

Parental Roles and Academic Achievement in Mathematics: The Mediating Role of Students' Attitude

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ABSTRACT

This study determined the mediating role of students' attitudes toward the relationship between parental roles and academic achievement in mathematics. The study used a quantitative descriptive-correlational research design, which involved analyzing data from 332 grade 8 students from six public national high schools in three congressional districts of Davao City. Using sets of modified-adapted survey questionnaires, the researcher collected data from the respondents and subjected them to content validity and reliability analyses. The data were analyzed using the mean, standard deviation, Pearson product moment correlation, and mediation analysis using the Sobel z-test. The objectives of the study were to know the level of parental roles as perceived by the students; to know the level of students perceived academic achievement in mathematics in terms of their perceptions; to assess the level of students' attitude in mathematics; to determine the significant relationship between: parental roles and attitude in math; attitude in math and academic achievement; and parental roles and academic achievement. The results indicated that the level of parental role, as perceived by the students, was moderate. On the other hand, both the students perceived academic achievement in mathematics and their attitude levels were high. Meanwhile, the relationships between parental roles and students' attitudes in mathematics and between parental roles and students' academic achievement in mathematics demonstrated a moderate correlation. However, there was a strong correlation between students' attitudes and their academic achievement in mathematics. Results revealed that parental roles and student academic achievement in math were initially correlated; however, when student attitude was included as a mediator, the direct relationship between parental roles and academic achievement became statistically insignificant. This indicated the presence of full mediation, suggesting that parental roles influence academic achievement primarily through their positive impact on students' attitudes toward mathematics.

keywords: parental roles, math academic achievement, students' attitude towards mathematics, quality education, Philippines

INTRODUCTION

Math is more than just a collection of equations and numbers and is an important subject that plays a significant role in the educational system. Most importantly, it is essential to our day-to-day lives and activities. Mathematics is not only a stand-alone subject but also plays a vital role in the development of problem-solving and critical thinking abilities (Liu et al., 2021). A strong command of mathematics enables students to analyze intricate problems, make well-informed choices, and contribute to innovation and technological progress (Xie & Ma, 2019). This knowledge provides the foundation for a prosperous career in a diverse range of fields. Capuno et al. (2019) confirm that the performance of students in mathematics is consistently prioritized in certain countries, as it is regarded as the primary subject that is essential for the country's advancement and progress. Moreover, the significance of studying academic achievement in mathematics lies in its pivotal influence on students' future opportunities. Mathematics is a fundamental subject that provides access to diverse fields, such as science, technology, engineering, and mathematics (STEM) disciplines (Moyano et al., 2020). Mathematical proficiency is frequently required for individuals who wish to pursue further education and careers in STEM fields (Erdoğan, 2019). In our modern society, characterized by a growing reliance on data and technology, possessing mathematical skills is crucial for meaningful engagement in both societal and professional domains.

Unfortunately, high school students often perceive mathematics as a formidable subject. The challenges it presents lead to inadequate academic performance in mathematics. However, multiple studies have consistently demonstrated a concerning decline in math scores on standardized tests and assessments (Otani, 2020; Poon, 2020). The decrease in math proficiency has prompted concerns regarding the efficacy of current math education practices and the readiness of students for a job market that relies heavily on mathematics (Veas et al., 2019). A significant factor contributing to low academic achievement in mathematics is the decreasing proficiency levels in math among students in different educational systems.

Additionally, the issue of low academic achievement in mathematics is a worldwide concern that has been extensively studied in educational research. Pekpazar et al. (2021) and Li et al. (2020) have consistently observed a decrease in students' math proficiency levels. Standardized test scores and assessments indicate a concerning trend, as students are facing difficulties in meeting the expected level of math proficiency. The decrease in math proficiency presents a notable obstacle to the efficacy of existing math education methods and prompts concerns regarding students' preparedness for future professions that require mathematical abilities (Zhou et al., 2020). Poor academic achievement in mathematics can have a detrimental impact on students' future academic and career opportunities, thereby perpetuating socioeconomic inequalities. Furthermore, tackling the issue of low academic achievement in mathematics is in line with broader educational objectives, including promoting fairness and inclusiveness.

For in fact, in other countries, similar to the situation at the University of the South Pacific in Fiji, as mentioned in the study of Chand et al. (2021), there is a decline in both the quantity and caliber of potential students entering STEM disciplines due to insufficient mathematics pass rates on national evaluations. Over the years, this has led to a series of consequences that have prompted institutions of higher learning to abolish the strict threshold scores for certain fields in order to mitigate student attrition. In the Philippines, despite all the projects made by our Department of Education to improve the math performance among the students, we still got low scores in the Programme for International Student Assessment (PISA). Very few students in the Philippines were top performers in mathematics, meaning they achieved Level 5 or 6 on the PISA mathematics test (OECD average: 9%). According to OECD PISA (2023), 16% of students in our nation achieved at least Level 2 proficiency in mathematics, which is much lower than the average for all OECD countries (OECD average: 69%). The problem of low performance in mathematics is also evident in Region XI, or the Davao region, according to Oracion et al. (2021, as cited in Schleicher, 2019), who stated that based on the PISA 2018 average scores in mathematical literacy, the Davao region achieved an average score lower than the national average of 353 points, which falls below level 1 of the proficiency scale of mathematical literacy set by the PISA. Furthermore, based on the results, it was interpreted that students are very low performers.

There are several factors that influence the academic achievement of students in mathematics, including the roles that parents play and the attitude of the students. Parental roles involve emotional support, academic guidance, and expectations. Rodríguez et al. (2019) conclude that parental emotional support positively influences students' self-confidence and motivation in mathematics. According to Shi et al. (2023), parental encouragement and positive feedback were found to be associated with the development of a growth mindset in mathematics among students. This mindset entails the belief that one's efforts can result in improvement. Parental involvement in students' mathematics education has a direct impact on academic achievement. Research conducted by Khawar et al. (2021) suggests that parental involvement in their children's math education, including assisting with homework and engaging in math-related activities, is associated with enhanced math performance. This engagement not only offers supplementary learning prospects but also signifies the significance of mathematics within the familial setting.

Moreover, parental roles play a critical role in shaping a student's attitude towards mathematics. Parents who display a favorable attitude about mathematics and illustrate its application in everyday life can have a big impact on their children's thoughts. Encouraging study, problem-solving, and a growth perspective promotes a love of learning. Santillan et al. (2023) conclude in their study that the parents could influence the students' attitudes toward math by how they motivate the student to do tasks accordingly, as parental encouragement plays a crucial role in the student's success since, they are "partners" of teachers in education. Meanwhile, Alorki et al. (2024) cite in their findings that the majority of students do not receive the necessary assistance, emotional support, and resources, as well as parental encouragement, which affects their attitude towards mathematics as a subject. This

illustrates how parental support and involvement influence the respondents' attitudes towards learning mathematics.

In contrast, several studies have examined the relationship between students' attitudes towards mathematics and their academic achievement. Tan et al. (2020) identify several factors that contribute to these attitudes, such as interest, motivation, self-efficacy, and anxiety. Several studies, including Smith et al. (2020) and Li et al. (2020), have consistently demonstrated a positive correlation between students' attitudes towards mathematics and their academic performance, as reflected in higher grades and improved performance on standardized math assessments. Students who possess negative attitudes or experience math anxiety tend to face academic difficulties (Rivera & Li, 2019). The association between students' attitudes and academic achievement is complex. Wu et al. (2020) and Carmona-Halty et al. (2021) highlight the importance of the family environment in promoting a positive attitude towards mathematics. One contributing factor to this problem is students' negative perception of mathematics. Longobardi et al. (2020) and Cui et al. (2021) identify math anxiety and a fixed mindset towards mathematics as prevalent among many students. Negative attitudes can impede students' motivation to interact with mathematical concepts, resulting in subpar academic achievement.

Furthermore, students' attitudes are influential in moderating the connection between parental expectations and their math achievement. According to Milovanović (2020), when parents hold high expectations for their children's math performance, it increases the likelihood that students will view mathematics as significant and work towards achieving success. Low parental expectations can have a demotivating effect on students and lead to negative attitudes towards math (Ribeiro et al., 2019). Recent research has emphasized the role of parental involvement and support. Li et al. (2020) emphasize the significant influence parents have on their children's attitudes and behaviors regarding mathematics.

This study is anchored by social cognitive theory (SCT), developed by Albert Bandura (1986), it offers a complete framework for understanding how students' perceptions of parental participation and academic results affect their attitudes towards learning. It elucidates how observing and interacting with family members shapes students' attitudes and beliefs about mathematics. The study examines the relationship between parental roles and students' academic achievement in mathematics, specifically focusing on the mediating role of students' attitude. It suggests that students acquire knowledge and behavior related to mathematics by observing and learning from their parents' attitudes, behaviors, and beliefs. Bandura's theory highlights self-efficacy, which pertains to an individual's belief in their capability to achieve success in a specific task or area. In the field of mathematics, students who possess a strong sense of self-efficacy are more inclined to approach mathematical challenges with confidence and persistence. Parental influences often shape self-efficacy. When parents demonstrate belief in their child's mathematical skills and offer assistance and motivation during math challenges, the child is more inclined to cultivate a favorable mindset and a robust sense of self-efficacy in mathematics.

Additionally, Social Cognitive Theory emphasizes the significance of observational learning. Children learn by observing and imitating their parents' behaviors and attitudes, including their approach and engagement with mathematical tasks. Parents' positive and enthusiastic attitude towards mathematics, along with their demonstration of problem-solving skills, can influence their children to adopt similar behaviors. This, in turn, can lead to the development of a positive attitude towards math and improved academic performance. Huang et al. (2021), Wang et al. (2023), and Yang et al. (2024) conduct research that supports the principles of the Social Cognitive Theory in the field of mathematics education. These studies indicate that children whose parents have positive attitudes towards mathematics are more likely to develop positive attitudes themselves and, as a result, attain higher levels of mathematical proficiency.

Another theory that supports this study is the Expectancy-Value Theory, formulated by Eccles and Wigfield (2002), which centers on students' perceptions regarding the value of a task and their expectations of achieving success in that task. This theory is pertinent for comprehending the correlation between parental roles and academic performance in mathematics, particularly in relation to the mediating influence of students' attitude. Expectancy-value theory posits that students' attitudes and motivation towards a specific activity, such as mathematics, are shaped by their expectations of success and the subjective value they assign to the subject. Within the context of their roles, parents play a crucial role in shaping expectations and values. Parents who

actively participate in their children's math education, offer academic assistance, and express high expectations for achievement send a clear message that mathematics is both valuable and attainable. Parental involvement has been shown to improve students' motivation in mathematics by increasing their belief in their ability to succeed and their perception of the subject's importance (Eccles & Wigfield, 2002). Corwyn et al. (2020), Kirkham et al. (2023), and Mayerhofer et al. (2024) provide empirical support for Expectancy-Value Theory. Research indicates that students whose parents have high expectations for their math performance and emphasize the significance of math tend to exhibit more positive attitudes and achieve higher academic performance in mathematics.

The third theory that underpins this study is Cultural Capital Theory, developed by Pierre Bourdieu, which examines the impact of cultural resources and practices within families on students' academic achievement and attitudes in mathematics (Bourdieu, 1986). It highlights the influence of social and cultural elements, such as parents' educational background, on students' attitudes and educational achievements. The study examines the relationship between parental roles and students' academic achievement in mathematics, considering the mediating role of students' attitude. It posits that parents' cultural resources, including their knowledge, beliefs, and educational experiences, significantly influence their children's attitudes and achievement in mathematics. Parents with higher levels of cultural capital, including a strong educational background and familiarity with the academic environment, are more capable of providing support for their children's learning and effectively navigating the educational system. Parents can offer valuable guidance, resources, and opportunities to enhance their children's math education. Briones et al. (2023), Hao et al. (2024), Hortelano et al. (2022), and López-López et al. (2022) emphasize the significance of Cultural Capital Theory for comprehending disparities in math achievement. Research indicates that students who come from families with higher cultural capital, which encompasses factors such as parental education and involvement, demonstrate superior performance in mathematics and exhibit more favorable attitudes towards the subject.

Figure 1 illustrates the conceptual framework utilized in this study, visually representing the variables being investigated. It delineates the impact of parental roles on students' attitudes, represented by path a. It further explores the impact of students' attitudes on their academic achievement in math, designated Path B. Additionally, it examines the impact of parental roles on students' mathematical academic achievement, mediated by students' attitudes. It explores the complex dynamics between the roles of parents, students' attitudes toward mathematics, and their academic achievement in the subject. The students' attitudes towards mathematics serve as a mediating factor, shaping the influence of parental roles on math achievement. This framework is developed using established theories and prior research in the fields of education and psychology.

The independent variable in this study is "parental roles," which is based on the research conducted by Cai, Moyer, and Wang (1999). This variable encompasses the diverse roles parents play in influencing their children's attitudes and academic performance in mathematics. This study measures parental roles based on the students' perceptions.

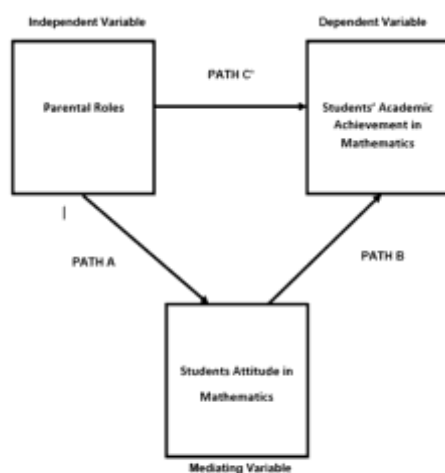


Figure 1: The Conceptual Framework of the Study

The parental roles indicators comprise five distinct components; these are the parents, as the role of the parent as a motivator is centered on the emotional support, they offer to enhance their children's learning experiences. The objective is to inspire and support children in achieving excellence in mathematics. This indicator focuses on parents' role in providing necessary resources for their children to effectively learn mathematics. This task entails providing access to a suitable study environment, pertinent reference materials, and potentially library resources. The parent assumes the role of monitoring their children's mathematical progress and involvement at home. They engage in monitoring their learning activities and provide guidance as needed. The role of parents as mathematics content advisors involves providing advice and insights to their children on specific mathematical concepts. Tutors can provide clarification on mathematical concepts and offer guidance on problem-solving strategies. The role of a parent as a mathematics learning counselor focuses on the parents' comprehension of their children's unique learning requirements, capabilities, and difficulties in the field of mathematics. They provide individualized assistance to aid their children in overcoming challenges and excelling in their mathematical endeavors.

The dependent variable, "academic achievement in math," is derived from Sanitchai and Thomas's research conducted in 2018. In their study, academic achievement is based on the students' perceptions of mathematics. It is associated with self-regulation, which implies that individuals who possess self-efficacy have a belief in their ability to complete a task or achieve a goal. It encompasses their confidence in themselves. The study uses self-perceived academic achievement to capture students' confidence and self-efficacy, which are important motivational factors influencing learning behavior. While standardized assessments like PISA show low regional performance, students' high self-ratings reveal how they perceive their capabilities. This approach offers information about learners' internal motivation and belief in their competence, which objective scores alone cannot measure. Acknowledging this difference helps clarify that self-perception reflects psychological readiness rather than actual proficiency, emphasizing the need to align confidence with measurable learning outcomes.

The mediating variable in this study, proposed by Sanchal (2017), is "students' attitude toward mathematics." This variable is crucial for understanding students' perception and engagement with mathematics. It includes three essential indicators. The confidence in mathematics indicator measures students' self-assurance and belief in their mathematical abilities. The concept of a growth mindset is also included, which pertains to students' willingness to persist, take risks, and rely on their abilities when faced with mathematical challenges. The importance of mathematics is examined through students' perspectives on its relevance in their everyday lives. The assessment evaluates students' recognition of the significant role of mathematics in their daily lives, highlighting its relevance and practicality beyond the confines of the classroom. Mathematics Engagement assesses the level of active student involvement in mathematical tasks and activities. The objective is to evaluate students' level of engagement and connection with the realm of numbers and mathematical concepts.

Although previous studies have provided valuable information about the separate components, there is still a significant gap in integrating these factors into a cohesive framework. There has been attention given to parental involvement and support in education; there remains a lack of understanding regarding the specific roles that parents play in relation to mathematics education. Previous research has primarily examined parental involvement in a general sense, overlooking the specific roles that parents may play in the context of mathematics education. Furthermore, prior research has extensively explored the correlation between students' attitudes towards mathematics and their academic achievement. Further investigation is required to examine the various aspects of attitudes, including confidence, importance, and engagement in mathematics, and their combined impact on academic achievement in math. This study involves a comprehensive evaluation of attitudes that surpasses a one-dimensional perspective. Examining the various students' attitudes within the mediating framework, such as confidence, importance, and engagement in mathematics are essential for obtaining a comprehensive understanding.

Moreover, the research gap in examining parental roles as perceived by students and their views on academic achievement in mathematics, mediated by student attitudes, is evident in several critical areas. Research frequently emphasizes parental roles from the viewpoint of the parent. There exists a significant gap in understanding students' perceptions of the roles of parents and the alignment of these perceptions with the actual

roles. This gap is significant, as student perceptions, rather than solely objective parental actions, directly affect their attitudes and academic achievement. This study evaluates students' academic achievement through their perceptions, distinguishing it from most research that relies on math test scores and grades. The necessity for the present study arises from the persistent low performance in mathematics, despite various programs, interventions, and strategies implemented by educational institutions. Acido et al. (2024) concluded in their study that the Philippine PISA results from 2018 and 2022 in mathematics, reading, and science have not made any educational progress and are significantly lower than the average score of all countries. Consequently, there is an immediate need to conduct the study.

Specifically, this study aimed to investigate the mediating impact of students' attitude in mathematics on the relationship between parental roles and students' academic achievement in mathematics of the secondary students in Davao City. Consequently, the ensuing objectives were meant to be achieved. Initially, to know the level of parental roles as perceived by the students in terms of motivator, monitor, resource provider, content advisor and learning counselor. Secondly, to know the level of students' academic achievement in mathematics in terms of their perceptions. Thirdly, to assess the level of students' attitude in mathematics. Fourthly, to determine the significant relationship between: parental roles and attitude in math; attitude in math and academic achievement; and parental roles and academic achievement. And finally, whether there is a significant mediating effect of students' attitude on the relationship between parental roles and academic achievement in Mathematics is significant.

These null hypotheses were formulated and analyzed at a significance level of 0.05: there is no significant relationship between parental roles, students' academic achievement in mathematics, and students' attitude in mathematics, and students' attitude; and there has no significant mediating effect on the relationship between parental roles and the academic achievement in mathematics.

This study corresponds with Sustainable Development Goal No. 4 (Quality Education) by investigating the correlation among parental roles, students' attitudes, and mathematical academic performance. It stresses the importance of family involvement in efficient educational systems, asserting that education is a shared responsibility among teachers, parents, and communities. The study highlights the substantial impact of parental attitudes and roles, including those of motivators and mentors, on students' academic achievement, especially in mathematics. Affirmative parental attitudes towards mathematics enhance children's confidence, perseverance, and curiosity, which are vital attributes for the acquisition of knowledge and skills. The study ultimately supports the incorporation of family-oriented educational methods to improve mathematical academic achievement and promote comprehensive learner development.

In addition, this study offers significant insights for educators and policymakers focused on enhancing instructional practices and institutional policies related to equity and inclusion. By recognizing and utilizing the numerous forms of cultural, emotional, and academic capital that parents provide for their children's education, schools can create pedagogical approaches suited to varied student requirements. This inclusive methodology promotes active engagement in education and academic advancement for all learners, regardless of their socioeconomic or cultural backgrounds.

Furthermore, the research emphasizes the necessity of augmenting the quantity of skilled educators via focused professional development and capacity-building programs. It underscores the significance of parental participation as a crucial component of effective pedagogy, indicating that educators who actively engage parents as learning partners can fortify the school-home connection, hence improving student engagement and performance in mathematics.

Ultimately, this study supports the goal of SDG no. 4 (Quality Education) by calling for a comprehensive and cooperative approach to education that brings together the work of families, teachers, and schools. It proposes a framework for long-term improvements in the quality of math education and lifelong learning by giving evidence-based insights and suggestions. By integrating parental involvement into the broader educational ecosystem, this research enhances individual student outcomes and contributes to the long-term goal of building more equitable, empowered, and knowledge-driven societies.

METHOD

This section presents the methodologies and procedures used in the study's conduct. It highlights the discussion about the research respondents, materials, and instruments, as well as the design and procedure.

Research Respondents

The respondents of the study were the grade 8 secondary students among six public high schools distributed evenly from the first to the third congressional districts of Davao City. The study included two public high schools from the first district, two from the second district, and two from the third district. According to NEDA Region XI, on their website, Davao City had a total land area of 2,444 sq. km., making it the largest city in the Philippines in terms of land area. It was divided into three congressional districts. Poblacion and Talomo Districts comprise District I, while Congressional District II was composed of the following administrative districts, namely: Agdao, Buhangin, Bunawan, and Paquibato. District III includes Toril, Tugbok, Calinan, Baguio, and Marilog. Grade 8 learners were specifically chosen for this study, as they were at a pivotal point in junior high school, shifting from basic arithmetic to complex areas like algebra, geometry, and problem-solving. This transition facilitated the development of higher-order thinking skills and a profound understanding of mathematics, affecting their academic confidence and attitudes. They were acclimated to the high school environment. This intermediate status rendered them particularly influenced by external factors, especially parental support. Thus, studying this cohort offered crucial insights into the interplay between parental roles and students' attitudes in relation to academic performance in mathematics, making Grade 8 an appropriate selection for examining these dynamics during this developmental and educational transition.

Among the 2,428 students, there were 332 student respondents in this study. The sample size was determined using the Raosoft application. After getting the sample size, the stratified random sampling technique was employed among the six public high schools. Stratified random sampling was a statistical technique used in research and data collection to ensure the representativeness of the selected sample in relation to the entire population being studied. This method involved dividing the population into subgroups or strata based on specific characteristics or attributes that were of interest to the researcher.

Additionally, the study was conducted in the first quarter of the school year (2024-2025). When selecting the participants for the study, the researcher took into account the predetermined criteria for inclusion and exclusion. Non-discriminatory in age and gender, the research respondents consisted of regular eighth-grade students attending those selected public national high schools. Their knowledge enabled them to furnish valuable data that was utilized to examine the study's hypothesis.

This study included students who were minors and officially enrolled in the selected school, provided that their parents or legal guardians gave an informed consent letter for their participation. Furthermore, only those students who personally gave their assent form and voluntarily agreed to take part in the research were included. Students whose parents or guardians did not consent, those who refused assent, and those who chose not to participate were excluded from the study. Additionally, any participant who withdrew consent or discontinued participation at any stage of the research was also excluded, ensuring that involvement in the study remained entirely voluntary and ethically sound.

Materials and Instrument

Primary data of parental roles, pupils' academic achievement in mathematics, and students' attitudes were utilized in the study's data collection, which was divided into three phases. The study utilized survey questions sourced from numerous relevant studies. Revision had been implemented to enhance the instrument's relevance to the current environment. In order to enhance the instrument, it underwent validation by five experts who assigned it a grade of 4.0, which corresponds to a descriptive equivalent of "very good."

Experts on the preparation of questionnaires evaluated three sets of questionnaires that were taken from various studies as well. The experts' opinions were duly considered and included in the finalization of the aforementioned instrument. The standardized questionnaire that was implemented demonstrated content validity. The researcher

had already tested and verified them during the process of modifying them to categorize the queries. With the assistance of knowledgeable validators, the questionnaire was created in a highly detailed format to make it easy and comfortable for the respondents to answer each question and comprehend the goal of the study.

The first section of the instrument focused on the students' perceptions of parental roles. The study employed the adapted survey questionnaire from Cai, Moyer, and Wang's (1999) study, Parental Roles in Students' Learning of Mathematics: An Exploratory Study. In 1996, they developed a Parental Involvement Questionnaire (PIQ) to assess the level of parental involvement in the students' learning of mathematics. It had the following indicators: parents as motivators, parents as monitors, parents as resource providers, parents as content advisers, and parents as learning counselors. Pilot testing was done, and the reliability of the scales was established using the Cronbach alpha coefficient with a mean of 2.70, SD of 0.708, and a Cronbach alpha of 0.932 with a remark of very high reliability. The respondents will answer the 25 items, 5 items in each of the 5 domains.

The academic achievement questionnaire was adapted and modified based on the research conducted by Sanitchai and Thomas (2018) regarding the relationship between active learning and academic achievement among provincial university students in Thailand. The instrument measuring academic achievement was originally developed for university students in Thailand; however, its adaptation was deemed appropriate because the core dimensions it assessed such as self-perceived competence, effort, and performance in academic tasks are applicable across educational levels. The items were carefully reviewed and simplified to align with the cognitive, linguistic, and developmental characteristics of junior high school students. Furthermore, cultural and contextual modifications were made to reflect the local educational environment, ensuring that the questions were meaningful and comprehensible to Filipino learners. The reliability of the instrument was measured through pilot testing with a mean of 3.81, an SD of 0.704, and a Cronbach alpha of 0.884, with a remark of "very high reliability," supporting the adapted instrument's suitability for this population. Thus, the adaptation process was guided by both theoretical relevance and empirical validation, ensuring cross-cultural and developmental appropriateness. The assessment consists of 10 statements designed to evaluate the level of mathematical academic achievement as perceived by the students. The reliability of the instrument was measured through pilot testing with a mean of 3.81, an SD of 0.704, and a Cronbach's alpha of 0.884, with a remark of "very high reliability."

The final aspect pertains to students' attitudes toward mathematics, as evidenced by their confidence in mathematics, importance of mathematics, and engagement in mathematics. This adapted-modified questionnaire is based on the research conducted by Sanchal and Sharma (2017) regarding students' attitudes towards learning mathematics in a sporting context. It utilizes the attitude questionnaire developed by Martha (1996) for the investigation of 'The Attitudes toward Mathematics Instrument.' It consists of 15 statements, with 5 for each indicator.

The respondents answered the questionnaire items for the three variables parental roles, students' attitudes toward mathematics, and mathematics academic achievement using a five-point Likert scale ranging from 1 to 5. A uniform interpretation scale was applied to ensure consistency in evaluating all variables. The range of means and their corresponding descriptions are as follows: 4.20–5.00, interpreted as Very High, indicating that the measures are always observed, practiced, or manifested by the students; 3.40–4.19, interpreted as High, meaning the measures are often observed, practiced, or manifested; 2.60–3.39, interpreted as Moderate, signifying that the measures are sometimes observed, practiced, or manifested; 1.80–2.59, interpreted as Low, meaning the measures are seldom observed, practiced, or manifested; and 1.00–1.79, interpreted as Very Low, which indicates that the measures are never observed, practiced, or manifested by the students. This unified interpretation scale ensured a consistent and objective basis for analyzing and comparing the responses across the three study variables. The study covered the period from June 2023 to October 2025.

Design and Procedure

This study employed a quantitative descriptive-correlational research design to explore the relationships among various variables linked to mathematics education. This design enabled the researcher to describe existing conditions and analyze the degree of association between variables without manipulation. According to Creswell and Creswell (2018), such a design identifies relationships among measurable variables using numerical data.

Shuttleworth (2014) clarifies that correlational research aims to determine if variables are related, without claiming causation. This study's descriptive aspect summarized respondents' levels in each variable, while the correlational aspect assessed the strength and direction of their interrelationships. Cohen, Manion, and Morrison (2018) said that correlational research was especially useful in education for developing empirical foundations that help with policy making, curriculum design, and improving instruction.

Moreover, in analyzing the data statistically, applying appropriate statistical tools to test hypotheses, analyze relationships, and draw inferences was important. In this research, the statistical tools used mean and standard deviation in finding the level of parental roles as perceived by the student, the level of students' perceived academic achievement in mathematics, and the level of students' attitude in mathematics. In finding the correlation on the relationship between parental roles and students' attitude in mathematics, the correlation on the relationship between the attitude and academic achievement of students in mathematics, and the correlation on the relationship between parental roles and academic achievement in mathematics of students, Pearson Product Moment Correlation (Pearson r) was used. And mediation analysis using the Sobel z -test was initially used to determine the mediating effect of students' attitude on the relationship between parental roles and academic achievement in mathematics.

Moreover, in analyzing the data statistically, applying appropriate statistical tools to test hypotheses, analyze relationships, and draw inferences was important. In this research, the statistical tools used mean and standard deviation in finding the level of parental roles as perceived by the student, the level of students' perceived academic achievement in mathematics, and the level of students' attitude in mathematics. In finding the correlation on the relationship between parental roles and students' attitude in mathematics, the correlation on the relationship between the attitude and academic achievement of students in mathematics, and the correlation on the relationship between parental roles and academic achievement in mathematics of students, Pearson Product Moment Correlation (Pearson r) was used. Initially, mediation analysis using the Sobel z -test was conducted to determine how students' attitudes mediate the relationship between parental roles and academic achievement in mathematics. The procedures for data collection were as follows. A formal letter to the validators requesting permission to conduct a comprehensive review of the questionnaire and seeking their approval. Following the validation of the questionnaire, the researcher submitted her study to the University of Mindanao Ethics Review Committee (UMERC) for verification of ethical compliance. After gaining UMERC approval, the researcher conducted a pilot test of the questionnaire to evaluate its validity. Then, the researcher submitted a formal letter to the Schools Division Superintendent of the Department of Education, granting authorization for the study. The researcher communicated with cluster heads and school administrators to seek permission to conduct the Grade 8 student study in their institutions. The researcher collected the total population and sections of grade 8 students from each school to determine the sample size. The researcher provided instructions to the teachers facilitating the study. Ongoing communication with the supervising teacher was essential for ensuring a smooth execution of the survey. Finally, the retrieval of questionnaires was completed.

Ethical considerations were paramount in the execution of research studies, ensuring the protection of participants, the integrity of the research process, and the credibility of findings. The researcher adhered strictly to ethical principles and guidelines set forth by the University of Mindanao Ethical Review Committee (UMERC), particularly concerning population management and data integrity. To prevent issues of plagiarism, Turnitin was utilized to ensure originality and proper citation, thereby upholding academic honesty. The researcher was committed to honesty, ensuring that conclusions are drawn from reliable studies rather than personal bias. Key ethical components included the management of data accuracy and avoiding fabrication or falsification, which could compromise study validity. The researcher emphasized transparency, proper data management, and rigorous documentation to maintain trust in the results obtained. Moreover, there were no conflicts of interest present, ensuring that respondent data was unaffected by any biases due to the researcher's role as a primary-level educator. The researcher was honest and transparent, providing respondents with accurate and complete information. Additionally, significant contributions from advisory figures were acknowledged appropriately. The research particularly aimed to benefit teachers, parents of high school students, guidance counselors, and education administrators by providing knowledge about parental roles in academic achievement in mathematics. The study was designed not to present high-risk situations for respondents, minimizing potential distress. Should any risk arise, measures were implemented to mitigate harm. Safeguards were in place for

confidentiality, ensuring that respondents' identities remain anonymous and personal data secure, adhering to the Data Privacy Act of 2012. Respondents' personal information was kept safe, and data will be retained securely for at least five years post-publication. Ultimately, the researcher aimed to foster an environment of trust and respect for participant privacy while providing substantial contributions to future research and educational practices.

RESULTS AND DISCUSSION

This section introduces the results and discussion of a research study that analyzes the mediating impact of students' attitudes on the relationship between parental roles and students' academic achievement in the field of mathematics. It begins by presenting the level of parental roles as perceived by the students. This is followed by the students' perceived level of academic achievement in mathematics and their attitude towards it. Next, we establish the relationship between parental roles and math attitude, the relationship between math attitude and academic achievement, and the relationship between parental roles and academic achievement. Finally, the mediating effect of students' attitude on the relationship between parental roles and academic achievement in math.

Parental Roles

Table 1 displays the average scores for the indicators of parental roles as perceived by the students, showing an overall mean of 3.35, which is described as moderate, and a standard deviation of 0.730. This was measured on the level of parental roles as perceived by the students and was sometimes observed. It was gleaned from the data that the indicator with the highest mean rating of 3.87, with a registered standard deviation of 0.758, considered high, was parents as motivators. The lowest mean of 2.72 was parents as monitors and had a standard deviation of 0.966, which was considered moderate; it may be attributed to developmental and contextual factors. As adolescents seek greater independence, they may perceive less need for parental supervision, viewing monitoring as restrictive rather than supportive. Cultural and socioeconomic factors in Davao City may also limit parents' ability to closely monitor their children due to work or other responsibilities. Differentiating these roles highlights that while motivation is positively perceived, effective monitoring remains crucial for sustaining students' academic success.

Table 1 Level of Parental Roles of the Students

INDICATORS	SD	Mean	Descriptive Level
Motivator	0.758	3.87	High
Monitor	0.966	2.72	Moderate
Resource Provider	0.86	3.33	Moderate
Content Advisor	0.864	3.36	Moderate
Learning Counselor	0.899	3.45	High
Overall	0.73	3.35	Moderate

The results indicated that the parents had individual differences. Diverse backgrounds and experiences among students resulted in differing perceptions of the role of parents. Some students may experience varying levels of parental support in their education, with some perceiving their parents as highly engaged and others as less so. Parental roles may fluctuate based on the age and developmental stage of the student. As students mature, they generally exhibit increased independence, leading to a natural reduction in parental support.

This finding is supported by the study of Raja et al. (2023), based on their findings that the importance of parental involvement in a child's education has been repeatedly demonstrated to have a beneficial effect on the "academic achievement, behavior, and attendance of students, as well as their social and emotional growth and long-term

consequences. And also supported by the study of Padilla et al. (2023), cited in their study, is that the role of parents in education is such that, in addition to being a critical indicator of educational quality, it is valued as an essential element to advance the fulfillment of educational effectiveness and improvement.

Students' Academic Achievement in Mathematics

The second research objective was to know the level of students' academic achievement in mathematics in terms of their perceptions. As shown in table 2, computations yielded an overall mean score of 0.658 and a standard deviation of 3.91.

The results indicated that all statements regarding students' perceived achievement were rated as high. The data suggested that students generally perceive their academic achievement in mathematics as high or often observed. The mean scores for all items related to perceived achievement fall within the "High" range (3.47 - 4.19) on the 5-point Likert scale. The indicator who had the highest mean score of 4.19 and the standard deviation of 0.927 was learning to answer math problems, which is important for students. In contrast, the statement with the lowest mean indicated that students are confident they can perform well on math tests, with a mean score of 3.47 and a standard deviation of 1.058, which is considered high.

The standard deviation values presented in Table 2 indicated the degree of variation in students' responses concerning their perceived academic achievement in mathematics. Several items yielded standard deviations greater than 1.0, suggesting that students' perceptions varied considerably across those indicators. This implied that while many students expressed positive views toward their performance in mathematics, others demonstrated less favorable perceptions, reflecting differences in confidence, motivation, or learning experiences. A higher SD denoted greater variability and less agreement among the respondents. Conversely, the overall standard deviation of 1.011 indicated a high degree of variability in students' perceptions of their academic achievement in mathematics. This suggested that the respondents did not have uniform experiences or confidence levels in their mathematical performance. While the overall mean may indicate a generally positive or high perception, the relatively large SD revealed that some students rated themselves much higher or lower than others. This variability implied that there were distinct differences in students' understanding, engagement, and confidence in mathematics, which may be influenced by factors such as individual ability, learning attitudes, or parental and instructional support.

Table 2 Level of Students' perceived Academic Achievement in Mathematics

STATEMENTS	SD	Mean	Descriptive Level
The student can understand the math lesson, no matter how hard or how easy it is.	1.049	3.59	High
The student is happy with his/her math class when he/she does get a good grade on a test.	1.007	4.16	High
The student is confident that he/she can do well on math tests.	1.058	3.47	High
It is important for the student to be able to meet his/her own interests while he/she is learning math.	0.942	3.89	High
Learning to answer math problems is important for the student.	0.927	4.19	High
Learning mathematics challenge the student mind, which is why he/she does believe it is important.	0.964	3.94	High
Because the student can use math in his/her everyday life, she/he does believe that understanding it is important.	1.017	3.98	High
The student is satisfied when sure that he/she does understand what his/her teacher discusses about during math class.	1.021	3.92	High
When the student is able to answer a difficult question in mathematics, he/she experience the deepest kind of happiness.	1.100	3.92	High
The student does feel best when the math teacher accepts his/her ideas.	1.028	4.04	High
Overall	1.011	3.91	High

The findings indicated that students generally view themselves as competent and successful in mathematics, reflecting a high degree of confidence and positive self-assessment for their performance in the field. This perception was ascribed to conducive learning environments, efficient pedagogical methods, and active parental engagement, which foster a sense of achievement among pupils. The foremost evidence was students' acknowledgment of the significance of mastering mathematical problem-solving, demonstrating their comprehension of mathematics as a vital competency for academic achievement and practical use. A marginally diminished confidence in math test performance indicated that certain students may encounter worry or self-doubt during evaluations. Therefore, educators must cultivate and augment students' confidence through affirmative feedback, interactive instructional strategies, and opportunities for achievement in mathematical assignments. By establishing a balanced educational atmosphere that provides both challenges and support, educators can transform students' perceived ability into robust and consistent academic achievement in mathematics.

It was supported by some studies such as by Cabuquin et al. (2023) concluded in their study that high school learners who were proficient in mathematics tend to succeed and perform better in their academic courses while low mathematics performer learners tend to experience difficulties in their overall academic achievement. In addition, Hagan et al. (2020) recommended in their study that students' positive perception towards Mathematics must be sustained and improved by teachers and headmasters. The interest of students should be heightened to ensure that they desire the study of Mathematics to improve their academic performance.

Students' Attitude in Mathematics

The third research objective was to assess the level of students' attitude in mathematics. Table 3 revealed the overall mean score of 3.71 with a verbal interpretation of high. It indicated that the level of students' attitude is often observed with a standard deviation of 0.644. Among the indicators, importance had the highest mean of 3.81 and a standard deviation of 0.742. The lowest mean was engagement, which had 3.57 and a standard deviation of 0.773.

Table 3
Level of Students' Attitude in Mathematics

INDICATORS Level	SD	Mean	Descriptive
Confidence	0.697	3.75	High
Importance	0.742	3.81	High
Engagement	0.773	3.57	High
Overall	0.644	3.71	High

The results suggested that students generally had a positive attitude towards mathematics. Students typically view themselves as proficient in mathematics, demonstrating confidence and favorable self-assessments influenced by nurturing educational settings and efficient teaching methodologies. The acknowledgment of mathematics' significance indicated that students appreciate the discipline for both academic achievement and practical application. A diminished confidence level during evaluations signifies possible nervousness. Moreover, pupils had a favorable disposition towards mathematics, perceiving it as crucial for future achievement. Robust engagement indicated that pedagogical methods foster interest and motivation; yet, ongoing assistance is essential to sustain this momentum.

The outcome of students' attitude highlighted the idea of Wakhata et al. (2022) stated that the students' positive attitude towards mathematics leads to better performance and may influence their overall achievement and application of mathematics in real-life. Furthermore, in the study Kiwanuka et al. (2020) cited that students with a positive attitude toward mathematics tend to enjoy the subject, understand its value, and have confidence in it; thus, they are likely to prioritize the study of mathematics.

The fourth research objective was to determine the significant relationship between parental roles and attitude in math, attitude in math and academic achievement, and parental roles and academic achievement.

Significance of the Relationship among the Parental Roles, Attitude and Academic Achievement of the Students

The correlation matrix shown in table 4 had an overall result of $r = 0.508$, which was significant at the 0.05 level as reflected by the p-value of 0.000. It meant a moderate correlation or substantial relationship between parental roles and student attitude towards mathematics.

The relationship between students' attitude and parental roles as learning counselor had the highest r-value of 0.480 with a p-value of 0.000 and in students' attitude in mathematics in terms of importance, with a correlation coefficient of 0.460. It had a moderate correlation. Meanwhile, there was a slight correlation, a definite but small relationship between students' attitude and parental roles as a monitor, with a correlation coefficient of 0.295 with a p-value of 0.000. Moreover, there was a moderate correlation, a substantial relationship between parental roles and students' attitude in mathematics in terms of engagement, having a correlation coefficient of 0.426 and a p-value of 0.000.

Table 4 Correlation Matrix on the Relationship between Parental Roles and Students' Attitude in Mathematics

Attitude in Mathematics	Parental Role					Overall
	Motivator	Monitor	Resource Provider	Content Advisor	Learning Counselor	
Confidence	0.396*	0.239*	0.394*	0.412*	0.443*	0.445*
Importance	0.417*	0.256*	0.404*	0.441*	0.431*	0.460*
Engagement	0.368*	0.275*	0.888*	0.394*	0.386*	0.426*
Overall	0.450*	0.295*	0.448*	0.476*	0.480*	0.508*

* P-value is significant @ $\alpha = 0.05$

It indicated that as parents increase their roles in their students' math education through encouragement, motivation, and support students tend to develop a more positive perspective on the subject. The effectiveness of parental monitoring and support varied with the student's age and maturity; strategies beneficial for younger students may not be effective for teenagers. Overall, the emphasis was on how parents who provide resources, guidance, and emotional support are likely to foster positive attitudes in their children towards mathematics.

The result agreed with the findings of the Cruz et al. (2022) study, which suggested that the greater the extent to which the parents practice their parental roles as motivators, monitors, mathematics content advisers, and learning counselors, the more favorable are the attitudes of their children towards mathematics as regards the benefits they derived from doing their lessons and activities in the subject. Furthermore, in the findings of Lachica (2024) study, he implied that parental involvement in learning mathematics is significantly related to the attitude of students towards the said subject.

Table 5 shows the correlation of the relationship between different aspects of students' attitudes towards mathematics and their academic achievement. It revealed a high correlation, or marked relationship, between overall aspects of attitude and the academic achievement of students in mathematics. The overall correlation coefficient is 0.783, with a significance level of 0.05 and a p-value of 0.000.

Table 5 Correlation Matrix on the Relationship between the Attitude and Academic Achievement of students in Mathematics

Attitude in Mathematics	Academic Achievement	
	r-value	p-value
Confidence	0.706*	(0.000)
Importance	0.708*	(0.000)
Engagement	0.640*	(0.000)
Overall	0.783*	(0.000)

* P-value is significant @ $\alpha = 0.05$

The highest correlation coefficient of 0.708 with a p-value of 0.000 was between students' attitude in terms of importance and academic achievement in mathematics, with an interpretation of moderate correlation and substantial relationship. In contrast, the lowest r-value of 6.40 with a p-value of 0.000 was found between students' attitudes regarding engagement and their academic achievement in mathematics, which is interpreted as a moderate correlation and substantial relationship.

It implied that students with an affinity for mathematics tend to engage more actively in class, pose questions, and seek assistance when necessary. Active engagement fostered deeper understanding and enhanced performance. A positive attitude towards mathematics was a strong predictor of academic achievement in the subject. Furthermore, fostering a positive attitude towards mathematics, particularly confidence, importance, and engagement, can significantly contribute to students' academic success in the subject.

The said result confirmed with the study of Hwang et al. (2021), they concluded in their findings that they emphasize the important role of attitude toward mathematics, which contributes to achieving high performance in the subject. As well as that, the study by Wakhata et al. (2022) stated that students' positive attitude towards mathematics leads to better performance and may influence their overall achievement and application of mathematics in real life.

The relationship between parental role and achievement in mathematics of students is shown in table 6. This revealed that there was a moderate correlation or substantial relationship with an overall computed r-value of 0.437 with a p-value of 0.000. The confidence level set for this study was a p-value of 0.05 level of significance. The relationship of parents as learning counselors and students'

Table 6 Correlation Matrix on the Relationship between Parental Roles and Academic Achievement in Mathematics of Students

	Parental Role				
	Motivator	Monitor	Resource Provider	Content Advisor	Learning Counselor
	r-value	r-value	r-value	r-value	r-value
Academic Achievement	0.413*	0.187*	0.393*	0.425*	0.440*
					0.437*

* P-value is significant @ $\alpha = 0.05$

math academic achievement, which had the highest correlational coefficient of 0.440, which had a moderate correlation. The lowest r-value of the relationship between parents as monitors and math academic achievement of students was 0.187 with a p-value of 0.000, with a very low correlation interpretation.

It indicated that parents who provide resources for their children's math learning tend to have children who perform better. This meant that as parental involvement in their child's math learning increases, students tend to achieve higher in the subject. Additionally, parental involvement in their child's math learning had a significant impact on their academic achievement. It highlighted the importance of parents playing multiple roles in supporting their children's math learning, from providing resources and guidance to offering emotional support and encouragement.

The findings were underpinned by the study of Utami (2022). It implied an academic success, as well as other good outcomes like better social and emotional skills and stronger self-esteem, have been proven to be positively correlated with parental involvement in a student's education, and also the study of Shimi et al. (2024) discussed that poor parental participation might have unfavorable effects. Learners who have disengaged or uninvolved parents may encounter it difficult to succeed academically because they lack academic assistance and supervision. In the end, parental participation shapes a child's attitude towards learning and academic performance by reinforcing the value of education and by providing necessary resources and encouragement.

Mediation Analysis

Table 7 presented the results of a mediation analysis, detailing the indirect, direct, and total effects of the independent variable on the dependent variable through the proposed mediator. The table included the estimated effect, standard error (SE), 95% confidence intervals (CIs), Z-value, and p-value for each effect.

Table 7 Mediation Analysis of the Three Variables

Effect	Label	Estimate	SE	95% Confidence Interval		Z	p
				Lower	Upper		
Indirect	$a \times b$	0.3465	0.0456	0.2577	0.440	7.61	<.001
Direct	c	0.0475	0.0445	-0.0388	0.138	1.07	0.286
Total	$c + a \times b$	0.3941	0.0647	0.2708	0.524	6.09	<.001

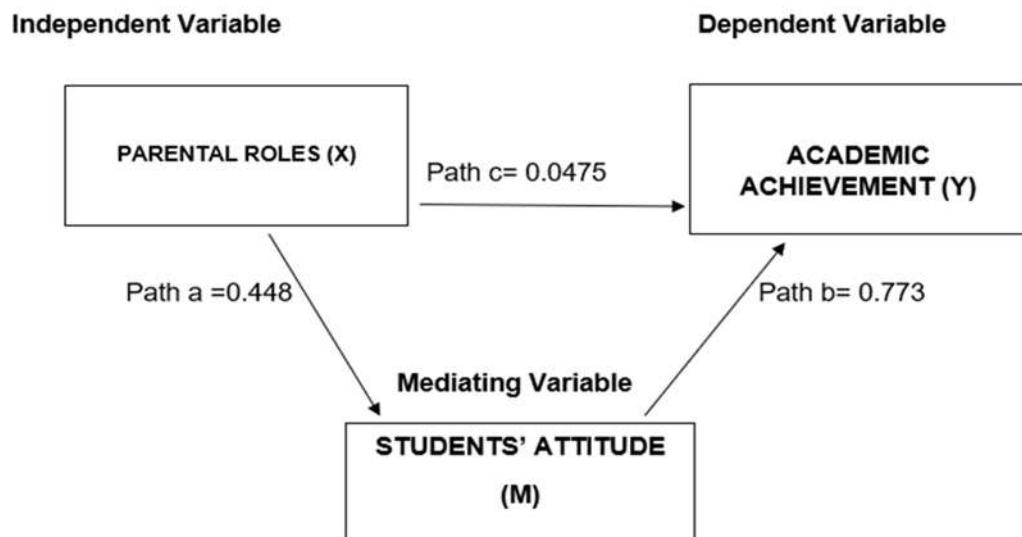
First, the indirect effect (labeled ' $a \times b$ ') was statistically significant ($b = 0.3465$, $SE = 0.0456$, 95% CI [0.2577, 0.440], $Z = 7.61$, $p < .001$). The positive indirect effect indicated that the independent variable significantly influences the dependent variable through its effect on the mediator. Specifically, for every one-unit increase in the independent variable, the dependent variable was estimated to increase by 0.3465 units via the mediator. The 95% confidence interval for the indirect effect does not include zero, further confirming its statistical significance and supporting the presence of a mediating effect.

Second, the direct effect (labeled ' c ') was not statistically significant ($b=0.0475$, $SE = 0.0445$, 95% CI [-0.0388, 0.138], $Z = 1.07$, $p = .286$). The 95% confidence interval for the direct effect includes zero, and the p-value of .286 is greater than the conventional alpha level of .05. This finding suggests that, once the mediating variable is accounted for, there is no statistically significant direct relationship between the independent variable and the dependent variable.

Finally, the total effect (labeled ' $c + a \times b$ ') was statistically significant ($b = 0.3941$, $SE = 0.0647$, 95% CI [0.2708, 0.524], $Z = 6.09$, $p < .001$). This indicates a significant overall relationship between the independent and dependent variables when the mediator is not considered. The total effect is the sum of the direct and indirect effects, and its significance further supports the overall model.

The mediation analysis implies that parental involvement affects students' academic achievement indirectly through their attitudes toward mathematics. The significant indirect effect ($b = 0.3465$, $p < .001$) and the non-significant direct effect ($b = 0.0475$, $p = .286$) confirm full mediation. This means that parental involvement enhances achievement primarily by fostering positive attitudes, motivation, and confidence in students. Strengthening parental engagement that supports students' attitudes is therefore essential in improving mathematics learning outcomes.

Figure 2 Mediation Analysis results (point effect)



Note: $a * b$ = direct effect; c = direct effect

This finding was supported in the study of Asare et al. (2024), which had results indicating a statistically significant correlation between parental participation and mathematical achievement. As well as the Tang et al. (2023) study, the findings showed that parents' expectations and involvement boost their children's mathematics achievement. Past research (Gordon et al., 2012; Wilder, 2014, as cited in Tang et al., 2023) indicated that parents' involvement and expectations regarding students' education are significantly positive influences on their students' learning results, especially their mathematical performance.

In summary, these findings suggested a full mediation model. The independent variable had a significant total effect on the dependent variable, and this effect was fully explained by the mediator, as evidenced by the significant indirect effect and the non-significant direct effect. This implied that the independent variable's influence on the dependent variable operates primarily, if not exclusively, through its impact on the mediating variable. Researchers should consider the implications of this mediation for theoretical understanding and practical interventions, focusing on the role of the mediator in the causal pathway.

CONCLUSION

Based on the findings of the study, the researcher derives the following conclusions that summarize the key results and highlight the significant relationships among the variables investigated. These conclusions provide a deeper understanding of the factors influencing students' academic achievement in mathematics and serve as a basis for formulating appropriate recommendations and educational interventions.

The level of parental roles was moderate. This variation may be due to differences in students' backgrounds, developmental stages, and subject-specific perceptions of parental support. Some students may experience highly engaged parents, while others may not, and such involvement often fluctuates with age and developmental stage. As students mature, increased independence may naturally reduce parental participation. Additionally, the level of students' academic achievement in mathematics was high, which may be attributed to positive learning experiences created by supportive teachers, engaging curricula, and encouraging parents who foster a conducive home learning environment. Such support helps build students' confidence and self-efficacy, enabling them to

approach mathematical challenges with resilience and a sense of accomplishment. As well as students demonstrated a high level of attitude toward mathematics, which can be influenced by factors such as teacher quality, peer relationships, personal interest. Parents who express high regard for mathematics and encourage curiosity from an early age can positively shape their children's attitudes toward the subject.

Moreover, a moderate relationship existed between parental roles and students' attitudes toward mathematics, suggesting that parental influence interacts with other environmental and personal factors such as teacher effectiveness and peer relationships. Therefore, collaboration between parents and educators is essential. Meanwhile, a high correlation was observed between students' attitudes and their academic achievement in mathematics, indicating that positive attitudes toward the subject enhance motivation, confidence, and performance. Students who maintain a positive outlook toward mathematics tend to be more motivated, persistent, and confident, resulting in improved performance. Lastly, the study revealed a moderate positive correlation between the parental role and students' academic achievement in mathematics. This indicates that while parental involvement contributes meaningfully to students' performance, it is not the sole determinant of their achievement. Yet other factors such as students' attitudes, teacher effectiveness, and learning environment also play significant roles in shaping their academic success.

The study further revealed that students' attitudes mediate the relationship between parental roles and academic achievement, highlighting that parents influence their children's success not only through direct support but also by shaping their learning attitudes.

RECOMMEDATION

Based on the conclusions derived from the findings of this study, the following recommendations are hereby presented to enhance parental roles and students' attitude as well as to promote the academic achievement of students in mathematics.

It is recommended to enhance the role of parents in terms of monitoring their students, the schools strengthen programs that encourage parents to take an active monitoring role in their children's academic progress. This may be achieved by conducting regular parent-teacher conferences, orientation sessions, and training workshops that emphasize effective monitoring strategies, such as setting academic goals, tracking homework and assessment performance, and providing consistent feedback and motivation. There should be continuity and sustainability in educational programs and projects, particularly those aimed at supporting students and parents. Schools may also utilize digital platforms or communication tools to keep parents informed of their children's academic standing and classroom activities. By fostering open communication and collaboration between parents and teachers, parents can be better guided and empowered to effectively monitor and support their children's learning.

Additionally, to improve the confident of students that he/she can do well on math test. It is advised that teachers implement strategies that strengthen students' confidence in mathematics, such as providing positive feedback, recognizing progress, and offering engaging problem-solving activities to enhance their academic achievement in the subject. Moreover, to intensify the students' attitude in terms of engagement toward academic achievement in math, It is suggested that teachers employ innovative and student-centered instructional approaches that promote active engagement and a positive attitude toward learning mathematics. Strategies such as collaborative problem-solving, use of educational technology, and application of math concepts to real-life situations can increase students' interest and participation. Furthermore, providing opportunities for interactive learning and recognizing students' efforts can help sustain their motivation and enhance their academic achievement in mathematics.

Moreover, it is suggested that parents actively monitor their children's learning progress in mathematics by providing guidance, tracking performance, and offering encouragement during study and assessment preparation. Strengthening the monitoring role of parents can help build students' confidence in their mathematical abilities, as consistent support and feedback from parents foster a sense of accountability and self-assurance that contributes to improved academic achievement.

Finally, for future researchers, this study urges Conduct further studies to explore other mediating or moderating factors such as motivation, peer influence, and school climate that may affect the relationship between parental roles and academic achievement.

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