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THE MODERATING EFFECT OF INSTRUCTIONAL PRACTICES ON THE RELATIONSHIP BETWEEN MATHEMATICS ATTITUDE AND ANXIETY OF GRADE 9 STUDENTS

Lian C. Antoniano, LPT[1], Daphne M. Legaspino, LPT, Ph.D.[2]
[1]*St. Mary's College of Tagum, Inc., National Highway, Tagum City, 8100, Philippines*
[2]*St. Mary's College of Tagum, Inc., National Highway, Tagum City, 8100, Philippines*

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ABSTRACT
This study aspired to determine the moderating effect of instructional practices on the relationship between mathematics attitude and anxiety of students of Grade 9 students. The quantitative design utilizing descriptive and correlational methods were used in the study. The respondents of the study were 207 grade 9 students at selected schools in Santo Tomas, Davao del Norte of S.Y. 2025-2026. Mean, Standard Deviation, Pearson-r and Hierarchical Regression Analysis were used in interpreting the data gathered. Findings were, levels of mathematics attitude, mathematics anxiety, and instructional practices are all high. Also, it was found that there is a significant relationship between mathematics attitude and mathematics anxiety among the respondents. Furthermore, instructional practices of teachers do not significantly moderate the relationship between mathematics attitude and mathematics anxiety among the respondents. Based on the findings, it would serve as basis for DepEd as well as other organizations for strengthening policies and programs that address students' emotional and psychological experiences in learning mathematics that help positive mathematics attitude and eventually improved mathematics performance and confidence among students

KEYWORDS: *mathematics, education, instructional practices, mathematics attitude, mathematics anxiety*

INTRODUCTION
Mathematics anxiety has become one of the perennial problems in the education system as it gives students the fear to engage in the said subject and be successful. Because of it, many students tend to avoid the subject as they also feel hopeless. In fact, a lot of them resolve into using AI tools when solving math problems just to pass the subject (Zhang, 2022). Aside from that, mathematics anxiety can also give students a hard time to understand the lessons that makes them less motivated in participating to the class, or worse attending classes (Agnes & Mathew, 2019). According to Salazar (2025), mathematics anxiety disrupt the ability of the students to recall concepts and participate skilfully in mathematics classes that may result to academic withdrawal and school dropout. Globally, mathematics anxiety has become an educational concern affecting learners across different countries. An increasing numbers of students around the world experience mathematics anxiety, particularly among high school learners Luu-Thi et al. (2021). Furthermore, a research by Wang et al. (2025) highlighted that mathematics anxiety is a prevailing constraint to academic progress and quality of educational systems worldwide.

In Philippines, Aleguen (2023) revealed that the level of mathematics anxiety has been rising in recent years, making it one of the major problems when it comes to difficulties in the said subject. Similarly, a research study by Quintana (2024) was conducted and proved that mathematics anxiety is a primary contributor not only to the students' poor academic performance but also the evidently increasing rates of absenteeism and dropouts among high school students. Apparently, this educational predicament is true among schools in the Division of Davao del Norte, as Caputol and Chan (2024) revealed that mathematics anxiety is a prevailing challenge especially among high school students that detrimentally affects their academic performance and self-confidence. Hence, it a challenge for the teachers to implement appropriate and effective research-based insights on different instructional practices that mold classroom instruction into inter-active and conducive learning environment that would boast mathematics attitude of the students. Hereby, providing essential interventions to deliver more effective learning experiences to the students and mitigate the level of math anxiety.

OBJECTIVES
1. To determine the level of mathematics attitude of grade 9 students in terms of: (i)enjoyment of mathematics; (ii)motivation to do mathematics; (iii)self-confidence in mathematics; and (iv) perceived value of mathematics.
2. To determine the level of mathematics anxiety of grade 9 students in terms of: (i) test anxiety; (ii) subject anxiety; (iii) physical anxiety; (iv) off-task behavior; and (v) social anxiety.
3. To determine the level of instructional practices of the teachers in terms of the following dimensions: (i) cognitive; (ii) interpersonal; and (iii) intrapersonal.
4. To ascertain the significant relationship between mathematics attitude and mathematics anxiety.
5. To investigate if instructional practices of teachers significantly moderate the relationship between mathematics attitude and mathematics anxiety of students.

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METHODOLOGY

The study employed the quantitative research design using both descriptive and correlational approaches. A quantitative study summarizes and analyzes numeric information to assess hypotheses and offer solutions to research issues (Singh, 2024). In quantitative research, the findings about the population were usually based on the collected data using a large sample size with the aid of statistical tools to analyze the gathered data.

The descriptive approach portrays the features of the phenomenon or the topic under investigation. It is a method used to describe the characteristics, behaviors, or conditions of a group using numerical data without manipulating any variables (Hassan, 2023). On the other hand, correlational research attempts to identify relationships between two or more. It studies whether a single variable goes up or down along with another variable (Hassan, 2023). It examines the relationship or association between two or more variables without manipulating them in order to determine whether changes in one variable are related to changes in another (Singh, 2024). It was used to define the relationship between the math attitude, math anxiety, and the instructional practices of teachers in the Division of Davao del Norte. Particularly, used in investigating the moderating effect of instructional practices of teachers on the relationship between mathematics attitude and mathematics anxiety

This study was conducted to selected schools in Santo Tomas Davao del Norte. There were 143 out of 571 students from School A, 21 out of 82 students from School B, 30 out of 120 students from School C, and 13 out of 49 students from school D. The questionnaires were distributed in accordance with permission by the school principal and instruction given by the mathematics teacher.

RESULTS

The result indicates that students generally possess a high mathematics attitude Thus, students exhibit high levels of enjoyment, confidence, and perceived value of mathematics. Meanwhile, the moderate mathematics attitude in terms of motivation to do mathematics indicates that students are somewhat motivated but not consistently driven to engage in mathematics tasks. The the overall high category mean indicates that Mathematics Attitude is evident to the students, which mean that a positive mathematics attitude is evident manifested in their learning experiences. Perceived Value of Mathematics has the highest mean followed by Self-confidence in Mathematics then Enjoyment of Mathematics and Motivation to do Mathematics as the lowest with a moderate level.

This is parallel to the study of Min Feng et al. (2025), indicating that positive learning experiences contribute to a favorable mathematics attitude.As Suren and Kandemir (2020) explained, that learners' motivation can manifest through a reasonable degree of willingness to engage in mathematical tasks and sustain effort when working on problems.

Furthermore, the result indicates that students generally experienced a high level of anxiety toward mathematics. This implies that many students may feel worried, nervous, or stressed when dealing with mathematics lessons, activities, and assessments. Students who feel anxious are more likely to avoid tasks, become distracted, or disengage from classroom activities. However, the moderate levels of physical and social anxiety indicate that some students experience discomfort when participating in class discussions or solving problems in front of peers, which may limit collaborative learning opportunities.

These findings are consistent with the ideas presented by Zhang (2022), who indicated that students may experience a high level of mathematics anxiety in learning situations involving mathematical tasks. It was further explained by Carmo et al. (2019) that mathematics anxiety is reflected in the feelings of tension, worry, and apprehension that learners encounter when dealing with mathematical activities. This perspective supports the observation of Agnes & Mathew (2019) that students can exhibit a high level of mathematics anxiety, suggesting that such emotional responses toward mathematics are strongly present among learners.

Moreover,This result indicates that teachers frequently demonstrate practices that promote positive relationships, communication, cooperation, and interaction among students during mathematics lessons. Teachers may be encouraging group work, discussions, participation, and collaborative learning activities that allow students to interact and learn from one another. This finding implies that the classroom environment supports social interaction and cooperation, which can help make learning more engaging and supportive for students.

These findings are parallel to ideas presented by Cevikbas & Kaiser (2022). indicated that students may demonstrate a high level of interpersonal engagement in mathematics classrooms with instructional practices that promote collaborative learning, peer discussion, and brainstorming on problem-solving. It was further explained by Francisco and Celon (2020) that interpersonal engagement is reflected in learners' ability to interact, communicate, and collaborate effectively with others during classroom activities. Similarly, a study of Mance-Avila and Guzon (2020) states that students can exhibit a high level of interpersonal engagement, suggesting that positive interactions and cooperative participation are strongly evident among learners.

Moreover, the statistical analysis revealed that there is a significant relationship between mathematics attitude and mathematics anxiety among the respondents. This implies that as students' positive attitude toward mathematics increases, their level of mathematics anxiety tends to decrease. Conversely, students who exhibit less favorable attitudes toward mathematics are more likely to experience higher levels of anxiety in the subject. The finding suggests that students' attitudes toward mathematics play a meaningful role in it relationship with their level of anxiety when dealing with mathematical tasks.

The finding that mathematics attitude significantly predicts mathematics anxiety is parallel to several recent studies. Hernandez de la Hera et al. (2023) reported that students'

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attitudes toward mathematics are highly correlated to anxiety, where high levels of positive attitudes toward mathematics tend to decrease anxiety levels. Similarly, C Rashaad Shabab (2024) emphasized that unfavorable perceptions of mathematics contribute to higher anxiety and lower engagement in mathematical tasks. Moreover, Alemany-Arrebola et al. (2025) explained that negative attitudes toward mathematics frequently manifest anxiety, highlighting the importance of developing positive attitudes to reduce mathematics anxiety.

Furthermore, instructional practices of teachers do not significantly moderate the relationship between mathematics attitude and mathematics anxiety among the respondents. However, not all instructional practices impact mathematics anxiety equally. While one dimension appears negligible, the other has a significant and meaningful influence. This statement is parallel to the ideas presented by Jameson et al. (2022), who suggest that instructional practices alone may not significantly change the relationship between mathematics attitude and mathematics anxiety unless students' confidence and emotional beliefs about mathematics are addressed.

Overall, mathematics attitude is a significant predictor of mathematics anxiety, which means positive attitudes reduce anxiety. While instructional practices do not significantly change the relationship between mathematics attitude and mathematics anxiety. In spite of a high level of instructional practices across cognitive, interpersonal, and intrapersonal dimensions, they do not automatically eliminate mathematics anxiety. Instructional quality is a strong factor, but mathematics anxiety is a multidimensional phenomenon influenced by cognitive ability, emotional history, beliefs, and environmental pressures. Therefore, reducing anxiety requires not only effective teaching but also psychological support, mindset development, and consistent positive learning experiences.

SUGGESTIONS

After a profound consideration on the possible implications of the findings and conclusion of this study, the researcher recommends in improving instructional approaches that intentionally foster positive mathematics attitudes among students, such as incorporating interactive activities, real-life applications of mathematical concepts, and supportive classroom discussions that encourage student participation. School administrators are encouraged to organize professional development programs, workshops, or training sessions that equip teachers with strategies for addressing students' mathematics anxiety and for promoting positive learning attitudes toward mathematics.

Furthermore, future researchers are recommended to further investigate other variables that may influence mathematics anxiety among students, such as self-efficacy, parental support, learning environment, or peer influence. They may also consider employing different research designs, larger sample sizes, or diverse educational contexts to provide a more comprehensive understanding of the factors affecting students' mathematics attitudes and anxiety

CONCLUSIONS

Based on the results of the research objectives, the researcher has come up with the conclusions; The high mathematics attitude among Grade 9 students indicate a positive attitude towards mathematics. However, while students show high interest and excitement in learning mathematics, a relatively moderate mathematics attitude in terms motivation to do mathematics signifies that students may participate in learning tasks but may not consistently exert full effort unless further encouraged. The findings also revealed high mathematics anxiety, implying that students experience anxiety which manifest a negative attitude toward the subject but may not intensely manifest discomfort and tension during math activities. Additionally, there is a high level of instructional practices of teachers. This indicates that mathematics teachers are actively facilitating learning, providing clear instructions and explanations. Moreover, there is a significant relationship between mathematics attitude and mathematics anxiety, which means mathematics attitude predict mathematics anxiety. Hence improving mathematics attitude reduces mathematics anxiety that would contribute better performance of the students. Meanwhile, instructional practices of teachers do not significantly moderate the relationship between mathematics attitude and anxiety. These findings indicate that the effort to reduce mathematics anxiety should not only focus solely on instructional practices but also on cultivating positive mathematics attitudes, self-confidence, and supportive learning environments that encourage students to develop a more favorable disposition toward mathematics.

TABLES AND REFERENCES

Table 1. Level of Mathematics Attitude of Grade 9 Students

Items	SD	Mean	Descriptive Equivalent
Enjoyment of Mathematics	1.10	3.52	High
Motivation to do Mathematics	1.08	3.27	Moderate
Self-confidence in Mathematics	1.05	3.73	High
Perceived Value of Mathematics	0.92	4.14	High
Overall Mean	1.07	3.73	High

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Table 2. Level of Mathematics Anxiety of Grade 9 Students

Items	SD	Mean	Descriptive Equivalent
Test Anxiety	1.23	3.50	High
Subject Anxiety	1.19	3.88	High
Physical Anxiety	1.29	2.96	Moderate
Off-Task Behavior	1.23	3.42	High
Social Anxiety	1.37	3.34	Moderate
Overall Mean	1.29	3.47	High

Table 3. Level of Instructional Practices of the Teachers

Items	SD	Mean	Descriptive Equivalent
Cognitive	0.94	3.64	High
Interpersonal	0.96	4.01	High
Intrapersonal	0.94	3.62	High
Overall Mean	0.95	3.99	High

Table 4 Significance of the Relationship Between Mathematics Attitude and Mathematics Anxiety

Variables Correlated	r - value	p-value	Decision on H_o	Decision on Relationship
Mathematics Attitude and Mathematics Anxiety	-0.224	0.001	Rejected	Significant

Table 5. Regression Analysis on the Moderating Effect of Instructional Practices of Teachers on the Relationship Between Mathematics Attitude and Mathematics Anxiety

	Estimate	SE	Z-value	P-value	Decision on Ho
Mathematics Attitude	-0.2571	0.0912	-2.818	0.005	Reject
Instructional Practices of Teachers	-0.0778	0.1196	-0.650	0.516	Fail to Reject
Interaction (IV*MV)	-0.2529	0.1909	-1.325	0.185	Fail to Reject

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