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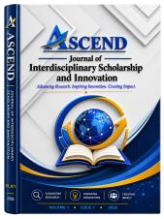

# THE INTERPLAY OF STUDENT–TEACHER RELATIONSHIP, MATHEMATICS INTEREST, AND MATHEMATICS ACHIEVEMENT AMONG GRADE 10 STUDENTS

John Chris L. Decina, Jeralyn D. Bellita, Jerome D. Bellita, Mae P. Valenzona, Trisha Jay L. Edroso, and James Cliford O. Boter

**Authors' Affiliation:**

College of Education, Cebu Technological University – Main Campus, Cebu City, Philippines

**Corresponding Author:**
johnlebariosdecina@gmail.com

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**Abstract.** This study examined the relationship between student–teacher relationship, mathematics interest, and Mathematics performance among Grade 10 students of Pinamungajan National High School during School Year 2025–2026. Utilizing a quantitative descriptive-correlational research design, the study involved 243 respondents selected through proportionate stratified random sampling from a population of 609 learners. Data were collected using adapted survey instruments measuring student–teacher relationship and mathematics interest, while official Third Quarter Mathematics grades were used to determine academic performance. Statistical treatments included weighted mean, standard deviation, and Pearson Product-Moment Correlation Coefficient. Findings revealed that respondents perceived a high level of student–teacher relationships, particularly in academic and social relations. Mathematics interest was generally moderate, with value and emotion obtaining high ratings, while engagement and knowledge were rated moderate. Respondents attained a very satisfactory level of Mathematics performance, with most learners earning grades in the satisfactory to very satisfactory range. Correlation analysis showed negligible positive relationships between student–teacher relationship and Mathematics performance ($r$ = .057, $p$ = .377) and between mathematics interest and Mathematics performance ($r$ = .042, $p$ = .517). Neither relationship was statistically significant. The study concludes that although positive student–teacher relationships and mathematics interest remain important educational factors, they did not independently explain variations in Mathematics performance among the respondents. The findings highlight the multifaceted nature of mathematics achievement and underscore the need for comprehensive interventions that strengthen learner engagement, mathematical competence, and overall academic support.

***Keywords:*** *mathematics education, mathematics interest, mathematics performance, Pinamungajan, student–teacher relationship*

## Introduction

Mathematics is a fundamental discipline that develops logical reasoning, analytical thinking, and problem-solving skills necessary for academic success and everyday life. Beyond computations and formulas, mathematics enables learners to analyze situations, make informed decisions, and solve real-world problems. Studying mathematics promotes higher-order thinking skills through reasoning, analysis, and exploration of complex problems (Santos-Trigo, 2024). In fact, several studies consistently describe it as engaging reasoning, complex problems, and analysis, which are vital parts of higher-order thinking (Sehrawat, 2024; Sugiharti et al., 2026; Wang et al., 2025). These competencies extend beyond the classroom, as individuals apply mathematical concepts in various daily activities, such as managing finances, organizing schedules, and making informed judgments based on quantitative information (Rosell et al., 2024).



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Consequently, mathematics remains a critical component of educational development and lifelong learning.

Despite its recognized importance, mathematics remains challenging for many learners. Across different educational settings, students often perceive mathematics as difficult, intimidating, and highly demanding. In the Philippine context, many learners struggle to understand mathematical concepts and solve problems, which may reduce motivation and lower academic performance. Students often hesitate to ask teachers for clarification when they encounter difficulties, resulting in limited classroom participation and reduced engagement in learning activities (Nolasco, 2025). Teacher-related factors, including classroom support, instructional approaches, and teacher accessibility, may further shape learners' attitudes toward and experiences with mathematics.

The challenges learners encounter in mathematics may have important consequences for academic achievement. According to Cognitive Behavioral Theory (Beck, 1976), repeated experiences of difficulty and failure may contribute to negative thought patterns, reduced self-confidence, and anxiety, which can adversely affect learning and academic performance. In mathematics education, such experiences may discourage learners from actively participating in classroom activities and from persisting when confronted with challenging tasks. This concern is reflected in Filipino learners' performance in international assessments. Results from the Program for International Student Assessment (PISA) 2022 showed that the Philippines ranked 77th among 81 participating countries in mathematics performance, while findings from the Trends in International Mathematics and Science Study (TIMSS) 2019 revealed that the country ranked last among 58 participating countries with a mathematics score of 297. These findings indicate persistent challenges in mathematics achievement and underscore the need to examine factors that may influence students' academic performance.

Factors commonly associated with academic success include student–teacher relationships and students' interest in learning. Research has consistently highlighted the importance of supportive teacher-student relationships in promoting positive academic outcomes. In a meta-analysis of 99 studies, Roorda et al. (2011) found that both positive and negative qualities of teacher-student relationships were significantly associated with students' academic achievement. Similarly, Polydoros et al. (2025) emphasized that positive student-teacher relationships characterized by warmth, support, and low levels of conflict contribute to improved academic achievement and foster students' interest in mathematics by reducing anxiety and enhancing emotional engagement. When learners perceive their teachers as approachable, supportive, and responsive to their needs, they are more likely to participate actively in classroom activities and develop confidence in their academic abilities.

Relatedly, students' interest in mathematics plays a crucial role in their engagement and achievement. Interest influences learners' willingness to participate, invest effort, and persist in challenging tasks. Greater interest in mathematics encourages students to engage more deeply in learning experiences and to view mathematical activities as meaningful and worthwhile. Positive student-teacher relationships may further strengthen interest in mathematics by providing encouragement, constructive feedback, and opportunities for meaningful participation (Byiringiro, 2024; Di Lisio et al., 2025; Wang et al., 2024). Consequently, student-teacher relationship and



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Volume 2 | Issue 2 | November | 2026

mathematics interest may interact in ways that influence learners' academic experiences and achievement outcomes.

The relevance of these factors is evident within the local educational context. Observations in the research setting revealed that many learners hesitate to participate in mathematics discussions, rarely volunteer answers, and often remain passive during instructional activities. Some students experience difficulty understanding mathematical concepts and tend to avoid consulting their teachers when they encounter academic challenges. Instead, they often seek help from classmates or choose not to share their concerns. These behaviors may suggest low confidence, engagement, or comfort in communicating with teachers. Consistent with Polydoros et al. (2025), these classroom realities suggest that the quality of student-teacher interactions may influence learners' academic participation and engagement.

Further evidence of the need to examine these concerns is reflected in school performance data. Records from the Division of Cebu City indicated a Mean Percentage Score (MPS) of 53.91 percent in Mathematics during School Year 2023–2024. Although this level falls within the Average Mastery category, it remains considerably below the proficiency benchmark established by the Department of Education. This performance gap suggests that many learners continue to struggle to reach higher levels of mathematical competence. While cognitive factors undoubtedly shape learning outcomes, the observed lack of participation, low confidence, and limited engagement among some learners suggest that non-cognitive factors may also contribute to academic performance.

Although previous studies have examined student-teacher relationships and academic achievement, as well as students' interest in mathematics and learning outcomes, findings have not always been consistent across educational contexts. Moreover, limited research has examined student-teacher relationships and mathematics interest together in relation to mathematics achievement among Grade 10 learners in the Cebu context. Consequently, a clearer understanding of how these factors relate to mathematics achievement among secondary school students remains necessary.

Given these considerations, the present study examined the interplay between student-teacher relationship, mathematics interest, and mathematics achievement among Grade 10 students of Pinamungajan National High School during School Year 2025–2026. Specifically, the study sought to determine the level of student-teacher relationship, mathematics interest, and mathematics performance among the respondents, and to examine the relationships among these variables. The findings may provide valuable insights for teachers, school administrators, parents, and educational stakeholders in developing evidence-based interventions and support mechanisms that enhance learner engagement, strengthen positive classroom relationships, and improve mathematics achievement.



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# Methodology

## Design

This study used a quantitative, descriptive-correlational research design. The descriptive component described the level of student–teacher relationships in terms of academic and social relations, the level of mathematics interest in terms of emotion, engagement, knowledge, and value, and the respondents' mathematics performance.

The correlational component examined the relationships between student–teacher relationship and mathematics performance, as well as mathematics interest and mathematics performance. This design was appropriate because it enabled the researchers to describe existing conditions and determine the magnitude and direction of relationships among variables without manipulating them.

## Locale

The study was conducted at Pinamungajan National High School, located in Cebu Province, Philippines, during School Year 2025–2026. The school serves secondary students from diverse socio-economic backgrounds and provides a suitable setting for examining the relationship between student–teacher relationship, mathematics interest, and mathematics achievement among Grade 10 learners.

## Respondents

The study respondents consisted of Grade 10 students officially enrolled at Pinamungajan National High School during School Year 2025–2026. To be included in the study, respondents were required to be currently enrolled in Mathematics classes under the K–12 curriculum, have completed at least one academic quarter in Mathematics, and be willing to participate. Because the respondents were minors, the researchers obtained appropriate parental or guardian consent and student assent before participation.

The total population of Grade 10 students was 609. The sample size of 243 respondents was determined using Slovin's formula at a 5% margin of error:

$$n = \frac{N}{1 + Ne^2}$$

where:
n = sample size
N = population size (609)
e = margin of error (0.05)

A proportionate stratified random sampling technique was employed to ensure adequate representation of respondents across Grade 10 sections. This sampling method provided each student within the identified strata an equal opportunity to participate while ensuring proportional representation of the entire Grade 10 population.



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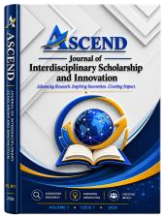

**Instrument**

Data were collected using a structured survey questionnaire and official academic records. The questionnaire consisted of two parts designed to measure the study variables: student–teacher relationship and interest in mathematics. Mathematics performance was measured using respondents' official Third Quarter Mathematics grades from school records, with approval from school authorities.

**Part I: Student–Teacher Relationship Scale.** This section utilized an instrument adapted from Alhadabi and Aldhafri (2020) to assess the level of student–teacher relationship. The scale measured students' perceptions of their interactions with their Mathematics teacher in terms of academic and social relations, including teacher support, communication, trust, and classroom engagement. Responses were measured using a five-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*), with higher scores indicating a more positive student–teacher relationship.

**Part II: Mathematics Interest Scale.** This section employed an instrument adapted from Bongabong and Doronio (2025) to determine the respondents' level of interest in Mathematics. The instrument measured four dimensions of mathematics interest: emotion, engagement, knowledge, and value. As in the first section, responses were rated on a five-point Likert scale, with higher scores indicating greater interest in learning Mathematics.

Before data collection, experts in Mathematics education and educational research validated the instrument for clarity, relevance, and alignment with the study's objectives. A pilot test was conducted among Grade 10 students not included in the actual sample to assess the instrument's comprehensibility and reliability. The questionnaire's internal consistency was determined using Cronbach's alpha coefficient. The reliability analysis indicated that the instrument had acceptable reliability and was suitable for data collection.

Mathematics performance was measured using respondents' official Third Quarter Mathematics grades for School Year 2025–2026. These grades served as the basis for determining the respondents' level of academic performance and for examining the relationships among the variables included in the study.

**Data Gathering Procedure**

The data gathering process was conducted in three phases: pre-data gathering, actual data gathering, and post-data gathering.

**During the pre-data gathering phase,** the researchers secured the necessary approvals from the Schools Division Office and the school administration. The researchers informed respondents and their parents or guardians about the study's purpose, procedures, and ethical considerations. The researchers obtained informed consent and assent prior to participation.

**During the data-gathering phase,** the researchers personally administered questionnaires to the selected respondents. The researchers provided clear instructions to ensure the instrument was completed properly. The researchers immediately retrieved completed questionnaires and checked them for completeness. The researchers then obtained respondents' official Third Quarter



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Volume 2 | Issue 2 | November | 2026

Mathematics grades with appropriate authorization from school authorities and encoded them using identification codes to maintain confidentiality.

**During the post-data gathering phase,** the collected data were reviewed, coded, organized, and encoded into Jamovi, a statistical software, for analysis. The results were tabulated, interpreted, and analyzed in accordance with the study objectives.

## Data Analysis

The collected data were analyzed using both descriptive and inferential statistical techniques.

Weighted mean and standard deviation were employed to determine the levels of student–teacher relationship and mathematics interest.

To determine the relationships between student–teacher relationship and mathematics performance, as well as between mathematics interest and mathematics performance, the Pearson Product-Moment Correlation Coefficient (Pearson's *r*) was utilized. This statistical technique was appropriate because the study sought to determine the strength, direction, and significance of relationships among continuous variables.

All inferential statistical analyses were conducted using a 0.05 level of significance. The results served as the basis for interpreting findings, drawing conclusions, and developing the proposed Mathematics Enhancement Plan.

## Ethical Considerations

The study adhered strictly to established ethical principles governing research involving human participants. Prior to data collection, approval was obtained from the appropriate school authorities. Because the respondents were minors, informed consent from parents or legal guardians and assent from student participants were secured before participation.

Participation in the study was entirely voluntary. Respondents were informed of their right to refuse participation or withdraw from the study at any stage without penalty. The purpose of the study, research procedures, and intended use of the collected information were clearly explained to all participants.

To ensure privacy and confidentiality, respondents' identities were protected through the use of identification codes. Information obtained from questionnaires and academic records was treated with strict confidentiality and used exclusively for research purposes. All research documents and electronic files were stored securely and were accessible only to the researchers.

The study likewise adhered to the ethical principles of respect for persons, beneficence, and justice. No respondent was subjected to discrimination, coercion, or unnecessary risk. Furthermore, the study complied with the provisions of the Data Privacy Act of 2012 (Republic Act No. 10173) in safeguarding the confidentiality, integrity, and security of participants' personal information.



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Volume 2 | Issue 2 | November | 2026

## Results and Discussion

**Table 1**
*Level of Student–Teacher Relationship*

| Components | $\bar{x}$ | SD | Verbal Description |
|---|---|---|---|
| Academic Relations | 3.82 | 1.07 | High |
| Social Relations | 3.75 | 1.05 | High |
| **Overall Weighted Mean and Standard Deviation** | **3.79** | **1.06** | **High** |

*Note. n = 243. Responses were measured using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Interpretation: 4.21–5.00 = Very High; 3.41–4.20 = Moderately High; 2.61–3.40 = Moderate; 1.81–2.60 = Low; 1.00–1.80 = Very Low.*

As shown in Table 1, respondents perceived their overall student–teacher relationship as High (*M* = 3.79, *SD* = 1.06). Of the two dimensions, academic relations had a slightly higher mean (M = 3.82, SD = 1.07) than social relations (M = 3.75, SD = 1.05), although both were interpreted as High. These results indicate that the respondents generally perceived their Mathematics teachers as supportive in both instructional and interpersonal aspects of classroom interaction.

The finding suggests that students experience a positive classroom environment characterized by teacher support, accessibility, and meaningful interaction. These conditions matter because supportive student–teacher relationships may encourage learners to participate actively in classroom discussions, seek clarification when they encounter difficulties, and persist when faced with challenging mathematical concepts. Positive relational experiences may also contribute to learners' confidence and willingness to engage in learning activities, particularly in subjects often perceived as difficult, such as Mathematics.

The results align with De Vera et al. (2025), who reported a strongly positive student–teacher relationship among Grade 10 learners in the Cebu City Division. Similarly, Semeraro et al. (2020) found that the quality of teacher–student relationships may influence mathematics achievement indirectly through factors such as mathematics anxiety. These findings collectively suggest that student–teacher relationships help create classroom conditions that support learning, even when their direct statistical effect on achievement is not always evident.

The relatively higher rating for academic relations indicates that students generally perceive their Mathematics teachers as capable of providing instructional assistance, academic guidance, and learning support. Meanwhile, the high rating for social relations suggests that teachers are also viewed as approachable and attentive to students' interpersonal and emotional needs. These results imply that teachers have successfully established positive classroom relationships that may foster a supportive learning climate.

Nevertheless, while the findings reveal a favorable perception of student–teacher relationships, such positive perceptions do not necessarily guarantee corresponding increases in Mathematics achievement; other variables may influence the relationship between teacher support and academic performance, including learners' motivation, self-efficacy, prior knowledge,



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learning habits, and mathematical anxiety. Thus, maintaining positive student–teacher relationships should remain a priority while simultaneously addressing other factors that contribute to Mathematics learning and achievement.

**Table 2**
*Level of Interest in Learning Mathematics*

| Components | $\bar{x}$ | sd | Verbal Description |
|---|---|---|---|
| Emotion | 3.43 | 0.97 | High |
| Engagement | 3.07 | 1.02 | Moderate |
| Knowledge | 3.27 | 0.91 | Moderate |
| Value | 3.58 | 0.96 | High |
| **Overall Weighted Mean and Standard Deviation** | **3.34** | **0.97** | **Moderate** |

*Note. n = 243. Responses were measured using a five-point Likert scale. Interpretation: 4.21–5.00 = Very High; 3.41–4.20 = High; 2.61–3.40 = Moderate; 1.81–2.60 = Low; 1.00–1.80 = Very Low.*

Table 2 shows that the respondents demonstrated an overall Moderate level of interest in learning Mathematics (*M* = 3.34, *SD* = 0.97). Among the four dimensions, value had the highest mean (M = 3.58, SD = 0.96), followed by emotion (M = 3.43, SD = 0.97), both interpreted as High. In contrast, engagement (*M* = 3.07, *SD* = 1.02) and knowledge (*M* = 3.27, *SD* = 0.91) were classified as Moderate.

The findings indicate that students generally recognize the importance and usefulness of Mathematics and maintain relatively positive emotional attitudes toward the subject. However, these favorable perceptions are not consistently translated into active engagement or strong confidence in their mathematical knowledge and abilities. This pattern suggests that while students acknowledge the value of Mathematics, they may still struggle to sustain active participation and meaningful engagement in learning activities.

The results support the view that mathematics interest is a multidimensional construct consisting of emotional, cognitive, and behavioral components. Students may value Mathematics and appreciate its relevance without necessarily demonstrating high levels of participation, persistence, or confidence. Such findings highlight the complexity of mathematics interest and suggest that positive attitudes alone may not automatically lead to stronger academic engagement.

These findings partly align with studies by Zhang and Wang (2020) and Asanre et al. (2024), who reported positive associations between mathematics interest and academic achievement. In their studies, interest functioned as an important motivational factor influencing students' willingness to learn and perform in Mathematics. Likewise, a local study found that students strongly valued the subject's importance for future work (M = 3.54) and wanted to



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Volume 2 | Issue 2 | November | 2026

improve their skills (M = 3.58), but confidence in their own mathematical abilities was low (M = 2.66) (Arre & Jatulan, 2026). However, unlike the present study, those investigations reported significant relationships between interest and achievement. This discrepancy may indicate that interest in mathematics varies across educational settings, student populations, and contextual circumstances.

The moderate levels of engagement and knowledge identified in this study suggest areas requiring educational intervention. Although learners recognize the value of Mathematics, teachers may need to employ instructional approaches that transform positive perceptions into sustained participation and stronger mathematical competence. Activities that encourage active problem-solving, collaborative learning, real-life applications, and meaningful classroom engagement may strengthen students' behavioral and cognitive investment in learning Mathematics.

**Table 3**
*Level of Mathematics Performance of the Respondents*

| Level | Numerical Range | f | % |
|---|---|---|---|
| Outstanding | 90–100 | 38 | 15.64 |
| Very Satisfactory | 85–89 | 110 | 45.27 |
| Satisfactory | 80–84 | 81 | 33.33 |
| Fairly Satisfactory | 75–79 | 14 | 5.76 |
| Did not Meet the Expectations | Below 75 | 0 | 0.00 |
| Total | | 243 | 100.00 |
| $\bar{x}$ | | 85.53 | |
| sd | | 3.84 | |

*Note. n = 243. Responses were measured using a five-point Likert scale. Interpretation: 4.21–5.00 = Very High; 3.41–4.20 = High; 2.61–3.40 = Moderate; 1.81–2.60 = Low; 1.00–1.80 = Very Low.*

Table 3 reveals that the largest proportion of respondents, 110 students (45.27%), obtained grades within the Very Satisfactory range (85–89). This was followed by 81 students (33.33%) in the Satisfactory range (80–84), and 38 students (15.64%) who attained Outstanding grades (90–100). Only 14 respondents (5.76%) were classified as Fairly Satisfactory (75–79), and none obtained grades below 75.

The overall mean Mathematics grade was 85.53 (*SD* = 3.84), indicating a Very Satisfactory level of Mathematics performance. This finding suggests that the respondents generally demonstrated satisfactory mastery of the mathematical competencies assessed during the Third Quarter.



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The results are encouraging because they indicate that most learners met or exceeded the expected performance standards in Mathematics. At the same time, the relatively small standard deviation suggests limited variability in the respondents' grades. The concentration of grades within the Satisfactory to Very Satisfactory ranges may affect the correlation analyses conducted later in the study. When respondents exhibit relatively similar achievement levels, the likelihood of observing strong statistical relationships with other variables may become reduced.

The findings support Wang et al. (2023), who emphasized that a complex interaction of individual, family, school, and system-level factors influences mathematics achievement. Within this broader framework, the present study examined only two factors—student–teacher relationship and mathematics interest—which represent only a portion of the numerous influences affecting achievement.

These findings imply that although overall Mathematics performance is satisfactory, continuous instructional improvement remains necessary. Particular attention should be directed toward students classified under the Fairly Satisfactory and Satisfactory categories to help them progress toward higher levels of mastery. Targeted interventions, differentiated instruction, and additional academic support may further improve learning outcomes.

**Table 4**
*Pearson Correlation Between Student–Teacher Relationship and the Respondents' Mathematics Performance*

| Variables | Pearson r | p - value | Strength of Correlation | Decision | Remarks |
|---|---|---|---|---|---|
| Student–Teacher Relationship and Mathematics Performance | 0.057 | 0.377 | Negligible Positive | Do not Reject Ho | Not Significant |

*Note. n = 243. Pearson product–moment correlation coefficient was used to determine the relationship between variables. **p < .001.*

Table 4 shows a Pearson correlation coefficient of $r = 0.057$, indicating a negligible positive relationship between student–teacher relationship and Mathematics performance. The obtained *p*-value of 0.377 exceeded the 0.05 level of significance; therefore, the null hypothesis was not rejected. The findings indicate that no statistically significant relationship exists between student–teacher relationship and Mathematics performance among the respondents.

Although students who reported more positive student–teacher relationships tended to obtain slightly higher Mathematics grades, the observed relationship was too weak to establish a statistically meaningful association. This result suggests that while positive teacher–student interactions may contribute to learners' overall educational experiences, they did not function as a significant direct predictor of Mathematics achievement within the present sample.

The findings align with those of De Vera et al. (2025), who likewise reported a negligible positive relationship between student–teacher relationship and Mathematics achievement. However, the findings differ from those of Byiringiro (2024), who observed a strong positive association between teacher–student relationship and Mathematics achievement. These



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Volume 2 | Issue 2 | November | 2026

differences may reflect variations in educational contexts, respondent characteristics, measurement approaches, and achievement indicators.

The findings are also consistent with Semeraro et al. (2020), who suggested that teacher–student relationships may influence mathematics achievement indirectly through intervening variables such as mathematics anxiety. This perspective provides a possible explanation for the absence of a significant direct relationship in the current study. Supportive relationships may contribute to achievement through mediating factors rather than through a direct linear effect.

The findings may be viewed through Attachment Theory and Sociocultural Theory. Attachment Theory suggests that supportive relationships provide learners with emotional security, while Sociocultural Theory emphasizes the importance of guided learning and social interaction. Although these theories support the educational value of positive teacher–student relationships, the present findings suggest that such relationships alone may be insufficient to explain differences in Mathematics achievement.

Overall, the results indicate that maintaining positive teacher–student relationships remains important for fostering supportive learning environments. However, improving Mathematics achievement may require simultaneous attention to other learner-related, instructional, and contextual factors beyond relationship quality alone.

**Table 5**
*Pearson Correlation Between Respondents' Mathematics Interest and Their Mathematics Performance*

| Variables | Pearson r | p - value | Strength of Correlation | Decision | Remarks |
|---|---|---|---|---|---|
| Mathematics Interest and Mathematics Performance | 0.042 | 0.517 | Negligible Positive | Do not Reject Ho | Not Significant |

*Note. n = 243. Pearson product–moment correlation coefficient was used to determine the relationship between variables. **p < .001.*

Table 5 shows a Pearson correlation coefficient of $r$ = 0.042, indicating a negligible positive relationship between mathematics interest and Mathematics performance. The computed *p*-value of 0.517 was greater than the 0.05 level of significance, so the null hypothesis was not rejected. Therefore, no statistically significant relationship was found between mathematics interest and Mathematics performance.

The finding indicates that respondents with higher levels of mathematics interest generally obtained slightly higher grades; however, the association was extremely weak and statistically insignificant. This suggests that mathematics interest, as measured in this study, was not a significant independent correlate of Third Quarter Mathematics achievement.

Multiple papers support the claim that higher interest yields only slightly higher grades with a non-significant association. In fact, among pre-service teachers, a computed r of −0.10 with p = 0.37 indicated a negligible negative correlation and no significant relationship between math interest and performance in a history-of-mathematics course (Abenoja et al., 2025). Similarly,



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among Grade 11 non-STEM students, the r-value of 0.239 indicated a negligible positive correlation, and the p-value of 0.095 failed to reject the null (Granada & Bacus, 2025). However, this result differs from Zhang and Wang (2020), who reported a positive relationship between mathematics interest and achievement, and from Asanre et al. (2024), who found that interest and motivation positively influenced Mathematics performance. While these studies support the importance of interest as a motivational factor, the present findings suggest that the strength of this relationship may vary with contextual and learner-related factors.

Several explanations may account for this result. First, respondents already demonstrated relatively high achievement, with an overall mean grade of 85.53, which limited variability in performance scores. Second, interest in mathematics was not uniformly high across all dimensions. While the respondents highly valued Mathematics and reported positive emotional attitudes, their engagement and knowledge-related interest remained moderate. This suggests that participation and perceived competence did not consistently match positive attitudes.

Furthermore, Wang et al. (2023) emphasized that numerous interrelated factors influence Mathematics achievement. While mathematics interest may contribute to achievement, it may operate alongside other variables such as self-efficacy (Zou, 2025), study habits (Falebita et al., 2025; Rini & Agustika, 2023), mathematics anxiety (Mehmeti & Bajrami, 2026; Tumimang & Doronio, 2026; Zhang et al., 2026), instructional quality (Qin & Wang, 2026), and access to learning facilities (Frimpong et al., 2025; Sugatamama & Cajandig, 2026). Omitting these factors from the current analysis may help explain why mathematics interest alone did not show a significant relationship with achievement.

The findings imply that efforts to improve Mathematics achievement should not rely exclusively on increasing students' interest in the subject. Rather, interest-enhancement initiatives should be complemented by effective instructional practices, opportunities for meaningful engagement, the development of mathematical competence, and support systems that address learners' academic and psychological needs.

Overall, although the respondents demonstrated moderate mathematics interest and very satisfactory Mathematics achievement, the relationship between these variables was not statistically significant. Therefore, mathematics interest should continue to be nurtured as an important educational outcome while recognizing that achievement is influenced by multiple interacting factors beyond interest alone.

## Conclusion

This study examined the relationship between student–teacher relationship, mathematics interest, and Mathematics performance among Grade 10 students of Pinamungajan National High School. The findings revealed that respondents perceived a high level of student–teacher relationship, particularly in terms of academic and social relations, indicating that Mathematics teachers were generally viewed as supportive, approachable, and responsive to learners' academic and interpersonal needs. Respondents also showed a moderate level of interest in Mathematics, with high ratings in the value and emotion dimensions but only moderate levels of engagement and knowledge. Furthermore, respondents achieved a very satisfactory level of Mathematics performance, with most obtaining grades within the satisfactory to very satisfactory range.



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Volume 2 | Issue 2 | November | 2026

Despite these favorable findings, the study found no statistically significant relationship between student–teacher relationship and Mathematics performance and no statistically significant relationship between mathematics interest and Mathematics performance. Although both variables showed negligible positive correlations with Mathematics achievement, the relationships were not statistically significant. Consequently, the null hypotheses were not rejected.

The findings suggest that while positive student–teacher relationships and mathematics interest remain important aspects of the educational experience, they did not independently explain variations in Mathematics performance among the respondents. This indicates that Mathematics achievement is a multifaceted outcome influenced by a complex interaction of learner-related, instructional, family, and school factors. Variables such as prior knowledge, self-efficacy, mathematics anxiety, study habits, attendance, instructional practices, learning resources, and family support may collectively influence academic performance more than the variables examined in this study alone.

The study contributes to the growing body of Mathematics education research by providing localized evidence on the relationship between student–teacher relationships and mathematics interest and mathematics achievement among Filipino secondary school learners. The findings further highlight the importance of examining academic performance from a multidimensional perspective rather than attributing achievement solely to individual motivational or relational factors.

However, the findings should be interpreted in light of the study's limitations. The investigation was confined to Grade 10 students from a single public secondary school and utilized self-reported measures of student–teacher relationship and mathematics interest. Moreover, the study examined only two potential correlates of Mathematics performance, leaving other relevant cognitive, affective, and contextual factors beyond its scope.

Overall, the study underscores the importance of sustaining positive student–teacher relationships and fostering students' interest in Mathematics while recognizing that improving academic achievement requires a comprehensive approach that addresses multiple dimensions of the learning process. Strengthening learner engagement, mathematical competence, instructional effectiveness, and support systems may provide greater opportunities for enhancing Mathematics performance among secondary school students.

## Recommendations

Based on the findings and conclusions of the study, the following recommendations are proposed:

**For Mathematics Teachers.** Since respondents reported strong student–teacher relationships, Mathematics teachers should continue fostering supportive academic and social interactions in the classroom. Strategies such as encouraging learners to ask questions, promoting collaborative problem-solving, providing constructive feedback, and creating a supportive learning environment may help sustain positive teacher–student relationships. Particular attention should be given to strengthening learners' confidence in solving challenging mathematical problems, as confidence and persistence are critical components of successful mathematics learning.



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Volume 2 | Issue 2 | November | 2026

Teachers should also focus on improving the dimensions of mathematics interest that obtained only moderate ratings, particularly engagement and knowledge. This can be achieved through learner-centered instructional strategies such as problem-based learning, collaborative activities, mathematics games, real-life applications, and differentiated instruction. Integrating practical and meaningful mathematical contexts into lessons may help transform students' appreciation of Mathematics into active participation and deeper conceptual understanding.

**For School Administrators and Mathematics Department Heads.** These people should support the implementation of enrichment and intervention programs designed to strengthen students' engagement and mathematical competence. Regularly monitoring mathematics performance and interest levels may help identify learners who need additional academic support. Schools may also offer professional development activities that equip teachers with innovative instructional approaches to increase learner engagement and mathematical understanding. Furthermore, the Mathematics department may establish targeted remediation and enhancement programs for learners in the Fairly Satisfactory and Satisfactory performance categories. Periodic diagnostic assessments and progress monitoring activities may help ensure that interventions respond effectively to learners' needs.

**For Parents and Guardians.** They should actively support learners' mathematics learning at home by establishing study routines, monitoring academic progress, and communicating regularly with teachers regarding their children's learning needs. Encouraging positive attitudes toward mathematics and providing opportunities to apply mathematical concepts in everyday situations may help strengthen learners' confidence and engagement with the subject.

**For Guidance Personnel and School Stakeholders.** They should collaborate with Mathematics teachers in promoting learners' self-confidence, perseverance, and positive learning attitudes. Programs addressing learners' academic motivation, confidence in mathematics, and classroom participation may complement instructional efforts and contribute to a more supportive learning environment. Such initiatives may be particularly beneficial for learners who experience difficulty engaging in Mathematics activities despite demonstrating satisfactory academic performance.

**For Future Researchers.** They are encouraged to investigate additional variables that may influence Mathematics achievement, including mathematics self-efficacy, mathematics anxiety, study habits, attendance, prior academic achievement, learning resources, instructional practices, and socioeconomic factors. Because the present study found no significant relationships between the student–teacher relationship, mathematics interest, and Mathematics performance, future studies may use multivariate or predictive research designs to examine the combined influence of multiple factors on mathematics achievement. Researchers may also conduct similar studies in other schools, grade levels, and educational settings to determine whether the findings generalize to broader populations. Comparative studies involving different student groups or longitudinal investigations may also provide deeper insights into how mathematics achievement develops over time.



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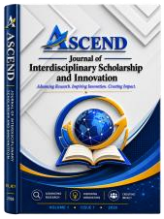

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