engagement and academic outcomes. The theory highlights three core variables—dialogue, structure, and learner autonomy. Dialogue refers to meaningful two-way communication that supports learning (Boyd, as cited in Moore & Diehl, 2019), while structure pertains to the rigidity or adaptability of instructional methods, learning goals, and assessment (Moore, 1993; Lowell, 2004; Nwankwo, 2013, as cited in Alotibi, 2018). Learner autonomy, or the capacity of students to manage their learning, plays a crucial role in reducing transactional distance.

In the context of the COVID-19 pandemic, these theoretical considerations were reflected in national educational policies. The Philippine Senate and House of Representatives enacted Republic Act No. 10650, or the Open Distance Learning Act, to promote inclusive and accessible education through distance learning modes (The Daily Tribune, 2020). Complementing this, the Department of Education issued DepEd Order No. 012, s. 2020, which introduced the Basic Education Learning Continuity Plan (BE-LCP). This plan outlined curriculum adjustments, instructional material alignment, and flexible delivery modalities tailored to varying local conditions and learner needs.

Several empirical studies also inform this research, particularly those focusing on student attitudes toward mathematics in remote learning environments. Haddock, MacDonald, and Whittaker (2020) define attitudes as a person's overall disposition—positive or negative—toward a particular subject. Yamani (2019) emphasized that learners' commitment to solving mathematical problems is strongly tied to their attitudes. Capuno (2019) further supported this by establishing a strong link between mathematical performance and both attitudes and study habits. Similarly, Ngalim and Mbenteh (2019) identified effective learning habits as crucial to fostering positive attitudes. Flores (2019) added that math anxiety, parental involvement, and study habits collectively influence high school students' mathematics achievement. Lastly, Andamon and Tan (2018) concluded that students' conceptual understanding of mathematics is deeply connected to their attitudes, making it a critical determinant of success.

Together, these studies and theoretical frameworks underscore the importance of addressing affective factors in mathematics education. They provide the foundation for the development of a Modular Distance Learning (MDL) Engagement Plan aimed at enhancing learner attitudes and performance in a modular distance learning environment.

## 3. Methodology

This section provides a detailed description of the procedures and methodologies employed in the conduct of the study.

### *3.1 Research Design*

This quantitative study employed a descriptive correlational design to examine the relationship between junior high school students' engagement in COVID-induced modular distance learning and their academic performance in mathematics. A survey method was used, and respondents were selected through random sampling based on Slovin's formula. The questionnaire assessed students' engagement with mathematical demands and their affective beliefs, relating these factors to academic performance. The design focused on identifying correlations rather than establishing causality or determining direct effects on mathematics achievement.

### *3.2 Flow of the Study*

An input-process-output (IPO) conceptual framework guided the conduct of the study (Figure 1). The input comprised the respondents' affective belief profiles, which included their attitudes, interests, behaviors toward mathematics, and the value they placed on the subject. Also considered were students' levels of engagement in mathematical tasks and their academic performance. These inputs were analyzed with each other, with particular focus on the correlation between student profiles, engagement with mathematical demands, and academic outcomes.

The process involved the distribution of a transmittal letter followed by the administration of validated questionnaires to the selected respondents. Adopting a descriptive correlational research design, the study aimed to identify and measure the relationships among key variables rather than to establish causality. The data collected were systematically encoded, statistically analyzed, and interpreted to derive meaningful insights and formulate recommendations.

The output of the study was a Modular Distance Learning (MDL) engagement plan designed to address the issues identified in the findings and serve as a reference for future instructional strategies.

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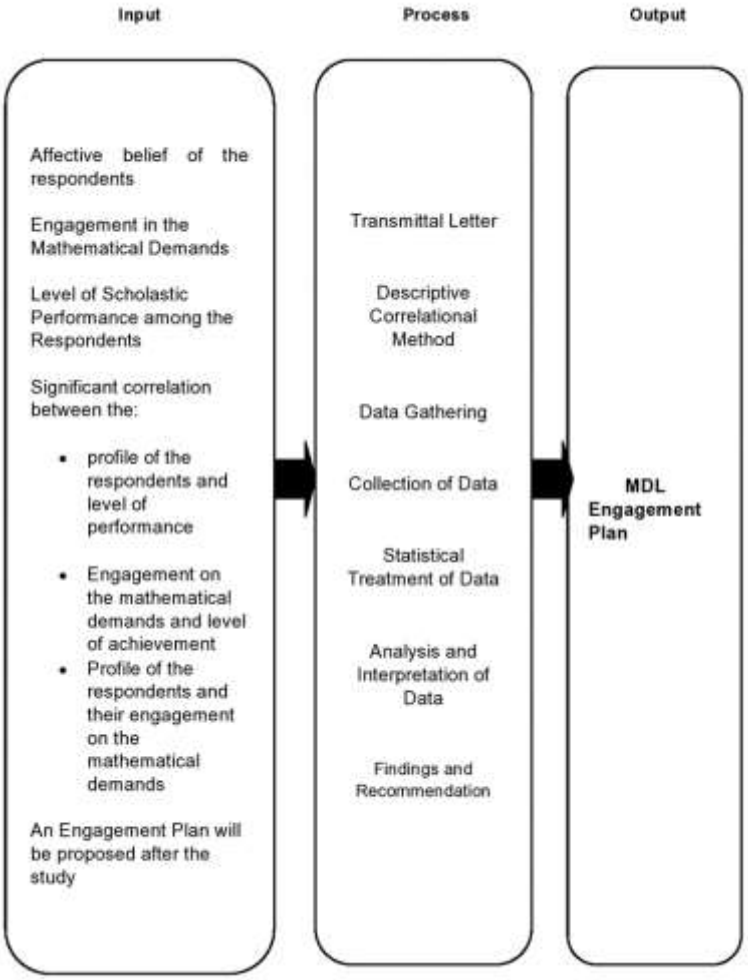


### *3.4 Respondents*

The participants in this study were junior high school students from Grades 7 and 8 enrolled at Liloan National High School. Selection of the subjects was based on their accessibility and availability during the period of modular learning. This cohort was deemed appropriate, as these grade levels are considered preparatory for higher education. A total of 155 respondents from Grade 7 and 156 respondents from Grade 8 were included in the sample. The sample size was determined using Slovin's formula to ensure a representative selection of students.

**Table 1**
*Distribution of the Respondents*

| Year Level | N | n | % |
|---|---|---|---|
| Grade 7 | 700 | 155 | 49.84 |
| Grade 8 | 705 | 156 | 50.16 |
| Total | 1405 | 311 | 100.00 |

### *3.5 Instrument*

The instrument used in this study was a survey questionnaire designed to facilitate orderly and efficient data collection. The questionnaire was divided into two parts :

Part 1 consisted of 25 statements addressing affective beliefs related to students' attitudes, interests, behaviors, and the value they place on mathematics. This section was based on a modified version of a survey questionnaire from Almerino et al. (2019) and employed a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree).

Part 2 focused on students' engagement with mathematical tasks during COVID-induced modular distance learning. This section included items on focus, task and time management, independent work, and motivation, also using a 4-point Likert scale. The questionnaire was developed by the researcher and validated by experts and a statistician. A pilot test was conducted to confirm its reliability, with the Cronbach's alpha values indicating high internal consistency for the following constructs: focus on learning (0.757), task and time management (0.783), independent work (0.760), and motivation (0.820).

The academic performance of respondents was assessed using their grades from the last three academic quarters, which were obtained from the Registrar's Office.

### *3.6 Data Gathering Procedure*

The researcher sought approval from the administration of Liloan National High School to survey Grade 7 and 8 mathematics students. The researcher collaborated with mathematics teachers to include the survey forms within the students' modules. Upon completion, the survey responses were collected when the students returned their modules.
In compliance with Republic Act No. 10173, also known as the Data Privacy Act, all information provided by the respondents was treated as confidential. The collected survey data were tabulated, and the results were subsequently analyzed and interpreted to derive conclusions and recommendations.

### *3.7 Statistical Treatment of Data*

To effectively analyze and interpret the data, the researcher employed various statistical techniques. A Likert scale was used to create a rating system, allowing respondents to select the option that most accurately represented their opinions. The standard deviation was utilized to assess the dispersion or variability within the data points. The weighted mean was calculated to represent the overall rating, reflecting the degree to which the mathematical needs of students were addressed during their participation in COVID-19-induced modular distance learning.

Additionally, Spearman's rank correlation coefficient (ρ) was applied to determine the strength and direction of the relationship between students' mathematical needs and their academic achievement while engaged in modular distance learning.

### *3.8 Presentation, Analysis, and Interpretation of Data*

This chapter presents the analysis, interpretation, and findings of the study. The research aims to evaluate the engagement of Grade 7 and Grade 8 students at Liloan National High School with the mathematical demands of COVID-Induced Modular Distance Learning (MDL) during the last three academic quarters of the 2020-2021 school year. The results from this study will inform the development of an Enhanced MDL Engagement Plan. Specifically, the study addresses the following sub-problems:

1. Profiling students based on their affective beliefs about mathematics, focusing on their attitudes, interests, behaviors, and values.
2. Evaluating students' engagement in the mathematical demands of MDL, examining factors such as focus, task and time management, independent work, and levels of will and motivation.
3. Assessing students' academic performance during the period of modular distance learning.

The tables in this chapter are organized in alignment with the structure outlined in the Statement of the Problem. The findings are discussed in detail, with reference to the responses gathered from the survey questionnaire completed by the respondents.

### *3.9 Profile of Affective Beliefs of the Respondents*

This section outlines the respondents' profiles regarding their affective beliefs about mathematics, specifically focusing on their attitudes, interest, behaviors, and the value they place on the subject. The data provides insights into how these affective factors manifest among learners and how they may influence their engagement with mathematical tasks. The following subsections present the outcomes observed based on the analysis of the respondents' profiles.

#### *3.9.1 Attitudes Towards Mathematics*

The ability of a student to respond to any academic or learning experience is referred to as their attitude. This study explored students' responses toward mathematics in the context of modular distance learning, with significant findings summarized in Table 2.

**Table 2**

*Profile of Affective Belief of the Respondents in terms of Attitudes towards Mathematics*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | Contacting my mathematics teacher in times of confusion is preferable | 3.01 | 0.760 | Positive |
| 2 | I am motivated to finish my modules in math before the deadline. | 3.12 | 0.749 | Positive |
| 3 | I like to learn math lessons at my own pace | 2.89 | 0.802 | Positive |
| 4 | It feels good when I receive feedback from my math teacher | 3.21 | 0.751 | Positive |
| 5 | Modular learning is preferable as it gives me more time to answer and review my modules in math | 2.79 | 0.919 | Positive |
| 6 | Difficult math problems make me upset and demotivate me to keep trying to get the correct solution | 2.95 | 0.811 | Positive |
| Aggregate Mean | | 2.99 | | Positive |
| Aggregate Standard Deviation | | | 0.799 | |

Legend: 3.25 – 4.00-Very Positive; 2.50 – 3.24-Positive; 1.75 – 2.49-Negative; 1.00 – 1.74 –Very Negative
n= 311

According to Ajisuksmo and Saputri (2017), students' attitudes significantly influence their mental abilities. Their study revealed that students who possess positive attitudes toward mathematics value its importance and make deliberate efforts to improve their mathematical learning outcomes. Similarly, Stanford Medicine (2018) reported that a positive attitude toward arithmetic enhances brain activity related to memory and predicts mathematics achievement beyond a child's IQ.

The results of this investigation highlight the role of feedback and teacher communication in shaping students' attitudes toward mathematics. Statements 1 and 3 in Table 2, which received weighted means of 3.21 and 3.02, reflect that students are more motivated when they receive positive feedback from their mathematics teachers. The item *"It feels good when I receive feedback from my math teacher"* received the highest weighted mean of 3.21. This finding aligns with Selvaraj et al. (2021), who emphasized that feedback contributes significantly to students' academic growth by reinforcing their strengths and guiding their learning progress.

Moreover, Aksan (2021) found that students generally view the modular distance learning approach positively, considering it an effective strategy for learning mathematics. The item *"Modular learning is preferable as it gives me more time to answer and review my modules in math"*, although with the lowest weighted mean, was still interpreted positively. This indicates that students appreciate the flexibility and extended time that modular learning allows.

Overall, the data in Table 2 demonstrate that students generally hold a positive attitude toward mathematics, encouraging them to take on academic challenges and seek learning opportunities, even during the disruptions caused by the pandemic. This

positive mindset reflects their successful adaptation to the modular distance learning approach and promotes optimism and enthusiasm for continued learning.

These findings underscore the importance of fostering favorable attitudes toward mathematics.
Constructive feedback and a supportive learning environment play essential roles in boosting student performance. A positive attitude, coupled with effective instructional practices, enhances academic success. Therefore, improved student outcomes reflect both personal effort and the quality of educational support provided.

### *3.10 Interest Towards Mathematics*

The term *interest* refers to an individual's willingness or readiness to engage fully in a specific task or goal. As emphasized by Uchechi (2018), interest is essential in ensuring the fulfillment of a task's objectives. Student interest in academic content holds significant influence; when learners are deeply engaged in subjects they find interesting, effective learning outcomes are more likely to occur, as illustrated in Table 3.

In this study, the modular approach to teaching mathematics was generally viewed positively, with the highest weighted mean of 3.16. This suggests that many students acknowledge its value, even as they find mathematics challenging. Meanwhile, the statement *"Complex mathematical problems are not interesting because they are of no use in practical living"* received the lowest weighted mean of 2.47, reflecting the respondents' belief in the real-life relevance of solving complex problems.

Positive responses to indicators 1 and 6 in Table 3 reinforce the notion that interest is closely linked to emotional involvement. As described by Finn and Voelkl (1993) and Skinner and Belmont (1993), as cited in Fung et al. (2018), affective engagement refers to students' emotional responses during the learning process and their perception of the value of education. Renninger and Hidi (2019) further clarify that interest not only influences comprehension and attention but also shapes students' feedback preferences and their ability to set and achieve academic goals.

These findings emphasize the interconnected nature of instructional strategies and student motivation. When students express genuine interest in learning mathematics, such engagement encourages teachers to improve instructional methods that can further stimulate student interest. This process creates a positive feedback loop: the more students become interested, the more likely they are to exert effort, persist in understanding mathematical concepts, and ultimately improve their academic performance.

**Table 3**

*Profile of Affective Belief of the Respondents in Terms of Interest Towards Mathematics*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | It is interesting to study my mathematics modules so I can get higher grades | 3.16 | 0.766 | Positive |
| 2 | It is interesting to watch DepEd TV-Based Instructions as it delivers mathematics lessons effectively | 2.93 | 0.763 | Positive |
| 3 | Studying mathematics is interesting as it applies to real-life situations. | 3.04 | 0.784 | Positive |
| 4 | Problem-solving activities are interesting as they develop my critical thinking | 3.04 | 0.720 | Positive |
| 5 | Complex mathematical problems are not interesting as they are of no use for practical living. | 2.47 | 0.845 | Negative |
| 6 | Working on my math modules is more interesting than playing mobile games or watching TV programs when I get bored. | 2.91 | 0.810 | Positive |
| Aggregate Mean | | 2.92 | | Positive |
| Aggregate Standard Deviation | | | 0.781 | |

Legend: 3.25 – 4.00-Very Positive; 2.50 – 3.24-Positive; 1.75 – 2.49-Negative; 1.00 – 1.74 –Very Negative n= 311

### *3.11 Behavior Towards Mathematics*

Table 4 presents the results regarding respondents' behavior toward mathematics. Said et al. (2018) emphasize that education plays a vital role in driving positive societal change, and educated individuals are often expected to exhibit good behavior. As a result, teachers place importance on student engagement, believing that well-behaved students are more likely to succeed academically.

**Table 4**

*Profile of Affective Belief of the Respondents in terms of Behavior towards Mathematics*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | My answer is always incorrect during math drills or exercises | 2.63 | 0.836 | Positive |
| 2 | Asking questions in my mathematics class is of no sense. | 2.26 | 0.773 | Negative |
| 3 | Even if there is a tutor, I still would not have learned mathematics | 2.31 | 0.870 | Negative |
| 4 | Preparing for a math exam makes the students tense. | 2.91 | 0.741 | Positive |
| 5 | Listening to a math instructor in class does not stress me. | 2.85 | 0.849 | Positive |
| 6 | Mathematics does not suit me. | 2.54 | 0.890 | Positive |
| Aggregate Mean | | 2.58 | | Positive |
| Aggregate Standard Deviation | | | 0.826 | |

Legend: 3.25 – 4.00-Very Positive; 2.50 – 3.24-Positive; 1.75 – 2.49-Negative; 1.00 – 1.74 –Very Negative n= 311

However, some negative affective beliefs related to behavior were observed in the statements *"Asking questions in my mathematics class is of no sense"* and *"Even if there were a tutor, I still would not learn mathematics."* Particularly, statement number 2, which recorded the lowest weighted mean, suggests that some students may not see the value in asking questions. This is concerning, as formulating questions is a key element in enhancing comprehension of academic content.

When it comes to anxiety, the survey results indicate that respondents associate studying for a math exam with feelings of tension, an indicator of math anxiety. Sokolowski and Ansari (2017) report that math anxiety affects many students and is strongly linked to underperformance in mathematics both in school and later in life.

Overall, the students' affective beliefs about behavior concerning mathematics yielded an aggregate mean of 2.58 and a standard deviation of 0.826. This was interpreted favorably, suggesting that students' beliefs, when positive, can contribute to better academic performance in mathematics. Thus, cultivating a supportive learning environment that addresses behavioral and emotional challenges may help students develop more productive attitudes and improve their outcomes in mathematics.

### *3.12 Valuing Mathematics*

Table 5 reveals that the respondents' average grade in mathematics is 2.71. Davis et al. (2021) emphasize that students' values significantly influence their thoughts, emotions, and approaches to learning mathematics, thereby shaping their reasoning and decision-making. The results suggest that students who place a higher value on mathematics tend to be more motivated and focused.

**Table 5**

*Profile of Affective Belief of the Respondents in terms of Valuing Mathematics*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | Mathematics is one of the subjects I like the least | 2.78 | 0.879 | Positive |
| 2 | Mathematics helps me to understand life in general | 2.93 | 0.731 | Positive |
| 3 | it is essential to be good at math in school | 3.00 | 0.709 | Positive |
| 4 | Using mathematics outside of school is not that important | 2.00 | 0.789 | Negative |
| 5 | Mathematics is useless to me | 2.05 | 0.900 | Negative |
| 6 | Mathematics can be applied in my daily living or routine | 3.11 | 0.738 | Positive |
| 7 | Mathematics helps those who make important decisions. | 3.11 | 0.769 | Positive |
| Aggregate Mean | | 2.71 | | Positive |
| Aggregate Standard Deviation | | | 0.788 | |

Legend: 3.25 – 4.00-Very Positive; 2.50 – 3.24-Positive; 1.75 – 2.49-Negative; 1.00 – 1.74 –Very Negative n= 311

Positive interpretations are particularly evident in statements concerning the practical application of mathematics in daily activities and decision-making. Indicators 6 and 7, which both recorded a weighted mean of 3.11, and indicators 1 and 2 support the idea that students recognize the usefulness of mathematics in real life. Despite this, many respondents still reported that mathematics was their least favorite subject.

Hunter (2021) explored the values of students from diverse schools and cultural backgrounds, finding that Pāsifika students often prioritize values such as practice, family, respect, and perseverance, more than correctness and utility in mathematics.

In conclusion, while mathematics may not be the most favored subject, Table 5 indicates that students still appreciate its relevance. This suggests that teaching strategies that highlight the practical uses and decision-making benefits of mathematics can enhance student engagement and motivation. The findings underscore the importance of aligning instructional content with students' values to cultivate a more positive attitude toward learning mathematics.

### *3.13 Summary of the Affective Belief of the Respondents*

This section provides a summary of the respondents' affective beliefs, including their attitudes, interests, behaviors, and the extent to which they value mathematics. The outcomes below are based on the data collected.

**Table 6**

*Summary of the Profile of the Affective Belief of the Respondents*

| Components | Weighted Mean | SD | Interpretation |
|---|---|---|---|
| Attitude towards Mathematics | 2.99 | 0.799 | Positive |
| Interest towards Mathematics | 2.92 | 0.781 | Positive |
| Behavior towards Mathematics | 2.58 | 0.826 | Positive |
| Valuing Mathematics | 2.71 | 0.788 | Positive |
| Overall Aggregate Mean | 2.80 | | Positive |
| Overall Standard Deviation | | 0.799 | |

Table 6 presents the affective beliefs of the respondents toward mathematics. The first component, attitude, recorded the highest weighted mean of 2.99 with a standard deviation of 0.799. This suggests that, while students generally maintain a

positive attitude toward mathematics, some still identify it as their least favorite subject. This is a significant finding, as a student's attitude toward mathematics has been linked to overall academic performance in various contexts.

The second indicator, interest, yielded a weighted mean of 2.92 (SD = 0.781), reflecting students' engagement and personal curiosity in learning mathematics. Meanwhile, valuing mathematics showed an average of 2.71 (SD = 0.788), indicating that many students appreciate the subject's relevance to real-life applications and decision-making. This value perception often contributes to persistence when facing academic défis.

The last component, related to behavioral and emotional responses, had the lowest weighted mean of 2.58 (SD = 0.826), showing a broader variation in students' emotional engagement. Some respondents expressed a genuine appreciation for the subject, while others demonstrated negative feelings or lacked motivation.

The overall mean score of 2.80 (SD = 0.799) indicates a generally positive affective belief toward mathematics. These beliefs influence key areas such as active class participation, willingness to respond, personal satisfaction during the learning process, and the development of self-reliance in solving mathematical problems.

The findings highlight the diversity of students' emotional responses toward mathematics and emphasize the need for targeted interventions. Addressing negative perceptions and motivational barriers is essential to improving students' learning experiences and academic outcomes. Enhancing emotional engagement can lead to more effective teaching strategies and better student performance in mathematics.

### *3.14 Extent of the Respondents' Engagement in Mathematical Demands*

This section presents the outcomes of the respondents' engagement in the mathematical demands of learning. Specifically, it examines their focus on learning the lesson, task and time management, capacity to work independently, and level of strong will and motivation. The summarized data are shown in the tables below.

#### *3.14.1 Focus on Learning the Lessons*

Table 7 highlights the significant role of focus in learning mathematics and its contribution to academic performance. As noted by Rochani (2019), focus on learning refers to the capacity to concentrate on mathematics lessons and tasks, which fosters the development of self-confidence and self-esteem. When paired with effective learning strategies and adequate educator support, focus enhances students' concentration and leads to improved mathematical outcomes.

**Table 7**

*Extent of the Respondents' Engagement in the Mathematical Demands in Terms of Focus in Learning the Lessons*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | I can focus on my mathematics modules because convenient learning pace. | 3.02 | 0.779 | High |
| 2 | I can focus on learning Mathematics through enough resources such as a calculator, protractor, compass, etc. | 2.95 | 0.712 | High |
| 3 | I can focus on learning mathematics with the help of the Internet | 2.92 | 0.703 | High |
| 4 | I can focus on learning mathematics in a quiet place. | 3.13 | 0.783 | High |
| 5 | I can focus on learning mathematics with the help of a calming place. | 3.19 | 0.717 | High |
| 6 | I can focus on learning mathematics because other tasks are done. | 2.95 | 0.775 | High |
| 7 | I can focus on learning mathematics because I like this subject. | 2.67 | 0.763 | High |
| 8 | I can focus on learning mathematics through the modules I can immediately work on my own. | 2.85 | 0.731 | High |
| 9 | I can focus on learning mathematics because it gives me lessons in life | 3.03 | 0.718 | High |
| 10 | I can focus on learning mathematics because it can help me learn other subjects. | 3.03 | 0.722 | High |
| Aggregate Mean | | 2.97 | | High |
| Aggregate Standard Deviation | | | 0.740 | |

Legend: 3.25 – 4.00-Very High; 2.50 – 3.24-High; 1.75 – 2.49-Low; 1.00 – 1.74 –Very Low n=311

Despite the distractions brought about by modular distance learning, the students demonstrated their ability to remain focused. Notably, Indicator 5, *"I can focus on learning mathematics with the help of a calming place,"* received the highest weighted mean (WM = 3.19). This was followed by *"I can focus on learning mathematics in a quiet place"* (WM = 3.13) and *"I can focus on doing my modules in mathematics because there is a convenient learning pace"* (WM = 3.02), reflecting a shared preference for conducive learning environments (Usman et al., 2019).

In addition, the findings align with Kapur (2018), who emphasized the value of access to resources and stable internet connectivity in facilitating comprehension of academic content. The results suggest that students' engagement with mathematical demands is closely tied to their ability to maintain focus, thereby mitigating the adverse effects of environmental distractions.

Focus serves as a critical cognitive driver that supports perception, memory, reasoning, and problem-solving—all of which are essential to effective decision-making. Improved focus, bolstered by supportive environments and sufficient resources, is a key determinant of academic success in mathematics. As such, educators are encouraged to establish learning conditions that enhance students' concentration and engagement, particularly in remote or modular learning settings. Future research may investigate specific strategies to reduce distractions and further enhance learning environments to support academic achievement in mathematics.

### *3.15 Management of Tasks and Time*

Management of tasks and time refers to the process of planning, organizing, and allocating time effectively while prioritizing tasks based on their importance and urgency. This approach ensures the timely and efficient completion of work.

Table 8 outlines how respondents manage mathematical tasks and time during modular distance learning. The data indicate that respondents effectively practice time management when studying mathematics. All indicators were rated highly, suggesting that students are capable of setting, initiating, and adjusting their study schedules. This ability allows for curriculum flexibility, faster pacing, and the potential inclusion of advanced mathematics lessons.

The study underscores the importance of time management in students' academic engagement with mathematics. Effective time management not only enhances academic performance but also contributes to improved mental and physical health. As such, time management skills should be integrated into educational frameworks to boost student efficiency, reduce stress, and foster better academic outcomes. Future research could explore specific time management strategies employed by students and their potential integration into educational practices.

**Table 8**

*Extent of the Respondents' Engagement on the Mathematical Demands in terms of Management of Tasks and Time*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | I follow the schedule I allotted for my math subject. | 2.87 | 0.789 | High |
| 2 | I allot 1-2 hours studying my math lesson every day. | 2.66 | 0.778 | High |
| 3 | I answer mathematical problems from simple to complex | 2.85 | 0.715 | High |
| 4 | I study my modules in mathematics after doing all the household chores | 2.96 | 0.735 | High |
| 5 | If I do not know how to solve a problem, I go back to the page/s where the lesson is discussed. | 3.13 | 0.766 | High |
| 6 | I message my mathematics teacher for some clarifications of the lesson | 2.61 | 0.847 | High |
| | Aggregate Mean | 2.85 | | High |
| | Aggregate Standard Deviation | | 0.772 | |

Legend: 3.25 – 4.00-Very High ; 2.50 – 3.24-High; 1.75 – 2.49-Low; 1.00 – 1.74 –Very Low n=311

### *3.16 Working Independently*

Independent learning in mathematics is characterized by students acting based on their motivations and experiences, rather than relying on external assistance (Adiansha, 2018, as cited in Sari & Zamroni, 2019). This learning mode fosters enhanced cognitive performance, the development of skills, and deeper knowledge acquisition. It also enables teachers to implement differentiated tasks tailored to students' needs.

**Table 9**

*Extent of the Respondents' Engagement on the Mathematical Demands in terms of Working Independently*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | I answer my module without asking for help from my classmates. | 2.85 | 0.807 | High |
| 2 | I read ahead on mathematical topics that I anticipate being difficult. | 2.93 | 0.735 | High |
| 3 | I do further research if I cannot understand some mathematical concepts | 3.07 | 0.733 | High |
| 4 | I do not seek help from my parents or elder siblings in answering mathematical problems. | 2.52 | 0.922 | High |
| 5 | I do not copy the answers to the mathematics problems shared by my classmates in our group chat. | 2.86 | 0.880 | High |
| Aggregate Mean | | 2.85 | | High |
| Aggregate Standard Deviation | | | 0.815 | |

Legend: 3.25 – 4.00-Very High; 2.50 – 3.24-High; 1.75 – 2.49-Low; 1.00 – 1.74 –Very Low n=311

Table 9 presents the extent to which respondents engaged in independent work, with all five indicators receiving a high interpretation and an aggregate mean of 2.85. This suggests that students were able to manage their mathematics learning independently during modular distance learning, demonstrating a sense of responsibility in the process.

The benefits of independent learning include not only improved cognitive outcomes but also the development of a more positive attitude toward learning (Agustina et al., 2018). It empowers learners to personalize their learning based on individual motivations and prior experiences.

Moreover, integrating independent learning within the classroom provides teachers with greater flexibility to diversify instructional activities. While some students engage in independent tasks, teachers can focus on delivering more individualized instruction to smaller groups, thereby enhancing overall learning outcomes. This approach also reduces the need for constant supervision, allowing teachers to concentrate more on the teaching and learning process rather than on classroom management.

### *3.17 Strong Will and Motivation*

According to Purnama et al. (2019), a strong will and motivation in learning mathematics reflect a student's determination to achieve academic goals despite challenges.

Motivation plays a significant role in influencing the effort and capability of students to attain their learning objectives. This is evident in the respondents' high level of enjoyment in solving mathematical problems, as reflected by a weighted mean of 2.88. Specifically, Table 10 indicates that Statements 1, 7, 5, and 6 demonstrate a strong sense of determination and motivation among students to complete tasks effectively and develop conceptual understanding.

This motivation is further reinforced by their belief in the long-term relevance of mathematics beyond academic success. The high aggregated mean score of 3.07 supports the notion that students are driven not only by immediate academic goals but also by the broader significance they attribute to mathematics in real-life contexts.

**Table 10**

*Extent of the Respondents' Engagement on the Mathematical Demands in terms of Strong Will and Motivation*

| S/N | Indicators | WM | SD | Interpretation |
|---|---|---|---|---|
| 1 | I try to answer the questions even if it is quite difficult on my part. | 3.11 | 0.682 | High |
| 2 | I am eager to study and answer my module in mathematics to learn and get a high grade. | 3.08 | 0.686 | High |
| 3 | I am motivated to learn mathematics | 3.04 | 0.708 | High |
| 4 | I enjoy solving mathematical problems | 2.88 | 0.735 | High |
| 5 | I am eager to study Mathematics as it can help me become successful in the future. | 3.13 | 0.690 | High |
| 6 | Mathematics is helpful in everyday life, and that is why I am inspired to learn more. | 3.06 | 0.697 | High |
| 7 | If I could not get the correct answer on the first try, I continued trying until I got it right | 3.17 | 0.776 | High |
| | Aggregate Mean | 3.07 | | High |
| | Aggregate Standard Deviation | | 0.711 | |

Legend: 3.25 – 4.00-Very High; 2.50 – 3.24-High; 1.75 – 2.49-Low; 1.00 – 1.74 –Very Low n=311

### *3.18 Summary of Respondents' Engagement on Mathematical Demands*

This section summarizes the respondents' engagement with mathematical demands in the context of modular distance learning. It focuses on key areas such as concentration on learning the lessons, task and time management, independent work, and strong will and motivation. The results derived from the collected data are presented below.

**Table 11**
*Summary of the Respondents' Engagement in Mathematical Demands*

| Components | Weighted Mean | SD | Interpretation |
|---|---|---|---|
| Focus on Learning the Lessons | 2.97 | 0.740 | High |
| Management of Tasks and Time | 2.85 | 0.772 | High |
| Working Independently | 2.85 | 0.815 | High |
| Strong Will and Motivation | 3.07 | 0.711 | High |
| Overall Aggregate Mean | 2.94 | | High |
| Overall Standard Deviation | | 0.760 | |

n=311

Table 11 presents an overview of the respondents' engagement with various demands associated with learning mathematics. Among the assessed components, *strong will and motivation* recorded the highest weighted mean (M = 3.07, SD = 0.711), followed by *focus on learning the lessons* (M = 2.97, SD = 0.740). These results emphasize the pivotal role of determination, motivation, and sustained focus in supporting academic success, particularly within the context of modular distance learning during the COVID-19 pandemic.

All components received high interpretive ratings, reinforcing their collective importance in promoting effective learning outcomes under remote learning conditions. These findings highlight the need to cultivate self-regulated learning strategies, which are essential for maintaining student engagement and performance in non-traditional educational settings.

***3.19 Summary of Respondents' Engagement on Mathematical Demands***

**Table 12**
*Level of Scholastic Performance of the Respondents in Math*

| **Level** | **Numerical Range** | f | % |
|---|---|---|---|
| Outstanding | 90 – 100 | 9 | 2.89 |
| Very Satisfactory | 85 – 89 | 32 | 10.29 |
| Satisfactory | 80 – 84 | 80 | 25.72 |
| Fair Satisfactory | 75 – 79 | 177 | 56.91 |
| Did not meet the Expectations | Below 75 | 13 | 4.18 |
| **Total** | | **311** | **100.00** |
| **Average** | | **80.0** | |
| **Standard Deviation** | | **4.32** | |

Table 12 shows that the majority of respondents (56.91%) fell under the Fairly Satisfactory level, with scores ranging from 75 to 79. This indicates that while most students met the minimum requirements, their performance suggests a need for further academic support. Meanwhile, 25.72% achieved a Satisfactory rating, reflecting a basic understanding of the lessons.

Only a small portion of the respondents reached higher performance levels, with 10.29% in the Very Satisfactory category and just 2.89% in the Outstanding range. On the other hand, 4.18% did not meet expectations, pointing to possible challenges in learning mathematics independently during modular distance learning.

With an overall mean of 80.0 and a standard deviation of 4.32, the data suggest average scholastic performance. These results highlight the need for enhanced learning support and strategies to help students improve, especially under remote learning conditions.

### *3.20 Correlation between the Profile of the Respondents and their Level of Performance*

**Table 13**

*Test of Significant Correlation between the Profile of the Respondents and their Level of Performance*

| Variables | Spearman rho | Strength of Correlation | p-value | Decision | Remarks |
|---|---|---|---|---|---|
| Attitudes towards Mathematics and Performance | 0.188* | Negligible Positive | 0.001 | Reject Ho | Significant |
| Interest towards Mathematics and Performance | 0.118* | Negligible Positive | 0.038 | Reject Ho | Significant |
| Behavior towards Mathematics and Performance | -0.056 | Negligible Negative | 0.322 | Do not Reject Ho | Not Significant |
| Valuing Mathematics and Performance | 0.076 | Negligible Positive | 0.182 | Do not Reject Ho | Not Significant |

*Significant at p<0.05 (two-tailed); n=311

Table 13 presents the correlation between selected student profile variables and their level of achievement in mathematics using Spearman rho at a 0.05 level of significance. A significant yet negligible positive correlation (r = 0.188, p = 0.001) was found between attitudes toward mathematics and academic achievement. This indicates that students with more favorable attitudes tend to perform slightly better in math. This aligns with Purnama et al. (2019), who emphasized the impact of determination and motivation on academic outcomes. Similarly, studies by Khoshaim (2020), Al-Mutawah (2018), and Capuno et al. (2019) support the conclusion that positive attitudes and study habits are key contributors to success in mathematics.

A negligible but statistically significant correlation was also found between interest in mathematics and performance (r = 0.118, p = 0.038). This suggests that students who show greater interest in the subject are more likely to perform better. Wong and Wong (2019) affirm that even learners with low performance can benefit from heightened interest in mathematics. Azmidar et al. (2017) further underscore the role of personal interest in promoting engagement and cognitive effort.

In contrast, behavior toward mathematics showed a negligible negative correlation with achievement (r = -0.056, p = 0.322), indicating no significant relationship. This finding supports the work of Kremer et al. (2016) and Oluwagbohunmi and Olabisi (2019), who found that student behavior and mannerisms do not necessarily influence academic outcomes in mathematics.

Lastly, valuing mathematics was found to have a negligible and non-significant positive correlation with achievement (r = 0.076, p = 0.182). While some studies (e.g., Seah, 2018; Clarkson et al., 2019) link valuing mathematics to performance, this study suggests that valuing the subject alone may not directly result in higher achievement, particularly if learning relies on memorization rather than deep understanding.

Overall, the findings highlight the importance of fostering positive attitudes and sustained interest in mathematics to improve student outcomes, while suggesting that behavior and valuing mathematics, though relevant, may not have a direct impact on achievement.

### *3.21 Correlation between the Respondents' Engagement and their Level of Performance*

Table 14 illustrates the relationship between different aspects of student engagement and their mathematics achievement using Spearman rho correlation coefficients at the 0.05 significance level.

**Table 14**

*Test of Significant Correlation Between the Respondents' Engagement and their Level of Performance*

| Variables | Spearman rho | Strength of Correlation | p-value | Decision | Remarks |
|---|---|---|---|---|---|
| Focus on Learning Lessons and Performance | 0.089 | Negligible Positive | 0.118 | Do not Reject Ho | Not Significant |
| Management of Tasks and Time, and Performance | 0.172* | Negligible Positive | 0.002 | Reject Ho | Significant |
| Working Independently and Performance | 0.030 | Negligible Positive | 0.602 | Do not Reject Ho | Not Significant |
| Strong Will and Motivation, and Performance | 0.128* | Negligible Positive | 0.024 | Reject Ho | Significant |

*significant at p<0.05 (two-tailed) ; n=311

The analysis revealed no significant relationship between focus on learning and academic achievement ($r = 0.089$, $p = 0.118$). This finding aligns with Poorghorban et al. (2018), who found no significant difference in attention between high- and low-achievers, though they noted that weaker task-shifting among low-achievers may indirectly impact performance.

A significant positive correlation was observed between task and time management and mathematics achievement ($r = 0.172$, $p = 0.002$), suggesting that students who manage their tasks and time effectively tend to perform better. This is supported by Wu et al. (2021) and Alsalem et al. (2017), who reported that effective time management is associated with higher self-efficacy and academic performance. Vale et al. (2019) further emphasized that poor time management often leads to lower academic outcomes.

Independent work showed a negligible and non-significant correlation with achievement ($r = 0.030$, $p = 0.602$), consistent with Güneş and Alagözlü (2020), who reported no direct link between learner autonomy and academic success. However, studies by He and Zhang (2019) and Fauzi and Widjajanti (2018) suggested that independent work, when combined with self-regulation and motivation, may contribute to better academic results.

Strong will and motivation showed a significant positive correlation with achievement ($r = 0.128$, $p = 0.024$), underscoring their importance in academic performance. Almalki (2019) emphasized the role in academic success, influenced by contextual factors such as socioeconomic background and family support. Güneş and Alagözlü (2020) also linked motivation to higher performance, deeper understanding, and improved overall school experience.

In conclusion, among the various dimensions of engagement, time management and motivation emerged as the most significant predictors of student success in mathematics. These results underscore the need for educators to foster time-management strategies and sustain student motivation to enhance learning outcomes in the subject

### *3.22 Significant Correlation Between the Profile of The Respondents and Their Engagement on the Mathematical Demands*

This section presents the test of significant correlation between the respondents' profile variables and their engagement in addressing mathematical demands. The engagement is categorized into four components. The statistical analyses were conducted using Spearman's rho correlation coefficient at a 0.05 significance level and a two-tailed test. The results are presented in Tables 15 to 19.

#### *3.22.1 Significant Correlation between the Profile of the Respondents and their Focus on Learning the Lessons*

This section presents the test of significant correlation between the respondents' attitudes towards learning mathematics and their focus on learning, as shown in Table 15

**Table 15**

*Test of Significant Correlation between the Profile of the Respondents and their Engagement on the Mathematical Demands in terms of Focus on Learning the Lessons*

| Variables | Spearman rho | Strength of Correlation | p-value | Decision | Remarks |
|---|---|---|---|---|---|
| Attitudes towards Mathematics and Focus on Learning the Lessons | 0.496* | Weak Positive | 0.000 | Reject Ho | Significant |
| Interest towards Mathematics and Focus on Learning the Lessons | 0.509* | Moderate Positive | 0.000 | Reject Ho | Significant |
| Behavior towards Mathematics and Focus in Learning the Lessons | 0.079 | Negligible Positive | 0.164 | Do not Reject Ho | Not Significant |
| Valuing Mathematics and Focus on Learning the Lessons | 0.395* | Weak Positive | 0.000 | Reject Ho | Significant |

*significant at p<0.05 (two-tailed) ; n=311

The correlation between attitudes toward mathematics and focus on learning yielded an *r*-value of 0.496, indicating a weak positive correlation. With a *p*-value of 0.000, which is less than 0.05, the null hypothesis is rejected, confirming statistical significance. This result suggests that students who possess a positive attitude toward mathematics tend to show better focus in learning.

The *r*-value of 0.509 for the correlation between interest in learning mathematics and focus indicates a moderately positive relationship. The corresponding *p*-value of 0.000 signifies that this relationship is statistically significant. This implies that students who are genuinely interested in mathematics are more likely to engage and concentrate during lessons.

Math behavior, on the other hand, shows a very weak correlation with focus, with an *r*-value of 0.079 and a *p*-value of 0.164. Since the *p*-value is greater than 0.05, the result is not statistically significant. This supports the idea that the students' behaviors related to mathematics have little influence on their ability to focus. However, Cicekci and Sadik (2019) noted that external factors such as teacher behavior and classroom climate can significantly impact students' attention and engagement in class.

Lastly, valuing mathematics and focusing on lessons yielded an *r*-value of 0.395, suggesting a weak positive correlation. The *p*-value of 0.000 indicates statistical significance. This means that students who place value on mathematics tend to pay more attention and remain focused during lessons.

Overall, the results highlight the importance of fostering positive attitudes and interest in mathematics to improve students' focus and engagement. While behavior alone may not have a significant impact, the influence of teachers and instructional strategies remains crucial in maintaining student attention and motivation in mathematics learning.

***3.23 Significant Correlation between the Profile of the Respondents and their Management of Task and Time***

This section presents the test of significant correlation between respondents' attitudes toward learning mathematics and their management of tasks and time, as shown in Table 16.

The correlation between respondents' attitudes toward mathematics and their management of tasks and time yielded an r-value of 0.509 and a p-value of 0.000, indicating a moderately positive and statistically significant relationship. This suggests that students with a more positive attitude toward mathematics tend to manage their tasks and time more effectively. Gayef et al. (2017) emphasized that students' perceptions of the importance of time management are crucial in developing skills that contribute to academic success.

A moderately positive correlation was also found between respondents' interest in mathematics and their task and time management, leading to the rejection of the null hypothesis due to the significant p-value. This finding aligns with Gayef et al. (2017), who reported that students' learning strategies and their interest in lessons positively affect academic achievement, suggesting that a strong interest in mathematics enhances students' ability to manage academic tasks and time.

**Table 16**

*Test of Significant Correlation between the Profile of the Respondents and their Engagement on the Mathematical Demands in terms of Management of Tasks and Time*

| Variables | Spearman rho | Strength of Correlation | p-value | Decision | Remarks |
|---|---|---|---|---|---|
| Attitudes towards Mathematics and Management of Tasks and Time | 0.509* | Moderate Positive | 0.000 | Reject Ho | Significant |
| Interest in Mathematics and Management of Tasks and Time | 0.506* | Moderate Positive | 0.000 | Reject Ho | Significant |
| Behavior towards Mathematics and Management of Tasks and Time | 0.103 | Negligible Positive | 0.069 | Do not Reject Ho | Not Significant |
| Valuing Mathematics and Management of Tasks and Time | 0.327* | Weak Positive | 0.000 | Reject Ho | Significant |

*significant at p<0.05 (two-tailed) ; n=311

Meanwhile, the correlation between students' behavior toward mathematics and their management of tasks and time was negligible, with an r-value of 0.103 and a p-value greater than 0.05. Thus, no significant relationship was found. This is consistent with Kaminske (2020), who argued that time management is shaped more by the nature of the tasks and individual personality traits rather than by behavior alone.

Finally, the correlation between valuing mathematics and task and time management indicated a weak positive relationship, with an r-value of 0.327 and a p-value of 0.000, signifying statistical significance. This result suggests that students who value mathematics are more likely to manage their tasks and time efficiently.

Overall, the findings highlight that positive attitudes and genuine interest in mathematics are significantly associated with better task and time management skills, both of which contribute to academic success. However, behavior toward mathematics alone does not appear to directly influence students' time management abilities, reflecting the complex interplay of factors that impact effective academic management.

### *3.24 Significant Correlation between the Profile of the Respondents and their Working Independently*

**Table 17**

*Test of Significant Correlation between the Profile of the Respondents and their Engagement on the Mathematical Demands in terms of Working Independently*

| Variables | Spearman rho | Strength of Correlation | p-value | Decision | Remarks |
|---|---|---|---|---|---|
| Attitudes towards Mathematics and Working Independently | 0.337* | Weak Positive | 0.000 | Reject Ho | Significant |
| Interest towards Mathematics and Working Independently | 0.292* | Negligible Positive | 0.000 | Reject Ho | Significant |
| Behavior towards Mathematics and Working Independently | 0.183* | Negligible Positive | 0.001 | Reject Ho | Significant |
| Valuing Mathematics and Working Independently | 0.333* | Weak Positive | 0.000 | Reject Ho | Significant |

*significant at p<0.05 (two-tailed) ; n=311

Table 17 presents the relationship between respondents' attitudes toward mathematics and their ability to work independently. This section discusses the strength and significance of the correlations found, highlighting how students' attitudes, interests, behaviors, and values in mathematics relate to their development of independent learning skills.

The calculated r-value between respondents' attitudes toward mathematics and their ability to work independently was 0.337, indicating a weak positive correlation. Furthermore, the p-value was less than 0.05, leading to the rejection of the null hypothesis.

This result suggests that a significant relationship exists between students' attitudes toward mathematics and their capacity for independent work, implying that students' positive attitudes can enhance their independence.

This finding is supported by Asrial et al. (2019), who investigated the relationship between students' attitudes toward independence and self-confidence. Their study reported a positive correlation with an r-value of 0.518 among elementary students in Batanghari, demonstrating a strong link between independence and positive student attitudes. Moreover, Akbar et al. (2020) emphasized that students with a positive learning attitude develop the maturity to take initiative and explore new concepts independently. Particularly during the COVID-19 pandemic, students had to continuously adapt to new learning environments, highlighting the need for self-directed learning.

To further assess the relationship between respondents' interest in mathematics and their ability to work independently, the same statistical test was applied. The resulting r-value was 0.292, indicating a negligible positive correlation. However, since the p-value was still less than 0.05, the null hypothesis was rejected. Meng et al. (2019) explained that students with a strong interest in learning are more likely to take an active role in their education, develop new skills, and strengthen their capacity for independent learning, an essential competence especially during uncertain periods.

Regarding the correlation between respondents' behavior toward mathematics and their ability to work independently, the table reveals a negligible positive correlation strength. Although the effect size was minimal, the p-value was less than 0.05, resulting in the rejection of the null hypothesis.

Finally, the correlation between valuing mathematics and the ability to work independently revealed a weak positive relationship, with an r-value of 0.333 and a p-value less than 0.05, indicating statistical significance. This suggests that students who value mathematics are more likely to engage in independent work and persist in their academic tasks. The significant correlation between these variables highlights the role of valuing mathematics in promoting student autonomy.

Overall, these results demonstrate that positive attitudes, strong interest, and valuing mathematics are significantly related to students' ability to work independently, supporting their academic growth.

### *3.25 Significant Correlation between the Profile of the Respondents and their Strong Will and Motivation*

**Table 18**

*Test of Significant Correlation between the Profile of the Respondents and their Engagement on the Mathematical Demands in Terms of Strong Will and Motivation*

| Variables | Spearman rho | Strength of Correlation | p-value | Decision | Remarks |
|---|---|---|---|---|---|
| Attitudes towards Mathematics and Strong Will and Motivation | 0.506* | Moderate Positive | 0.000 | Reject Ho | Significant |
| Interest towards Mathematics and Strong Will and Motivation | 0.469* | Weak Positive | 0.000 | Reject Ho | Significant |
| Behavior towards Mathematics and Strong Will and Motivation | 0.020 | Negligible Positive | 0.722 | Do not Reject Ho | Not Significant |
| Valuing Mathematics and Strong Will and Motivation | 0.260* | Negligible Positive | 0.000 | Reject Ho | Significant |

*significant at p<0.05 (two-tailed) ; n=311

Table 18 presents the results of the statistical test for significant correlations between the respondents' profiles and their engagement with the mathematical demands, specifically in terms of strong will and motivation.

In detail, the association between students' attitudes toward mathematics and their strong will and motivation presents an r-value of 0.506, with a p-value smaller than 0.05. These findings indicate a moderately positive correlation, and the statistical correlation is significant; thus, the null hypothesis is rejected. Jufrida et al. (2019) reported a significant relationship between student attitudes and motivation toward mathematics and physics learning, elaborating that students with high intrinsic motivation typically display a positive attitude toward learning.

For the correlation between respondents' interest in mathematics and their strong will and motivation, the r-value is 0.469, indicating a weak positive correlation. A p-value less than 0.05 confirms the significance of the correlation, leading to the rejection of the null hypothesis. Kahu et al. (2017) demonstrated that individual interest leads to engagement and knowledge, which subsequently enhances further interest and motivation. Similarly, Otoo et al. (2018) found that students' self-belief directly impacts their interest in learning mathematics, emphasizing a clear relationship between confidence, interest, and motivation.

The correlation between respondents' mathematical behavior and their strong will and motivation presents an r-value of 0.020, signifying a negligible positive correlation. With a p-value of 0.722, which exceeds the 0.05 significance level, the null hypothesis is not rejected, indicating no significant correlation between these variables. According to Kasten et al. (2019), while pre-motivational factors are important for the formation of motivation, they do not directly influence behavior. This suggests that strong will and motivation must first be established for positive mathematical behavior to develop.

Lastly, the correlation between valuing mathematics and strong will and motivation reveals an r-value of 0.260, suggesting a weak positive correlation. However, with a p-value of 0.000, the null hypothesis is rejected, confirming a significant correlation. Seah (2018) emphasized that valuing refers to an individual's embrace of convictions considered important and worthwhile, implying that students' strong will and motivation are strengthened when they value mathematics and recognize its importance for their future.

In summary, the results show that a positive attitude and interest in mathematics are significantly related to enhancing students' strong will and motivation toward academic success. Although mathematical behavior is only weakly correlated with motivation, the findings highlight the essential role of fostering a positive attitude and interest among students to nurture their motivation and engagement in mathematics.

## 4. Results/Findings

The following findings were derived from the data collected and analyzed statistically. The profile of the respondents' affective beliefs, specifically in terms of their attitudes, interests, and behavior towards mathematics, all indicated positive results. Additionally, the respondents' valuing of mathematics also showed positive outcomes.

Regarding the students' engagement with the mathematical demands of COVID-Induced Modular Distance Learning, the data revealed that the respondents exhibited high levels of engagement in key areas, including focus in learning the lesson, task and time management, working independently, and demonstrating strong will and motivation.

Furthermore, the academic performance of these respondents in mathematics was found to be satisfactory, as reflected in their scholastic achievement levels.

The study also explored the correlation between the respondents' profiles and their academic performance. It was found that both attitude and interest towards mathematics had a significant relationship with their level of achievement, while behavior and valuing of mathematics did not show a significant impact on achievement levels. Additionally, significant correlations were observed between task and time management, strong will and motivation, and the respondents' academic performance. However, no significant correlation was found between the focus in learning the lesson or working independently and the students' level of achievement.

Finally, the analysis revealed that students' attitudes, interests, and valuing of mathematics had a significant influence on their focus in learning the lesson. However, behavior did not show any significant effect in this regard. The respondents' affective beliefs were also found to have a substantial impact on their ability to work independently. Moreover, significant correlations were observed between attitudes, interests, and valuing of mathematics and the respondents' strong will and motivation. In contrast, behavior did not show any significant correlation with students' strong will and motivation.

## 5. Conclusion

Based on the findings of this study, it can be concluded that the engagement of Grade 7 and 8 learners at Liloan National High School in the mathematical demands of COVID-induced modular distance learning significantly impacts their learning outcomes. However, certain factors were found to be less relevant to the learners' engagement. These insights emphasize the importance of understanding the specific dynamics of distance learning in the context of mathematics education and highlight areas that may require further attention to enhance student engagement and performance in a remote learning environment.

### *5.1 Recommendations*

Considering the findings of the study, it is highly recommended that the proposed Modular Distance Learning (MDL) Engagement Plan be adopted. This plan addresses the specific needs and dynamics observed in the engagement of Grade 7 and 8 learners at Liloan National High School during the COVID-induced modular distance learning period. By incorporating the insights gained from this study, the plan aims to enhance student engagement, optimize learning outcomes, and better support students in navigating the challenges of remote learning in mathematics education. Implementing this plan could lead to more effective teaching strategies and a more engaged student body, ultimately improving the overall academic experience in a distance learning environment.

**Funding**: This research received no external funding.
**Conflicts of Interest**: The authors declare no conflict of interest.

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