

TEACHER-RELATED FACTORS AND STUDENTS' ACADEMIC PERFORMANCE IN THE MATHEMATICS CLASSROOM

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ABSTRACT

This study explored the relationship between teacher-related factors and students' academic performance at San Andres National High School in Kadingilan, Bukidnon. The teacher-related factors considered were personality traits, teaching skills, and instructional materials — key elements consistently highlighted in educational research as crucial to teacher effectiveness, classroom interaction, instructional delivery, and student engagement. Using a descriptive-correlational design, data were collected from 51 Grade 11 STEM students through a structured Likert-scale questionnaire. The students' academic performance was determined based on their average grades in General Mathematics and Pre-Calculus during the first semester of the school year 2024–2025. Results showed that teacher-related factors were consistently demonstrated ($M = 4.30$, $SD = 0.31$). Among the three variables, personality traits ranked highest, followed by teaching skills and instructional materials. These findings suggest that the way teachers present themselves and build connections with students can influence classroom dynamics and engagement. The students demonstrated a very satisfactory level of academic performance, with an average mean score of 88.98. The correlation between teacher-related factors and students' academic performance was weak and negative ($r = -0.149$, $p = 0.298$), indicating that a slight increase in teacher-related factors corresponds with a slight decline in academic performance. However, this relationship is not statistically significant. These results suggest that although teacher-related factors are generally well-practiced, they may not be the primary contributors to students' success in mathematics. Future research is recommended to explore additional variables—such as students' attitudes, motivation, and home environment—to provide a more comprehensive understanding of the factors influencing academic performance.

Keyword: *personality traits, teaching skills, instructional material, teacher-related factors, mathematics academic performance*

1. INTRODUCTION

Mathematics serves as a foundation for many academic disciplines and is widely regarded as one of the most challenging subjects for learners. Students' performance in mathematics is shaped by numerous factors, particularly those associated with teachers, who play a vital role in creating a productive classroom environment, motivating learners, and encouraging active engagement. Research has shown that the quality of education strongly depends on the competence of teachers and the presence of a supportive learning environment (Kamayubonye & Mutarutinya, 2023).

Teacher-related factors include the knowledge, skills, and instructional practices that educators bring into the classroom—elements that significantly influence students' learning

outcomes. These aspects, such as personality traits, lesson planning, and teaching proficiency, have a direct connection to students' success in mathematics (Stronge, 2018). The Department of Education (DepEd) in the Philippines highlights the crucial role of teacher expertise in improving instructional quality. DepEd Order No. 42, series of 2016, *Policy Guidelines on Classroom Assessment for the K to 12 Basic Education Program*, emphasizes that teachers must possess both strong subject-matter knowledge and appropriate pedagogical techniques to address learners' needs effectively.

Additionally, DepEd Order No. 35, series of 2016, *National Educators Academy of the Philippines (NEAP) Continuous Professional Development Policy*, underscores the significance of ongoing professional development in enhancing teachers'

subject expertise and teaching effectiveness. The policy requires teachers to participate regularly in training and capacity-building programs to refine their knowledge and instructional strategies. It also encourages participation in subject-specific workshops and seminars to ensure that teachers remain equipped with current tools and methodologies.

Although teacher-related factors are known to influence student performance, there remains limited understanding of their specific impact on mathematics achievement across different school contexts. Challenges such as insufficient content knowledge, outdated teaching practices, and limited professional development opportunities often hinder effective mathematics instruction (Darling-Hammond et al., 2017). Hofkens and Pianta (2022) note that teacher–student relationships significantly shape student engagement and academic outcomes, particularly in mathematics. This insight is especially relevant in rural schools, where disparities in resources and teacher qualifications can negatively affect student learning. Furthermore, there is still a lack of localized research that investigates how these teacher-related factors influence student outcomes in Philippine classrooms, especially in rural public schools where professional development access remains inconsistent.

Given the vital role of teachers in mathematics instruction, examining how teacher-related factors affect students' academic performance is essential. Academic performance in mathematics is commonly assessed through students' grades, test scores, and their ability to apply mathematical concepts to real-life problems. Recent national examinations have revealed continuing issues in Filipino students' academic achievement. In the 2022 Programme for International Student Assessment (PISA), the Philippines' average mathematics score was 355—far below the OECD average of 472. This gap reflects a significant deficiency in foundational mathematical skills.

Furthermore, less than half of the Filipino students assessed demonstrated Level 2 competency, which represents the fundamental ability to apply mathematical concepts to everyday situations. According to the Second Congressional Commission on Education (EDCOM 2, 2024), the Philippine education system continues to face a severe learning crisis that weakens essential skills in reading, mathematics,

and science. The EDCOM 2 Year Two Report stressed the urgent need for systemic reforms to improve teaching quality, enhance teacher preparation, and address learning gaps—particularly in mathematics education. These findings underscore persistent challenges in mathematics instruction in the Philippines and highlight the need for targeted interventions to improve teaching methods, strengthen teacher training, and resolve systemic issues that hinder equitable learning outcomes.

A meta-analysis conducted by Callaman and Itaas (2020) also revealed that teacher preparation and teaching quality are crucial for improving mathematics achievement in Mindanao. Their study identified disparities in teacher effectiveness between public and private schools, which point to unequal access to training and resources. Furthermore, inadequate teacher preparation and inconsistent teaching practices contribute to learning gaps, particularly in under-resourced areas. Addressing these concerns through focused professional development and enhanced teacher training programs can help close achievement gaps and foster better mathematics learning outcomes.

This study, therefore, seeks to explore the relationship between teacher-related factors and students' academic performance in mathematics classrooms, focusing on a rural setting—San Andres National High School in Bukidnon. By examining the effects of variables such as personality traits, teaching skills, and instructional materials, this research aims to identify key areas for improvement that can enhance student outcomes. The findings of this study may inform teaching practices and education policies, contributing to stronger mathematics instruction and improved learner achievement.

2. STATEMENT OF THE PROBLEM

This study aimed to examine the relationship between teacher-related factors and the academic performance of Grade 11 STEM students in the mathematics classroom. Specifically, it sought to answer the following questions:

1. What is the level of teacher-related factors in the mathematics classroom as perceived in terms of:
 - a. Personality traits;

- b. Teaching skills; and
 - c. Instructional materials?
2. What is the level of students' academic performance as measured by their grades?
 3. Is there a significant relationship between teacher-related factors and students' academic performance in the mathematics classroom?

3. METHODOLOGY

3.1 Research Design

This study utilized a descriptive-correlational research design to explore the relationship between teacher-related factors and students' academic performance in mathematics. This design is appropriate for identifying relationships between variables without manipulating them, thereby enabling an objective analysis of existing conditions (Creswell, 2014). The investigation focused on three dimensions of teacher-related factors—personality traits, teaching skills, and instructional materials—and their possible correlation with students' academic performance.

3.2 Locale of the Study

The research was carried out at San Andres National High School (SANHS), located in Barangay San Andres, Kadingilan, Bukidnon. The school was established through Republic Act No. 7867 on January 20, 1995, to provide quality secondary education to the community. It is known for its commitment to academic excellence and offers various academic tracks, including the STEM strand, designed to prepare students for higher education and professional careers.

3.3 Respondents of the Study

The respondents consisted of 51 Grade 11 STEM students from the Newton and Einstein sections of San Andres National High School during the school year 2024–2025. These students were chosen because of their strong engagement in mathematics and exposure to different teaching strategies, which made them suitable participants for examining how teacher-related factors influence academic performance.

3.4 Data Gathering Procedure

The researchers used structured questionnaires to collect data from the respondents. Before the data collection, approval and informed consent were

obtained from the school administration and the students. All information collected from participants was kept strictly confidential to ensure the ethical integrity and reliability of the study.

3.5 Statistical Techniques

Descriptive statistics, such as the mean and standard deviation, were applied to determine the level of teacher-related factors and students' academic performance in mathematics. To analyse the relationship between these variables, the Pearson Product-Moment Correlation was used.

Meanwhile, the following methods were employed for scoring:

A. Teacher-related Factors

Range	Descriptive Rating	Qualitative Interpretation
4.20-5.00	Always	Consistently demonstrated
3.40-4.19	Often	Frequently observed
2.60-3.39	Sometimes	Inconsistently applied
1.80-2.59	Rare	Rarely observed
1.00-1.79	Never	Not evident

B. Students' Academic Performance

Grading Scale	Descriptor	Interpretation
90 - 100	Outstanding	Shows excellent mastery in all learning domains.
85 - 89	Very Satisfactory	Demonstrates strong understanding and skill application.
80 - 84	Satisfactory	Shows adequate understanding and essential skills.
75 - 79	Fairly Satisfactory	Meets minimum standards but requires improvement.
Below 75	Did not meet Expectation	Struggles to understand concepts and lacks basic skills.

4. RESULTS AND DISCUSSION

Table 1. Summary of the Level of Teacher-Related Factors

Indicator	Mean	SD	Qualitative Interpretation
Personality Traits	4.56	0.34	Consistently demonstrated
Teaching Skills	4.43	0.37	Consistently demonstrated
Instructional Materials	3.91	0.52	Frequently observed
Overall Mean	4.30	0.41	Consistently demonstrated

Legend:

Range	Descriptive Rating	Qualitative Interpretation
4.20 - 5.00	Always	Consistently demonstrated
3.40 - 4.19	Often	Frequently observed
2.60 - 3.39	Sometimes	Inconsistently applied
1.80 - 2.59	Rare	Rarely observed
1.00 - 1.79	Never	Not evident

As shown in Table 1, Personality Traits ($M = 4.56$, $SD = 0.34$) and Teaching Skills ($M = 4.43$, $SD = 0.37$) were both interpreted as *Consistently Demonstrated*, while Instructional Materials ($M = 3.91$, $SD = 0.52$) was rated as *Frequently Observed*. The relatively low standard deviation across all indicators shows that students generally agree in their responses, suggesting consistency in how they perceive these teacher-related factors in the classroom. However, the slightly higher SD for Instructional Materials (0.52) indicates greater variation in student experiences. Some classrooms may be well-equipped and resource-rich, while others may have limited access to instructional tools.

The results indicate that personality traits are among the key teacher-related factors influencing students' academic performance in mathematics. This finding suggests that mathematics teachers often display positive personal qualities such as approachability, patience, enthusiasm, and professionalism—all of which are essential for creating a supportive and motivating learning environment. These characteristics help build students' confidence and engagement, leading to improved learning outcomes.

The consistently high mean for teaching skills also reflects teachers' strong ability to deliver content, manage classroom dynamics, and apply effective instructional strategies. However, the lower mean score and greater variation for instructional materials highlight an area for improvement. Although teachers demonstrate solid interpersonal and instructional abilities, limited and inconsistent use of varied teaching resources may hinder students from achieving optimal learning outcomes. Schools and educational authorities should therefore help teachers gain better access to a wider range of instructional materials. Providing diverse resources—such as real-world texts, manipulatives, and digital tools—can enrich instruction, deepen understanding, and bridge the gap between theoretical knowledge and practical application in mathematics education.

These findings show that students view their teachers' personal qualities and teaching abilities as major contributors to their academic success. Stronge (2018) emphasized that teacher-related factors such as classroom management, content expertise, and the ability to connect with students are critical in fostering successful learning experiences. The consistently high ratings in

personality traits and teaching skills suggest that teachers demonstrate enthusiasm, patience, and professionalism, all of which are vital for sustaining a positive learning environment.

Moreover, these findings align with Hattie's (2009) conclusion that teacher effectiveness—which includes the ability to explain concepts clearly and manage the classroom—significantly impacts student achievement. Shulman (1986) further reinforced this by highlighting the importance of pedagogical content knowledge, where a deep understanding of both subject matter and teaching strategies helps teachers make mathematics more comprehensible to learners.

Conversely, the lower and more varied ratings in instructional materials ($SD = 0.52$) reveal inconsistencies in how teaching resources are utilized. Some teachers effectively integrate various tools and materials, but others may have limited access or training. This supports Kamayubonye and Mutarutinya's (2023) argument that a quality teaching environment—supported by sufficient instructional resources—is crucial for quality education. Therefore, schools and educational leaders should focus on improving access to diverse and updated teaching materials to enhance learning experiences for all students.

Table 2. Level of Students' Academic Performance in Mathematics

Grading Scale	Frequency	Percent	Descriptor
90 – 100	20	39.21	Outstanding
85 – 89	24	47.06	Very Satisfactory
80 – 84	7	13.73	Satisfactory
75 - 79	0	0	Fairly Satisfactory
Below 75	0	0	Did not meet Expectation
Total	51	100	
Mean = 88.98			Very Satisfactory

Legend:

Grading Scale	Descriptor
90 - 100	Outstanding
85 - 89	Very Satisfactory
80 - 84	Satisfactory
75 - 79	Fairly Satisfactory
Below 75	Did not meet Expectation

As shown in Table 2, 20 students (39.21%) scored within the 90–100 range (Outstanding), 24 students (47.06%) obtained scores between 85–89, and 7 students (13.73%) scored from 80–84. Notably, no student scored below 80.

These results indicate that students' overall academic performance in mathematics is notably high, with an average score of 88.98. Nearly half of the students (47.06%) performed within the 85–89 range, showing strong academic outcomes, while 39.21% achieved outstanding results (90–100), reflecting excellent comprehension and mastery of mathematical concepts. The absence of students scoring below 80 suggests that the teaching strategies employed are effective and that a supportive learning environment exists in the classroom.

The findings underscore the importance of maintaining and strengthening effective teaching practices, particularly in the areas of teaching skills and teacher personality, which have consistently contributed to positive student outcomes. Although the use of instructional materials received a slightly lower rating, student performance remained strong, likely due to teachers' strong presence, interpersonal skills, and effective delivery. Expanding the use of diverse and interactive teaching resources could further improve outcomes, particularly for students within the 80–84 range. This highlights the potential for continued academic improvement through enriched materials and more individualized instruction.

Students' consistent performance demonstrates a high level of engagement and understanding of mathematical concepts. This achievement can be partly attributed to strong teacher–student relationships and consistent feedback, both of which play a vital role in fostering student growth. Felipe and Punzalan (2022) emphasized that meaningful feedback and teacher support enhance student motivation and academic improvement. Likewise, Hattie (2009) affirmed that such interactions enhance student achievement, reinforcing that a positive and supportive classroom environment enables students to excel in demanding subjects like mathematics.

Furthermore, the value of digital tools in learning should not be underestimated. Jablonka (2020) found that technology integration allows students to work at their own pace and engage more actively in problem-solving activities. Although instructional materials received slightly lower ratings in this study, overall student performance remained strong—likely due to effective teaching strategies and active engagement. Still, incorporating more interactive tools and updated

online resources could lead to even better learning outcomes, particularly for students performing in the lower range.

Other contributing factors, such as students' socioeconomic conditions and psychological well-being, may also influence academic results. Wild and Neef (2023) noted that access to educational resources and home support plays a significant role in student achievement. Similarly, Yang et al. (2021) found that learners with a growth mindset and low levels of math anxiety tend to perform better. These insights emphasize the importance of continuous efforts to support students both inside and outside the classroom through encouragement, inclusive practices, and accessible resources. Such measures can help sustain—and potentially improve—current levels of academic achievement in mathematics.

Table 3. Correlation Analysis between the independent variable and students' academic performance in mathematics

Variable	r-value	p-value
Teacher-Related Factors	-0.15	0.30 ^{ns}
Personality Traits	-0.23	0.11
Teaching Skills	-0.20	0.15
Instructional Material	0.02	0.87

Ns – Not Significant

As shown in Table 3, the correlation coefficient (r-value) between teacher-related factors and students' academic performance in mathematics is -0.15 , with a p-value of 0.30. The negative r-value indicates a weak inverse relationship, while the p-value shows that this correlation is not statistically significant ($p > 0.05$). Therefore, the results suggest that teacher-related factors have no significant correlation with students' academic performance in mathematics based on this analysis.

The results in Table 3 reveal that teacher-related factors are not statistically associated with students' mathematics performance, as evidenced by a correlation coefficient of $r = -0.15$ and a p-value of 0.30. This finding implies that the teacher-related variables examined—namely, personality traits, teaching skills, and instructional materials—do not have a measurable or direct effect on students' academic outcomes in mathematics.

When analyzed individually, personality traits displayed a weak negative correlation ($r = -0.23$, $p = 0.11$), while teaching skills also showed a weak

negative relationship ($r = -0.20$, $p = 0.15$). Meanwhile, instructional materials revealed an extremely weak positive correlation ($r = 0.02$, $p = 0.87$), indicating virtually no connection between the materials used and students' academic performance.

These findings suggest that improving students' academic performance in mathematics may require a broader and more multifaceted approach that extends beyond teacher-related characteristics alone. While effective teaching is undeniably important, the results indicate that its individual influence on student outcomes may be limited. Other factors—such as student motivation, attitude toward mathematics, parental support, socioeconomic background, classroom environment, peer influence, curriculum design, and access to learning resources—may exert a more substantial impact on achievement. Therefore, education stakeholders and policymakers should consider these additional elements when developing strategies to enhance mathematics learning outcomes.

The results also emphasize the importance of conducting further empirical studies to determine the primary factors influencing students' success in mathematics. Although teacher quality remains a key component of the learning process, the findings suggest that its effect may be indirect or dependent on how it interacts with other variables. For instance, even highly skilled teachers may find it challenging to produce significant learning gains if students lack motivation, face emotional difficulties, or do not receive adequate support both at home and at school.

Although many previous studies have highlighted the positive effects of teacher-related variables on student achievement, the present study provides a more contextualized understanding. Totto et al. (2015) emphasized that mathematical content knowledge and the use of effective, evidence-based strategies significantly enhance student comprehension and engagement. Similarly, OECD (2023) and Darling-Hammond et al. (2017) stressed the value of differentiated instruction and learner-centered approaches. However, the weak and statistically insignificant correlations observed in this study suggest that teacher-related qualities may not have the same degree of influence in every context—particularly in settings where systemic challenges, student

mindset, or socio-emotional factors play more dominant roles.

This perspective aligns with findings by Capuno et al. (2019), who reported that students' motivation, self-confidence, and personal attitudes toward mathematics were stronger determinants of performance than instructional methods or materials. Additional barriers—such as teacher turnover, large class sizes, limited instructional time, and outdated or insufficient resources (OECD, 2023; DepEd, 2018)—can also weaken the impact of even the most qualified teachers.

Therefore, while teacher-related factors should remain a focus of educational improvement, this study emphasizes the need for a holistic framework that integrates teacher quality with contextual and learner-specific variables. Enhancing mathematics performance requires reforms that promote socio-emotional development, positive learner attitudes, resource adequacy, and collaborative learning environments. As noted by Blazar (2015) and Hamre & Pianta (2015), students achieve more effectively when instructional quality is supported by emotionally responsive classrooms and stable school systems. Hence, a comprehensive and learner-centered approach is essential to advance academic performance in mathematics.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the result of the study, the following conclusions was derived:

The study found that teacher-related factors, as perceived by students, were generally rated as Consistently Demonstrated in terms of personality traits and teaching skills, while instructional materials were rated as Frequently Demonstrated. This means that teachers are viewed positively in both their personal and professional attributes; however, the availability and effective use of instructional materials appear to be somewhat limited.

Students' academic performance in mathematics, as measured by their grades, was found to be satisfactory overall. While many students showed a solid grasp of mathematical concepts, some demonstrated only average levels of performance.

There was no significant relationship between teacher-related factors and students' academic

performance in mathematics, as indicated by a weak negative correlation and a p-value greater than 0.05. This finding implies that teacher-related factors, though important, did not exert a statistically measurable effect on students' mathematics achievement within the scope of this study.

5.2 Recommendations

The following recommendations are presented concerning the teacher-related factors and the academic performance of Grade 11 STEM students in mathematics, based on the findings and conclusions of this study.

From the findings on the level of teacher-related factors, it is advisable for school administrators to focus on improving instructional materials to complement the consistently high levels of teachers' personality traits and teaching skills. Providing sufficient, updated, and well-integrated learning resources can enhance classroom instruction and student engagement. Teachers and administrators should continue nurturing strong personal and professional qualities while addressing gaps in instructional support to ensure a more effective learning process.

Considering the students' level of academic performance, teachers should apply differentiated instruction and provide enrichment or remedial activities to assist learners who are performing below expectations. School administrators can strengthen this initiative by allocating adequate time and resources for targeted interventions. Students are also encouraged to actively participate in supplementary programs that deepen their mathematical understanding and promote continuous academic growth.

Since the study found no significant relationship between teacher-related factors and students' academic performance, researchers and policymakers are encouraged to examine other potential influences on mathematics achievement, such as student-related, environmental, and curriculum-based factors. While continuous teacher development remains essential, future studies should adopt a broader perspective that incorporates various elements affecting student learning, thereby contributing to a more holistic understanding of the determinants of academic success in mathematics.

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