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ATTITUDINAL FACTORS AFFECTING STUDENTS' MATHEMATICAL PERFORMANCE TOWARDS CORRECTIVE ACTIONS

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Abstract

Attitudinal factors comprise values, beliefs, attitudes, and norms that influence an individual's predisposition to behave in an environmentally significant manner, as well as their actual behavior. These factors include self-confidence, interest, and motivation. Many students are considered underachievers in mathematics. Although they possess average or above-average intelligence, their actual performance in mathematics does not align with their intellectual capabilities.

This study seeks to uncover the attitudinal factors that contribute to underachievement in mathematics. A quantitative research design, utilizing the descriptive method, was used to determine the effect of attitudinal factors on the mathematical performance of Grade 10 students. The respondents of this study are 60 Grade 10 students from San Gregorio Integrated School, San Gregorio, Laurel, Batangas. Total population sampling was employed in selecting the respondents. The researcher employed a self-made questionnaire to assess students' attitudes toward mathematics, with their performance level determined by their final grades for the 2023-2024 school year. Using a Likert scale, the responses of Grade 10 students were analyzed to understand the effect of these attitudinal factors on their mathematics performance. A one-sample test identified the students' attitudes and performance levels, while linear regression analysis examined how these attitudes influenced their overall performance in mathematics.

Results showed that the students of San Gregorio Integrated School exhibited a high extent of attitudinal factors in terms of interest and motivation, and a moderate extent in terms of self-confidence. The students' performance in mathematics was at a strongly satisfactory level. Self-confidence and interest significantly affected students' performance in mathematics, while motivation did not.

The study concludes that attitudinal factors significantly affect students' performance in mathematics. It is recommended that enhancing these factors can help improve students' performance in mathematics.

The study also recommended the proposed corrective actions that will use of mathematics teachers like using a "no wrong answers" approach, creating a safe space where students feel comfortable answering without fear of judgment, Connect math to real-life applications, provide a variety of practice resources, create and distribute a range of engaging supplemental materials, such as worksheets, online resources, and math games, to encourage students to practice extra problems at their own pace. These are examples that will help the teachers and students to enhance their performance in mathematics.

Keywords: *Attitudinal Factors, Mathematical Performance*

Introduction

Mathematics is one of the essential subjects in the K-12 basic education curriculum in the Philippines. However, despite its importance, many students struggle and face difficulties in learning Mathematics. The performances of Filipino students have been consistently low in local, national, and

international standardized assessments Callaman, R.A., & Itaas, E.C. (2020). Students performance in many areas are now the concern for all academic and government institutions Cave, B.C., and Brown, E. (2010). Therefore, revisiting how the students learned and the students' performance is an effort worthwhile to consider.

Majority of the people in the world hate the four-letter word, MATH, they don't like it and feel that they are not good at it". Mathematics is a significant course in school curriculum. Young age children must learn the basic foundations of the subject which is useful in functioning well in their everyday lives. Mathematics is taught so that students can understand the numerical data presented to them and able to solve simple mathematics computations in a day-to-day living. It is a belief among children that mathematics is a difficult subject to learn. In some cases, attitude of students has a great factor in mathematics performance of the students. Attitude towards mathematics defines as liking or disliking of the subject; a tendency to engage in avoid mathematical activities; a belief that one is good or bad at mathematics; and a belief that math is useful or useless give a simpler definition.

The Laurel District's schools were having problems with their students' mathematical performance. Some students have a fear of mathematics, specifically at San Gregorio Integrated School in San Gregorio Laurel, Batangas. Their attitude toward mathematics is affected by this behavior. There are several attitudes among students when it comes to mathematics. Some of the attitudes that influence students' performance in mathematics include self-confidence, motivation, and interest in the subject. The researcher found this issue as a result of this observation. She had the opportunity to investigate any possible relationships between the students' attitudes and their mathematical performance since the students have low performance in previous years because of these matters.

In conclusion, mathematics plays a crucial role in the educational curriculum, providing essential skills needed for everyday life. However, the prevailing negative attitudes towards mathematics, particularly among students in schools like San Gregorio Integrated School in Laurel District, significantly impact their performance in the subject. The students' fear and lack of confidence in mathematics, coupled with low motivation and interest, have contributed to their poor performance in recent years. This study aims to explore the effect between these attitudinal factors and mathematical performance, with the goal of addressing the challenged faced by students and improving their outcomes in mathematics through corrective actions.

Methods

The quantitative research design utilizing the descriptive method was used in this study because it determined the effect of attitudinal factors on the mathematical performance of grade 10 students.

Descriptive research involved gathering data that describe events and then organizes, tabulates, depicts, and describes the data collection (Glass, G.V. & Hopkins, K. D. 1984).

The researcher used Self Made Questionnaire to measure the attitudinal factor of the students in mathematics and level of performance determined by the final grades of students in mathematics.

The respondents of this study were the 60 Grade 10 students of San Gregorio Integrated School, San Gregorio, Laurel, Batangas, for the school year 2024-2025. A total population sampling technique was employed in selecting the respondents for the study.

Results

1. The Extent students do Exhibit Attitudinal Factors in Mathematics in terms of :

1.1. Self - Confidence

Table 3.1 One – Sample Test on the Extent of the Students' Attitudinal Factors in Mathematics in terms of Self – confidence

	Indicator	Mean	Std. Deviation	T	Sig. (2-tailed)	Significance
1.	I believe I can understand the content of my mathematics class.	3.92 To a high extent	.809 Homogeneous	3.991	<.001	Significant
2.	I am confident in my ability to solve math problems.	3.45 To a moderate extent	.746 Homogeneous	-.519	.606	Not Significant
3.	I think I can do well in math exams.	3.27 To a moderate extent	.710 Homogeneous	-2.546	.014	Significant
4.	I am usually one of the first to answer questions in math class.	3.02 To a moderate extent	1.049 Heterogeneous	-3.567	<.001	Significant
5.	I can learn new math topics quickly.	3.42 To a moderate extent	.962 Homogeneous	-.671	.505	Not Significant
Overall Mean: 3.416 To a moderate extent			Overall SD: 0.8552 Homogeneous			

Test Value = 3.5 N = 60 Df = 59 α = .05

The data in the table 3.1 reveal the results of mean and standard deviation on the extent of the students' attitudinal factors in terms of self – confidence. The results show that students generally have a positive belief in their ability to understand mathematics content, with the highest mean score of 3.92, indicating agreement "to a high extent" and a relatively low standard deviation (SD = .809), suggesting a consistent response (homogeneous) among students. Confidence in solving math problems and performing well in exams received moderate extent, with means of 3.45 and 3.27, respectively, and low standard deviations (SD = .746 and .710), reflecting a stable level of moderate confidence across participants. Notably, while students moderately agree that they are quick to respond in class (M = 3.02), the higher standard deviation (SD = 1.049) suggests more varied responses, indicating a heterogeneous perception on this indicator. Additionally, students show moderate confidence in learning new math topics quickly (M = 3.42, SD = .962), with responses more consistent but slightly varied. These results indicate overall moderate self confidence in mathematics, with certain aspects like quick class responses showing more individual differences among students.

1.2. Interest

Table 3.2 One – Sample Test on the Extent of the Students' Attitudinal Factors in Mathematics in terms of Interest

	Indicator	Mean	Std. Deviation	T	Sig. (2-tailed)	Description
1.	I enjoy learning math.	4.00 To a high extent	.921 Homogeneous	4.207	<.001	Significant
2.	I find math interesting and engaging.	3.82 To a high extent	.873 Homogeneous	2.809	.007	Significant
3.	I chose to do extra math problems for practice.	3.37 To a moderate extent	1.073 Heterogeneous	-.962	.340	Not Significant
4.	I feel excited about solving math problems.	3.60 To a high extent	.867 Homogeneous	.893	.376	Not Significant
5.	I participate actively in math class discussions.	3.53 To a high extent	.911 Homogeneous	.284	.778	Not Significant
Overall Mean: 3.664 To a high extent			Overall SD: 0.929 Homogeneous			

Test Value = 3.5 N = 60 Df = 59 α = 0.05

The results indicate that students generally exhibit a positive attitude towards learning mathematics, as evidenced by an overall mean score of 3.664, categorized as "to a high extent," and a standard deviation of 0.929, which suggests a consistent response among students (homogeneous). The highest mean score of 4.00 for the statement "I enjoy learning math" demonstrates that students have a strong enjoyment of the subject, while the other indicators, such as finding math interesting and engaging (M = 3.82) and feeling excited about solving math problems (M = 3.60), further reinforce this positive sentiment. The indicators related to active participation in class discussions (M = 3.53) and the choice to do extra practice problems (M = 3.37) still reflect moderate to high engagement but reveal slightly lower enthusiasm

compared to enjoyment. The higher standard deviation of 1.073 for the practice problems indicator indicates a more varied response, suggesting that not all students feel equally inclined to seek additional practice, leading to a heterogeneous perception in this indicator. Overall, the data suggests that while students are generally enthusiastic about mathematics, there are varying levels of engagement in practices that could enhance their learning.

1.3. Motivation

Table 3.3 One – Sample Test on the Extent of the Students' Attitudinal Factors in Mathematics in terms of Motivation

	Indicator	Mean	Std. Deviation	T	Sig. (2-tailed)	Description
1.	I set goals for myself to achieve in math.	4.23 To a high extent	.871 Homogeneous	6.524	<.001	Significant
2.	I work hard to understand math concepts even when they are difficult.	4.48 To a high extent	.676 Homogeneous	11.263	<.001	Significant
3.	I stay motivated to improve my math grades.	4.60 To a very high extent	.694 Homogeneous	12.281	<.001	Significant
4.	I believe that studying math is important for my future success	4.65 To a very high extent	.633 Homogeneous	14.070	<.001	Significant
5.	I completed my homework on time to have a reward from my parents.	3.48 To a moderate extent	1.408 Heterogeneous	-.092	.927	Not Significant
	Overall Mean: 4.288 To a high extent		Overall SD: 0.8564 Homogeneous			

Test Value = 3.5 N = 60 Df = 59 $\alpha = 0.05$

The results indicate that students exhibit a strong sense of goal setting and motivation in mathematics, reflected in an overall mean score of 4.288, categorized as "to a high extent," and a consistent standard deviation of 0.8564, indicating homogeneous responses. The highest mean score of 4.65 for the statement "I believe that studying math is important for my future success" highlights students' recognition of the relevance of math to their future, coupled with a similarly high mean of 4.60 for "I stay motivated to improve my math grades," indicating a positive intrinsic drive toward academic performance. Additionally, the mean score of 4.48 for "I work hard to understand math concepts even when they are difficult" suggests perseverance among students when facing challenges. However, the indicator "I completed my homework on time to have a reward from my parents" received a moderate mean score of 3.48, with a higher standard deviation of 1.408, indicating a heterogeneous response and suggesting that not all students are equally motivated by external rewards. Overall, these findings illustrate a predominantly positive attitude towards self-motivation and goal setting in mathematics, with varying extent of external motivation impacting homework completion.

2. The Level of Performance of the Students in Mathematics

Table 3.4 Academic Performance of The Students in Mathematics

Grade Bracket	Frequency	Percentage	Description
90-100	22	37%	Outstanding
85-89	23	38%	Strongly Satisfactory
80-84	9	15%	Satisfactory
75-79	6	10%	Fairly Satisfactory
Total	60	100 %	

Mean = 87.38 (Strongly Satisfactory)

Table 3.4 shows the level of performance of the students in mathematics presented by a frequency and percentage. It shows that the grade brackets of 85-89 and 90-100 have the highest amount of frequency. This means that most of the respondents are excelling in mathematics. 22 or 37% are outstanding, moreover, 38% or 23 students are strongly satisfactory in their performance in Mathematics, 15% are satisfactory, and 10% are fairly satisfactory. The overall mean or average of the grades of the students in terms of their performance in Math is 87.38, meaning the level of performance is Strongly Satisfactory. This indicates that majority of students are performing well in mathematics. This positive outcome reflects effective teaching practices, student motivation, and a supportive

learning environment that encourages academic success.

3. The Extent of Effects of Attitudinal Factors to Students' Performance in Mathematics in terms of:

3.1 Self-Confidence

Table 3.5 Regression Analysis on Attitudinal Factors in Terms of Self-Confidence and Students Performance in Mathematics

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.361[a]	.130	.115	4.559

a. Predictors: (Constant), Self - Confidence

This table shows the summary model providing key insights into the relationship between self-confidence and student performance in mathematics. The R value of 0.361 indicates a moderate positive correlation between self-confidence and mathematical performance, suggesting that as students' self-confidence increases, their performance tends to improve as well.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	180.770	1	180.770	8.698	.005[b]
	Residual	1205.414	58	20.783		
	Total	1386.183	59			

a. Dependent Variable: Performance in Mathematics
b. Predictors: (Constant), Self - Confidence

This table shows the significant difference between attitudinal factors in terms of self-confidence and the performance of the students in mathematics The significance value (Sig.) of 0.005 is below the common alpha level of 0.05, confirming that the relationship between self-confidence and math performance is statistically significant. Therefore, self-confidence is significantly affect students' performance in mathematics, highlighting its importance in teaching and learning process.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	78.268	3.146		24.877	<.001
	Self- Confidence	2.670	.905	.361	2.949	.005

a. Dependent Variable: Performance in Mathematics

This table shows the coefficients of the variables. As shown in the table the value of B in the variable self-confidence is 2.670. This indicates increasing value of the variables. When self-confidence increases, the grades also increase. Therefore, self confidence positively affects the grades of the students.

3.2 Interest

Table 3.6 Regression Analysis on Attitudinal Factors in Terms of Interest and Students Performance in Mathematics

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.379[a]	.144	.129	4.523

a. Predictors: (Constant), Interest

The Model Summary table shows the relationship between students' interest in mathematics and their performance, with an R value of 0.379, indicating a moderate positive correlation. This suggests that higher levels of interest in mathematics are associated with better performance.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	199.604	1	199.604	9.757	.003[b]
	Residual	1186.579	58	20.458		
	Total	1386.183	59			

a. Dependent Variable: Performance in Mathematics
b. Predictors: (Constant), Interest

The ANOVA table evaluates the significance of the regression model that

examines the effect of students' interest on their mathematics performance. With a p value (Sig.) of 0.003, well below the alpha level of 0.05, the result is statistically significant, meaning it can conclude that interest has a meaningful and significant effect on students' math performance. This suggests that increasing students' interest in mathematics is likely to positively influence their performance in the subject.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	77.678	3.161		24.570	<.001
	INTEREST	2.649	.848	.379	3.124	.003

a. Dependent Variable: Performance in Mathematics

This table shows the coefficients of the variables. The hypothesis (Ho5), which states that interest does not significantly affect students' performance in mathematics, the p-value for the attitudinal factors in terms of Interest examined. The significance (Sig.) for Interest is 0.003, which is below the alpha level of 0.05, indicating to reject the null hypothesis. This suggests that there is a statistically significant positive relationship between students' interest in mathematics and their performance. Therefore, the findings demonstrate that cultivating interest in mathematics can have a positive effect on student performance in the subject.

3.3 Motivation

Table 3.7 Regression Analysis on Attitudinal Factors in Terms of Motivation and Students Performance in Mathematics

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.161[a]	.026	.009	4.825

a. Predictors: (Constant), Motivation

The Model Summary table evaluates the relationship between students' motivation and their performance in mathematics. The R value of 0.161 indicates a weak positive correlation, suggesting that motivation has a minimal association with math performance.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	35.920	1	35.920	1.543	.219[b]
	Residual	1350.263	58	23.280		
	Total	1386.183	59			

a. Dependent Variable: Performance in Mathematics
b. Predictors: (Constant), Motivation

The ANOVA table assesses the statistical significance of the regression model, which examines the effects of students' motivation and their performance in mathematics. With a significance (Sig.) value of 0.219, which is above the alpha level of 0.05, therefore, it concludes that the model is not statistically significant. This means that motivation does not significantly affect students' mathematics performance in this context, indicating that other factors may be more influential in determining their performance in mathematics.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	80.420	5.640		14.258	<.001
	MOTIVATION	1.623	1.307	.161	1.242	.219

a. Dependent Variable: Performance in Mathematics

This implies that even if students are motivated, other factors such as study habits, or instructional quality might have a greater effect on their math performance. For educators, this suggests the importance of a holistic approach, where fostering motivation is balanced with addressing other academic needs. For parents, this finding highlights the need to support not just motivation but also effective learning strategies and resources that can aid math comprehension. Overall, while motivation remains valuable, it may need to be coupled with other educational support to see significant improvements in math performance.

Discussion

Based on the findings of the study, the following conclusions were made:

Ho_1: Self - Confidence as an attitudinal factor in student performance in math is not significant.

Since the null hypothesis is rejected, therefore Self - Confidence as an attitudinal factor in student performance in mathematics is significant. Elaborating on self confidence, research has shown that students with high self-confidence in their mathematical abilities tend to engage more actively in problem-solving and demonstrate resilience when faced with challenges. Self-confidence helps students approach mathematical tasks with a positive attitude, which in turn leads to better performance. According to Bandura (1997), self-confidence, often framed as self efficacy, directly influences a student's ability to organize and execute actions required to succeed in mathematics. Confident students are more likely to persist through difficulties, believe in their ability to improve, and ultimately achieve higher levels of performance. Thus, self-confidence is not just a predictor of academic performance but also a catalyst for increased effort and persistence in mathematics.

Ho_2: Interest as an attitudinal factor in student performance in math is not significant.

Interest as an attitudinal factor in student performance in math is significant, therefore reject the null hypothesis. According to Schiefele (1991), interest influences the quality of cognitive engagement, leading students to employ deeper learning strategies and maintain sustained attention during mathematical tasks. Additionally, interest in mathematics fosters a positive emotional response to learning, making students more likely to persevere when faced with challenges. In the long term, interest has been linked to improved academic performance and a greater likelihood of pursuing careers in fields requiring mathematical skills.

Ho_5: Self - confidence do not significantly affect the performance of the students in mathematics.

Self – confidence significantly affect the performance of the students in mathematics, the null hypothesis is rejected. Self-confidence is an important factor that influences students' learning which in turn affects their performance in mathematics. Students with high self-confidence believe in their abilities that they can be successful in learning mathematics, thus overcoming the fear of failing. These students are ready to take mathematical challenges which in turn increase their academic achievement; otherwise, students with low self-confidence do not believe in themselves, thus tend to avoid taking mathematics challenges Therefore, this leads into minimizing the chances of expanding their mathematical skills and success. Hence, it is desirable to study the students' attitude towards their own confidence and how it relates to performance. (Adelson & McCoach, 2011; Hannula, Maijala, and Pehkonen 2004; Van der Bergh 2013).

Ho_6: Interest do not significantly affect the performance of the students in mathematics.

Interest significantly affect the performance of the students in mathematics the null hypothesis is rejected. The study of Mathematics interest has revealed that, students' interest in Mathematics increases when they understand the skills and how that skill is developed, connected to needed Mathematics competencies for performance. The condition that cannot be eliminated such for solution to poor performance in Mathematics is the interest of students in Mathematics and how this interest construct can be influenced by the teacher's

ability to connect Mathematical concepts to real life problems. The problem of Mathematics connectedness to the real life problems as well as other subject areas and how its influence students' interest and understanding to enhance performance requires investigation. (Dweck, (1986); Mensah, Okyere, & Kuranchie, (2013); Rowland, Huckstep, & Thwaites, (2005); Tobias, (1989))

In the light of the findings and conclusion made, the following recommendations are given:

1.To build students' confidence in solving math problems, setting personalized, attainable goals allows students to experience progress and strengthen their self-belief. Creating a supportive classroom environment, along with breaking down complex topics and providing resources like peer tutoring, helps students grasp new material more efficiently while reinforcing their understanding.

2.To catch the interest of the students, practice them doing additional math problems, providing a range of engaging resources like worksheets, online tools, and math games that cater to their individual pace. Encouraging students to set achievable practice goals and organizing peer study groups fosters a sense of progress and collaboration, making practice more enjoyable. Incorporating real world applications and offering rewards for extra.

3. In terms of Motivation, students will be motivated to complete their homework on time, it's essential to set clear expectations, deadlines, and quality standards. Collaborating with parents to establish a reward system reinforces the importance of timely completion, while encouraging students to reflect on their work helps them link effort with success. Regular feedback and a supportive home environment, where parents help create routines and reduce distractions, further motivate students to stay on track and meet deadlines.

4.Recommend to use the proposed corrective actions as the bases for strategies that will be used of the students and teachers in improving the performance in mathematics.

5. Future researchers should design and implement interventions that specifically target attitudinal factors like self-confidence, interest, and motivation in mathematics. Additionally, they can explore the impact of technology, such as educational software, online resources, and gamification, on shaping students' attitudes, particularly in relation to their self-confidence, interest, and motivation toward math.

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