

BRIDGING THE GAP BETWEEN CLASSROOM PARTICIPATION AND QUIZ PERFORMANCE IN GRADE 10 MATHEMATICS: A STUDY IN THE DIVISION OF OROQUIETA CITY

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DOI: 10.47760/cognizance.2026.v06i02.024

ABSTRACT: Mathematics is often regarded as one of the most challenging subjects in secondary education, yet it is also one of the most essential. The study aimed to examine the correlation between participation and quiz scores. It also seeks to provide localized insights that can inform teaching strategies, professional development, and curriculum implementation in the Division of Oroquieta City. The study employed a correlational research design to investigate the relationship between classroom participation and mathematics quiz performance among 100 Grade 10 learners, which was identified through stratified random sampling. The results revealed a nearly perfect positive correlation. For the regression results, the equation derived from the model is: $\text{Quiz Score} = 39.637 + 11.540 \text{ Participation}$. This equation indicates that for every one-unit increase in participation score, the predicted quiz score increases by approximately 11.54 points. The unstandardized coefficient for participation ($Y = 11.540$) is notably high, suggesting a substantial effect size. The associated standard error ($SE B = 0.167$) is minimal, and the t-value ($t = 69.14$) is exceptionally large, further confirming the strength of the relationship. The p-value ($p = 0.001$) is well below the conventional threshold of 0.05, indicating that the effect of participation on quiz scores is statistically significant. The constant ($X = 39.637$) represents the expected quiz score when participation is zero, although in practice, participation scores in the dataset range from 3.0 to 4.4. The high t-value for the constant ($t = 62.58$) and its low p-value ($p = 0.001$) suggest that the intercept is also statistically meaningful. Classroom participation plays a significant role in supporting mathematics quiz performance among Grade 10 learners in the Division of Oroquieta City. While participation enhances comprehension and retention, it is not the sole determinant of academic success. Bridging the gap requires a holistic approach that combines active engagement with structured learning strategies, feedback, and inclusive pedagogy. Teachers are encouraged to create mathematics classroom environments that promote participation while addressing diverse learning needs. By situating the study within the Division of Oroquieta City, the findings provide localized insights that can inform DepEd initiatives and teacher training programs. Ultimately, fostering both participation and achievement contributes to the broader goal of improving mathematics education quality in the Division and in the province as a whole.

Keywords: Classroom Participation, Mathematics Quiz Performance, Active Engagement, Correlation, Regression

INTRODUCTION

Mathematics is often regarded as one of the most challenging subjects in secondary education, yet it is also one of the most essential. At the Grade 10 level, learners in the Division of Oroquieta City are expected to master foundational competencies in algebra, geometry, statistics, and trigonometry, which serve as prerequisites for senior high school and higher education pathways. The Department of Education (DepEd) emphasizes learner-centered pedagogy, encouraging active participation in classroom activities to foster deeper understanding and retention of mathematical concepts (Department of Education, 2023).

Classroom participation in mathematics goes beyond mere attendance; it involves active engagement such as answering questions, solving problems on the board, contributing to group discussions, and explaining reasoning processes. These behaviors are believed to enhance comprehension, critical thinking, and confidence in problem-solving (Kusmaryono, & Wijayanti, 2023). However, despite the theoretical benefits, the actual impact of participation on measurable academic outcomes, such as quiz performance, remains a subject of debate. Studies in the Philippine context suggest that while engagement positively influences motivation and confidence, its direct correlation with achievement outcomes varies depending on instructional strategies and learner readiness (Çali *et al.*, 2023).

In the Division of Oroquieta City, teachers face unique challenges, including diverse learner readiness, large class sizes, and limited instructional resources. These contextual realities make it imperative to investigate whether classroom participation truly translates into improved mathematics performance. By examining the correlation between participation and quiz scores, this study aims to provide localized insights that can inform teaching strategies, professional development, and curriculum implementation in the Division of Oroquieta City (Yambot, R. L., 2023).

The study is guided by the belief that participation is not merely a behavioral indicator but a cognitive and motivational process that can bridge the gap between engagement and achievement. Understanding this relationship is crucial for educators who seek to balance interactive teaching methods with structured assessment practices.

METHODOLOGY

The study utilizes a correlational research design to examine the relationship between classroom participation and mathematics quiz performance among Grade 10 learners. This design was appropriate because it allows the identification of patterns and associations between variables without the need for manipulation or experimental control, thereby providing insights into naturally occurring classroom dynamics. The participants of the study consisted of 100 Grade 10 mathematics learners drawn from selected public secondary schools in the Division of Oroquieta City. To ensure fair representation, stratified random sampling was utilized, which accounted for differences across schools and sections, as well as variations in academic ability, classroom dynamics, and geographic distribution between urban and rural contexts.

Data collection focused on two primary variables. Classroom participation was measured using structured observation checklists and teacher ratings, with an emphasis on the frequency, quality, and relevance of learners' contributions during mathematics lessons. These contributions included answering questions, solving problems on the board, engaging in group discussions, and explaining reasoning processes. Quiz performance, on the other hand, was assessed through standardized mathematics quizzes administered during the semester, covering key content areas such as algebra, geometry, statistics, and trigonometry.

For data analysis, the researchers utilized the Minitab Software version 18. Pearson's correlation coefficient was employed to determine the strength and direction of the relationship between classroom participation and quiz scores. This statistical technique provided an initial measure of whether higher levels of participation were associated with improved performance. To further

examine the predictive capacity of participation, regression analysis was conducted, controlling for other potential variables that might influence performance outcomes. Together, these methods enabled the study to rigorously assess not only the existence of a correlation but also the extent to which classroom participation could serve as a predictor of mathematics achievement in the local educational context of Oroquieta City.

RESULTS AND DISCUSSION

The results revealed a nearly perfect positive correlation between classroom participation and mathematics quiz scores, with a correlation coefficient of $r = 0.99$ and a significance level of $p = 0.001$. This indicates that increased participation is strongly and significantly associated with higher quiz performance. The descriptive statistics further support this finding: classroom participation was relatively high ($M = 3.774$, $SD = 0.395$), while quiz scores were consistently strong ($M = 83.2$, $SD = 4.6$). Together, these results suggest that students who actively engage in classroom activities tend to achieve superior outcomes in mathematics assessments.

Table 1

Correlation Between Participation and Quiz Scores

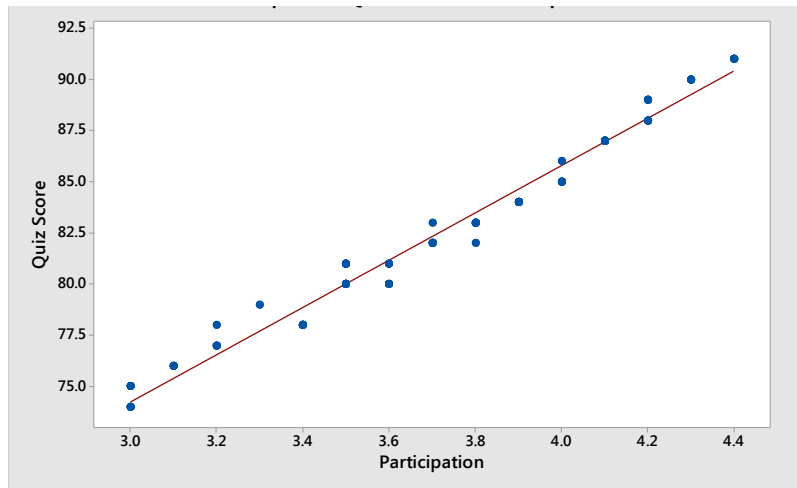
Variable	Mean	SD	r	p-value
Classroom Participation	3.774	0.395	.99	0.001
Mathematics Quiz Scores	83.2	4.6		

From an educational perspective, these results underscore the importance of fostering active participation as a pedagogical strategy. Participation enhances attentiveness, encourages deeper cognitive processing, and facilitates collaborative learning, all of which contribute to improved academic achievement. This interpretation aligns with Bekkering and Ward (2021), who found that class participation significantly predicted student performance across multiple courses, emphasizing that engagement is a critical determinant of success in higher education. Their study concluded that students who participate more frequently in class tend to achieve higher grades, reinforcing the present findings within the mathematics education context.

For local educational settings, such as DepEd divisions, these results provide empirical support for integrating participatory approaches into instructional design. Strategies such as interactive discussions, peer-led problem-solving, and formative feedback mechanisms can be leveraged to cultivate engagement, thereby improving mathematics learning outcomes. By embedding participation into classroom culture, educators can create environments that not only support academic performance but also foster critical thinking and collaborative skills essential for lifelong learning.

Figure 2

Scatterplot of Quiz Score vs Participation



The scatterplot presented in Figure 2 depicting the relationship between classroom participation and quiz performance in Grade 10 Mathematics. It reveals a clear and consistent positive linear association. Students with higher participation (ranging from 3.0 to 4.4) consistently achieved better quiz outcomes (spanning from 74.0 to 92.5). The regression line emphasizes this upward trajectory, suggesting that active classroom engagement is a meaningful predictor of academic achievement. This finding is consistent with prior studies that have established participation and attentiveness as significant predictors of student performance (Lu & Cutumisu, 2022). Participation, in this context, goes beyond mere attendance; it encompasses active involvement in discussions, responsiveness to teacher prompts, and collaborative engagement with peers. The data suggest that students who are more engaged in these activities are better able to process mathematical concepts, retain information, and apply knowledge effectively during assessments. These results reinforce broader educational theories that emphasize engagement as a multidimensional construct influencing learning outcomes (Maamin et al., 2021)

On the other hand, Table 2 displayed the regression analysis to predict quiz scores based on classroom participation yielded statistically significant results, reinforcing the hypothesis that participation is a strong predictor of academic performance in mathematics.

Table 2

Regression Coefficients Predicting Quiz Scores from Participation

Predictor	B	SE B	T-Value	P-Value
Constant	39.637	0.633	62.58	0.001
Participation	11.54	0.167	69.14	0.001

The regression equation derived from the model is:

$$\text{Quiz Score} = 39.637 + 11.540 \text{ Participation}$$

This equation indicates that for every one-unit increase in participation score, the predicted quiz score increases by approximately 11.54 points. The unstandardized coefficient for participation ($Y = 11.540$) is notably high, suggesting a substantial effect size. The associated standard error ($SE B = 0.167$) is minimal, and the t-value ($t = 69.14$) is exceptionally large, further confirming the strength of the relationship. The p-value ($p = 0.001$) is well below the conventional threshold of 0.05, indicating that the effect of participation on quiz scores is statistically significant.

The constant ($X = 39.637$) represents the expected quiz score when participation is zero, although in practice, participation scores in the dataset range from 3.0 to 4.4. The high t-value for the constant ($t = 62.58$) and its low p-value ($p = 0.001$) suggest that the intercept is also statistically meaningful.

These results provide robust empirical support for the study's central claim: that classroom participation plays a critical role in shaping student performance in mathematics. The strength and significance of the regression coefficients align with existing literature on student engagement and academic achievement ((Maamin et al., 2021; Pagupat & Oco, 2025). Within the context of Grade 10 learners in the Division of Oroquieta City, the findings underscore the importance of fostering participatory learning environments. Encouraging active involvement in classroom activities may not only enhance conceptual understanding but also lead to measurable improvements in assessment outcomes.

Implications for Practice

The results emphasize the importance of fostering classroom participation as a pedagogical strategy to enhance mathematics achievement. Active involvement in discussions, collaborative problem-solving, and interactive learning activities appear to strengthen cognitive processing and retention, which in turn translate into improved quiz performance. For teachers in the Division of Oroquieta City, these findings highlight the need to integrate participatory approaches into instructional routines. Strategies such as structured questioning, peer collaboration, and formative feedback may serve as effective mechanisms for bridging the gap between passive learning and active knowledge construction. This is consistent with research emphasizing that classroom interaction significantly influences academic performance (Pagupat & Oco, 2025). Moreover, the findings suggest that teachers should view participation not merely as a behavioral expectation but as an instructional tool that directly contributes to learning outcomes. By designing lessons that encourage dialogue, problem-solving, and student-led exploration, educators can create environments where participation becomes a catalyst for achievement. This echoes international findings that student engagement is a critical determinant of mathematics performance (Maamin et al., 2021), thereby situating the local results within a broader scholarly discourse.

Local Context and Relevance

Within the Division of Oroquieta City, the observed correlation carries particular significance. Mathematics achievement has long been a focal point of educational improvement efforts, and the evidence presented here provides empirical support for interventions that prioritize engagement. By quantifying the relationship between participation and performance, the study contributes to localized strategies aimed at improving student outcomes. Encouraging participation not only enhances academic achievement but also promotes equity by ensuring that all learners are actively involved in the learning process. Similar findings in nearby regions have shown that mathematics engagement strongly predicts academic performance among junior high school students (Plateros et al., 2024). In the local context, where challenges such as limited resources and varying levels of student motivation persist, the emphasis on participation offers a practical and cost-effective strategy for improving outcomes. Teachers can leverage existing classroom structures to promote engagement, thereby maximizing learning opportunities without requiring extensive external interventions. At the same

time, the alignment of these local findings with international literature strengthens the argument that participatory pedagogy is universally beneficial, while also being adaptable to the unique realities of Oroquieta City classrooms.

CONCLUSION

Classroom participation plays a significant role in supporting mathematics quiz performance among Grade 10 learners in the Division of Oroquieta City. While participation enhances comprehension and retention, it is not the sole determinant of academic success. Bridging the gap requires a holistic approach that combines active engagement with structured learning strategies, feedback, and inclusive pedagogy. Teachers are encouraged to create mathematics classroom environments that promote participation while addressing diverse learning needs. By situating the study within the Division of Oroquieta City, the findings provide localized insights that can inform DepEd initiatives and teacher training programs. Ultimately, fostering both participation and achievement contributes to the broader goal of improving mathematics education quality in the Division and in the province as a whole.

REFERENCES

1. Bekkering, E., & Ward, T. (2021). Class Participation and Student Performance: A Follow-Up Study. *Information Systems Education Journal*, 19(4), 77–91. <https://eric.ed.gov/?q=student+performance&id=EJ1310042>
2. Çali, M., Lazimi, L., & Ippoliti, B. M. L. (2024). Relationship between student engagement and academic performance. *International Journal of Evaluation and Research in Education (IJERE)*, 13(4), 2210. <https://doi.org/10.11591/ijere.v13i4.28710>
3. Department of Education (DepEd). (2019). *K to 12 curriculum guide: Mathematics – Junior high school*. Department of Education, Philippines.
4. Kusmaryono, I., & Wijayanti, D. (2023). Exploration of students' mathematics learning experiences and engagement outside the classroom. *International Journal of Education* 16(2):75-84. <https://doi.org/10.17509/ije.v16i2.48399>
5. Lu, C., & Cutumisu, M. (2022). Online engagement and performance on formative assessments mediate the relationship between attendance and course performance. *International Journal of Educational Technology in Higher Education*, 19(1), 2. <https://doi.org/10.1186/s41239-021-00307-5>
6. Maamin, M., Maat, S. M., & Iksan, Z. H. (2021). The Influence of Student Engagement on Mathematical Achievement among Secondary School Students. *Mathematics*, 10(1), 41. <https://doi.org/10.3390/math10010041>
7. Pagupat, R. E., & Oco, R. M. (2025). *Classroom interaction and academic performance: A mixed method research*. *International Journal of Multidisciplinary Research and Analysis*, 8(1). <https://doi.org/10.47191/ijmra/v8-i01-50>
8. Plateros, M. E., Sarail, L. J. O., Enero, R. G. Q., Mancera, K. J., Gonzales, V. A. B., Sultan, A. M., Cala, J. D., Bais Jr., R. L., & Esperat, H. P. (2024). *Exploring the relationship between mathematics engagement and students' academic performance*. *Psychology and Education: A Multidisciplinary Journal*, 31(5), 561–565. <https://www.scimatic.org/storage/journals/11/pdfs/4443.pdf>
9. Yambot, R. L., Ayro, E. C., & Vidal, E. S., Jr. (2023). Teachers' challenges and readiness of the school on the implementation of expanded face-to-face classes. *International Journal of Multidisciplinary Applied Business and Education Research*, 4(7), 2482–2502. <https://doi.org/10.11594/ijmaber.04.07.26>