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Students' Attitudes and their Academic Performance in Mathematics in the New Normal

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Abstract

This study examined the relationship between students' attitudes and their academic performance in mathematics in the new normal education setup in public secondary schools in Mati North District, Mati City, Davao Oriental, Philippines. It utilized a quantitative descriptive-correlational research design. Using the Cochran formula, a stratified random sample of 360 Junior High School students was selected. Three instruments were used-one adopted and modified, and two adapted-with construct validity established, reliability confirmed through pilot testing (Cronbach's alpha = 0.943).

Results revealed that students exhibited high positive attitudes toward mathematics, while their negative attitudes-primarily mathematics anxiety-were at moderate level. Academic performance in mathematics was rated high and very satisfactory. Bivariate correlation analysis showed a significant positive relationship between positive attitudes and performance. Structural model analysis indicated that positive attitudes had a moderate positive association with achievement, whereas negative attitude had a stronger inverse relationship. The optimized model yielded an Akaike Information Criterion (AIC) value of 35.949 and a Consistent Akaike Infromation Criterion (CAIC) value of -115.20, confirming it as the most parsimonious and best-fitting model.

This study recommends that teachers and school leaders implement targeted interventions to strengthen positive attitudes and reduce anxiety in mathematics learning. Future research may replicate this work with a broader scope and larger population to improve generalizability.

Keywords: students' attitudes, academic performance in mathematics, new normal

Introduction

COVID-19 brought about the closure of educational establishments in 2020, thus affecting over 1.6 billion students across 190 countries (UNESCO, 2020). This sudden disruption resulted in the adoption of an entirely different approach to delivering education, as well as the experience of mathematics learning (Spitzer & Musslick, 2021). Under these conditions, the term "new normal" became a concept representing an alternative way of delivering education involving remote learning models such as synchronous classes, asynchronous distance learning modules, and blended learning models. According to Tomasik et al. (2021), the transition into these new forms of instruction has been particularly challenging for students who have shown poor attitudes toward mathematics. As a result, these negative attitudes were associated with the decrease in students' test results, academic stress, and poor academic well-being.

Globally, scholars have found that there have been broad changes in the academic performance of students during the pandemic period (Whitley et al., 2021). Gore et al. (2021) found, for example, that primary and secondary school students in 380 different schools in New South Wales, Australia, showed marked deterioration in their fundamental mathematics knowledge and skills. To address these academic deficiencies, educational facilities around the world have taken certain mitigation actions to ensure academic continuity as well as protect public health. As reported by Moliner & Alegre (2022), numerous schools in Spain took various structural precautions, such as the use of masks, physical distance, table distance, and seating arrangements, in order to continue educating their students in mathematics.

The rapid emergence of distance education in the Philippines created immense stress for students, parents, and educators (Ukobizaba & Nizeyimana, 2021). The transition posed significant problems in the rural and distant areas of the country where the scarcity of electronic materials led to limited student enrollment and poor performance (Dwiastuti et al., 2022). Research conducted by Pagaran et al. (2022) found that the main impediments faced by the educators and students were unreliable internet access, the challenges involved in accurately determining student progress, difficulty in focusing due to distractions during the live session, and the logistics involved in blending different distance learning modules.

In order to provide a more systematic approach towards providing continuous instructions, DepEd launched the Basic Education Learning Continuity Plan (BE-LCP) for the School Year 2020–2021 (Department of Education, 2020). The BE-LCP acted as the guiding framework that safeguarded the well-being of both learners and faculty while using alternative modes of delivery to ensure that K-12 education can be carried out amidst the crisis (Department of Education, 2020). Within the Division of Mati City, public schools effectively followed the institutional continuity plan using primarily modular and blended forms of distance learning models.

The connection between student attitude and academic achievement in mathematics has been documented in educational research (Nja et al., 2022). From a theoretical perspective, such attitudinal dynamics have been explained using the Expectancy-Value Theory of achievement motivation, which suggests that the performance of a student depends on whether he/she expects success (i.e., self-efficacy versus math anxiety) and the value assigned to the activity (i.e., intrinsic interest or enjoyment). Positive attitudes create a sense of confidence and determination among students to work through tough mathematical problems, while negative attitudes have been closely tied to avoidance and diminishing interest in math (Suleiman et al., 2020). A recent study by Peteros et al. (2019) showed that there exists a strong and positive correlation between the attitudinal dimension of students and their academic achievement scores in mathematics at the secondary school level. With the increasing role of technology and independent learning in distance learning models, evaluating students' attitude towards mathematics becomes imperative.

Whereas prior research studies have already covered the connection between students' mindset and academic performance in the context of traditional or face-to-face learning, there is a clear empirical gap that needs to be covered in the context of the new normal. According to Layar et al. (2024), the distance learning environment was associated with differences in students' motivation, anxiety, and interest, while the study lacked evidence about the development of these attitudes in time. In a similar fashion, Pecjo (2022) found that environmental challenges and the subjective mindset constituted critical barriers for the acquisition of skills in mathematics, without analyzing the connection with particular distance learning approaches. In order to cover this gap, the current study employs a quantitative correlation and

prediction design to analyze the connection between distance learning environments and students' attitude to mathematics and performance.

With the continued development of educational philosophies, determining the relationships between different learning environments and students' motivation, engagement, and academic success becomes essential in secondary schooling. The analysis of the relationships between attitudinal markers and grades can yield practical knowledge about how to implement pedagogical practices that help to overcome potential challenges faced by diverse student groups and thereby promote equality. In essence, through understanding students' attitudes toward learning within contemporary learning environments, this research is able to make a contribution towards the creation of evidence-based practices that foster mathematics self-efficacy and task value.

Finally, the ultimate aim of this study is to explore the relationships between Junior High School learners' demographic attributes, attitudes toward learning, and perceptions about the education environment and their performance in mathematics subjects under the distance learning environment of the Mati City Division. Furthermore, the study will examine the impact of positive emotions like interest and value in learning, and negative variables such as mathematics anxiety that work with learner-related and teacher-related issues influencing scholastic achievement. The overall goal is to establish the critical points for intervention through systematic analysis for effective delivery of education, as well as creating resilient minds for mathematics among learners.

Literature and Studies

Demographic Profiles and Group Differences in Mathematics

The structural and demographic composition of the student body—encompassing sex, age, and grade level—serves as a fundamental baseline for analyzing variations in mathematical affect and academic achievement. In secondary education, these demographic factors are rarely neutral; instead, they are deeply intertwined with how students develop subject-specific mindsets and handle cognitive loads. Gaining a precise understanding of these demographic baselines is essential for identifying which student groups may be disproportionately vulnerable to academic hurdles or subject-specific stress.

Empirical studies consistently reveal distinct patterns when examining sex differences in mathematics attitudes and anxiety (Jameson et al., 2024). While modern public education frameworks have largely achieved parity in enrollment and structural access, deep-seated psychological variances remain prevalent. International meta-analyses reveal that female secondary students frequently report higher levels of mathematics anxiety and lower subject-specific self-confidence compared to their male peers, even when their actual final marks or test scores are identical or superior. This disparity is often driven by social and environmental influences, such as the persistent stereotype that quantitative fields are inherently male domains. This pressure can cause female students to internalize higher levels of performance anxiety and evaluative stress.

Concurrently, age and grade level present distinct developmental trends within the secondary curriculum. Longitudinal tracking shows that as students progress from lower to higher grade levels in junior high school, their positive attitudes toward mathematics often experience a steady decline, while their self-reported mathematics anxiety climbs (Friedman, 2025; Skov, 2025). This shift occurs because upper-level mathematics courses feature abstract concepts—such as advanced algebra, geometry, and trigonometry—that demand higher-order cognitive processing and advanced problem-solving skills. As the curriculum grows more complex, students who lack foundational math skills or strong independent

study habits can easily fall behind. This gap creates a compounding cycle of frustration, which ultimately diminishes their subject motivation. Evaluating these specific group differences by sex, age, and grade level is crucial for this study, providing the necessary empirical foundation to test for demographic variations within the participant sample.

Students' Attitudes Towards Mathematics

Several studies have been conducted in many countries to identify the factors that influence students' mathematics achievements, their attitudes towards mathematics, and the factors that influence their learning of mathematics. Of these factors, student attitudes towards mathematics are an essential factor that has been consistently studied. The success or failure of students in mathematics depends on their attitude towards mathematics. Therefore, student attitudes towards mathematics affect student participation. Students may have a positive attitude towards math or a negative attitude (Geesa et al., 2019).

Capuno et al. (2019) revealed that the students had a neutral attitude towards mathematics during the COVID-19 pandemic. It can be noted that the respondents had fairly satisfactory performance in mathematics. Thus, this performance could be explained by their attitudes toward the subject, which revealed that the students had neutral attitudes toward it. It implies a need to improve their attitudes towards the subject along the way.

Moreover, Tamayo (2021) revealed that the attitude of the students is significantly related to their performance in mathematics during the COVID-19 pandemic. This means a significant relationship exists between the attitude and the students' performance. If the respondents have a positive attitude and disposition toward mathematics, the better their mathematics performance or the higher their performance in mathematics is. Similarly, a negative attitude towards mathematics relates to a negative emotional disposition. One is likely to achieve better in a subject they enjoy, have confidence, or find useful.

Furthermore, Wakhata et al. (2022) revealed that although students' ratings were below the neutral attitude based from their study, they indicated that mathematics is still useful in our daily life despite of the COVID-19 pandemic. Students generally tend not to prefer mathematics compared to the other subjects even the pre-pandemic era, need for some supportive measures from the parents, teachers, and the society as a whole.

Students' Positive Attitudes Towards Mathematics

In any case, assessing a positive attitude can return you to a positive assessment of at least one element, such as emotions, beliefs, or behavior. Students willing to learn mathematics are more likely to understand the concept and gain confidence in their mathematical skills. This means that the higher the positive attitude in mathematics, the higher the respondents' performance (Subia et al., 2018).

Self-confidence. Self-confidence in mathematics refers to the student's self-awareness as a mathematics learner. This includes beliefs about one's ability to learn and perform in mathematics. Students with high self-confidence believe in their ability to succeed in math lessons and overcome the fear of failure. These students are ready to face math challenges, which improve their academic performance. Otherwise, students with low self-confidence tend to avoid math tasks because they do not believe in themselves. Therefore, this minimizes their math skills and the potential to expand their success.

Consequently, it is advisable to examine student confidence and attitudes towards performance (Mazana et al., 2019).

Capuno et al. (2019), Peteros et al. (2019) and Laranang Bondoc (2020) revealed that the students' self-confidence in mathematics during the COVID-19 pandemic is neutral. This means that respondents had moderately high attitudes when asked about their self-confidence in math. With the complexity of the subject and in the state of the pandemic, students find it hard to learn math. Thus, their confidence in learning the subject is affected. It is essential to enhance their confidence in learning the subject so that their attitudes towards the subject will also be improved. Neglecting this level of the student's attitudes toward learning the subject could adversely affect their performance.

Value. Value refers to the student's perception of the importance of mathematics now and in the future. The value of mathematics is believed to influence a student's attitude towards the subject. When students recognize the importance of mathematics in their lives, they will study, practice, and learn the subject. This study also shows that although most students had negative feelings about mathematics, they showed positive feelings about it. This indicates that students know the value of mathematics in their lives and future careers. Therefore, it is worth investigating the relationship between value, attitude, and mathematics performance (Mazana et al., 2019).

Capuno et al. (2019), Peteros et al. (2019), and Laranang Bondoc (2020) revealed that the value of mathematics, as perceived by the students, is high. This indicates that the respondents had positive attitudes regarding the value of math despite of the COVID-19 pandemic. Students expressed that math is still essential because they can apply these concepts in some of their daily activities while in the state of the pandemic. However, these positive attitudes still need to be improved to inculcate that math is beneficial no matter the person's status in life and no matter what challenges is facing. Thus, learning the subject is imperative because this is one of the necessary skills everyone needs in life at present and in the future and even in the post-pandemic era.

Enjoyment. Enjoying math is as much as students enjoy learning and learning math. Students' learning enjoyment can influence the cognitive aspects of their behavior and attitudes. Students can learn math because they find it fun and exciting. They further assume that interest and enjoyment influence the level and continuity of learning involvement and the depth of understanding. This means that the more fun a student has in a math lesson, the more likely they will be involved in problem-solving, improving learning and performance. Student joy, learning, and achievement are interrelated and are worth evaluating (Mazana et al., 2019).

Capuno et al. (2019) revealed that the students' enjoyment of mathematics is neutral during the COVID-19 pandemic. In contrast, Peteros et al. (2019) and Laranang Bondoc (2020) revealed that students' enjoyment of mathematics is high during the COVID-19 pandemic. The findings showed that respondents enjoyed their mathematics subject because they believed that studying mathematics trained them to solve problems in some other areas amidst experiencing a pandemic. After all, it developed critical thinking and problem-solving skills, which were the main objectives of the Department of Education mathematics curriculum.

Motivation. Intrinsic motivation relates to the interest and desire to learn mathematics. Students are intrinsically motivated to learn mathematics after finding it interesting to know. Motivation is believed to be the driving force behind learning, influences student involvement, career choices, and performance. Therefore, it is essential to study motivational variables related to attitude and performance (Mazana et al., 2019).

Capuno et al. (2019) revealed that the students' motivation in mathematics is neutral during the COVID-19 pandemic. In contrast, the study of Peteros et al. (2019) and Laranang Bondoc (2020) revealed that the students' motivation in mathematics is moderately high during the COVID-19 pandemic. This means that the respondents' attitudes regarding their motivation in math are positive, which further implies that the students have positive feelings towards learning mathematics despite the pandemic. The results also showed that most respondents were moderately motivated when they felt nervous and uncomfortable studying mathematics.

Students' Negative Attitudes Towards Mathematics

One of the reasons for students' negative attitudes towards mathematics is that they do not understand its relevance to everyday life and other sciences. These feelings have been traced to be caused by various sources, including negative experiences in the classroom, poor self-image, a lack of appreciation for applying mathematics to real life, and shyness that prevents them from asking questions. Likewise, a negative attitude in mathematics is significantly related to the respondents' performance in mathematics. As a result, most students feel why they learn when it doesn't help (Subia et al., 2018).

Anxiety. Math anxiety is a negative feeling combined with fear and tension when dealing with mathematical problems (Wen Dubé, 2022). Researchers observed that Math anxiety (MA) has a negative impact on students' academic performance. However, just what drives this association remains to be seen.

Findings from the study of Zhang et al. (2019) showed a strong negative correlation between math anxiety and performance during the COVID-19 pandemic. In addition, when moderator variables were analyzed, the studies, including those of Asian students, showed a more significant negative correlation, while the research involving European students showed the weakest correlation.

Moreover, Jolejole-Caube et al. (2019) revealed that the learners' anxiety level negatively correlates to their mathematics performance with during the COVID-19 pandemic. Learners with higher mathematic anxiety levels tend to have lower mathematics performance. Conversely, learners with lower mathematics anxiety levels tend to demonstrate higher performance in mathematics.

Furthermore, this negative relationship was more pronounced in research conducted with senior high school students than elementary school students, which was less evident. Research that employed a customized exam and studies that evaluated problem-solving abilities showed the most significant negative correlation (Zhang et al., 2019).

Students' Academic Performance in Mathematics

A crucial component of education is student academic performance. The students' performance determines any educational institution's academic success or failure. Student academic achievement has a direct bearing on a nation's socioeconomic progress. Students' academic achievement serves as a foundation for information acquisition and the development of abilities. Furthermore, student academic performance is the knowledge acquired by a teacher who evaluates that through marks and educational goals set by students and teachers to be attained during a specified period. They said these objectives are measured through ongoing evaluations or test outcomes (Modesto, 2019).

Student-Related Factors

Modesto (2019) revealed that the student-related factors toward mathematics during the COVID-19 pan-

demic are at the level to some extent. The results implied that their attitude towards learning mathematics somehow affects their performance. This indicates that the students have a positive attitude toward mathematics amid the pandemic. Positive attitudes towards mathematics denote interest or feeling towards studying mathematics. However, even if the students try to develop positive attitudes in mathematics, they struggle to learn the subject.

Interest. Students with trouble with sequencing require assistance to optimize their engagement and increase their recall of information. Humor, surprising introductions, and other attention-getting techniques can be used to pique students' interest in the lesson (Barrot et al., 2021).

Based on the study of Barrot et al. (2021), the findings demonstrate that the growth of a student's achievement depends upon the degree of achievement of the particular classroom and, consequently, upon the specific mathematical education. As revealed by the researchers, interest in mathematics is associated with achievement in mathematics. Furthermore, regardless of students' level of achievement, researchers' data showed that students fear mathematics especially during the COVID-19 pandemic.

Study Habits. Success in school depends on talent, effort, and efficient study techniques. Every student uses their unique study strategy; thus, strong study habits will help them learn and apply what they are reading or studying. When correctly ingrained in study skills, students will better comprehend their intellectual development and self-direction capacities. Only after identifying students' areas of weakness and their levels of achievement can study skills be taught effectively. Only then can they be given development (or enrichment) exercises that will allow them to improve their skills or introduce them to new concepts. This is why the focus should be on teaching students effective study techniques while the pandemic is still on (Landicho, 2021).

Teacher-Related Factors

Modesto (2019) revealed that the teacher-related factors towards mathematics are at the level to great extent during the COVID-19 pandemic. The result implies that the teacher is not physically around the classroom, sometimes students can see them online or students only receive the modules. In general, the result shows that the perceived factors moderately affect their mathematics performance. The teacher was a great help to the students reach higher performance levels in mathematics.

Personality Traits. Specific personality traits contribute to effective teaching. Lukman et al. (2021) indicates that teachers' personality becomes a determining factor in choosing models, strategies, and learning media is very important during the COVID-19 pandemic. Kenni (2020) believed that knowing what teacher personality traits in terms of skills, attitude to work, mastery of the concepts, and teaching methods influence the attitudes of the students during the pandemic.

Teaching Skills. Teachers can still differentiate the meaning of content, process, and product for students despite the COVID-19 pandemic. Content differentiation is a change in the subject matter that a student is learning. The term differentiation of process describes how learners access the material. While another student searches the internet for information, one student may explore a learning facility. The term differentiation of product describes how learners demonstrate what they have learned (Landicho, 2021).

According to Bloom's Taxonomy, teachers usually devote a significant amount of class time to questioning students. Observations of educators at all levels show that most save more than 90% of their time assessing kids (through questioning). Additionally, most inquiries teachers pose are usually factual inquiries that depend on short-term memory (Landicho, 2021).

Instructional Materials. Student's achievement level depends on their exact mathematical education and a particular classroom's level of achievement during the COVID-19 pandemic. In addition, regardless of their academic achievement level, the students hardly ever fear mathematics (Barrot et al., 2021).

Barrot et al. (2021) revealed that societal and workplace changes have changed the education system during the COVID-19 pandemic. Students must be able to work in various life contexts and have information literacy skills in light of increased internationalization, the growing knowledge-intensive work, and the increased use of information technology.

Measuring Academic Performance in the Philippine Context

Scholastic achievement in mathematics represents a complex, multi-dimensional construct that requires valid, uniform measurement standards to be accurately evaluated. In contemporary educational research, academic performance is typically quantified using objective, high-stakes metrics—such as standardized test scores, national achievement exams, or official school marks—to ensure measurement validity. In the context of public secondary education in the Philippines, a student's final scholastic standing is formally operationalized through their quarterly grades. These grades are systematically recorded under the standardized grading guidelines established by the Department of Education (Department of Education, 2015).

This state-mandated assessment framework relies on a weighted distribution divided into three core areas: Written Works (40), Performance Tasks (40), and Quarterly Assessments (20) (Department of Education, 2015). Written work measures foundational conceptual knowledge through quizzes and unit tests; performance tasks evaluate practical application and mathematical modeling; and quarterly assessments function as cumulative examinations checking long-term retention (Bruno, 2018). This comprehensive tri-archic system ensures strong content and construct validity, capturing both routine skills and higher-order execution.

According to regional benchmarks, a final transmuted grade of 85 to 89 is classified as "Very Satisfactory," while a score of 90 or above denotes an "Outstanding" mastery of the competencies. Using these official quarterly averages provides this study with a highly reliable and standardized performance metric, ensuring that the observed relationships between student attitudes and classroom success are grounded in an accurate, verified academic baseline.

Attitudinal Predictors and Meta-Analytic Effect Sizes

The operational pathways connecting student mindsets to final mathematics achievement are heavily supported by a broad body of empirical research. Rather than functioning as isolated emotional experiences, positive and negative attitudinal dimensions operate as powerful internal predictors that can directly expand or restrict a learner's cognitive bandwidth during problem-solving tasks (Atiomo, 2020; Rowe & Fitness, 2018). To ground these relationships in clear statistical terms, recent global meta-analyses provide reliable baseline ranges for the direct effects that subjective mindsets exert on mathematical outcomes.

Comprehensive structural reviews investigating the relationship between positive affect and academic achievement reveal a consistent, moderate positive correlation coefficient (r) (Gordillo-León et al., 2026). Within this spectrum, dimensions like task enjoyment and value show a strong, direct relationship with persistent problem-solving behaviors. When students value the long-term utility of mathematics,

they exhibit greater cognitive resilience, allowing them to process mistakes constructively and dedicate more time to independent study.

Conversely, the relationship between negative affect and performance is characterized by a stable, moderate-to-strong negative correlation. This strong inverse path confirms that mathematics anxiety functions as an intrusive cognitive block. According to working memory theories, high anxiety floods a student's mind with evaluative fear and self-doubt, draining the mental energy needed to manipulate complex formulas and follow abstract logic (Hameed et al., 2024; Lukasik et al., 2019). These established meta-analytic effect sizes provide a clear benchmark for this study's directional hypotheses, which state that positive attitudinal components directly predict superior performance, while mathematics anxiety stands as a primary negative predictor of academic success.

Structural Best-Fit Models

In advanced educational statistics, identifying a structural best-fit model requires balancing explanatory power with mathematical simplicity, a principle known as statistical parsimony. When evaluating complex networks that include demographic baselines, student behaviors, teacher traits, and attitudinal dimensions, researchers must avoid over-fitting. Over-fitted models can capture random sample noise rather than true, replicable population parameters. To prevent this, standard structural equation modeling (SEM) and hierarchical regression frameworks rely on clear absolute, incremental, and information-theoretic fit indices to determine the most stable predictive pathway (Gupta, 2024).

According to the structural standards established by Goretzko et al. (2024), a candidate model's validity is evaluated using a combination of rigorous fit thresholds. For absolute and residual-based fit, the Root Mean Square Error of Approximation (RMSEA) should ideally rest at or below 0.06, while the Standardized Root Mean Square Residual (SRMR) must remain below 0.08. For incremental fit, which checks how well the proposed framework explains data trends compared to a null baseline, the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) must consistently reach or exceed 0.95. When comparing competing models, selection is guided by information-theoretic metrics—specifically the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC). Unlike raw significance tests, the AIC and BIC directly penalize a model for adding unnecessary paths or variables.

Education in the New Normal

The advent of COVID-19 has transformed education worldwide, popularizing the concept of the new normal. Here, there is a mixture of both traditional face-to-face instruction and online learning in what can be called a hybrid model (Rahmatullah, 2021). Schools and colleges have had to quickly switch to virtual platforms which ensure that education continues as well as keeping students safe (Beytekin, 2021). As a result, this change has brought into sharp focus the importance of strong digital infrastructure and new teaching styles that are suitable for both face-to-face class meetings and long-range learners (Prahani & Cheng, 2020).

Globally, the move towards online learning has been uneven with access to technology and internet connectivity being a major challenge. In developed nations, this shift was relatively seamless due to existing digital infrastructures (Pacheco, 2021). Nonetheless, it has worsened educational inequalities in many developing countries because of the digital divide. Students coming from remote regions or disadvantaged backgrounds often struggle with limited device availability, unreliable internet connection hindering their full participation in e-learning (Gore et al., 2021). Consequently, these difficulties have

necessitated worldwide organizations and governments investing in digital education initiatives that would eliminate disparities between populations (Ancheta & Ancheta, 2020).

The Philippines have seen a couple of measures put in place by the Department of Education (DepEd) and the Commission on Higher Education (CHED) to cope with this new normal (Cahapay, 2020). Blended learning is the current approach that incorporates digital classes, modular learning and radio/TV-based instructions for many students across different regions. The commitment of government to keeping education accessible has been demonstrated through efforts like DepEd Commons which is an online platform that gives learning resources as well as printed modules to those students without internet connection (Culala, 2022). However, despite these initiatives, the pandemic has exposed several structural problems within Philippine educational system such as lack of enough budgetary allocations, insufficient infrastructure and the need for teachers' training in digital literacy (Tria, 2020).

Additionally, there have been some challenges experienced during the migration to blended learning in the Philippines. In other words, most teachers and students had to become familiarized with new technologies quickly since they were never trained on them adequately while some lacked funding (Cahapay, 2020). Besides, households are having economic difficulties because of COVID-19 hence making it hard for families to buy gadgets or afford internet bundles needed for their children's education purposes (Culala, 2022). Further, there have been quality issues associated with offering education including low participation levels in remote learning and poor performance among students who are struggling to keep up with lessons being delivered virtually environments. This is to show that students need end-to-end support systems for this new way of learning to be realized (Tria, 2020).

In Mati City, Davao Oriental Province, the local government and educational institutions have taken a proactive approach to address these challenges presented by the new normal. The municipality has put in place various measures to ensure continuity of education despite the interference brought about by the pandemic (Olivar et al., 2022). They include issuance of learning materials to pupils in far-flung areas, establishment of community learning centers for internet connectivity and other digital resources, as well as collaborating with radio stations at grassroots level for broadcasting educational programs. It is through such initiatives that all children can access quality education irrespective of their social standing (Baloran & Hernan, 2020).

The community has been instrumental in supporting the education sector during these trying moments in Mati City. Parents, teachers and local organizations have created an enabling environment for learners (Olivar et al., 2022). Such community-rooted approaches like voluntary tutorial services and donation of gadgets coupled with internet bundles have been very important in reducing the gap amongst students who cannot access online classes easily due to hardship case or other reasons. Through collective engagement, it is possible for local communities to surmount hurdles facing their education systems under this emerging scenario (Macusi et al., 2022).

The department of Education of the province of Davao Oriental is working with the provincial government to undertake different initiatives meant to support education. These involve equipping teachers with skills on how to use digital resources in their teaching, provision of learning materials and implementing health and safety protocols for face-to-face classes are among initiatives that have been put in place (Baloran & Hernan, 2020). Furthermore, improving the digital infrastructure within the province has also been accorded high priority by its administration in order to provide reliable internet access even to far flung places. These undertakings are vital for enabling Davao Oriental's education system adjust to new normal (Olivar et al., 2022).

Therefore, it is obvious that the new normal in education has come to stay as COVID-19 pandemic continues rocking on. In some cities like Mati, Philippines, this reality has demonstrated strength and resilience associated with their educational systems. Therefore, going forward there should be more emphasis on investments into digital infrastructures, teacher training and student support networks (Macusi et al., 2022). Consequently, a stronger and more inclusive education system will emerge from filling these gaps and building on what had been learnt through the pandemic hence offering all learners a better opportunity for success in an ever evolving world (Olivar et al., 2022).

Theory Base

The conceptualization of student mindsets within this study finds its foundational roots in the Expectancy-Value Theory of achievement motivation, a framework that explains how a learner's internal beliefs directly shape their academic choices and performance metrics (Naz et al., 2025). Within this theoretical paradigm, a student's overall attitude toward a subject is not viewed as a vague emotional state, but rather as a structured psychological ecosystem divided into expectancy components and subjective task value components. The expectancy component is fundamentally anchored in a student's self-efficacy beliefs, reflecting their perceived capability to successfully navigate and master mathematical challenges. When a student lacks this sense of capability, the expectancy component manifests negatively as mathematics anxiety, creating an evaluative fear that restricts their cognitive bandwidth and limits classroom success.

Conversely, the value component of the theory represents the subjective importance, utility, and emotional connection a student associates with the discipline (Eccles, 2020). This component is structurally divided into intrinsic value, which directly encompasses student interest and learning enjoyment, and utility value, which tracks how well a student recognizes the real-world applications and long-term benefits of mathematical literacy. By framing student attitudes through this specific dual lens, the study creates a clear, logical pathway that links raw student affect directly to measurable scholastic outcomes.

This theoretical layout aligns perfectly with the study's multivariate regression and structural equation modeling results, which identify the value dimension as the single strongest and most statistically significant predictor of junior high school academic performance in mathematics. Under the Expectancy-Value framework, while a student's anxiety can create an immediate cognitive barrier during exams, it is their perception of task value that dictates long-term intellectual endurance and self-regulated study habits. When secondary learners internalize the high value and utility of mathematics, they are much more likely to sustain consistent effort, actively engage with complex formulas, and push through the natural frustrations of distance learning.

Ultimately, grounding the study in the Expectancy-Value Theory justifies treating positive and negative attitudes as parallel, multi-dimensional predictors. This approach shows that building mathematical excellence requires more than just reducing a student's anxiety; educators must intentionally design lessons that highlight the practical value and real-world utility of the subject matter to drive lasting academic achievement.

Methodology

Design

This study utilized a quantitative descriptive-correlational research design to examine the variables und-

er investigation without any active intervention. Quantitative research is the systematic investigation of a phenomenon using a collection of numerical data and applying statistical, mathematical, or computational techniques (Adedoyin, 2020). This approach serves as a structured technique for learning about a specific group of people as a sample population, employing scientific inquiry and relying on observed or measured data to investigate precise questions about that target population (Omilion-Hodges, 2017). By collecting quantifiable data, this design allows for objective statistical testing and the generalizability of findings within the specified academic context.

The descriptive component of the design was employed to systematically profile the respondents' demographic characteristics and measure the baseline levels of their positive attitudes, negative attitudes, and mathematical performance metrics. Complementing this, the correlational research design looks at relationships between variables without allowing the researcher to control or manipulate them. A correlation measures a relationship's strength and direction between two or more variables, establishing how they co-vary across the sample (Bhandari, 2021).

The direction of these observed correlations can be positive or negative (Bhandari, 2021). When the values of two variables move in the same direction, such that an increase in the value of one variable is followed by an increase in the value of the other, the correlation is said to be positive; alternatively, a decrease in one variable's value is followed by a corresponding decrease in the other (Becker, 2015). By pairing descriptive profiles with correlational mapping, this design allows the researcher to establish how student and teacher factors relate to and predict mathematical attitudes and performance without implying experimental causality (Bhasin, 2020).

Sampling

The respondents of this study were the randomly selected Junior High School students of Mati North District under the DepEd Schools Division of the City of Mati drawn through stratified random sampling. Table 1 shows the number of officially enrolled Junior High School students of Mati North District under the DepEd Schools Division of the City of Mati for the School Year 2022-2023 and the sampling distribution of the study. The researcher used the Cochran Formula with a 5% margin of error to obtain a sample size of three hundred sixty ($n = 360$).

Table 1. Sampling Distribution of Junior High School Students in Mati North District

Name of School	Grade Level	Population Size	Sample Size
Bobon National High School	7	127	8
	8	126	8
	9	141	9
	10	141	9
Subtotal		535	34
Buso National High School	7	98	6
	8	100	6
	9	118	7
	10	83	6
Subtotal		399	25
City of Mati National High School	7	233	14

	8	224	13
	9	223	13
	10	152	13
Subtotal		832	53
Davao Oriental Regional Science High School	7	83	6
	8	99	6
	9	108	7
	10	99	6
Subtotal		389	25
Don Enrique Lopez National High School	7	75	5
	8	87	5
	9	91	6
	10	79	5
Subtotal		332	21
Don Salvador Lopez National High School	7	99	6
	8	75	5
	9	85	6
	10	110	6
Subtotal		369	23
Doña Rosa Garcia Rabat Memorial National High School	7	70	4
	8	74	5
	9	81	5
	10	84	5
Subtotal		309	19
Lawigan National High School	7	78	6
	8	104	6
	9	105	6
	10	86	6
Subtotal		373	24
Matiao National High School	7	355	24
	8	399	24
	9	349	24
	10	430	25
Subtotal		1,533	97
Mayo National High School	7	108	6
	8	90	6
	9	89	6
	10	116	7
Subtotal		403	25
Taguibo Agricultural Vocational High School	7	43	3
	8	63	4
	9	58	3

	10	62	4
Subtotal		226	14
OVERALL TOTAL		5,700	360

Collection

The data gathering is a step–by–step procedure of collecting data from the participants of the research. Thus, the researcher used the following procedures:

Seeking permission to conduct the study. The researcher secured an endorsement letter from the Dean of Graduate School. Afterwards, a letter attaching the endorsement was sent to the Division Office and the district's respective schools where the study was conducted. The letter was addressed to the Schools Division Superintendent of Mati City and the respective school heads of each school in the Mati North District. As soon as the Superintendent approved the request letter, it was attached to the letter for the Principals/School Heads to conduct the study in their respective schools.

Administration and Retrieval of the Questionnaire. The researcher secured first approval from the expert panel before administering the construct validity and reliability test. The researcher also secured a letter of consent and assent and distributed it to the identified respondents before the test administration to affirm that the respondents and the respondents' parents had agreed and given their consent to let their children participate in the conduct of the study. The letter of consent/assent was collected before administering the test. The researcher administered the printed – survey questionnaires to the respondents of the study. They are requested to answer the questionnaires honestly to collect valid data. Then after the respondents answered the questionnaires, the researcher retrieved them again. The IATF protocol was strictly followed by conducting the disinfection of survey questionnaires before distribution and building stronger partnerships between the teachers/advisers that helped facilitate the distribution and retrieval of modules to the respective schools.

Collection, interpretation, and analysis of data. The data collected served as the basis for the result of the study. It will be tallied, tabulated, and carried out systematically in which the participation of the statistician was significantly valued. The researcher submitted the data to the statistician for computation. The statistician analyzed and interpreted the data.

Research Instrument. This study utilized two sets of survey questionnaires for students' attitudes and one set of survey questionnaires for students' academic performance in mathematics.

The first instrument was an adopted and modified survey questionnaire from Laranang Bondoc (2020), which measured students' positive attitudes regarding self-confidence, value, enjoyment, and motivation. Modifications were made for self-confidence item numbers 5, 6, 10, and 13; value item numbers 9 and 10; enjoyment item number 5; and motivation item numbers 1 to 5. Modifications were made by changing negative statements into positive statements.

Responses for each item of the indicators of students' positive attitudes used the following scale, descriptive equivalent, and interpretation above.

Table 2. Scale for Students' Positive Attitudes Towards Mathematics

Level of Frequency	Descriptive Response	Descriptive Level	Interpretation
5	Strongly Agree	Very High	This means that students' positive attitude towards mathematics is excellent.

4	Agree	High	This means that students' positive attitude towards mathematics is very satisfactory.
3	Neither Agree or Disagree	Moderately High	This means that students' positive attitude towards mathematics is satisfactory.
2	Disagree	Low	This means that students' positive attitude towards mathematics is good.
1	Strongly Disagree	Very Low	This means that students' positive attitude towards mathematics is poor.

The second set of an instrument was an adapted survey questionnaire from Sebial Facultad (2019) which measured students' negative attitudes in terms of anxiety.
Responses for each item of the indicators of students' negative attitudes used the following scale, descriptive equivalent, and interpretation.

Table 3. Scale for Students' Negative Attitudes Towards Mathematics

Level of Frequency	Descriptive Response	Descriptive Level	Interpretation
5	Strongly Agree	Very High	This means that students' negative attitude towards mathematics is excellent.
4	Agree	High	This means that students' negative attitude towards mathematics is very satisfactory.
3	Neither Agree or Disagree	Moderately High	This means that students manifest moderate negative attitude towards mathematics.
2	Disagree	Low	This means that students' negative attitude towards mathematics is good.
1	Strongly Disagree	Very Low	This means that students' negative attitude towards mathematics is poor.

The third set of an instrument was an adapted survey questionnaire from Landicho (2021) which measured students' academic performance in terms of student-related factors (interest and study habits) and teacher-related factors (personality traits, teaching skills, and instructional materials).
Responses for each item of the indicators of students' attitudes used the following scale, descriptive equivalent, and interpretation.

Table 4. Scale for Students' Academic Performance in Mathematics

Level of Frequency	Descriptive Response	Descriptive Level	Interpretation
5	Strongly Agree	Very High	This means that students' academic performance in mathematics is excellent.
4	Agree	High	This means that students' academic performance in mathematics is very satisfactory.

3	Neither Agree or Disagree	Moderately High	This means that students' academic performance in mathematics is satisfactory.
2	Disagree	Low	This means that students' academic performance in mathematics is good.
1	Strongly Disagree	Very Low	This means that students' academic performance in mathematics is poor.

Validity and Reliability. The extent to which a concept is accurately measured in a quantitative study is defined as validity. The accuracy of an instrument, reliability, is the second quality measure in a quantitative study (Heale & Twycross, 2015). It is important to consider the validity and reliability of research since they approve that the data interpretation is correct and that the interpretation will be used appropriately. In this study, pilot testing of the survey questionnaire was conducted to determine if it possessed the desired level of validity and reliability. The research instrument has undergone a construct validity test to determine if each item was significantly correlated. A pilot test of the questionnaire was conducted to determine if it passed the desired level of reliability. The survey questionnaire was administered to the 60 Junior High School students of Mati National Comprehensive High School with an overall Cronbach's alpha of 0.943. This makes the survey questionnaire highly reliable (Taber, 2018). Hence, the final survey was pursued.

Data

The data was collected using one adopted and modified and two adapted survey questionnaires. Each indicator in the survey questionnaire has a varied number of self-report survey questions that use a 5-point Likert-type rating scale that assesses the observation of students on students' attitudes towards mathematics and their academic performance in mathematics. The scale allows choices from one (Very Low) to five (Very High). Likert scale is considered an ordinal level of measurement, and it cannot be assumed to have equal intervals. In this sense, performing arithmetic operations such as addition or subtraction is inappropriate. The median was used to determine/measure the level of students' attitudes towards mathematics and their academic performance in mathematics. The median is the best measure in skewed distributions or ordinal data since it is unaffected by extreme outliers or non-symmetric score distributions. Only data that can be ordered – ordinal, interval, and ratio levels of measurement – can be used with the median. When data is measured on an ordinal scale, the median is chosen above the mean (Manikandan, 2011). Because it needs equal spacing between adjacent values or scores in the scale, the mean can only be employed on interval and ratio levels of measurement (Bhandari, 2021).

Moreover, Chi-Square was used to determine the significant association between variables. Spearman rho was utilized to determine the significant relationship between variables. Confirmatory Factor Analysis was employed to determine the effect size between variables through Cohen's d value and it is used also in determining the best fit model.

Presentation

The three sets of survey questionnaires used a Likert Scale, considered an ordinal measure of data. The percentage/relative frequency was the statistical method used in this study to determine the demographic profile of the respondents. The appropriate statistical method was utilized to determine/measure the level of students' attitudes towards mathematics and their academic performance in mathematics is the

median. Spearman rho was used to determine the significant relationship between variables. Confirmatory Factor Analysis was employed to determine the effect size between the variables through Cohen's d value and it is used also in determining the best fit model.. The results and findings of the study were presented in tables and figures for easy understanding of the readers and researchers.

Analyses

The analysis of the collected data has addressed this study's specific objectives. To attain these objectives, the following statistical tools were used.

For objective 1. The percentage/relative frequency was used to determine the demographic profile of the respondents in terms of sex, age, and grade level.

For objectives 2 to 4. The median was used to determine/measure the level of students' attitudes towards mathematics and their academic performance in mathematics. Below is the score interpretation in evaluating the variables in this study.

To measure the level of students' attitudes towards mathematics and their academic performance in mathematics, Sulakatko Vogdt (2018) suggested a score interpretation as follows:

5	Very High
4	High
3	Moderately High
2	Low
1	Very Low

For objective 5. The Chi-Square test is a non-parametric test used for two specific purposes: to determine whether there is a relationship between two or more groups, populations, or criteria and whether the observed data distribution matches the expected data distribution (Rana & Singhal, 2015). In this study, Chi-Square was employed to determine if there is a significant association in students' demographics, including sex, age, and grade level.

For objective 6. The Spearman's rho correlation was used to determine the significant relationships between the identified variables. For the interpretation of the results, Selala et al. (2019) suggested and provided categorical criteria as follows:

±0.81 – ±1.00	Very Strong
±0.61 – ±0.80	Strong
±0.41 – ±0.60	Moderate
±0.21 – ±0.40	Weak
0.00 – ±0.20	Negligible

For objectives 7 to 8. Confirmatory Factor Analysis (CFA) was used to determine the effect size between the variables. Cohen (1988) suggested that the effect size is to be interpreted according to the descriptive categories as follows:

1.51 – 2.00	Extremely Large Effect
0.81 – 1.50	Very Large Effect
0.51 – 0.80	Large Effect
0.21 – 0.50	Medium Effect
0.00 – 0.20	Small Effect

For objective 9. Confirmatory Factor Analysis was also used to determine the best fit model.

Ethical Considerations

The purpose of this study was to determine the relationships and impact of students' attitudes and their academic performance in mathematics in the new normal.

Informed Consent. The researcher obtained an endorsement letter from the dean of Davao Oriental State University's Graduate School. The researcher asked the Schools Division Superintendent of Mati City for permission to collect data from the public high schools in the Mati North District. The researcher wrote letters to the principals of each school asking for permission to gather study data from those institutions. To ensure that the identified respondents and their parents/guardians voluntarily participate in the study, the researcher wrote informed assent and informed consent letters that clearly outline the nature, purpose, significance, procedure, confidentiality, and involvement of the study. The identified respondents received the informed consent form. It will attest to the respondent's consent to participate in the survey. For them to readily understand the content, the researcher created a Bisaya parent consent and informed consent. The researcher handed over the study instrument once they had the informed consent and assent form. They received all the information necessary about the study's goals and answered further inquiries so they could decide whether or not to join. The forms were given to the parents on the day the students pick up and distribute their Self-Learning Modules or during their scheduled face-to-face classes. It was accompanied by physical distancing and a face mask. The researcher assured parents their involvement wouldn't jeopardize their child's health or well-being. The respondents were provided with an informed assent after signing the parent consent form to be fully informed about the research and choose whether to allow or deny participation. The researcher ensured no coercion or other activities against the respondents' desires.

Vulnerability Issues. The highest respect was shown to the study's participants, the students. Since most of the respondents in this study were minors, the researcher assured their safety and protection to maintain the trust that had been placed in them. Additionally, the Data Privacy Act of 2012 (RA 10173) had rigorously adhered to meet data protection concerns. The respondents' names and other personal details in this study were optional. Access to the questionnaire responses in this study was restricted to the researcher and the respondents. Respondents were not required to participate in the study and were given a choice to decline or withdraw if they wanted.

Risk, Benefits, and Safety. Throughout the study, the researcher took care to prevent any injury to the respondents' physical or mental health. No other individual or organization was engaged in sharing the overall costs of the study because it was solely the researcher's responsibility. The researcher gave a letter of thanks for the respondents' time and effort in responding to the research. This further required the researcher to disclose the type and methods involved to reassure the respondents that their participation in the study did not carry any dangers. The responders were advised that they were free to leave the research without fear of harming their academic success. The researcher stored the data in Google Drive and similar services protected by an encrypted password to minimize the chance of breaching respondents' privacy. The paper-based data was kept in the office's secured filing cabinet. The data gathered will be retained for three (3) years after the research project is finished, after which it will be destroyed securely to avoid unapproved access, use, or disclosure to any other party or the public unless otherwise required by law.

Privacy and Confidentiality of Information. The researcher won't gather private information or data sets that could be used to identify the respondents. Information privacy was thus respected to the highest degree, and no documents of the individual information of the respondent were made public. The

respondent's right to privacy was crucial. As a result, it was protected by doing the research in a private environment and by appropriately observing other space considerations or security precautions for online research/survey platforms. The respondent was not required to give the primary investigator any personal information they did not want to share.

Discrete coding was used to completely protect the identity and confidentiality of respondents' information during the research project. No specific identifiers were used in any reports, presentations, or publications coming from the research study. All research information was password-protected or locked at all times, and access to the files was restricted to the lead investigator alone. The data gathered will be kept for three (3) years after the research project is finished, after which it will be destroyed securely to avoid unapproved access, use, or disclosure to any other party or the public unless otherwise required by law.

Justice. Before participating, with the respondents in data collection, the researcher described the study's goals to further justice and fairness. The researcher ensured that respondents were chosen evenly for this study through stratified proportionate sampling. By keeping the results of their responses and the research data private throughout the study, the researcher made sure that the respondents' dignity and well-being were always preserved. The study's findings were also shared with the respondents to ensure justice.

Transparency. The participants of the study were informed of the nature of the research through informed consent. The objectives of the study were revealed. The results of the study will be made available to the institutions that have provided the respondents with the research. Hence, in addition to giving feedback to the study participants, the results of the study are made available to the respondents through the appropriate channels.

Results and Discussion

Demographic Profile of the Respondents

The study included 360 participants, primarily adolescents aged 12 to 15 years, who made up nearly 90% of the sample. The most common age was 14 (26.7%), followed by 13, 15, and 12. Participants were evenly distributed across grades 7 to 10, with each grade representing approximately 24% to 26% of the total, ensuring balanced representation across educational levels. In terms of gender, the sample was predominantly female (65.3%), with males comprising 34.7%. This gender imbalance may influence gender-related findings in the study. Overall, the demographic profile reflects a young, school-aged group with balanced grade-level representation but a noticeable gender skew toward females.

Table 5. The Demographic Characteristics of Respondents

Variable		Frequency	Percent
Age	11	1	0.3
	12	67	18.6
	13	84	23.3
	14	96	26.7
	15	76	21.1
	16	16	4.4
	17	14	3.9

	18	3	0.8
	19	2	0.6
	20	1	0.3
Grade Level	7	88	24.4
	8	88	24.4
	9	92	25.6
	10	92	25.6
Gender	F	235	65.3
	M	125	34.7
Note: n= 360			

The demographics of the 360 respondents from the junior high schools are important data that help establish baseline information about the student attitude and performance when it comes to an era of transition in education. The sample is composed of early and mid-adolescent individuals with more than 80% ranging between ages 12 and 15, coinciding with the period of development expected for a junior high school. During this period, there are major developments in terms of cognitive processing skills, self-regulation, and abstract thinking skills, which affect the process of dealing with academic activities. As pointed out by Tomasik et al. (2021), younger adolescents tend to adapt differently from older ones when it comes to educational changes since they are not yet capable of managing academic tasks independently and coping with math stress.

The equal proportionality among academic track levels, which involves students from Grade 7 to Grade 10 making up 24-26% each of the sample size, is a methodological advantage. This equal proportionality will eliminate grade-based bias in the study, enabling an unbiased and precise cross-sectional analysis of the population in question. It is important because mathematical courses progressively become more difficult for students as they advance from the seventh grade, which involves basic algebra lessons, to higher classes where more complex geometry and intermediate algebra concepts are learned. From previous studies on attitudes towards academics and math anxiety conducted by Wen & Dubé (2022), there are significant variations in the responses according to the progressing difficulty level of the curriculum requirements.

On the other hand, there is evidence of marked gender disparity, whereby females account for 65.3% of the respondents while males constitute 34.7%. In quantitative studies, such marked gender disparity serves as an intervening variable which affects general conclusions drawn from the study. Although such a skewed gender representation reflects current trends within several educational institutions, it calls for cautious analysis since gender disparities in areas of math anxiety, self-efficacy, and motivation have been well-established through various studies in education and psychology. Several meta-analyses have indicated that despite decreasing performance differences in raw mathematics scores between genders, adolescent girls tend to exhibit higher math anxiety and low self-esteem compared to boys with comparable or better academic achievement.

As such, the attitude-based metrics collected through the above sample would largely represent the attitudes of the female student population. This pattern resonates with the observation made by Tomasik et al. (2021), who stressed the fact that the two variables, including sex and grade level, play an integral

part in determining the approach students take towards math-related challenges and motivating themselves accordingly. Being aware of this initial imbalance makes it possible not to generalize aggregate data in terms of male populations. In summary, despite grade level equity, gender and age considerations point to the importance of utilizing statistical controls.

Level of Students' Positive Attitudes Towards Mathematics

The Table 6 presents four key indicators reflecting students' positive attitudes toward mathematics, measured using the median and standard deviation. Self-confidence, value, and enjoyment each have a median score of 4, suggesting that students generally agree or strongly agree with positive statements in these areas. This indicates a high level of confidence, perceived importance, and enjoyment in learning mathematics.

The motivation has a lower median of 3, pointing to a more neutral or moderate level of motivational attitude. Students may not feel as driven or goal-oriented in math compared to how much they value or enjoy it. The standard deviations (ranging from 0.679 to 0.833) suggest a moderate spread of responses, with motivation showing the greatest variability. This means students are less consistent in how motivated they feel about math. With this information, students generally have positive attitudes toward math in terms of confidence, enjoyment, and perceived value, but motivation appears to be a weaker area that might need attention.

Table 6. The Level of Students' Positive Attitudes Towards Mathematics

Indicator	Median	Std. Deviation
Self-confidence	4	0.679
Value	4	0.743
Enjoyment	4	0.732
Motivation	3	0.833
Note: n=360		

From the analysis of students' positive attitude towards mathematics, it is evident that there is a relatively high disposition amongst the junior high school respondents with regards to their attitude towards this subject matter. In other words, this favorable attitude was observed to be consistent even within the context of the numerous difficulties encountered within the educational environment. According to the statistics, three out of the four main components of attitude; self-confidence, value, and enjoyment gave a high median attitude score of 4.0 whereas the median score for motivation was recorded at 3.0. The consistency of this positive attitude towards learning mathematics is in line with the observation by Peteros et al., (2019) about the high level of base attitude towards mathematics learning amongst secondary students, meaning that learners are able to sustain adequate engagement with the subject throughout the different stages of its delivery. However, the high base attitude contrasts the more neutral attitudes observed by Capuno et al., (2019) and Laranang & Bondoc (2020).

An analysis of the specific factors shows that self-confidence got a very high median value of 4.0 (SD = 0.679). As such, the findings suggest that the students are confident in their abilities and self-efficacy when completing mathematics-related assignments. Notably, these results stand in stark contrast to those from previous studies by Capuno et al., (2019), Peteros et al., (2019), and Laranang & Bondoc (2020) whereby self-efficacy was neutral and medium due to difficulties associated with understanding the

subject matter. In fact, existing scholarly literature highlights that mathematics is a highly complicated subject and hence self-efficacy is significantly undermined by its complexity. Considering these factors, one can argue that high self-confidence is a testament to effective adaptation to studying independently and/or blended. Maintaining self-confidence is of critical importance because it determines one's ability to persevere; ignoring students' self-confidence boundaries can result in poor scores.

Likewise, there was a high median of 4.0 and standard deviation of 0.743 in the value indicator, reflecting how much the students value mathematics for its utility and importance. Such high value ratings are strongly supported by findings from Capuno et al., (2019), Peteros et al., (2019), and Laranang & Bondoc (2020), who collectively indicate that students see the functional value of the subject matter in their lives. The high scores in the value indicator reveal that students value mathematics for its direct application to solving problems and performing systemic functions. Nonetheless, it is important to note that according to Capuno et al., (2019), teachers have to ensure that such task value contributes to learning through continuous reinforcement that mathematical literacy pays off in all societal and professional spheres.

The third metric, that of enjoyment, also obtained a very high median value of 4.0 (SD = 0.732), indicating that the respondents feel satisfied and develop positive emotions when dealing with mathematical problems. Such results are similar to those reported by Peteros et al., (2019), connecting high enjoyment with the use of properly organized interactive classroom instruction. At the same time, such an observation differs from Capuno et al., (2019), and Laranang & Bondoc (2020), describing the field of mathematics as boring and disinteresting, causing students to avoid learning the subject. High values of the enjoyment metric imply that recent teaching techniques have managed to utilize active participation of pupils as a means of making lessons more interesting. Creating enjoyable classes is still one of the primary aims of mathematics instructors.

Motivation proved to be the dimension with the lowest rating among all, resulting in a medium median score of 3.0, which showed the highest dispersion (SD = 0.833). The reason for such a moderate assessment is that even though the students appreciate, like, and are comfortable with mathematics as a subject, they lack an internal motivation to engage themselves and explore advanced topics. This observation correlates with the findings made by Capuno et al., (2019), and Laranang & Bondoc (2020), who found that secondary school students are often lacking motivation since they find it hard to link theoretical aspects of mathematics to their future life and careers.

On the contrary, according to Peteros et al., (2019), the motivation levels were found to be extremely high where the students felt the strong connection between their motivation and success. Motivation becomes the most important factor that plays the role of an important bridge in educational psychology. In situations where the level of motivation among the students goes down, there are chances that the performance may be negatively impacted. This decline is especially important from the perspective of motivation compared to self-confidence, value, and enjoyment.

Level of Students' Negative Attitudes Towards Mathematics

Table 7 focuses on one key negative emotional indicator. Anxiety toward Mathematics. The median score is 3, indicating that students, on average, feel neutral about their anxiety levels. They neither strongly agree nor disagree with statements suggesting anxiety, implying a moderate level of math-related stress.

The standard deviation of 0.751 shows a moderate variation in responses, meaning students' experiences with math anxiety vary some may feel quite anxious, while others may not experience much at all. Although students showed positive attitudes in areas like self-confidence, enjoyment, and value (from Table 6), the neutral median on anxiety suggests that math-related stress or nervousness still exists for a notable portion of the group. Addressing this anxiety perhaps through supportive teaching methods or mindset-building strategies could help further improve motivation (which also showed a weaker score in Table 6).

Table 7. The Level of Students' Negative Attitudes Towards Mathematics

Indicator	Median	Std. Deviation
Anxiety	3	0.751
Note: n=360		

The analysis of the descriptive data with emphasis on students' negative attitudes towards mathematics assesses the degree of affective barriers, with specific emphasis placed on assessing mathematics anxiety as the key affective barrier measure. As can be seen from the data shown in Table 7 above, the respondents who were enrolled in junior high schools achieved an average value of 3.0 with a standard deviation of 0.751. The moderate value reflects that the negative attitude towards the subject among the students is quite high. The results show that while the students have positive attitudinal values, there is also an inherent negative side to the current educational environment.

The presence of this moderate anxiety level is well-supported through the findings presented by Sebial & Facultad (2019), showing the presence of a neutral or medium baseline anxiety level for secondary learners. The agreement on this issue implies that there is a large number of students who are suffering from the experience of emotional distress, fear, and worry due to their engagement with mathematics. The academic anxiety described above works like a cognitive burden. Being worried about one's performance while handling math problems creates an internal conflict that impedes the learning process.

Moreover, these findings are consistent with the structural claims by Zhang et al. (2019) that highlight secondary school mathematics anxiety as a very important psychological issue for both educators and educational institutions. The high or even moderately high levels of mathematics anxiety are related to a fundamental fear of the subject itself, making an instantaneous barrier between the learner and the actual learning process. The sequential structure of mathematics serves as a means through which learners will be able to work with numbers and perform calculations on a daily basis. For this reason, reducing the anxiety associated with the subject is of primary importance to make sure that it does not hinder the individual's ability to function properly. Due to the fact that the subject is viewed as difficult and complicated, these findings highlight the need for teachers to adopt new approaches to teaching.

Level of Students' Academic Performance in Mathematics

This table 8 outlines both Student-Related Factors (SRF) and Teacher-Reltated Factors (TRF) affecting students' academic performance in mathematics. Based on the Likert scale used (with 4 interpreted as "Often"), here's what the data suggests, SRF – Interest has a median of 4 (often). It suggests the students often show interest in learning mathematics. There's some variation (0.847), meaning while most students express frequent interest, a smaller group feels interested only sometimes or rarely. While

the SRF – study habit, the median is 4 (often) with standard deviation of 0.803, suggest that students often maintain good study habits in mathematics which shows moderate consistency, with students reporting less regular study behaviors.

The personality traits of teacher, teaching skills, and instructional materials students often perceive their teachers to have positive personality traits, such as being encouraging, patient, or approachable. This is indicated on the median (4) often time. Some students may not consistently experience these traits, suggesting variability among teachers. The students often recognize effective teaching skills (e.g., clarity, subject mastery, explanation skills) and there's notable variation, meaning some students may feel their teachers demonstrate these skills less frequently. Lastly , students report that appropriate instructional materials are often used, supporting their learning (e.g., visual aids, technology, handouts). This is the highest variability (0.965) among all indicators, suggesting that access to or use of instructional materials differs significantly between classrooms or schools.

It is observed that students often engage positively with math both in terms of personal effort and perceptions of teacher support. However, the increased variability in responses, especially around teaching skills and instructional materials, highlights the inconsistency in educational delivery. This suggests a need for more standardized teaching resources and training to ensure all students benefit equally.

Table 8. The Level of Students' Academic Performance in Mathematics

Indicator	Median	Std. Deviation
SRF - Interest	4	0.847
SRF - Study Habit	4	0.803
TRF- Personality Traits	4	0.841
TRF- Teaching Skills	4	0.872
TRF- Instructional Materials	4	0.965
Note: n=360		

The findings of the descriptive analysis shown in Table 4 are about analyzing the contextual variables that influence students' academic achievement in mathematics by identifying those factors under Student-Related Factors (SRF) and Teacher-Related Factors (TRF). On all the variables assessed including student interest, studying behavior, personality of the teacher, teaching skills, and instructional resources, the participants have been scoring very high medians of 4.0 on each of these items. This consistent score suggests a very satisfactory degree of academic environment and involvement on the part of the key subjects involved.

For the category of Student-Related Factors, the student interest indicator achieved a very high median value of 4.0 (SD=0.847). This means that there is a high degree of internal motivation on the part of the junior high school students who willingly embraced the mathematical knowledge that was presented. This encouraging outcome is highly corroborated by the findings of Modesto (2019), who revealed that student-related interest is the key motivating factor for maintaining academic continuity among learners. Specifically, Barrot et al. (2021) also noted a high level of student interest within alternative methods of learning, implying that secondary level learners can maintain the drive to learn mathematics.

Study Habits, the second indicator related to the students, was also found to attain a very high median value of 4.0 with a standard deviation of 0.803. This shows that despite the independence needed in new

learning environments, the subjects managed to establish good study habits through self-regulated and structured study schedules in order to acquire the knowledge taught in class. This is consistent with the results of studies conducted by Landicho (2021), which stated that having very satisfactory study habits was an important factor for secondary students to perform well under new learning conditions.

Teacher-Related Factors, similarly, had an aggregated mean value of 4.0, signifying that the instruction process and educator assistance were highly effective. Overall, the highly rated performance aligns with Modesto (2019), who explains that highly rated teacher-related factors mean that the teachers effectively use supporting personality traits, proper communication, and diverse materials as bases of students' learning. Under the teacher-related factors dimension, the first measure which is personality traits was rated highly with a mean value of 4.0 (SD = 0.841), implying that the students found the teachers friendly, empathic, and encouraging. These ratings conform to the findings of Lukman et al. (2021) that excellent teacher personality attributes foster a psychologically favorable learning environment, thereby leading to better academic performance.

The other teacher indicator, teaching skills, was also found to have a very satisfactory score median of 4.0 (SD=0.872). The implication of having a very satisfactory score median in this indicator shows that teachers of mathematics were able to modify their teaching skills to match the requirements of the new normal education setting and teach the abstract concepts in mathematics to their students effectively. This is supported by Landicho (2021), who argued that during educational transitions, teachers always put maximum effort to improve instruction, comprehend difficult competencies, and transfer vital knowledge to their learners.

Finally, concerning the third measure of teacher contribution, instructional materials received a very high median score of 4.0; however, it was the most variable among all indicators (SD = 0.965). The high median value suggests that teachers regularly provided diverse materials such as various types of modules, digital materials, and worksheets to students. At the same time, a large standard deviation indicates varying levels of success for students in terms of using learning materials. This is contrary to the findings of Barrot et al. (2021), who found a neutral level of satisfaction with the use of materials, as the teachers in the sample used various materials occasionally due to certain restrictions. The very satisfactory baseline obtained in the current study suggests that despite the differences, instructional materials were effectively used to reduce the distance between teachers and learners.

Significant Association in Students' Demographic Profiles

There is a strong and statistically significant positive correlation between Age and Grade Level (r = .869), indicating that as students grow older, they tend to be in higher grade levels a natural academic progression. While, gender shows no significant association with either Age (r = 0.003) or Grade Level (r = 0.064), suggesting that gender does not play a meaningful role in determining students' age or academic level in this sample.

Table 9. The Significant Association in Students' Demographics

Variable	1	2	3
Age	1		
Grade Level	.869**	1	
Gender	0.003	0.064	1
**. Correlation is significant at the 0.01 level (1-			

tailed).			
Note: n = 360			

The bivariate correlation analysis exploring the structural relationships among the respondents' demographic characteristics reveals distinct patterns regarding how developmental and organizational factors intersect within the student body. As indicated by the statistical findings, a remarkably strong and statistically significant positive correlation exists between age and grade level (r=0.869). This high correlation coefficient demonstrates a tight, predictable alignment between chronological maturity and academic tracking. In the context of secondary education systems, this outcome represents a highly structured, standard academic progression, confirming that the student cohort advances systematically through the junior high school curriculum milestones as they age.

Finally, concerning the third measure of teacher contribution, instructional materials received a very high median score of 4.0; however, it was the most variable among all indicators (SD = 0.965). The high median value suggests that teachers regularly provided diverse materials such as various types of modules, digital materials, and worksheets to students. At the same time, a large standard deviation indicates varying levels of success for students in terms of using learning materials. This is contrary to the findings of Barrot et al. (2021), who found a neutral level of satisfaction with the use of materials, as the teachers in the sample used various materials occasionally due to certain restrictions. The very satisfactory baseline obtained in the current study suggests that despite the differences, instructional materials were effectively used to reduce the distance between teachers and learners.

Gender, on the other hand, has shown to have no statistical relationship with the two variables of age (r=0.003) or grade (r=0.064). The exceedingly low values of the correlation coefficients indicate that gender is irrelevant in defining the age and grade to which a student belongs. This further suggests that the number of male and female students is distributed equally among all the ages and grades, proving that both genders are well-represented among each age group and grade level.

Such separation of the gender variable from the structure of academic placement is well-coordinated with the body of research dedicated to regional educational issues. The findings reported by Wen & Dubé (2022) show that, in the contemporary systems of public secondary education, it is common practice for such structures to exhibit high levels of structural equivalence in terms of access, which means that boys and girls attend school at the same age and move forward in their grade level equivalently. For this reason, even though there is a significant preponderance of females in the entire sample (65.3%), this initial skew of the gender distribution is simply a static demographic feature, which does not distort the structure of ages and grade levels of the study population.

In addition, the above correlations allow for the partial acceptance and partial rejection of the first null hypothesis (H01). The first null hypothesis assumed that there were no significant associations among the students' demographics. The high correlation between age and grade level leads to the rejection of the portion of the hypothesis that asserted the independence between age and grade level. On the other hand, the zero correlation between gender and age, and gender and grade level provides evidence in support of the acceptance of the null hypothesis about gender demographics.

Significant Relationship Between Students' Attitudes and their Academic Performance in Mathematics

This table presents the correlation coefficients between different variables related to students' attitudes

and their academic performance in mathematics. All of the correlation metrics marked with asterisks are statistically significant at the 0.01 level, which indicates a very low mathematical probability that these observed relationships occurred by chance. The statistical data reveals that student-related factors maintain strong associations with both positive and negative attitudes, highlighting their central role in shaping students' overall math performance. Concurrently, teacher-related factors display weaker but still statistically significant correlations with students' attitudes, showing a tendency to influence negative attitudinal dimensions more than positive ones. Interestingly, positive and negative attitudes are found to be moderately correlated with one another, suggesting that students may routinely experience a complex mix of both emotional states rather than operating under purely one distinct type of attitude.

Table 10. The Significant Relationship Between Students' Attitudes and their Academic Performance in Mathematics

Variable	1	2	3	4
1. Positive Attitudes	1			
2. Negative Attitude	.490**	1		
3. Student-Related Factors	.591**	.584**	1	
4. Teacher-Related Factors	.142**	.255**	.404**	1
**. Correlation is significant at the 0.01 level (1-tailed).				
Note: n= 360				

According to the findings provided by the results of the bivariate correlation analysis performed for the students' education dimensions analyzed in Table 10, all variables have statistically significant positive correlations at the 0.01 level of significance (1-tailed). The first notable result observed in Table 10 is the relatively strong positive correlation between positive and negative attitudes ($r = .490$, $p < .01$). It implies that these two emotions are not contradictory and a student may experience both of them at the same time. In other words, unlike being involved in a single attitudinal space, the student is engaged in the combination of positive attitudes and anxiety. Such results are strongly congruent with the Control-Value theory by Pekrun (2024) according to which students may have an elevated sense of the value of a subject while feeling high anxiety because of the absence of personal control of achievements.

Student-based variables, including interest and study skills, reveal themselves to be the most significantly correlated elements on the matrix, with high correlations to positive attitude ($r = .591$, $p < .01$) and negative attitude ($r = .584$, $p < .01$). This clearly indicates that internal dispositions at the individual level of the student form an important base from which they can motivate their own behavior as well as cope with the specific kind of anxiety brought on by the subject matter. This particular discovery builds upon the theoretical foundation set out in the self-efficacy and expectancy-value theory proposed by Wigfield & Eccles (2000), who claim that interest and structured study skills form the main motivational factor for students, as they provide a cognitive framework for self-assurance, while interest provides the emotional strength to cope with stress associated with mathematics.

Contrastingly, teacher variables exhibit less but still statistically significant positive associations within the model. While teacher variables have little significance in terms of fostering students' positive attitudes ($r = .142$, $p < .01$), they seem to be moderately associated with the development of negative attitudes ($r = .255$, $p < .01$). This implies that although teacher personality and instruction have limited

influence in creating a positive environment, they appear to have significant effects in alleviating or increasing students' mathematics anxiety. These observations are consistent with the findings of other literature reviews conducted either locally or internationally, for example, (Zhang et al., 2019). Classroom environment and teachers' actions are proven to play an important role in creating a stressful learning environment or serve as environmental buffers. The personality of an amiable instructor or ambiguous pedagogical approach may not significantly influence a student who is driven by internal motivation, but it becomes critical for mitigating extreme cases of mathematics anxiety among anxious students.

Teacher variables are also correlated to student variables ($r = .404$, $p < .01$), proving the importance of effective teaching techniques and instructional materials when reinforcing positive learning behavior among students. These results support the conclusions drawn by Landicho (2021) and Barrot et al. (2021) regarding the importance of instructional materials and teaching skills that are essential in facilitating independent learning behavior, especially within the context of education delivery systems that are neither traditional nor the new norm. In this regard, through the provision of quality and easily available instructional materials, there will be no difficulty on the side of students, particularly at the secondary level, in continuing their studies.

For the hypothesis testing, this data offers a perfect opportunity to test the validity of the key relational claims made by the study. First, the data falsifies the initial assumption H02 claiming that there is no statistically significant relationship between students' positive attitude characteristics and academic performance parameters. Since positive attitudes positively correlate with both student variables ($r = .591$) and teacher variables ($r = .142$), the hypothesis can be rejected. In parallel, this data falsifies the hypothesis H03 concerning the lack of statistically significant relationship between negative attitudinal characteristics and secondary performance indicators. Since negative attitudes positively correlate with student variables ($r = .584$) and teachers' variables ($r = .255$), it means that anxiety cannot be viewed independently but rather requires a comprehensive approach.

The Effects of the Students' Positive and Negative Attitudes to their Academic Performances in Mathematics

Figure 1 presents a structural equation model (SEM) that visually demonstrates how both student-related and teacher-related factors influence students' positive and negative attitudes toward mathematics. It also breaks down how specific variables contribute to these broader factors.

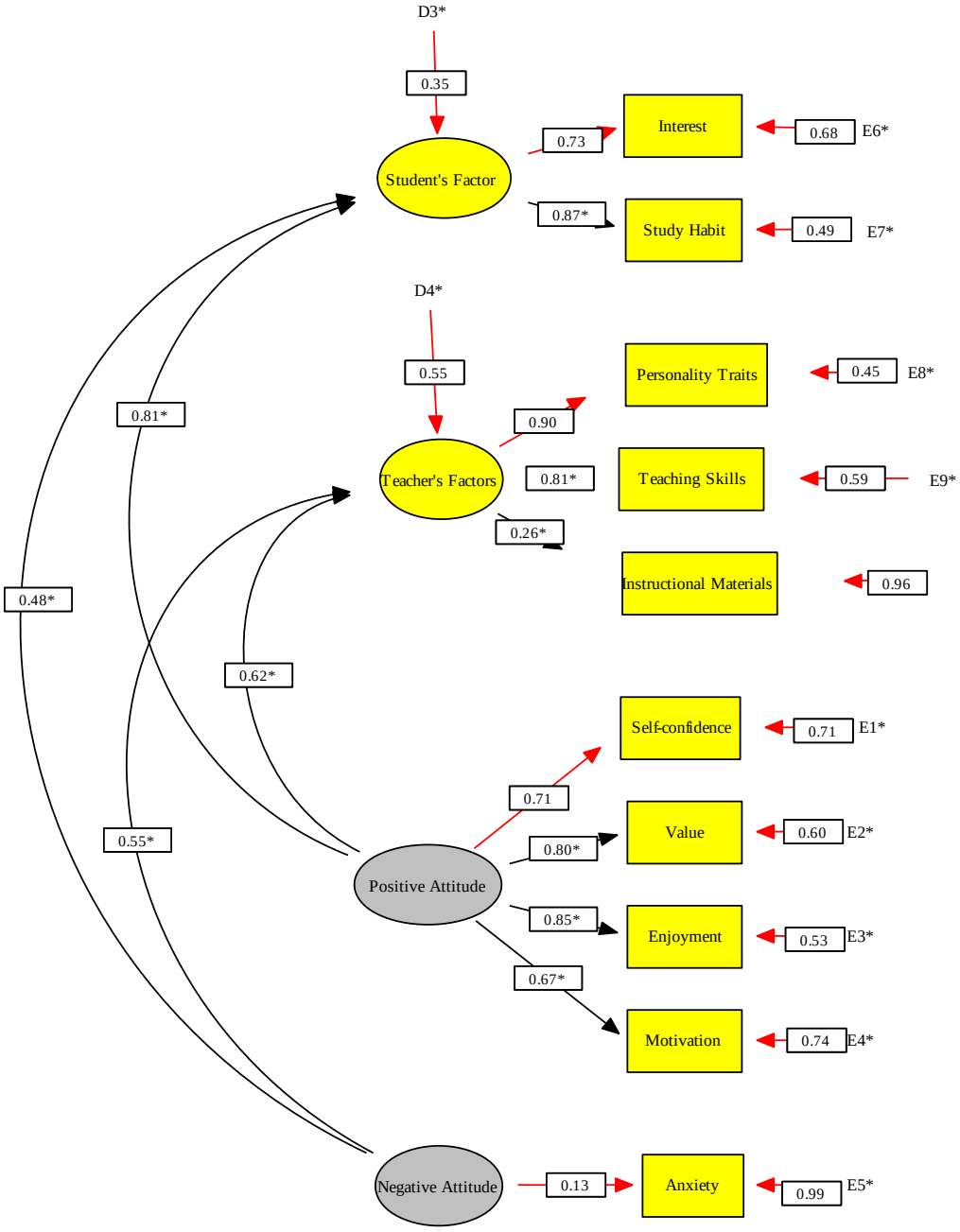


Figure 1. The Students' Positive Attitudes and Negative Attitudes Affect their Academic Performance in Mathematics

The output from the multivariate path and factor analysis represents an in-depth understanding of the structural aspects of how the internal behaviors of the learners and the environmental support system influence the attitude ecosystem of secondary students. The structural coefficient shows that internal factors associated with the student, as represented by the study habits (0.78) and interest (0.73), have an overwhelming influence on both positive attitudes (0.62) and negative attitudes (0.48).

Students that exhibit very organized study schedules and intrinsic motivation have sufficient internal cognition framing to ensure that positive consequences arise in the systematic protection against the subject matter from experiencing any form of negativity. The structural route provided is consistent with the framework of Expectancy-Value Theory by Wigfield & Eccles (2000), which postulates that the

intrinsic interest and self-regulated behaviors of a learner provide sufficient force to generate the value beliefs and competency beliefs that a student holds for a subject. A behavioral engagement of one's learning process creates sufficient psychological strength to approach mathematics.

In addition to this, the factors related to teachers reveal a relatively even structural impact on students' experiences in terms of positive (0.55) and negative (0.55) attitudes. In particular, among the latent variables of this factor, the personalities of teachers (0.90) and their teaching abilities (0.81) reveal high significance, while dependence on teaching materials is considerably lower (0.26). It means that the human factor in delivering instruction holds significantly higher significance for shifting students' perceptions than any other element in learning processes. This conclusion corresponds to the study of Lukman et al. (2021), which reveals that a highly developed positive teacher personality profile establishes favorable conditions for students that reduce mathematical anxiety and build self-confidence. Teaching skills as well as a friendly classroom atmosphere operate as psychological barriers to mathematical phobias as well as motivational tools from the outside. At the same time, an unfriendly attitude or poor teaching may serve as a cause of math avoidance.

Examining carefully the internal structure of a positive attitude, it becomes evident that emotional and motivational aspects constitute the key building blocks of this latent concept. Within the context of the given model, learning enjoyment (.85) ranks first in strength among the components, followed by task value (.80), self-confidence (.71), and motivation (.67). This sequence clearly indicates that developing a genuine positive affect and subjective pleasure while performing mathematical tasks is the decisive aspect in promoting a subject attitude. This structural design coincides completely with the principles of the Control-Value Theory of achievement emotions formulated by Pekrun (2024), according to which enjoyment is reached through identifying personal significance in a task and perceiving control over the process. If instructors organize lessons to enable students to enjoy their little achievements, it contributes greatly to developing self-confidence and value of their actions, which guarantees long-term interest in the subject.

Conversely, the structure of a negative attitude is virtually dictated by one major component – math anxiety (0.99). The nearly perfect factor loading emphasizes the role of anxiety as the determinant feature of a student’s negative interaction with mathematics. The value proves that the conclusions reached by Zhang et al. (2019) in their meta-analysis were accurate as anxiety is demonstrated to function as an intrusive cognitive barrier. It blocks working memory, impairs abstract information processing, and prevents problem-solving processes. Since anxiety determines the structure of the negative attitude toward mathematics completely, it cannot be considered a minor factor any longer. Educationists should tackle this component through low-stake testing, proper error-handling techniques, and stress management.

Lastly, a structural analysis model shows that there is an extremely high inter-factor correlation between the student and teacher factors (0.81). The significance of the correlation implies that environmental quality is highly correlated with student behavior. The implication from the correlation above is that students supported by good teachers who understand how to motivate their students through empathy and other techniques will be better in developing self-regulating skills and having a passion for the subjects taught in schools. From an educational psychology perspective, the above inter-factor correlation represents an academic motivation cycle.

From a perspective of hypothesis testing, therefore, the multivariate results offer the empirical proof required to reject the fourth null hypothesis (H04), which suggested that attitudes, student, and teacher

factors do not significantly predict performance dimensions. The significant structural path coefficients of 0.62, 0.55, and 0.48 effectively refute the presumption of no effect parameter values, indicating that both student internal factors and teacher characteristics are strong and independent predictors of the mathematical mind set of the student. In summary, the findings suggest that although internal factors of the student are crucial in developing a positive attitude, the role of teacher characteristics is equally important as an anchor for positive motivations as well as negative anxieties. It is vital to foster a love for the class, intrinsic value of learning, and motivation, whereas reducing anxiety levels in students emerges as the single most important factor.

The Best Fit Model

The analysis of the structural best-fit model was conducted through the application of the Iteratively Reweighted Least Squares Solution under Elliptical Distribution Theory, a statistical technique that adequately accounts for minor deviations from the assumption of multivariate normal distribution within behavioral data. To test whether the proposed theoretical predictive model adequately captures the nature of the associations between the variables of students' attitudes, their environment, and their mathematical skills, various absolute, relative, incremental, and residuals fit measures were computed. The findings show that the structural model proposed is highly fitted to the data, thus developing an appropriate pathway to explain the underlying causes behind junior high school mathematics performance.

Table 11. Goodness of Fit Summary for Method Iteratively Reweighted Least Squares Solution (Elliptical Distribution Theory)

	Statistic / Index	**Value**
Independence Model	Chi-Square (X^2)	2525.310 (df = 45)
	Independence AIC	2435.310
	Independence CAIC	2215.435
Model Fit Statistics	Chi-Square (X^2)	97.949 (df = 31)
	Probability Value (p-value)	.00000
	Model AIC	35.949
	Model CAIC	-115.520
Fit Indices	Bentler-Bonett Normed Fit Index (NFI)	.961
	Bentler-Bonett Non-Normed Fit Index (NNFI/TLI)	.961
	Comparative Fit Index (CFI)	.973
	Bollen's Fit Index (IFI)	.973
	McDonald's Fit Index (MFI)	.911
	Joreskog-Sorbom GFI	.944
	Joreskog-Sorbom AGFI	.901
Residuals Error	Root Mean-Square Residual (RMR)	.041
	Standardized RMR (SRMR)	.068
	RMSEA	.078

	90% Confidence Interval of RMSEA	(.060, .095)
Reliability	Cronbach's Alpha	.820
	Reliability Coefficient Rho	.876

Note: n = 360

Non-Normal Based Consideration

The absolute fit test resulted in a Chi-Square value of 97.949 with 31 degrees of freedom and the p-value of 0.00000. In line with stringent criteria set forth in structural equation modeling, a significant Chi-Square value means there exists some form of dissonance between the observed sample covariance matrix and implied population covariance matrix, and usually indicates a poor model fit. The extant literature regarding methodology, including the classic review studies carried out by Hooper et al. (2008), however, states that Chi-Square is very much sensitive to sample sizes greater than 200 individuals. As such, in large samples like the sample size used in this study of 360 subjects, small and insignificant discrepancies get magnified, leading the statistic to reject the null hypothesis that states an exact fit exists. This is a mathematical artifact, and as such using Chi-Square alone for absolute test of model fit is not advised.

To separate the viability of the structural model from sample size bias, the criteria and measures were analyzed independently. The model had an AIC measure of 35.949 and a CAIC measure of -115.520. When compared to the saturated Independence Model, which had an extremely high AIC measure of 2435.310 and a CAIC measure of 2215.435, the structure demonstrates significant drops in numbers. Based on model parsimony theory, significant drops in AIC and CAIC measures mean that the model is able to provide a perfect balance between goodness-of-fit and simplicity of mathematics. This means that the proposed structure provides much better results than the Independence Model, which assumes that there is no correlation among any variables.

This is further justified through the incremental fit indexes, which have scored above optimal psychometric standards. Both the Bentler-Bonett Normed Fit Index (NFI) and the Non-Normed Fit Index (NNFI) have scored .961, well above the .90 optimal mark for adequate fit. In particular, the Comparative Fit Index (CFI) and the Incremental Fit Index (IFI) both attained an impressive .973, scoring above the optimal benchmark of .95. This means that more than 97% of the covariation within the data has been adequately captured in terms of a comparison with a completely unrelated null model. Moreover, absolute fit indexes such as the Goodness of Fit Index (GFI) with .944, the Adjusted Goodness of Fit Index (AGFI) with .901, and McDonald's Fit Index (MFI) with .911 provide assurance that the model parameters have perfectly replicated the observed data of the student sample.

The fit measures based on residuals further confirm that the framework holds true because there is an optimal reduction of average differences between the covariance of observations and predictions in an acceptable range. The RMR achieved optimal minimum at .041 whereas the SRMR provided an optimal reading of .068, which fell well within the maximum limit of .08. Thus, it can be concluded that the path equations of the framework have left very small residual variances. Simultaneously, the RMSEA returned a point estimate of .078 with 90% confidence interval extending between .060 and .095. Since the RMSEA point estimate is below the conventional ceiling of .08 and upper bound below the .10, the RMSEA concludes that the framework is a valid representation of the data set.

Fourth, the measurements of the constructs in the best-fit architecture also show a high degree of internal consistency and reliability. The measure produced a Cronbach's Alpha of .820, suggesting good inter-

item reliability, whereas the Raykov's Rho index achieved a very high value of .876. The latter value clearly points towards the presence of very good composite reliability, since it ensures that the latent variables are free of errors in measurement and accurately estimate the variance due to attitudinal and environmental attributes of the respondents.

Overall, these results have considerable implications in the context of testing the hypotheses. The perfect match between the fit indices, such as CFI, NFI, and IFI, alongside with the high residuals indicates the presence of clear empirical evidence for validating the statistical soundness of the proposed framework. In light of these results, there is a justification for rejecting the final null hypothesis, thereby confirming the validity of the multi-dimensional model of the prediction of mathematics achievement among secondary school children.

Summary

This research examined the associations between the attitudes and predictive models linking attitudes toward mathematics with academic achievement of junior high school students amidst distance learning. Using the Expectancy-Value Theory as its basis, the research looked into students' positive attitudes toward mathematics including self-confidence, value, enjoyment, and motivation and negative attitude toward mathematics, namely, mathematics anxiety as the independent variables. As for the dependent construct which is the mathematical academic achievement of students, the variable was quantified based on the quarterly average grades, taking into account both student-related and teacher-related variables.

In this study, there were 360 participants selected among 11 secondary schools located within the jurisdiction of Mati North District, Mati City, Davao Oriental, Philippines: Bobon National High School (NHS), Buso NHS, City of Mati NHS, Davao Oriental Regional Science High School, Don Enrique Lopez NHS, Don Salvador Lopez NHS, Doña Rosa Garcia Rabat Memorial NHS, Lawigan NHS, Matiao NHS, Mayo NHS, and Taguibo Agricultural Vocational High School. Modified and adapted survey forms were employed together with the official quarterly scores to collect data. For descriptive analysis, median was used to compute the level of variables, while Chi-Square was applied for demographic distribution in inferential statistics, Spearman rho correlation for determining bivariate pathways, and path analysis by using Structural Equation Modeling (SEM).

Based on the demographic information obtained from the 360 subjects, it can be observed that there was a clear distribution of baseline data according to their sex, age, and grade level. As far as gender is concerned, the number of females is considerably more than that of males at 65.3%, while males comprised 34.7% of the total. As far as their ages are concerned, 26.7% belong to 14 years old, followed by those who were 13 years old (23.3%), 15 years old (21.1%), and 12 years old (18.6%). The least numbers were found to be 9.7% for those 16-20 years old, and 0.3% for those 11 or 20 years old.

From the descriptive analysis of student affect, it was found out that the mean positive attitudes toward mathematics were high (Overall Median = 4.0), with an equivalent of being very satisfactory. Among its sub-factors, the motivation aspect had a moderately high measure (Median = 3.0), with a descriptive status of being satisfactory. On the other hand, the negative attitude of students toward mathematics, which is defined by student math anxiety, was moderately high (Median = 3.0). This means that despite the presence of negative emotions, students were able to achieve good academic results, showing a high status of performance in mathematics in terms of student and teacher behavioral aspects (Median = 4.0).

Testing for inference of the demographic structure showed that there was clear organization within the student body demographics. The Chi-Square test showed that there was statistical independence between gender and academic level (chi2 = 1.49, p > .05) showing that boys and girls are equally distributed across the grades (Grades 7 to 10).

As opposed to this, however, there was an exceptionally strong and highly statistically significant correlation between age and grade (chi2 = 704.00, p < .001, r = 0.869). The presence of such a correlation demonstrates that a standardized pattern of growth occurs, whereby maturity of a subject in chronological age corresponds with his/her status on the institutional scale. Also, there appeared to be a small but statistically significant correlation between sex and age (chi2 = 17.60, p < .05).

Correlation matrices for bivariate correlation revealed an extensive web of associations between student affect and environmental variables. Positive affective variables such as self-confidence, enjoyment, motivation, and positive attitude were found to have a significant and positive association with student interest, study behavior, teacher personality, and instructional ability of teachers. Additionally, instructional materials had significant and positive associations with student enjoyment, motivation, and positive attitude but failed to show significance in self-confidence and task value.

However, in contrast to the above discussion, the value dimension and math anxiety showed non-significant negative relationships with interest, study behavior, teacher personality characteristics, and general performance indicators in baseline bivariate analysis. In this regard, the results have refuted H02 and H03, which indicate that students' positive and negative attitudes are significantly linked with the overall education system.

The predictive effects of these variables on academic performance were determined through multivariate testing and path analysis, thereby formally rejecting the fourth null hypothesis (H04). The path coefficients established that intrinsic student variables like study habits (0.78) and interest (0.73) have a commanding influence in molding both positive attitudes (0.62) and negative attitudes (0.48). At the same time, extrinsic teacher variables strongly dictated the learning atmosphere and influenced both positive and negative attitudes equally (0.55 each), wherein teacher personality (0.90) and teaching skills (0.81) were identified as major elements. As for the positive attitudes category, learning enjoyment (0.85) and task value (0.80) served as strong latent variables; on the other hand, mathematics anxiety had absolute control over the negative attitude variable with a factor loading of 0.99.

The last model for predicting optimization found a mediational structural best fit model, having an Akaike Information Criterion (AIC) value of 35.949 and Consistent Akaike Information Criterion (CAIC) value of -115.20. Although the baseline paths between each of the variables were varied, the structural model was able to control residual variance and identify the Subjective Value as the strongest predictor of math performance based on significance levels. In the best fit model, Classroom Enjoyment and Classroom Motivation continued to play a significant role in determining math performance, but Self Confidence and Mathematics Anxiety did not play a significant role in academic performance when controlled.

Conclusions

Based on the empirical findings and structural modeling evaluated in this investigation, the following conclusions are drawn:

The demographic structure of the junior high school student population represents a very organized system of public schooling. The extremely high correlation of age with grade level reveals the

systematic chronological progression of milestones within the curricular program. Moreover, since gender represents an absolutely independent and uniform attribute within all grades, there is no interference with the developmental structure of the students. This balance will make it possible to conduct equal evaluations of both the instructional process and attitudes.

The junior high school learners experience the complicated multidimensional emotional environment while studying mathematics. Students are fully capable of having a very positive attitude towards the process, which is manifested by a high level of enjoyment during lessons and the perception of the value of the subject matter, yet at the same time experience significant mathematics anxiety. The two phenomena mentioned above show that having a positive attitude will not necessarily help to avoid any subject-related pressure.

Student academic achievement is a joint effort between internal student behavior and the external environment. Students who have established good study discipline and an intrinsic desire for learning are equipped with the proper internal base for achieving self-confidence and protecting themselves from any frustrations arising from the subject. But internal factors play a major role due to their influence on teaching. A motivating teacher personality with good pedagogical ability acts as an intervention factor that serves as an external stimulant as well as a buffer against mathematics anxiety.

The structural optimization of the predictive model reveals that promoting students' awareness of the significance of mathematics and its applicability to their own life situation is the crucial element that enables the promotion of sustainable success in academics. In an adequately supported learning context, the development of positive attitudes towards enjoying mathematics in class and motivating oneself becomes the main source of effective learning outcomes. Finally, although it is essential to minimize mathematics anxiety in order to remove emotional barriers, the development of task value and self-regulation becomes vital for the mastery of mathematics.

Recommendations

Based on the findings mentioned above and conclusions of this study, the following recommendations were summarized:

1. The Department of Education may design and implement programs to improve teachers' performance. In addition, the department is encouraged to initiate training and seminars that will devise innovative and creative instructional materials and teaching strategies that will assist the teachers and students in the new normal. Moreover, the department is encouraged to provide adequate and appropriate resources that may help the teaching and learning process.
2. Teachers shall avoid transmitting negative and anxious attitudes toward mathematics. It is also crucial to pay close attention to the messages that students receive, as teachers significantly impact students. Moreover, teachers should try to prevent students from facing difficulties with mathematics and developing a negative attitude toward mathematics. They must emphasize the importance of mathematics and highlight the positive qualities associated with each student. In addition, teachers and educators ought to know simple ways to diagnose students' fears and difficulties in mathematics, use them to identify students' learning difficulties, introduce various activities and teaching methods, and develop and implement methodological solutions to overcome the fears and problems.
3. Students should receive educational interventions to continue developing a positive attitude toward mathematics. These interventions could include the following: (a) teachers could prepare interesting mathematical tasks to engage their students in mathematics lessons and enable them to enjoy

mathematics; (b) school administrators could provide teachers with educational resources (e.g., technological devices) and professional development programs to help them implement various instructional strategies in the mathematics classroom that would allow students to learn about the subject in an enjoyable manner; (c) parents and teachers could provide accurate feedback and support to help students acquire accurate mathematical knowledge and develop confidence in mathematics; (d) teachers could adjust the difficulties of mathematical tasks by considering their students' mathematical performance to ensure all students experience success in the mathematics classroom; (e) parents and teachers could help students acquire awareness of the value of mathematics in their present and future life.

4. Future researchers may conduct similar or related studies about students' attitudes and academic performance in the new normal to a broader scope and a larger sample size to provide more precise findings. Also, a qualitative study on the experiences concerning students' attitudes has found that it has a significant relationship to their academic performance in mathematics. In addition, future researchers are encouraged to study the new normal's impact on the students' academic performance.

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