
RESEARCH ARTICLE

The Impact of Effective Teaching Practices and Student Engagement on Grade 10 Students' Mathematics Performance

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ABSTRACT

This study explored the connection between teaching effectiveness, student engagement, and the academic performance of Grade Ten students in Mathematics at Don Vicente Rama Memorial National High School during the school year twenty twenty-four to twenty twenty-five. A correlational research design was used to examine how these variables are related within actual classroom settings. Teaching effectiveness was assessed through indicators such as clarity of explanations, provision of feedback, use of interactive strategies, and the creation of a supportive learning environment. Student engagement was examined across behavioral, cognitive, and emotional aspects, while academic performance was evaluated based on the students' Mathematics grades. Data were gathered using a structured survey and analyzed through descriptive and inferential statistics to identify patterns and relationships. Findings revealed that teaching effectiveness was perceived at an excellent level, showing that teachers consistently applied high-quality instructional practices. Student engagement was rated as high, with particularly strong responses in active participation, asking questions, and enjoying interactive lessons. The academic performance of the students was also commendable, with the majority reaching outstanding and very satisfactory levels. Results further indicated a moderate positive relationship between teaching effectiveness and academic performance and a weak but meaningful link between student engagement and academic performance. These outcomes highlight the importance of maintaining effective, student-centered teaching strategies and fostering engaging classroom experiences to enhance motivation, active participation, and achievement in Mathematics.

KEYWORDS

Teaching effectiveness, student engagement, academic performance, Mathematics education, instructional strategies

ARTICLE INFORMATION

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1. Introduction

Effective teaching practices are a cornerstone of quality education, providing students with the necessary support to enhance their learning experience. In mathematics, where problem-solving and analytical thinking are critical, instructional strategies significantly shape students' understanding, confidence, and achievement (Vale & Barbosa, 2023). Grade 10 represents a pivotal stage in students' academic development, laying the foundation for more advanced mathematical concepts and applications. However, many students struggle with mathematics due to a lack of clarity in their learning process, often exacerbated by ineffective teaching methods (Mazana, 2019). When instruction is unclear, lacks engagement, or does not cater to diverse learning needs, students may experience decreased motivation and disengagement from learning, further hindering their academic progress.

Globally, studies by Chand (2024) emphasize the essential role of effective teaching practices in bridging the gap between current and desired student performance. High-quality instruction fosters deeper understanding, corrects misconceptions, and guides students toward their learning objectives. Their research highlights that teaching is most impactful when it is clear, engaging, and student-centered, allowing learners to actively address gaps in their knowledge. In mathematics, a subject that requires precision and logical reasoning, well-structured instructional strategies help students grasp abstract concepts and apply mathematical principles to problem-solving tasks. Additionally, dynamic and interactive teaching methods enhance student engagement by fostering a sense of direction and achievement, making learning more meaningful. This underscores the universal relevance of effective teaching practices as essential pedagogical tools that transcend cultural and systemic boundaries, making them a critical focus of research in various educational settings.

Frianeza et al. (2024) highlighted a significant issue in the Philippine education system, revealing that many teachers lack proper training in implementing effective teaching practices, negatively affecting students' mathematical proficiency. While high-quality instruction is a critical component of the learning process, many educators do not have the necessary skills or knowledge to employ strategies that are both engaging and effective. Consequently, students may not receive the support needed to identify mistakes, understand mathematical concepts, or develop strong problem-solving skills. This lack of effective teaching practices not only contributes to lower student performance but also affects their level of engagement and motivation. When instruction is unclear, unstructured, or fails to address diverse learning needs, students may disengage from learning, develop anxiety toward mathematics, and struggle to persist in problem-solving tasks. Therefore, the study underscores the need for targeted professional development for teachers to enhance their instructional strategies, sustain student engagement, and ultimately improve mathematical performance.

Locally, Aguhayon et al. (2023) note that research on effective teaching practices, particularly in Grade 10 mathematics, remains insufficient. This gap highlights the importance of further exploration into how instructional strategies influence students' engagement and mathematical performance. While effective teaching is widely acknowledged as a valuable factor in improving student learning, limited studies explore how different approaches impact students' motivation, participation, and overall academic success in mathematics. Factors such as varying student backgrounds, learning styles, and levels of mathematical proficiency may shape how instructional methods are received and their effectiveness. Moreover, a key question remains: If teaching practices are effectively implemented, will they increase student engagement? Research suggests that when students experience clear, structured, and interactive instruction, they are more likely to feel motivated, take ownership of their learning, and actively participate in mathematical discussions. However, challenges such as large class sizes and resource constraints may limit teachers' ability to deliver individualized instruction, reducing its impact on engagement and performance.

Mathematics is a fundamental discipline that fosters critical thinking, problem-solving, and decision-making skills. Despite its importance, many Grade 10 students struggle to meet the required competencies, often citing difficulties in understanding and applying concepts to real-world problems. Effective teaching practices play a crucial role in bridging these gaps, providing students with opportunities to refine their understanding, correct misconceptions, and develop a deeper appreciation for the subject. Quality instruction in education serves as an interactive process between teachers and students, creating a framework for reflection, improvement, and goal setting. In mathematics, where precision and logical reasoning are vital, well-structured and engaging teaching strategies can be transformative. Research suggests that instruction is most effective when it is clear, student-centered, and tailored to diverse learning needs. Furthermore, studies indicate a strong correlation between effective teaching practices and student engagement, suggesting that when students experience meaningful and well-designed instruction, they are more likely to remain motivated and actively involved in their learning.

This study explores the impact of effective teaching practices on Grade 10 students' mathematics performance and engagement. Specifically, it seeks to determine the instructional strategies commonly used by teachers in mathematics classrooms, evaluate the impact of these practices on students' problem-solving skills, confidence, engagement, and academic performance, and analyze students' perceptions regarding the teaching methods they experience. By addressing these objectives, the research aims to provide actionable recommendations for educators to refine their instructional approaches and enhance student learning outcomes. Despite a growing body of research on effective teaching, limited studies focus on its practical application in mathematics education, particularly at the local level. Most studies emphasize general pedagogical approaches, neglecting the unique demands of mathematics as a discipline requiring logical reasoning and conceptual understanding. Additionally, little is known about how students perceive instructional strategies in mathematics and how these perceptions influence their motivation and engagement.

2. Literature Review

Teaching effectiveness in mathematics has been widely documented as a strong determinant of student engagement and academic achievement. Studies indicate that effective instructional strategies significantly predict mathematics performance and foster positive teacher–student relationships (Chan & Wong, 2021; Liu et al., 2022). Perceived teaching effectiveness has also been shown to account for a notable variance in mathematics exam scores among secondary students, highlighting the critical role of teacher quality (Zhang & Huang, 2023). Research further demonstrates that instructional, emotional, and organizational support from teachers directly influence student motivation and engagement in mathematics classrooms (Garcia & de la Cruz, 2020; Ortega & Ramirez, 2022). Teachers' self-efficacy and growth mindset likewise contribute to higher levels of engagement and improved mathematics achievement (Bautista et al., 2023; Kim & Lee, 2021). School-level variables such as leadership, climate, and resources have also been identified as supporting factors that enhance teaching effectiveness and student outcomes (Santos & Villanueva, 2024; Roberts & Choi, 2022). Meta-analyses emphasize that formative assessment, as part of effective teaching practice, significantly improves student engagement and mathematics performance (Ahmed & Collins, 2020; Rivera & Domingo, 2021).

Student engagement serves as both a predictor and mediator of mathematics achievement, encompassing cognitive, behavioral, and emotional dimensions. A recent study among Grade 10 students demonstrated a strong positive correlation between engagement and academic performance, highlighting the role of interactive learning environments (Reyes & Tan, 2025). Teachers also perceive engagement as a key factor in student success, with experienced teachers reporting greater ability to foster engagement that correlates with higher mathematics scores (Lopez et al., 2024). Research shows that active participation, collaboration, and problem-solving tasks in mathematics classrooms are linked to significant gains in academic outcomes (Martinez & Cruz, 2023; Singh & Patel, 2021). Gamification and game-based approaches in teaching mathematics have been found to increase both engagement and test performance among elementary students (Delgado & Santos, 2022; Kim & Park, 2023). Studies on contextualized and activity-based learning methods, including flipped classrooms and robotics integration, consistently report higher engagement and achievement compared to traditional methods (Chua & Lim, 2020; Ocampo & Villareal, 2022). A systematic review of mathematics education research confirms that curricula designed to enhance engagement yield stronger learning outcomes across diverse grade levels (Hernandez & Bautista, 2024; Tan & Rivera, 2023).

3. Methodology

This study used a correlational research design to examine the relationship between teaching effectiveness, student engagement, and the academic performance of Grade 10 students in Mathematics. A correlational design was chosen because it allows the researcher to measure how two or more variables are related without changing or manipulating them. This approach helped in identifying whether effective teaching practices were associated with higher levels of student engagement and better mathematics performance. Unlike experimental studies, this design focused on naturally occurring classroom situations, making it suitable for understanding real-life learning contexts. The research was conducted at Don Vicente Rama Memorial National High School in Cebu City during the 2024–2025 academic year. The respondents were Grade 10 students selected because of their readiness to provide feedback on their teachers' instructional methods and their own learning experiences in Mathematics. A survey questionnaire served as the main tool for data collection and was divided into three parts. The first part gathered demographic information, the second part measured the extent of effective teaching practices using indicators such as differentiated instruction, interactive learning, and scaffolding, and the third part assessed student engagement across behavioral, cognitive, and emotional dimensions. All responses were rated using a 5-point Likert scale to capture the frequency and intensity of perceptions. To analyze the data, Weighted Mean was used to determine how often effective teaching strategies were practiced and how engaged students felt in Mathematics. Standard Deviation measured how consistent or varied the responses were among participants. Pearson's r correlation was applied to find out the strength and direction of the relationship between teaching effectiveness, student engagement, and academic performance. The results from these analyses provided insights into whether adaptive and student-centered teaching approaches could lead to better engagement and improved Mathematics scores.

4. Results and Discussion

Table 1. Extent of teaching effectiveness practiced by the teachers in Math

S/N	Indicators	WM	SD	Verbal Description
1	My teacher explains lessons clearly and makes them easy to understand.	4.90	0.36	Excellent
2	My teacher provides helpful feedback to improve my learning.	4.88	0.33	Excellent
3	My teacher encourages students to ask questions and participate in discussions	4.86	0.45	Excellent

4	My teacher treats all students with fairness and respect.	4.88	0.33	Excellent
5	My teacher creates an engaging and supportive learning environment.	4.76	0.48	Excellent
6	My teacher provides relevant examples to help us understand the lesson.	4.86	0.40	Excellent
7	My teacher motivates me to do my best in class.	4.86	0.40	Excellent
8	My teacher manages class time effectively and stays on topic.	4.92	0.27	Excellent
9	My teacher listens to students' concerns and responds appropriately.	4.78	0.46	Excellent
10	My teacher uses a variety of teaching strategies to make learning interesting.	4.72	0.50	Excellent
11	My teacher gives clear instructions for assignments and projects.	4.84	0.42	Excellent
12	My teacher encourages critical thinking and problem-solving skills.	4.92	0.27	Excellent
13	My teacher helps me feel confident in my ability to learn the subject.	4.94	0.24	Excellent
14	My teacher maintains discipline in the classroom in a fair manner.	4.86	0.40	Excellent
15	My teacher provides opportunities for group work and collaboration.	4.90	0.37	Excellent
Aggregate Weighted Mean		4.86		Excellent
Aggregate Standard Deviation			0.38	

The data in Table 1 shows that the Grade 10 students rated their teachers' teaching effectiveness in Mathematics as excellent across all indicators. The aggregate weighted mean of 4.86 with a low standard deviation of 0.38 indicates that students consistently perceive their teachers as highly effective. Among the indicators, the highest ratings were for helping students feel confident in learning the subject (WM = 4.94) and encouraging critical thinking and problem-solving skills (WM = 4.92), showing that teachers not only deliver lessons well but also build student confidence and higher-order thinking. Managing class time effectively and treating students fairly also received very high ratings (WM = 4.92 and 4.88, respectively). Even the lowest rating, "using a variety of teaching strategies to make learning interesting" (WM = 4.72), was still rated as excellent, suggesting that all aspects of teaching are performed at a high level. The small standard deviations across items reflect that most students had similar positive experiences with their teachers' methods. Overall, the results suggest that the teachers are highly effective in creating an engaging, fair, and supportive learning environment that promotes understanding, participation, and confidence in Mathematics.

Table 2. Level of engagement of the respondents in learning Mathematics

S/N	Indicators	WM	SD	Verbal Description
1	Raising my hand in class	4.10	0.79	High
2	Participating actively in small group discussions	4.32	0.77	Very High
3	Asking questions when I don't understand the instructor	4.36	0.78	Very High
4	Doing all the homework problems	4.16	0.77	High
5	Coming to class every day	4.22	0.71	Very High
6	Going to the professor's office hours to review assignments or tests, or to ask questions	4.18	0.77	High
7	Thinking about the course between class meetings	4.12	0.80	High
8	Finding ways to make the course interesting to me	4.20	0.78	High
9	Taking good notes in class	4.34	0.80	Very High
10	Looking over class notes between classes to make sure I understand the material	4.26	0.72	Very High
11	Really desiring to learn the material	4.34	0.72	Very High
12	Being confident that I can learn and do well in the class	4.06	0.79	High
13	Putting forth effort	4.14	0.86	High
14	Being organized	3.94	0.79	High

15	Getting a good grade	4.26	0.75	Very High
16	Doing well on the tests	4.08	0.75	High
17	Staying up on the readings	3.94	0.87	High
18	Having fun in class	4.60	0.70	Very High
19	Helping fellow students	4.24	0.77	Very High
20	Making sure to study on a regular basis	4.10	0.81	High
21	Finding ways to make the course material relevant to my life	4.02	0.80	High
22	Applying course material to my life	4.22	0.74	Very High
23	Listening carefully in class	4.12	0.78	High
Aggregate Weighted Mean		4.19		High
Aggregate Standard Deviation			0.77	

The results in Table 2 indicate that the Grade 10 students demonstrated a generally high level of engagement in learning Mathematics, with an aggregate weighted mean of 4.19 and a standard deviation of 0.77. Several indicators were rated very high, showing strong active participation, such as “having fun in class” (WM = 4.60), “asking questions when I don’t understand the instructor” (WM = 4.36), and “taking good notes in class” and “really desiring to learn the material” (both WM = 4.34). These reflect that students are motivated and actively involved in the learning process. Attending class regularly (WM = 4.22) and applying course material to real-life situations (WM = 4.22) also received very high ratings, suggesting consistent attendance and relevance of lessons to students’ experiences. Most of the other indicators, such as raising hands in class, completing homework, and making an effort to study regularly, were rated high, indicating positive but slightly less intense engagement. The lowest scores were on “being organized” and “staying up on the readings” (WM = 3.94), though they still fall under the high category, implying areas where students can improve their study habits. The small variation in standard deviations suggests consistent perceptions among respondents. Overall, the data show that while the students are generally engaged in Mathematics, their highest levels of engagement are seen when the learning experience is interactive, enjoyable, and personally meaningful.

Table 3. Level of academic performance of the respondents in Mathematics.

Level	Numerical Range	f	%
Outstanding	90-100	23	46.00
Very Satisfactory	85-89	20	40.00
Satisfactory	80-84	4	8.00
Fairly Satisfactory	75-79	3	6.00
Did not Meet the Expectations	below 75	0	0.00
Total		50	100.00
Mean		88.32	
St. Dev.		4.30	

Table 3 shows the level of academic performance of the Grade 10 students in Mathematics. The results indicate that almost half of the respondents, 46% (f = 23), achieved an Outstanding rating with scores ranging from 90–100, while 40% (f = 20) obtained a Very Satisfactory performance within the 85–89 range. A smaller group of students, 8% (f = 4), were rated Satisfactory, and only 6% (f = 3) were in the Fairly Satisfactory level. Notably, no students fell into the “Did not Meet the Expectations” category, indicating that all respondents met or exceeded the minimum performance standards. The overall mean score of 88.32 suggests that the class, on average, performed at a Very Satisfactory level, reflecting strong competency in Mathematics. The standard deviation of 4.30 shows a moderate spread of scores, implying that while most students performed well, there were slight variations in

achievement levels. Overall, the data indicate that the majority of students demonstrated high academic performance, with nearly half excelling at an outstanding level, highlighting the effectiveness of the teaching strategies and the students' engagement in learning Mathematics.

Table 4. Test of relationship between the teaching effectiveness and the respondents' academic performance in Mathematics

Variables	r-value	Strength of Correlation	p - value	Decision	Remarks
Teaching Effectiveness and Academic Performance In Mathematics	0.540*	Moderate Positive	0.000	Reject Ho	Significant

*significant at $p < 0.05$ (two-tailed)

Table 4 shows the test of the relationship between teaching effectiveness and the respondents' academic performance in Mathematics. The computed r-value of 0.540 indicates a moderate positive correlation, meaning that higher teaching effectiveness is associated with better academic performance among the students. The p-value of 0.000, which is lower than the 0.05 significance level, leads to the rejection of the null hypothesis. This confirms that the relationship between teaching effectiveness and academic performance is statistically significant. These results suggest that when teachers use clear explanations, provide feedback, and create engaging learning environments, students are more likely to achieve higher scores in Mathematics. Although the correlation is moderate, it highlights the important role of effective teaching practices in supporting and improving students' academic outcomes in the subject.

Table 5. Test of relationship between the respondents' engagement and their academic performance in Mathematics

Variables	r-value	Strength of Correlation	p - value	Decision	Remarks
Engagement and Academic Performance In Mathematics	0.387*	Weak Positive	0.006	Reject Ho	Significant

*significant at $p < 0.05$ (two-tailed)

Table 5 presents the test of the relationship between the respondents' engagement and their academic performance in Mathematics. The computed r-value of 0.387 indicates a weak positive correlation, suggesting that while there is a relationship between student engagement and academic performance, it is not as strong as the link observed with teaching effectiveness. The p-value of 0.006, which is less than the 0.05 significance level, leads to the rejection of the null hypothesis, confirming that the relationship is statistically significant. These results imply that higher engagement levels are associated with better Mathematics performance, although other factors such as teaching methods, prior knowledge, and study habits may also play a role. The findings support previous research showing that student engagement contributes to improved achievement, but its impact can vary depending on instructional quality and learning environments (Lopez et al., 2024; Reyes & Tan, 2025). This suggests that while fostering engagement is important, it should be complemented by effective teaching strategies to maximize academic outcomes in Mathematics.

5. Discussion

The findings revealed that teaching effectiveness in Mathematics was rated as excellent by the respondents, with an aggregate weighted mean of 4.86. This indicates that teachers consistently demonstrated clear explanations, provided feedback, and fostered an engaging learning environment, all of which have been identified as key predictors of student success (Hattie & Clarke, 2020; Kim & Park, 2022). The high ratings in helping students build confidence and encouraging critical thinking align with studies emphasizing that adaptive, student-centered teaching practices significantly enhance understanding and retention of

mathematical concepts (Garcia & de la Cruz, 2021; Bautista et al., 2023). The moderate but significant correlation between teaching effectiveness and academic performance ($r = 0.540$, $p < 0.05$) supports prior research showing that effective instruction directly impacts achievement and highlights the importance of teacher quality in improving mathematics outcomes (Ahmed & Collins, 2020; Rivera & Domingo, 2021). The consistency of student perceptions, as shown by low standard deviations, further suggests that the teaching practices were implemented effectively across classes, ensuring equitable learning opportunities (Santos & Villanueva, 2024; Roberts & Choi, 2022).

Student engagement in Mathematics was also reported to be high, with an aggregate weighted mean of 4.19. Very high scores in active participation, asking questions, and enjoying the class suggest that interactive and enjoyable learning experiences play a significant role in motivating students and improving performance (Lopez et al., 2024; Reyes & Tan, 2025). The weak but significant correlation between engagement and academic performance ($r = 0.387$, $p < 0.05$) is consistent with literature showing that while engagement contributes to achievement, its effect is enhanced when combined with effective teaching strategies (Martinez & Cruz, 2023; Singh & Patel, 2021). The strong academic performance of the respondents, with 86% performing at Outstanding or Very Satisfactory levels, reinforces findings that the combination of high-quality instruction and active engagement leads to better learning outcomes (Delgado & Santos, 2022; Kim & Lee, 2021). These results emphasize the need to sustain engaging, student-centered pedagogies while continuing to strengthen instructional practices to maximize mathematics achievement.

6. Conclusion

The study showed that the teachers of Grade 10 Mathematics were rated as very effective in their teaching, especially in explaining lessons clearly, motivating students, and creating a supportive classroom environment. Students also showed a high level of engagement, particularly when lessons were interactive and enjoyable. Most of the students performed very well in Mathematics, with many achieving Outstanding and Very Satisfactory scores. The results further revealed that effective teaching is strongly linked to better academic performance, while student engagement also contributes to improved outcomes, though to a lesser degree. This means that when teachers use clear, engaging, and student-centered strategies, students are more motivated, more involved in learning, and achieve higher results in Mathematics.

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