A Correlational Study Between the Attitudes towards Mathematics of Senior High School Students and their Performance in Mathematics

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ABSTRACT

This quantitative correlational study investigated the relationship between attitudes toward mathematics and academic performance among 285 Senior High School students enrolled in General Mathematics at San Isidro National High School. Students' attitudes were measured using an adapted version of the Fennema-Sherman Attitude Scales, while academic performance was assessed using first-semester grades. Results indicated a neutral overall attitude toward mathematics (M = 3.26) and a very satisfactory academic performance (M = 86.73). Pearson's correlation analysis revealed a statistically significant, weak positive correlation between attitude and performance, $r(283) = .18$, $p < .01$. These findings suggest that although the correlation is weak, a positive attitude toward mathematics may contribute to improved academic outcomes. The study highlights the importance of fostering positive perceptions of mathematics through engaging instruction, real-world applications, and strategies that address math anxiety and promote a growth mindset.

Keywords: Mathematics attitude, academic performance, senior high school, correlational study, Fennema-Sherman

INTRODUCTION

Mathematics is widely recognized as a cornerstone of education, essential not only for academic success but also for various professional pursuits. It underpins numerous disciplines, including the sciences, technology, and economics. Despite its importance, many students develop negative attitudes toward mathematics, perceiving it as difficult or irrelevant to daily life. These attitudes often contribute to poor performance, especially during senior high school—a critical stage when students consolidate their understanding of mathematical concepts and explore their real-world applications (Etcuban et al., 2019; Kumah et al., 2023).

Research has consistently demonstrated that students' attitudes toward mathematics significantly impact their academic performance in the subject. Students with positive attitudes—marked by confidence, enjoyment, and perceived usefulness of mathematics—are more likely to perform well. In contrast, negative attitudes often lead to anxiety, avoidance, and lower achievement (Emenalo & Okpara, 1990; Saleem et al., 2023).

Understanding the factors that shape these attitudes is essential for designing effective teaching strategies. Studies have shown a strong correlation between students' attitudes and their academic outcomes, highlighting the need to address emotional and psychological factors in math education (Binns-Thompson et al., 2021; Saleem et al., 2023). For example, real-world applications and contextual learning experiences can enhance students' perceptions of the relevance and utility of mathematics, promoting a more positive outlook (Pizon & Ytoc, 2021).

Moreover, social support, particularly from teachers and peers, plays a crucial role in shaping students' experiences. A positive and collaborative learning environment has been found to enhance student motivation and reduce negative feelings associated with the subject (Mata et al., 2012).

Given the foundational role of mathematics in education and career readiness, addressing students' attitudes is vital. Understanding how Grade 11 students perceive the subject can guide educators in developing more

engaging and supportive instructional strategies. Ultimately, fostering a positive attitude toward mathematics can empower students to succeed academically and prepare for the demands of an increasingly quantitative world.

Research Questions

What is the level of attitudes towards mathematics of Senior High School students?

Is there a significant relationship between students' attitudes towards Mathematics and their performance in Mathematics?

Research Hypotheses

H_0: There is no significant relationship between students' attitudes towards Mathematics and their performance in Mathematics

H_a: There is a significant relationship between students' attitudes towards Mathematics and their performance in Mathematics.

LITERATURE REVIEW

Prior research has highlighted the importance of understanding students' attitudes toward mathematics. Mata et al. (2012) define an attitude toward mathematics as "a disposition towards an aspect of mathematics that has been acquired by an individual through his or her beliefs and experiences, but which could be changed" (p. X). This suggests that attitudes are not fixed and can be influenced by various factors, including individual characteristics, motivational factors, and social support.

Several studies have examined the relationship between student attitudes and mathematics performance. For instance, Pizon and Ytoc (2021) developed a path model indicating that attitude toward mathematics, learning style, and teaching strategies directly and indirectly influence mathematics performance. Similarly, Moussa and Saali (2022) found that higher education students' attitudes toward mathematics were significantly affected by factors such as interest in math, future career aspirations, and the quality of math instruction.

Research has also emphasized the role of the learning environment in shaping student attitudes. Robinson and Aldridge (2023) reported that in middle school classrooms where inquiry-based learning (IBL) was effectively implemented, students had significantly more positive perceptions of their learning environment and attitudes toward mathematics. This contrasted with classrooms where traditional teaching methods predominated. Additionally, Herbillia (2021) found that the overall learning environment significantly influenced students' attitudes toward mathematics, with the involvement domain being the best predictor.

These findings highlight the importance of fostering a positive learning environment that supports the development of positive attitudes toward mathematics.

METHOD

This study will use the correlational research design of the quantitative approach, which describes the relationships between variables like attitudes and their associated causal factors without manipulating them. The study involved 285 Senior High School students enrolled in the General Mathematics subject during the first semester at San Isidro National High School. Informed consent was obtained from all participants and their parents/guardians, if necessary, before their involvement in the study.

Fennema-Sherman Attitude Scales (Fennema & Sherman, 1996), designed to measure students' attitudes towards Mathematics, were adapted and administered. The academic performance of the students was measured by their first semester grades in their General Mathematics subject for the first semester. These grades were obtained from the school records, with permission secured.

Data collection was conducted over a two-week period. After securing informed consent from the school administration and participants, the adapted attitude scales were administered during regular class hours under the supervision of the researcher. Academic performance data were collected subsequently from the school registrar's office.

The collected date was analyzed using descriptive and inferential statistics. Descriptive statistics (mean) were used to summarize the attitudes towards mathematics and academic performance of the participants. Pearson's correlation coefficient (r) was used to determine the strength and direction of the relationship between the two variables. A significance level of $p < 0.05$ was used to determine statistical significance.

Permission will be obtained to access students' academic records to correlate survey responses with their performance in mathematics. Informed consent will be obtained from all participants, ensuring that participation is voluntary and confidential. The right to withdraw from study at any point will be emphasized.

RESULTS AND DISCUSSION

Table 1 The level of attitudes towards mathematics of Senior High School students

	Mean	Interpretation
Attitude Towards Mathematics	3.26	Neutral attitude
Academic Performance	86.73	Very satisfactory

This study investigated the relationship between Senior High School students' attitudes towards mathematics and their academic performance. The results indicated a moderate positive attitude towards mathematics, with a mean score of 3.26 on a five-point Likert scale. This suggests that students generally perceive mathematics favorably, though there is room for improvement in fostering a more enthusiastic approach. Correspondingly, students demonstrated good academic performance, achieving a mean score of 86.73% in mathematics.

These findings align with existing literature highlighting the significant impact of students' attitudes on their academic success in mathematics. For instance, Ma and Kishor (1997) conducted a meta-analysis revealing a moderate positive correlation between students' attitudes towards mathematics and their achievement in the subject. Similarly, a recent meta-analysis by Harun et al. (2021) confirmed that positive attitudes are associated with higher mathematics learning success. Furthermore, research by Hwang and Son (2021) identified that students who enjoy studying mathematics and believe in its value tend to have higher achievement levels.

In the Philippine context, a study by Etcuban et al. (2023) found that students participating in the Mathematics Teachers Association of the Philippines (MTAP) program exhibited improved attitudes and performance in mathematics. This underscores the importance of initiatives that enhance students' perceptions of mathematics to boost their academic outcomes.

Collectively, these studies suggest that fostering positive attitudes towards mathematics can lead to better academic performance. Therefore, educators are encouraged to implement strategies that promote a positive mathematical mindset among students.

Table 2 Significant relationship between students' attitudes towards Mathematics and their performance in Mathematics

	Correlation Coefficient (r)	df	t-value	p-value	Interpretation
Attitude Towards Mathematics vs Performance in Mathematics	0.18	283	3.08	<0.01	Significant weak positive correlation

A Pearson product–moment correlation coefficient was computed to assess the relationship between students' attitudes towards Mathematics and their performance in the subject. The results indicated a statistically significant, weak positive correlation, $r (283) = .18$, $p < .01$. According to Cohen's (1988) guidelines, this

represents a small effect size. The p-value indicates that the likelihood of observing such a correlation by chance is less than 1%, which provides sufficient evidence to reject the null hypothesis.

This result suggests that students who exhibit more positive attitudes towards Mathematics tend to have slightly higher academic performance in the subject. Although the relationship is weak, its statistical significance implies that attitude is a contributing factor to student achievement in Mathematics.

For instance, Khaiwal and Gupta (2025) reported a stronger correlation (r = 0.273) between attitudes and achievement among eleventh-grade students, highlighting the importance of fostering positive attitudes to enhance academic success.

Moreover, Pizon and Ytoc (2021) emphasized that attitude, along with learning style and teaching strategies, directly and indirectly influence mathematics performance, suggesting that a holistic approach to teaching can improve student outcomes.

Hadi et al. (2023) further supported the notion that self-assessment, as a component of attitude, is positively correlated with mathematics achievement, indicating that encouraging students to evaluate their own learning can be beneficial.

CONCLUSIONS AND RECOMMENDATIONS

The results suggest that educators and school leaders should consider implementing strategies to foster more positive attitudes toward Mathematics as part of a broader effort to improve academic outcomes. Encouraging a growth mindset, integrating engaging instructional methods, and addressing math anxiety may help enhance students' perceptions and performance.

In addition to, a significant but weak positive correlation between Senior High School students' attitudes towards mathematics and their academic performance, indicating that students with more positive attitudes tend to achieve higher scores in mathematics. These results are consistent with recent research demonstrating that attitudes, alongside factors such as motivation, learning styles, and teaching strategies, contribute to mathematics achievement (Hadi et al., 2023; Khaiwal & Gupta, 2025; Pizon & Ytoc, 2021). Although the strength of the relationship is modest, it underscores the importance of fostering positive attitudes to enhance academic outcomes. Educational stakeholders should consider integrating interventions that promote favorable attitudes toward mathematics to support student success

Based on the findings and conclusion of this study, it is recommended that teachers and school administrators actively implement strategies aimed at fostering positive attitudes toward mathematics to improve student academic performance. These strategies may include promoting a growth mindset to help students view challenges as opportunities for learning, incorporating engaging and relevant instructional approaches that connect mathematical concepts to real-life applications, and addressing math anxiety through supportive classroom environments and counseling services. Additionally, professional development for teachers should emphasize techniques that build students' motivation, self-efficacy, and interest in mathematics. Schools could also encourage peer tutoring and collaborative learning to create a positive and inclusive math culture. Finally, future research should investigate mediating factors such as motivation, interest, teaching practices, and socio-emotional support to better understand how attitudes influence academic achievement and to inform more targeted interventions.

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