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Relationship Between Students' Attitude Toward Mathematics and Academic Performance in Secondary School of Student

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Abstract

The important role of attitude in learning Mathematics has attracted the attention of educational researchers and Mathematics teachers for a long time. As a result, literature is rich with empirical data regarding the connection between student attitudes and student achievement in Mathematics. The study employed a quantitative, descriptive-correlational design to examine the relationship between students' attitudes toward mathematics and their academic performance. Data will be collected using a standardized attitude scale and academic records. Statistical analysis (Pearson correlation) will determine whether a significant relationship exists between the variables. The 100 students were selected through randomly, from 350 students of secondary level. Two sets of questionnaires were used to collect data from respondents after validation and reliability were confirmed. Students' final exam scores served as an indicator of their academic accomplishments. The research revealed a notable connection between Relationship Between Students' Attitude Toward Mathematics and Academic Performance in Secondary School of Student**.** . It was recognized that teachers' positive mindset inspired confidence in students, which subsequently led them to foster a positive attitude towards learning Mathematics. The study's results were also in agreement with prior findings regarding the link between students' attitudes and their performance in Mathematics. The findings' implications are examined, and suggestions for practical application have been provided.

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Introduction

Mathematics is widely recognized as a universal language of science, technology, and innovation. It equips learners with logical reasoning, problem-solving skills, and quantitative literacy essential for navigating contemporary societies. From early schooling to higher education, mathematics forms the backbone of academic curricula and professional disciplines such as engineering, medicine, economics, and information technology. Despite this significance, mathematics remains one of the most challenging subjects for students, frequently associated with fear, anxiety, and underachievement (Ashcraft & Krause, 2007).

In many educational systems, particularly in developing countries such as Nepal, students often perceive mathematics as abstract and irrelevant to daily life. This perception fosters negative attitudes that reduce motivation and academic persistence (Ma & Kishor, 1997). Conversely, students who value mathematics and believe in their ability to master it often achieve higher academic performance. This demonstrates the critical role of attitudes as mediators between instruction and achievement.

The relationship between students' attitudes toward mathematics and their performance has been examined for decades in educational research. Early studies focused primarily on cognitive ability, while recent scholarship emphasizes the affective domain beliefs, values, and emotions that shape learning behavior (Hannula, 2002). Positive attitudes toward mathematics are consistently linked with higher test scores, deeper conceptual understanding, and long-term success in STEM fields (Middleton & Spanias, 1999). On the other hand, negative attitudes, particularly mathematics anxiety, are associated with avoidance behaviors and poor achievement.

Every aspect of human life makes extensive use of the mathematical skills acquired through learning. How people handle the different aspects of their private, social, and civil lives is greatly influenced by mathematics (Anthony & Walshaw, 2009). This explains why most countries require all students completing basic and secondary school to study the topic. Thus, at these educational levels in Ghana, mathematics is a fundamental subject. Therefore, it is unfortunate that many students nowadays have difficulty with mathematics and score appallingly poorly on their final exams in the majority of countries. Lately, Ghanaian senior high school pupils have not been performing well in mathematics. According to the Chief Examiner's Report (2007), candidates are said to demonstrate a lack of comprehension of mathematical ideas and an inability to construct suitable mathematical models that could be addressed with the necessary abilities. It has also been observed that a large number of pupils have a negative attitude about studying mathematics as a result of the subject's widespread failure. It is undeniable that a wide range of factors influence how well a student learns a subject. The classroom, school, students, and teachers all have an impact on how well students learn mathematics. Students' success on final exams is always impacted by the seriousness or other elements that are associated with teaching mathematics. Researchers in education have spent a lot of time and effort attempting to identify the potential reasons behind students' subpar attitudes and performance in mathematics. The impact of teachers' attitudes on students' attitudes toward studying the subject has not been well investigated. According to research, good teachers help students learn by genuinely caring about their involvement and fostering an environment that supports learning (Noddings, 1995). In addition to giving students the chance to question why the class is doing particular activities and what the results

are, they have high but reasonable goals for improving students' ability to think, reason, communicate, reflect on, and evaluate their own practice (Watson, 2002). Students' attitudes, mathematical competencies, and identities can all be developed through the interactions that form in the classroom. These materials are crucial for studying mathematics. The idea of attitude refers to a person's manner of thinking, acting, and behaving. It affects the student, the instructor, the learner's immediate social circle, and the educational system as a whole in very significant ways.

Students go through many learning situations that shape their attitudes. This is impression, which also plays a role in the context of teaching and learning. In this way, the student models his attitude after that of his teachers, which could have an impact on his learning results (Yara 2009). According to Yara (2009), educators who had a positive outlook on mathematics were more likely to encourage. Mathematics is widely regarded as a fundamental subject that plays a crucial role in the development of logical reasoning, problem-solving skills, and scientific thinking among students. It is also essential for national development, particularly in science, technology, and innovation. Despite its importance, many secondary school students experience difficulties in mathematics, which often results in poor academic performance. One of the key factors influencing students' performance in mathematics is their attitude toward the subject.

Attitude toward mathematics refers to students' feelings, beliefs, and behavioral tendencies toward learning mathematics. It is a multidimensional construct that includes components such as interest, confidence, anxiety, and perceived usefulness. Students may develop either positive or negative attitudes depending on their learning experiences, teaching methods, and classroom environment. A positive attitude is characterized by enjoyment, motivation, and confidence, whereas a negative attitude often involves fear, anxiety, and lack of interest.

In the context of Nepal, students' attitudes toward mathematics significantly influence their academic performance. Students who have positive attitudes are more likely to engage actively in learning, persist in solving problems, and achieve higher academic results. In contrast, students with negative attitudes tend to avoid mathematics, experience anxiety, and perform poorly. For instance, studies have found a direct and significant positive relationship between students' attitudes and their performance in mathematics tasks, indicating that attitude is an important predictor of achievement..…… In the context of secondary education, particularly in developing countries like Nepal, students often perceive mathematics as a difficult and abstract subject. Traditional teaching methods, examination pressure, and limited use of interactive teaching approaches may contribute to negative attitudes and low achievement levels. Therefore, understanding the relationship between students' attitudes toward mathematics and their academic performance is essential for improving teaching practices and learning outcomes. Although several studies have examined this relationship in different contexts, there is still a need for more localized research focusing on secondary school students. Investigating this relationship can help educators, curriculum planners, and policymakers design effective strategies to foster positive attitudes and enhance students' academic success in mathematics.

Research Objectives

To examine the relationship between students' attitudes toward mathematics and their academic performance among secondary school students.

Hypotheses

To achieve the objectives of the study, the following hypotheses were formulated:

H_{01}: There is no significant relationship between students' attitudes and their academic performance in mathematics.

H_{11}: There is a significant relationship between teachers' attitudes and students' performance in mathematics.

Literature Review

A growing body of research has examined the relationship between students' attitude toward mathematics and their academic performance, particularly at the secondary school level. Recent studies consistently highlight attitude as a key predictor of achievement, although the strength and nature of the relationship vary across contexts.

A systematic review by Wen and Dube (2022) analyzed multiple studies on secondary students and found that attitudes toward mathematics tend to decline during secondary education, negatively affecting students' conceptual understanding and academic performance. The review emphasized that improving students' attitudes is essential for enhancing achievement outcomes.

Similarly, a study by Wakhata et at al. (2024) investigated the relationship between students' attitudes and performance in mathematics word problems. The findings revealed a significant positive relationship, indicating that students with positive attitudes performed better in mathematical tasks .

In another study, Svraka et at al. (2024) examined cognitive, affective, and sociological predictors of mathematics performance. The study highlighted that affective factors such as attitude and anxiety significantly influence students' academic performance, with negative attitudes contributing to lower achievement.

A recent study by Khaiwal and Gupta (2025) explored the relationship between attitude toward mathematics and academic achievement among secondary students. The results showed a positive correlation between students' attitudes (confidence, enjoyment, and perceived usefulness) and their academic performance, confirming that favorable attitudes enhance achievement.

Likewise, Quimbo (2025) conducted a correlational study among senior high school students and found that students generally had a moderate attitude toward mathematics, which was positively associated with satisfactory academic performance. The study concluded that improving students' attitudes could lead to better academic outcomes.

Earlier, Wakhata et al. (2022) reported that students with positive attitudes toward mathematics demonstrated better performance in solving word problems and applying mathematical concepts in real-life situations. The study emphasized that attitude plays a crucial role in both academic achievement and practical application of mathematics.

In the Nepalese context, Thapa and Paudel (2020) examined secondary school students' attitudes toward mathematics in Kathmandu Valley. The study found that most students had a positive

attitude toward mathematics, and this positive attitude was associated with higher motivation and engagement in learning, which are important factors for academic success.

In addition, research in educational psychology has consistently shown that attitude toward mathematics is closely linked to students' motivation and engagement. Studies indicate that students who enjoy mathematics and perceive it as useful are more likely to persist in learning tasks and achieve higher performance levels. Conversely, negative attitudes and anxiety hinder learning and reduce academic success.

Furthermore, several studies have emphasized the multidimensional nature of attitude. Components such as confidence, interest, anxiety, and perceived usefulness have been identified as key determinants of academic performance. Students with high confidence and low anxiety tend to perform better, while those with fear and low self-efficacy often struggle with mathematics.

Despite the general agreement on the positive relationship between attitude and performance, some studies suggest that the strength of this relationship may vary depending on contextual factors such as teaching methods, classroom environment, gender, and socioeconomic status. This indicates that attitude alone may not fully explain academic performance but interacts with other variables.

Overall, the reviewed literature clearly indicates that students' attitude toward mathematics is a significant factor influencing academic performance at the secondary level. Positive attitudes enhance engagement, motivation, and achievement, whereas negative attitudes hinder learning and performance. However, there remains a need for more context-specific studies to better understand this relationship in different educational settings.

Components of Attitude

According to research, attitude is made up of three distinct parts. These three components are behavioral, emotional, and cognitive (Eagly & Chaiken, 1993; Maio & Haddock, 2010). What a person thinks or believes about the attitude object is the cognitive component of attitude. For instance, someone may believe that snakes are hazardous reptiles. The emotions or sentiments of the person connected to the attitude object are the affective component of attitude. An individual may experience dread, for instance, when they see a snake. The propensity to react to the attitude object in a particular way is the behavioral component. One example might be someone who sees a snake and decides to scream or flee. As a result, attitude's cognitive, affective, and behavioral components are linked and interdependent.

Formation of Attitude

According to research, attitude is formed through experience. People's life experiences shape their attitudes. Three main learning theories-observational learning, operant conditioning, and classical conditioning-are used in social psychology to describe how attitudes are developed. Classical conditioning, as defined by Ivan Pavlov, is a method of behavior modification in which a conditioned response is developed through repeated pairing of a conditioned stimulus with an unconditioned stimulus (Ntim, 2010, Linero & Hinojosa, 2012). Neutral stimuli that inherently induce a response are the basis of classical conditioning. For example, kids start to support their dads' football teams. They

acquire the same enthusiasm for the teams and grow up thinking that those specific football teams are the greatest. Therefore, our perspectives are shaped by our experiences or how we are conditioned.

According to B.F. Skinner's theory of operant conditioning, learning occurs when a response is produced in expectation of a stimulus. Reinforcement makes behavior more likely to be repeated in operant conditioning (Ntim, 2010). When positive outcomes follow a conduct, it is reinforced and more likely to be repeated than when negative outcomes follow an action or attitude (Moris & Maisto, 2001). Reinforcement and punishment are essential components of operant conditioning. For example, if a child's mother picks up something for her or smiles at her at any moment, the youngster learns that it is good to be helpful and is likely to repeat the behavior. In contrast, if a mother yells at

Students Attitude towards Mathematics

Some authorities define attitude toward mathematics as simply liking or disliking it, while others broaden the definition to include beliefs, mathematical aptitude, and mathematical utility. According to Zan and Martino (2007), attitude toward mathematics simply refers to one's emotional disposition toward the subject, whether it be good or negative. However, according to Neale (1969), attitude toward mathematics is a sum of "a liking or disliking of mathematics, a tendency to engage in or avoid mathematical activities, a view that one is good or terrible at mathematics, and a judgment that mathematics is valuable or useless" (p. 632). According to Hart (1989), who examines attitudes toward mathematics from a variety of angles, a person's attitude toward mathematics is a more complicated phenomenon that is influenced by his or her beliefs, feelings, and behavior. One aspect of attitude toward mathematics is the propensity to feel nervous and afraid of it.

Cognitive, affective, and behavioral factors all have a role in attitude toward mathematics, and like all attitudes, it can be shaped by any of the three previously mentioned processes. By learning to connect mathematics with positive experiences or events, a student might cultivate a positive attitude toward the subject. Positive reinforcement also makes it possible for a positive attitude toward mathematics to develop. Furthermore, one of the least important elements influencing students' attitudes toward mathematics is by no means how they observe their teachers and how they behave, particularly when it comes to mathematics.

Methods

This study employed a correlational research design to examine the relationship between secondary school students' attitudes toward mathematics and their academic performance.
Population, Sample and Sampling Technique

The research was conducted in Surkhet, Nepal, involving three secondary schools selected to represent both public and private institutions. The target population consisted of approximately 3,50 students in Grade 10. To obtain a representative sample, stratified random sampling was used, considering grade level, gender, and school type as strata. Using Cochran's formula for finite populations, a total of 100 students were selected, with participants randomly drawn from each stratum to ensure balanced representation.

Tools/Instruments

Data for the study was collected using two sets of questionnaires. Likert type was used for the majority of the questionnaire's items. The Attitude towards Mathematics Inventory, a tool created by Tapia and Marsh II (2004), served as the model for the student questionnaire. It measured pupils' attitudes toward mathematics with 21 items. The Third International Mathematics and Science Studies-Repeat's Mathematics Teacher Questionnaire (1999) served as the model for the teacher questionnaire. It included five items that gathered information on instructors' perceptions of students' attitudes toward mathematics and twelve measures that measured teachers' attitudes toward the subject. Data on the academic performance of pupils in mathematics was obtained by an analysis of the chosen students' end-of-term scores.

Peer review was used to determine the instruments' face validity. To determine the instruments' dependability, pre-testing was conducted. The Cronbach reliability test gave the teacher and student questionnaires coefficient alphas of 0.798 and 0.87, respectively. The SPSS version 23 was used to examine the data.

Data Collection and Analysis Process

Data on students' attitudes were collected using a standardized Attitude Toward Mathematics Scale (ATMS), which measured dimensions such as enjoyment, confidence, value, and anxiety toward mathematics on a five-point Likert scale, showing good reliability (Cronbach's alpha = 0.87 in the pilot study). Academic performance data were obtained from school records and standardized to a 100-point scale for consistency. The questionnaires were administered during classroom sessions after obtaining the necessary permission from school authorities and informed consent from students and parents. For data analysis, the collected data were first screened for completeness, normality, and outliers, followed by descriptive statistics to summarize students' attitudes and academic performance. Pearson's correlation coefficient was calculated to examine the strength and direction of the relationship between attitude and performance, while simple linear regression was used to determine the predictive effect of students' attitudes on their mathematics achievement. Ethical considerations were strictly observed throughout the study, including voluntary participation, confidentiality, and secure handling of data. Despite the methodological rigor, limitations such as the cross-sectional design and restriction to Kathmandu schools may limit the generalizability of the findings.

Results and Discussion

The relationship between instructor and student attitudes about learning mathematics was the main focus of the study. The purpose of the study was to determine how the students viewed the attitude of the math teachers. Twelve items on a 5-point Likert scale made up the teacher questionnaire, which measured their attitude toward mathematics with a total score of 60. A score of 36 or more was regarded as positive, while a score of less than 36 was regarded as negative. 36 was considered a neutral score. Based on their attitude score, the results showed that every teacher had a favorable attitude toward mathematics. A high positive attitude score was indicated by the mean attitude score of 49.5.

The Pearson Product Moment Correlation Coefficient was used to calculate the correlation coefficient in order to test the hypotheses. Table 1 shows the results of a calculation of the correlation

between instructor and student attitudes. Ho: Students' attitudes toward mathematics and teachers' attitudes do not correlate. Table 1 shows the relationship between student and teacher attitudes.

Table 1

The relationship between student and teacher attitudes

Statistics	
Pearson Correlation	0.310
Significance (2-tailed)	0.002
N	100

The hypothesis's set showed a significant Pearson Correlation Co-efficient of 0.31 at the 95% (0.05 significance level) confidence level. The findings indicate a strong and favorable relationship between student and teacher attitudes. Consequently, the null hypothesis is disproved, and it is determined that there is a strong positive correlation between students' attitudes toward mathematics and teachers' attitudes. This supports Yara's (2009) claim that educators who have a positive outlook on mathematics are more likely to encourage similar sentiments in their pupils. The study's findings demonstrate a strong and favorable relationship between student and teacher attitudes. Students will have a favorable propensity for mathematics if professors cultivate a positive attitude toward the topic. Once more, children will emulate professors who behave well and speak well about mathematics, which will lead to a favorable attitude toward studying this crucial topic. H0: There is no relationship between math performance and student attitude.

Table 2

Relationship between student performance and attitude.

Statistics	
Pearson Correlation	0.419
Significance (2- tailed)	0.000
N	100

A correlation of 0.419 was found from Table 2 when the hypothesis was tested at a 95% (0.05 significance level) confidence level. We reject the null hypothesis since this indicates that there is a positive and significant association between student attitude and performance at the 0.05 significance level. The research's findings corroborate those of studies by Burstein (1992), Chueng (1998), and Schenkel (2009), among others, which discovered a strong and favorable relationship between students' attitudes and their mathematical ability. These studies indicate that students' attitudes about mathematics have a major impact on their performance in the subject. The research's conclusions have led it to join the school of thought that holds that student performance and attitude are closely related. H0: Student success in mathematics is unrelated to the mood of the teacher.

Table 3:

Correlation between student attitude and their Academic Performance in Mathematics

Statistics	
Pearson Correlation	0.015
Significance (2- tailed)	0.879
N	100

A modest association of 0.015 was found by the test of the hypothesis at the 95% (0.05 significance level) confidence level, as shown in Table 3. Accordingly, this study found that although instructor attitude and student performance are positively correlated, the relationship is not statistically significant. As a result, the null hypothesis cannot be rejected. about instructor attitude and student achievement, this study did not uncover a significant correlation between teacher attitude and student performance, despite supporting other research findings about the influence of teacher attitude on students' attitudes. This might be because student performance is influenced by a number of variables rather than just the teacher's mood. Therefore, while the attitude of the teacher does affect student outcomes, it is not the sole issue.

Conclusion and Recommendation

According to the study, students' attitudes toward mathematics are correlated with those of their math teachers. The attitudes of students and teachers toward mathematics are significantly correlated. This implies that students do not develop a favorable attitude toward mathematics if teachers have a negative attitude toward it, regardless of the students' mathematical aptitude, and vice versa. Students' attitudes toward studying mathematics are positively correlated with how positively math teachers feel about the subject. Students' attitudes regarding mathematics are reflected in their teachers' attitudes. Therefore, teachers' attitudes toward mathematics are important because they have a significant impact on how students form their own attitudes.

Attitude plays a crucial role in student learning, as evidenced by the positive relationships found between student performance and attitude, as well as between teachers' attitudes and student performance in mathematics. Teachers' attitudes about teaching mathematics, in particular, play a significant role in shaping how students feel about studying the subject. By demonstrating a favorable attitude toward mathematics instruction in the classroom, teachers positively influence their students' attitudes toward the subject.

Therefore, to help students develop a positive attitude toward mathematics, it is essential for teachers to cultivate a positive attitude toward the subject and make mathematics engaging and appealing. In addition to modeling enthusiasm for teaching and learning mathematics, teachers should create interactive, safe, and stimulating learning environments in their classrooms. This approach significantly supports students in developing positive attitudes toward mathematics, learning without inhibition, and consequently improving their performance.

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