Collaborative Classrooms: Measuring the Effectiveness of Peer Tutoring in Enhancing Problem Solving Performance among Grade 6 Pupils

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ABSTRACT

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| This study investigated the effectiveness of peer tutoring as a remediation strategy in improving the problem-solving performance of Grade 6 pupils of Calanasan District in Mathematics. The study utilized a mixed method research design. The research involved pre-test and post-test evaluations, with students assigned to tutors and tutees based on academic performance. The quantitative data confirmed the intervention's success, demonstrating the effectiveness of structured mathematical problem-solving activities. The study incorporated a qualitative component to understand the experiences and perceptions of tutors and tutees in the peer tutoring process. Through interviews, observations, and reflective journals, it explored difficulties, engagement, and effectiveness of the intervention.  The findings revealed a significant improvement in the pupils' academic performance, with achievement levels shifting from “Satisfactory” to “Very Satisfactory” following the intervention. Statistical analysis confirmed this with a significant mean difference between the pre-test and post-test scores (t(24) = -4.609, p = .000), validating the effectiveness of peer tutoring. Interviews highlighted challenges such as inconsistencies in explanations, fast pacing, behavioral issues, and language barriers. However, pupils reported feeling more comfortable and engaged during the peer tutoring sessions, particularly with teacher guidance.  The study concludes that peer tutoring, when guided by teachers, is an effective and inclusive educational intervention for improving mathematical problem-solving in primary education. |

*Keywords:* *Mathematics, peer tutoring, problem-solving, remediation strategy, performance, teacher, challenges, tutors*

1. INTRODUCTION

Education is widely recognized as a cornerstone of national development and social progress, aligning with the United Nations' Sustainable Development Goal 4 (SDG 4), which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (Department of Economic and Social Affairs, 2017). Around the world, educational systems strive to enhance learning outcomes through innovative instructional strategies that foster critical thinking, problem-solving, and collaboration among students (United Nations Statistics Division, 2024). However, many developing countries continue to struggle with improving students' academic performance in key subjects, particularly mathematics, which serves as a foundation for logical reasoning and practical applications in daily life (Congress of Local and Regional Authorities, 2024).

In the Philippines, the Department of Education (DepEd, 2024) has adopted policies and programs aimed at addressing learning deficiencies and improving overall academic achievement (DepEd). Despite these efforts, national and international assessments reveal that Filipino students, especially at the elementary level, continue to lag in mathematics, particularly in problem-solving (Agravante & Janer, 2023). The challenge is even more pronounced in rural areas, where limited educational resources, large class sizes, and inadequate teacher training contribute to persistent learning gaps (Magsambol 2024). The Calanasan District exemplifies these difficulties, as many Grade 6 pupils struggle to acquire essential problem-solving skills necessary for future academic success and real-world applications (Aguhayon et. al, 2023). Studies suggest that innovative teaching strategies such as peer-assisted learning can mitigate these challenges by enhancing student engagement and understanding (Hidayat et. al., 2023).

Trends. Educational research increasingly highlights the importance of collaborative learning strategies, such as peer tutoring, to improve student comprehension and engagement (Adelman & Taylor, 2017). Peer tutoring has gained traction as an alternative instructional approach that promotes active learning, reinforces subject mastery, and enhances students' confidence in their academic abilities (Fungamwango & Hashel, 2023). Globally, schools have integrated peer-assisted learning programs into their curricula to foster cooperative learning environments that benefit both high-performing and struggling students (Rusli et. al. 2020). Additionally, emerging evidence suggests that peer tutoring in mathematics significantly improves students' problem-solving skills by fostering a deeper conceptual understanding of mathematical principles (Buan et. al. 2021).

Issues. Despite its growing adoption, the effectiveness of peer tutoring as a remediation strategy remains underexplored, particularly in rural Philippine schools (Valdez & Marcelo, 2024). Many educators in underserved districts lack the necessary training and resources to implement structured peer tutoring programs effectively. Furthermore, the effectiveness of peer tutoring in mathematics problem-solving has not been widely documented in the local context, raising concerns about its scalability and adaptability to diverse learning environments (Doyle, 2008).

The persistent underperformance of Grade 6 pupils in problem-solving necessitates the exploration of alternative instructional approaches. Traditional teaching methods, such as direct instruction, may not fully address the individualized learning needs of students, especially in large classrooms with limited teacher support (Aguhayon et. al, 2023). Given the potential of peer tutoring to enhance learning experiences, this study seeks to evaluate its effectiveness as a remediation strategy for improving problem-solving skills in mathematics among Grade 6 pupils in selected elementary schools in the Calanasan District.

This study is significant in its alignment with global, national, and local educational goals. At the global level, it supports the achievement of SDG 4 by exploring an inclusive instructional strategy that fosters equitable learning opportunities. Nationally, the research complements DepEd’s ongoing initiatives to enhance foundational competencies among Filipino learners, particularly in mathematics. Locally, the study has the potential to provide evidence-based recommendations for improving remedial instruction in rural schools, contributing to sustainable educational improvements in Calanasan District.

Moreover, this study can serve as a valuable resource for educators, policymakers, and school administrators by providing insights into the practical implementation of peer tutoring. The findings may inform teacher training programs and curriculum development, ensuring that effective remediation strategies are integrated into elementary education to enhance student outcomes in mathematics problem-solving.

Although existing studies highlight the benefits of peer tutoring in various educational settings, there is a lack of empirical research focusing on its impact on problem-solving skills among Grade 6 pupils in rural Philippine schools (Adelman & Taylor, 2017). Most available research examines general academic performance rather than specific cognitive skills, such as problem-solving, which are essential for higher-order thinking and real-life applications. Furthermore, while international literature supports the effectiveness of peer tutoring, contextual factors such as class size, teacher training, and availability of instructional resources may influence its success in the Philippine education system. Addressing this research gap, the present study aims to generate localized data on the implementation and effectiveness of peer tutoring in improving mathematical problem-solving skills among Grade 6 pupils in the Calanasan District.

2. statement of the problem

Problem-solving abilities in mathematics are essential for both academic achievement and practical uses. Nonetheless, a lot of sixth-graders have trouble solving mathematical problems, which has an impact on their overall academic performance. Remedial techniques that promote comprehension and involvement are necessary to address these challenges. Hence, this study determines the impact of peer tutoring as a remediation strategy for improving the problem-solving performance in Mathematics of grade 6 pupils in selected elementary schools of Calanasan District for the academic year 2024-2025.

**2.1 Research Questions**

Specifically, this answers the following questions:

1. What is the pre-test score of the grade 6 pupils before implementing a peer tutoring remediation?

2. What is the posttest score of the grade 6 pupils after implementing a peer tutoring remediation

3. Is there a significant difference between the level of problem-solving performance of Grade 6 pupils before and after the implementation of peer tutoring as a remediation strategy in Mathematics subject?

4. What are the challenges encountered along the process of peer tutoring?

**2.2 Research Objective**

This study aims to evaluate the effectiveness of peer tutoring as a remediation strategy in enhancing the problem-solving performance of Grade 6 pupils in Mathematics in selected elementary schools of Calanasan District during the academic year 2024-2025. Specifically, it seeks to assess the pupils' problem-solving abilities through pre-test scores before the implementation of peer tutoring, measure the improvement in pupils' problem-solving performance through post-test scores after the intervention, determine whether there is a significant difference between pre-test and post-test scores, validating the effectiveness of peer tutoring, and identify challenges encountered in the peer tutoring process to provide insights for optimizing its implementation.

**2.3 Hypotheses**

There is no significant difference between the problem-solving performance of Grade 6 pupils before and after the implementation of peer tutoring as a remediation strategy in Mathematics subject.

3. Methodology

**3.1 Research Design**

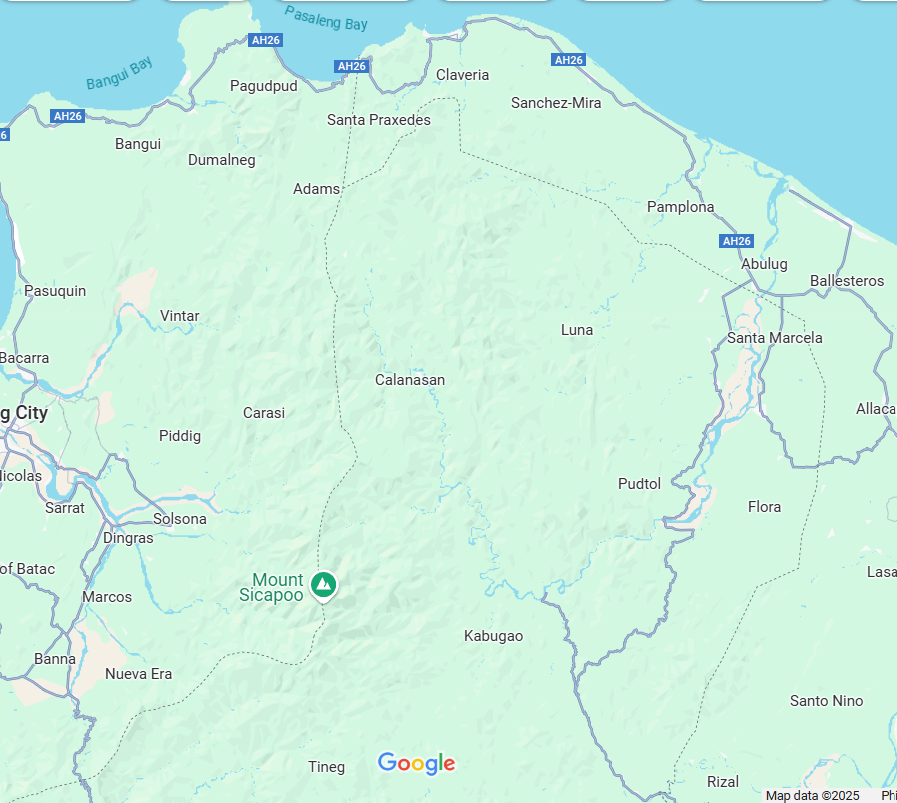
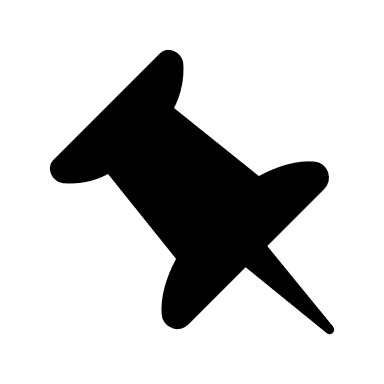
This study used a mixed method explanatory sequential research design, in which the quantitative findings were explained and further understood through a qualitative phase that was undertaken after the quantitative phase [20]. Peer tutoring's efficacy as a remediation technique to enhance Grade 6 pupils’ problem-solving abilities in a few Calanasan District elementary schools was the goal of the first quantitative phase. Using a pre-test and post-test design, the study evaluated students' problem-solving abilities both before and after peer tutoring was implemented. Participants were grouped according to their academic achievement; students with higher performance were assigned as peer tutors, while those with lower performance were placed as tutees. Focusing on structured mathematical problem-solving activities, daily peer tutoring sessions lasted at least thirty minutes under the direction of the classroom teacher. The quantitative data gathered offers concrete proof of the degree of performance improvement among students, therefore verifying the fundamental findings of the success of the intervention.

Following the quantitative phase, the qualitative component was implemented to further explore and contextualize the experiences and perceptions of both tutors and tutees involved in the peer tutoring process. Through in-depth interviews, observations, and reflective journals, this phase investigated the difficulties encountered by pupils during the intervention, their level of engagement, and how they perceived the effectiveness of peer tutoring in enhancing their problem-solving skills. Additionally, insights were gathered regarding the conduct and outcomes of the remedial sessions, the interpersonal dynamics between peer tutors and tutees, and the role of teacher facilitation. The qualitative findings provided a deeper understanding of the mechanisms behind the observed quantitative improvements and highlighted contextual factors influencing the success of the peer tutoring strategy. By integrating both quantitative and qualitative data, this mixed method design ensured a comprehensive analysis of the intervention, supporting a more nuanced interpretation of how and why peer tutoring can be an effective tool in addressing academic difficulties in mathematics among Grade 6 pupils.

**3.2 Locale of the Study**

The study was conducted in four elementary schools located in Calanasan District, specifically Butao Integrated School, Malitao Elemnentary School, Namaltugan Elementary School, Tubongan Elementary School. All schools are situated in rural areas, where access to educational resources and support may be limited, making them ideal settings for this study on peer tutoring as a remediation strategy.

FIG 1: STUDY AREA



**3.3 Respondents of the Study**

This study involved two sets of respondents corresponding to the two phases of the mixed method explanatory sequential design: the quantitative phase and the qualitative phase. The selection of respondents followed a purposive sampling technique, which was deemed appropriate based on the manageable class sizes and the willingness of teachers and school administrators to participate. The chosen schools were also selected for their conducive learning environments and the feasibility of implementing the peer tutoring intervention within their existing academic schedules. This purposive approach allowed for a focused and in-depth assessment of the effectiveness of peer tutoring in improving the problem-solving performance of Grade 6 pupils in Mathematics.

For the quantitative phase, a total of 37 Grade 6 pupils from four selected elementary schools in the Calanasan District were initially identified as potential participants. These schools included Butao Integrated School (8 learners), Malitao Elementary School (4 learners), Namaltugan Elementary School (18 learners), and Tubongan Elementary School (7 learners). However, based on the academic profiling and the need for balanced tutor–tutee pairing, only 23 pupils were selected to participate in the actual peer tutoring intervention. This selection was guided by the need to ensure that each low-performing pupil (tutee) could be matched with a suitable high-performing peer (tutor) for the daily 30-minute peer tutoring sessions. The pairing aimed to create meaningful learning partnerships that would effectively support the problem-solving development of the tutees while reinforcing the skills of the tutors.

Table 1: Name of the schools and number of learners

|  |  |
| --- | --- |
| **Name of the Schools** | **Learners** |
| Butao Integrated School | 8 |
| Malitao Elementary School | 4 |
| Namaltugan Elementary School | 18 |
| Tubongan Elementary School | 7 |
| **Total** | **37** |

For the qualitative phase, a smaller, focused group of participants was drawn from the 23 pupils involved in the quantitative intervention. Specifically, six pupils were selected to serve as key informants: three peer tutors and three tutees. These participants were purposefully chosen to represent diverse experiences and perspectives in relation to the peer tutoring process. The qualitative respondents provided in-depth insights through interviews and observations, sharing their personal experiences, perceived challenges, and reflections on the effectiveness of the remedial sessions. Their narratives helped illuminate the contextual factors that influenced the success of the intervention and offered a richer understanding of the dynamics between peer tutors and tutees.

By integrating data from both sets of respondents, the study was able to quantitatively measure the impact of peer tutoring on academic performance and qualitatively explore the underlying experiences that shaped the outcomes of the intervention. This dual approach ensured a comprehensive analysis that addressed both the measurable results, and the lived realities of the pupils involved.

**3.4 Research Instrumentation**

This study employed distinct research instruments for the quantitative and qualitative phases, aligning with the mixed method explanatory sequential design to ensure comprehensive data collection and analysis.

For the quantitative phase, the primary research instrument was the Grade 6 Mathematics Questionnaire, which was developed under the Department of Education’s PROJECT SMART (Standardized and Meaningful Assessment Result-Based Teaching) initiative. This standardized 20-item assessment tool was specifically designed to measure pupils’ proficiency in fundamental mathematical concepts covered in the K to 12 curricula. The instrument underwent rigorous validation procedures, including expert review, item analysis, and pilot testing, to confirm its content validity, reliability, and appropriateness for the target grade level. The questionnaire was administered to assess pupils’ problem-solving abilities before and after the peer tutoring intervention, allowing for the measurement of learning gains and the effectiveness of the remediation strategy. The data derived from this test served as the basis for the statistical comparison of pupil performance and informed the quantitative conclusions of the study.

Range of Scores and Interpretations for a 20-Item Test

**Table 2. Range of Scores and Interpretations for a 20-Item Test**

|  |  |  |  |
| --- | --- | --- | --- |
| **Score Range** | **Percentage** | **Descriptive Rating** | **Interpretation** |
| 17 – 20 | 85% – 100% | Outstanding / Excellent | Demonstrates an exceptional understanding of the concepts; exceeds expectations. |
| 13 – 16 | 65% – 80% | Very Satisfactory | Shows solid understanding with minor errors; meets most expectations. |
| 9 – 12 | 45% – 60% | Satisfactory / Average | Demonstrates basic understanding; some gaps or misunderstandings are present. |
| 5 – 8 | 25% – 40% | Needs Improvement | Limited understanding; significant gaps in knowledge and skills. |
| 0 – 4 | 0% – 20% | Poor / Unsatisfactory | Lacks understanding of fundamental concepts; remediation strongly recommended. |

For the qualitative phase, the research instrument comprised semi-structured interview guides designed specifically for the peer tutors and tutees who participated in the intervention. The guide included open-ended questions aimed at eliciting detailed responses about the participants' experiences during the peer tutoring sessions. For peer tutors, the questions explored the difficulties encountered while teaching their peers, strategies used to overcome those challenges, and how they ensured effective communication and understanding. For tutees, the questions focused on their learning difficulties, how peer tutoring influenced their comprehension of mathematical concepts, and what aspects of the sessions facilitated or hindered their learning. These guide questions were provided in both English and Tagalog to ensure clarity and accessibility for all participants, thus allowing for more authentic and meaningful responses. The qualitative data gathered through these interviews offered rich insights into the interpersonal dynamics, cognitive challenges, and perceived benefits of peer tutoring, complementing the quantitative findings with contextual depth and nuance.

**3.5 Data Gathering Procedure**

The data gathering process in this mixed method explanatory sequential study was carried out in two distinct phases—quantitative and qualitative—to thoroughly examine the effectiveness of peer tutoring as a remediation strategy for improving the problem-solving performance of Grade 6 pupils in selected elementary schools in the Calanasan District. The process encompassed three primary stages: preparation, implementation, and post-implementation.

For the quantitative phase, the data collection began with the preparation stage, where a pre-test was administered to all 37 Grade 6 pupils from Butao Integrated School, Malitao Elementary School, Namaltugan Elementary School, and Tubongan Elementary School. The test measured pupils’ problem-solving competencies based on the learning competencies outlined in the third and fourth quarters of the K to 12 Mathematics curriculum. The Grade 6 Mathematics Questionnaire from the Department of Education’s PROJECT SMART was used as the standardized assessment tool. This pre-test served as the baseline data for assessing learning progress after the peer tutoring intervention.

Following the pre-test, tutors and tutees were selected based on the test results. Pupils who obtained above-average scores and exhibited strong communication skills were assigned as tutors, while those with below-average scores who needed additional assistance were designated as tutees. From the initial 37 participants, 23 pupils were selected to form tutor-tutee pairs, ensuring an equitable and functional distribution that maximized learning outcomes.

During the implementation stage, peer tutoring sessions were held over a span of 6 to 8 weeks, with each session lasting 30 to 45 minutes. These sessions were integrated into the school schedule and conducted under the supervision of the researcher and classroom teachers. Each session focused on solving mathematical problems aligned with the curriculum content of the third and fourth grading periods. The researcher actively monitored the sessions, took field notes, and documented pupil participation, engagement levels, and the quality of tutor-tutee interactions.

In the post-implementation stage, a post-test that mirrored the pre-test in content and structure was administered to the same group of pupils. This enabled the researcher to measure the improvement in mathematical problem-solving skills attributable to the peer tutoring intervention. The quantitative data from the pre- and post-tests were statistically analyzed, employing descriptive and inferential statistics to determine the significance and effectiveness of the peer tutoring strategy.

Following the quantitative phase, the study proceeded to the qualitative phase, which aimed to deepen the understanding of the participants’ experiences and uncover challenges that might not have been captured by the numerical data. This phase involved semi-structured interviews with a purposefully selected group of six respondents: three tutors and three tutees who actively participated in the peer tutoring sessions.

Prior to the interviews, an orientation session was conducted for the selected participants. During this orientation, the purpose of the interviews, the nature of the questions, and the importance of honest feedback were explained. Pupils and their parents provided informed consent, and participation in the interview was entirely voluntary. Ethical considerations such as confidentiality, voluntary participation, and the right to withdraw at any point were emphasized.

The interviews were carried out in a quiet and private setting within the school premises to ensure that participants felt comfortable sharing their experiences. The semi-structured interview guide included questions tailored for both tutors and tutees. For tutors, the questions focused on the difficulties encountered during teaching, strategies used to ensure comprehension, and their perceptions of the tutoring process. For tutees, the questions explored their learning difficulties, how tutoring sessions supported their understanding of mathematics, and factors that helped or hindered their learning. The interview guide was made available in both English and Tagalog, enabling respondents to express themselves in the language they were most comfortable with.

Each interview lasted between 15 to 25 minutes and was conducted face-to-face by the researcher. Responses were audio-recorded, with the consent of the participants, and supplemented by field notes taken during the conversation. These interviews were later transcribed and thematically analyzed, with key themes and patterns extracted to provide insights into the real-life experiences of both tutors and tutees. The qualitative findings enriched the statistical results, offering a comprehensive narrative about the practical implementation and challenges of peer tutoring in a real classroom context.

**3.6 Statistical Analysis**

The statistical tools used to analyze the data in this study are as follows:

Quantitative Analysis

Mean was used to determine the level of problem-solving performance of Grade 6 pupils before the implementation of peer tutoring as a remediation strategy in the Math subject. The mean score will provide an average measure of the pupils' performance based on the pre-assessment results. the mean was used as the primary descriptive statistic. Specifically, the mean score of the pre-test was calculated to determine the initial level of problem-solving performance among Grade 6 pupils before the implementation of the peer tutoring intervention. This provided a benchmark for assessing the pupils’ baseline mathematical competency based on the competencies outlined in the third and fourth grading periods of the K to 12 Mathematics curriculum. Subsequently, after the peer tutoring sessions were completed, the mean score of the post-test was computed to evaluate the level of improvement in the problem-solving abilities of the pupils. By comparing the pre- and post-test mean scores, the researcher was able to establish whether peer tutoring led to a measurable increase in performance. (For Statement of problem number 1 and 2)

Paired sample t-test was employed to assess whether there is a significant difference in the problem-solving performance of Grade 6 pupils before and after the peer tutoring sessions. The paired t-test compared the pre- and post-assessment results to determine if the change in performance is statistically significant, thus indicating the effectiveness of the peer tutoring strategy as a remediation tool. (For Statement of the problem number 3)

Qualitative Analysis

For the qualitative component, a thematic analysis was conducted to make sense of the data gathered from the interviews with three tutors and three tutees. This method involved identifying, analyzing, and reporting patterns (themes) within the qualitative data to gain deeper insights into the peer tutoring process from the perspective of the participants.

Thematic analysis followed a six-phase process:

1. Familiarization with the data through repeated reading of interview transcripts.

2. Generating initial codes to capture key points of interest.

3. Searching for themes by grouping related codes.

4. Reviewing themes to ensure consistency and coherence across the dataset.

5. Defining and naming themes to clarify their meaning and relevance to the research questions.

6. Producing the final report, integrating illustrative quotes from participants.

This qualitative analysis enriched the quantitative findings by providing a contextual understanding of the peer tutoring experience, revealing not just the impact on performance but also the personal and interpersonal dynamics that contributed to its success. Ethical protocols, such as confidentiality and voluntary participation, were strictly observed throughout the data analysis process.

4. Results and discussion

**4.1 What is the pre-test score of the grade 6 pupils before implementing a peer tutoring remediation?**

Table 3: Pre-test Scores of Grade 6 Pupils Before Implementing Peer Tutoring Remediation

|  |  |  |
| --- | --- | --- |
| **Score Range** | **Frequency** | **Descriptive Body** |
| 0 – 4 | 2 | Very Low |
| 5 – 8 | 9 | Low |
| 9 – 12 | 9 | Moderate |
| 13 – 16 | 5 | High |
| 17 – 20 | 0 | Very High |
| **Total** | **25** |  |
| **Mean = 9.16** | | |
| **Standard Deviation (SD) = 3.01** | | |
| **Interpretation =** The mean score of 9.16 falls within the **Moderate performance level**, suggesting that most pupils had a basic understanding of the topic prior to the intervention. The relatively high SD implies varied levels of prior knowledge among the pupils. | | |

Table 3 presents the pre-test scores of 23 Grade 6 pupils (referred to as tutees) prior to the implementation of the peer tutoring remediation program. Prior to the intervention, data indicate that a substantial portion of the class (11 out of 23 pupils) scored below 9 points, placing them within the Very Low to Low categories. This suggests that nearly half of the students had little mastery of the content area. Only five pupils were in the High category, and none reached Very High proficiency. The mean score of 9.16, along with a standard deviation of 3.01, reinforces the notion of moderate comprehension but with a wide distribution, meaning there were significant gaps in foundational knowledge among the students.

This suggests that although a basic understanding of problem-solving concepts is present, many learners would benefit from targeted remediation. The results underscore the potential necessity and relevance of peer tutoring as an intervention to support learners struggling with mathematical problem-solving. These results aligned in the study of Valdez & Marcelo (2024), which highlighted the effectiveness of peer tutoring in enhancing students’ academic performance in Mathematics by providing learners with more personalized support and increased engagement.

**4.2 What is the posttest score of the grade 6 pupils after implementing a peer tutoring remediation**

**Table 4: Post-test Scores of Grade 6 Pupils After Implementing Peer Tutoring Remediation**

|  |  |  |
| --- | --- | --- |
| **Score Range** | **Frequency** | **Descriptive Body** |
| 0 – 4 | 0 | Very Low |
| 5 – 8 | 3 | Low |
| 9 – 12 | 2 | Moderate |
| 13 – 16 | 12 | High |
| 17 – 20 | 8 | Very High |
| **Total** | **25** |  |
| **Mean = 13.84** | | |
| **Standard Deviation (SD) = 3.12** | | |
| **Interpretation =** The post-test mean of 13.84 reflects a substantial improvement, falling within the **High performance level**. The shift indicates that the instructional intervention had a positive impact on student achievement. The spread of scores is still relatively wide, indicating differing degrees of improvement, but most scores shifted to higher categories. | | |

Table 4 displays the post-test scores of 23 Grade 6 pupils following the implementation of the peer tutoring remediation program. After the instructional intervention, a dramatic improvement is observed. Only 5 learners scored below 13 points, while a majority (20 pupils) scored within the High and Very High ranges. This notable increase in performance is reflected in the mean score rising to 13.84 with a slightly increased standard deviation of 3.12. The increased SD can be interpreted in context: while most learners improved, some advanced more significantly than others, leading to greater score dispersion in higher ranges.

This shift in distribution from lower categories in the pre-test to higher categories in the post-test demonstrates the effectiveness of the learning intervention employed. Furthermore, the absence of any Very Low post-test scores indicates that no learner was left behind, a key marker of instructional success. Notably, eight learners achieved scores in the Very High range (17–20), whereas none did so before the intervention.

These results aligned with the study of Fungamwango (2023) explored the effects of peer-assisted learning strategies and found that learners exposed to peer tutoring in science-related subjects improved significantly in conceptual grasp and problem-solving performance. These findings affirm the effectiveness of peer tutoring as a remediation strategy, especially in addressing diverse learning needs among primary learners. Furthermore, the results are consistent with existing research affirming that peer tutoring fosters meaningful academic gains, especially in foundational subjects such as mathematics. It facilitates deeper understanding by engaging learners in the act of teaching and learning simultaneously, thus reinforcing conceptual mastery and promoting cooperative learning behaviors (Hidayat et. al., 2023) (Maciejewski, 2018).

**4.3 Is there a significant difference between the level of problem-solving performance of Grade 6 pupils before and after the implementation of peer tutoring as a remediation strategy in Mathematics subject?**

**Table 5. Difference in the Problem-Solving Performance of Grade 6 Pupils Before and After the Implementation of Peer Tutoring in Mathematics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Problem-Solving Performance** | **Mean** | **SD** | **t-value** | **p-value** | **Interpretation at 0.05** |
| Pre-test Performance | 9.09 | 2.87 | -18.01 | <.001 | Significant |
| Post-test Performance | 15.22 | 2.52 |

Table 4 summarizes the statistical comparison between the pre-test and post-test problem-solving performance of Grade 6 pupils before and after the implementation of peer tutoring in Mathematics. The mean pre-test score was 9.09 with a standard deviation (SD) of 2.87, while the mean post-test score significantly increased to 15.22, with a slightly lower SD of 2.52, indicating a general improvement in consistency and performance.

The t-value of -18.01 and the p-value of <.001 reflect a statistically significant difference in scores at the 0.05 level of significance. Based on this result, the null hypothesis (Ho)—which states that there is no significant difference in the pupils’ problem-solving performance before and after peer tutoring—is rejected.

The data provides strong evidence that the peer tutoring remediation strategy had a significant positive effect on the problem-solving performance of Grade 6 pupils. The large increase in the mean score, coupled with the highly significant p-value, indicates that the intervention successfully enhanced pupils' mathematical understanding and ability to solve problems effectively.

The systematic literature review by Hidayat et. al. (2023) affirmed that peer tutoring serves as an effective intervention in Mathematics education, leading to better cognitive outcomes and reduced learning gaps across various grade levels. Moreover, the significant increase in posttest scores underscores the potential of peer tutoring to address performance gaps exacerbated by educational disruptions such as the COVID-19 pandemic. In response to widespread learning losses, both local and international education bodies have called for low-cost, high-impact interventions to restore academic achievement. This study’s results offer empirical support for peer tutoring as one such intervention, consistent with the Department of Education’s initiatives on learning recovery and remediation (DepEd, 2024).

**4.4 What are the challenges encountered along the process of peer tutoring?**

**The Challenges Encountered Along the Process of Peer Tutoring**

Peer tutoring, as an instructional strategy, fosters collaborative learning where learners assume roles either as the tutor or the tutee. In this context, Grade 6 pupils were engaged in peer tutoring sessions specifically in the subject of Mathematics, aimed at improving their problem-solving performance. Through qualitative interviews, narratives were collected and analyzed from both tutors and tutees. The responses were examined through thematic analysis, which yielded distinct themes that reflect the challenges experienced throughout the peer tutoring process. The findings are presented thematically, first from the perspective of the tutors, followed by the tutees.

1. **Challenges from the Perspective of Tutors**

**Profile of Tutors**

The tutors in this study were high-performing Grade 6 pupils who were selected based on their demonstrated proficiency in solving mathematical problems and their willingness to assist their peers. Despite their academic competence, these pupils were not professionally trained to teach, making their instructional experiences both challenging and developmental. Their engagement in the peer tutoring sessions allowed them to function as informal educators, attempting to bridge the academic gaps of their peers while simultaneously reinforcing their own understanding.

**Theme 1**: Communication Difficulties and Instructional Strategy

Tutors struggled significantly with articulating mathematical concepts in a manner that would be clear and understandable to their tutees. Although academically equipped, their pedagogical skill—the ability to teach in a structured and digestible way—was limited.

As evidence from the responses,

Tutor 1 admitted, “*Minsan hindi ko alam kung paano ko ituturo kaya nagpapaturo muna ako kay Ma’am*.”

*(Sometimes, I’m not sure how to explain it, so I ask Ma’am for guidance first.)*

Tutor 2 shared, “*Hindi po siya makaintindi kahit paulit-ulit na po kaya natatagalan kami*,”

*(He/She doesn’t seem to understand even after repeated explanations, so it’s taking us longer.)*

Tutor 1 quote reveals a lack of confidence in instructional delivery, indicating that even though the tutor understood the content, they needed to consult the teacher to effectively convey it. This strategy of seeking help demonstrated not only humility but also a reflective practice of learning through teaching.

Tutor 2 shared, pointing to the emotional and cognitive fatigue experienced when instructions need to be constantly repeated without noticeable improvement in comprehension. To address this, the tutor employed an alternative strategy by using worksheets, saying, “Pinapasagutan ko po ‘yung mga activities (*I have them work on the activities*.),” in an attempt to reinforce the lesson through practice.

**Theme 2**: Behavioral Management and Attention Span

Behavioral challenges among tutees emerged as another significant concern for tutors. These non-academic issues affected the productivity and success of the sessions.

Tutor 3 expressed difficulty in managing an inattentive peer, stating, “*Hindi po siya nakikinig. Laging naglalaro. Sinusumbong ko kay Ma’am*.” *(He/She doesn’t pay attention and is always playing, so I report him to Ma’am)*

The Tutor 3 response underlines the tutor’s limited authority in handling disciplinary issues, often resulting in the involvement of the teacher. It reflects the reality that while peer tutoring promotes academic support, it may lack the disciplinary structure necessary for effective classroom management.

**B. Challenges from the Perspective of Tutees**

**Profile of Tutees**

The tutees were selected based on their lower performance in problem-solving assessments. As recipients of peer tutoring, they were expected to benefit from a peer-to-peer instructional setting that was designed to be more relatable and less intimidating than teacher-led instruction. However, their narratives reveal challenges related to instructional clarity, pacing, language barriers, and emotional experiences during the sessions.

**Theme 1**: Fast Pacing of Instruction and Comprehension Gap

A recurring challenge among tutees was the fast-paced instruction delivered by the tutors, which often hindered their understanding.

Tutee 1 shared, “*Masyado siyang mabilis magturo kaya hindi ko po agad naiintindihan*,” *(He/She explains too quickly, making it hard for me to keep up.)*

The tutee 1 also acknowledged a positive aspect of the setup: “*Komportable po ako kahit paulit-ulit po ‘yung lesson dahil dalawa lang naman kami*.” *(I'm comfortable learning with my peer because I can ask for a repeated explanation since it's just the two of us, making it easier to understand.)*

Tutee 1 signaling that the peer tutor’s speed did not match the tutee’s learning pace. This mismatch in instructional delivery highlights a critical limitation of peer tutoring—assuming uniform understanding among learners. Nonetheless, this additional statement suggests that despite the instructional challenges, the one-on-one dynamic allowed for a more comfortable environment that enabled repeated discussions, which is beneficial for struggling learners.

**Theme 2**: Instructional Inconsistency and Reliance on Teacher

Tutees also reported confusion due to inconsistent explanations provided by their peer tutors. The lack of a structured teaching method led some learners to rely more heavily on their teacher for clarification.

Tutee 2 noted, “*Hindi ko maintindihan ang pag-eexplain niya kase paiba-iba. Kaya kay Ma’am ako nagtatanong*. (*I can't understand his explanations because they keep changing, so I ask Ma’am instead.)”* “*Mas madali ko maintindihan si Ma’am. Mahirap intindihin ang pageexplain ni tutor,” (I understand Ma’am more easily. The tutor’s explanations are harder to follow.)*

Tutee 2 statement clearly demonstrates that the tutee felt that the tutor lacked a consistent approach, which in turn created more confusion rather than clarity. The learner’s reaction—turning to the teacher for understanding—emphasizes the irreplaceable role of professional educators in ensuring the accuracy and coherence of instruction. The tutee further elaborated, reinforcing the perception that while peer tutoring is helpful, it does not fully substitute the expertise of trained teachers.

**Theme 3**: Language Barriers and the Role of Translation

Language was another central issue that emerged from the responses. Since the medium of instruction in Mathematics often involves English, tutees found themselves struggling not just with concepts but also with language comprehension.

Tutee 3 explained, “*Naiintindihan ko ‘yung lesson kapag ineexplain sa akin pero kapag ako na ang nagbasa, hindi na kase English*.” *(I understand the lesson when it's explained to me, but when I read it myself, I struggle because it's in English)*

The tutee coped by requesting translation*: “Pinapatranslate ko po.” “May mga natututunan akong English pero nakakalimutan ko din,” (I ask for translations. I pick up some English words, but I tend to forget them over time.)*

This response reveals the added cognitive load imposed by having to process content in a second language. This form of scaffolding allowed for better understanding, although the learner later admitted, which shows that retention of learned language remained a struggle. These observations suggest that language scaffolding must be an intentional component of instruction, especially in bilingual settings.

**Theme 4**: Emotional Reactions and the Role of the Teacher

The emotional dimension of learning was another layer that emerged prominently. Some tutees experienced discomfort when tutors became impatient or failed to manage their frustration.

Tutee 1 remarked, “*Nahirapan ako dahil masyado siyang mabilis magturo at minsan nagagalit,” (I struggle because he/she teaches too fast, and sometimes he gets frustrated.)*

Tutee 1 indicating that the tutor’s emotional expression negatively impacted the learning process. The tutor’s frustration translated into a stressful experience for the tutee, potentially impeding learning.

In both tutors’ and tutees’ narratives, there was a consistent return to the teacher’s role for resolution and guidance. Whether it was the tutor needing help explaining a concept or the tutee seeking clarity, “Kay Ma’am ako nagtatanong” *(I ask Ma’am whenever I need clarification.)* emerged as a recurring theme. This dependency signifies the centrality of the teacher in mediating and supporting the peer tutoring process.

**Summary of Insights**

The peer tutoring experience, while rich in collaborative learning potential, is not without its challenges. The thematic analysis of responses from both tutors and tutees revealed a complex interplay of academic, behavioral, emotional, and linguistic factors that shaped the effectiveness of the program.

For tutors, the main difficulties lay in articulating concepts clearly, maintaining instructional consistency, and managing peer behavior. Despite their academic qualifications, they were not fully equipped to handle pedagogical responsibilities, often relying on the teacher for support. However, their willingness to seek guidance and adapt their strategies was commendable and reflective of a growth mindset.

From the perspective of the tutees, fast-paced instruction, inconsistent teaching styles, and language comprehension issues posted significant barriers to learning. These challenges were compounded by the emotional responses elicited during the sessions, such as frustration or confusion. Nonetheless, the intimate setting of peer tutoring offered a level of comfort and personalized attention that is often not feasible in large classroom settings.

Language emerged as both a tool and a barrier. Translation from English to Filipino helped bridge understanding, yet vocabulary retention remained limited. This points to the need for language-sensitive instruction that aligns with the learner’s proficiency level.

Ultimately, the teacher’s role was found to be indispensable. Teachers served as the anchor for clarification, instructional modeling, and behavioral management. While peer tutoring is a valuable supplementary strategy, its success is contingent upon structured teacher support, clear instructional goals, and continual assessment of both tutors’ and tutees’ needs.

This analysis underscores the need for future peer tutoring programs to incorporate basic training for tutors, clearer instructional guidelines, and consistent teacher involvement. Doing so would enhance the educational value of peer tutoring and mitigate the challenges identified through this study.

**Fig 2. Challenges from the Perspective of Tutors**

**Fig 3. Challenges from the Perspective of Tutees**

CONCLUSION

Based on the initial assessment, it can be concluded that Grade 6 pupils generally had only a basic understanding of problem-solving concepts, highlighting the need for remedial strategies to strengthen their mathematical skills and comprehension.

After the implementation of the peer tutoring strategy, it was evident that pupils' problem-solving skills significantly improved, as reflected in their very satisfactory performance levels, suggesting that peer tutoring is an effective tool in enhancing analytical thinking and confidence in mathematics.

The comparison of pre- and post-intervention results confirms that peer tutoring led to a substantial improvement in learners’ problem-solving performance, validating it as a statistically effective remediation strategy for developing mathematical proficiency.

Interview data added depth to the findings. Tutors shared their struggles in explaining lessons, often turning to the teacher for guidance—“Minsan hindi ko alam kung paano ko ituturo kaya nagpapaturo muna ako kay Ma’am.” *(Sometimes, I'm unsure how to teach it, so I ask Ma’am for guidance first)* Tutees appreciated the support but noted challenges like fast pacing or unclear explanations—“Hindi ko maintindihan ang pageexplain niya kase paiba-iba.” (I struggle to understand his explanations because they keep changing.) These responses highlight the importance of instructional clarity and emotional support. Language barriers also played a role, as some learners found English terms difficult and preferred translations into Filipino.

While peer tutoring fosters active engagement and personalized learning, the study emphasizes that it must be guided by the teacher to succeed. As learners said, “Walang ibang mas makakatulong sa kapwa estudyante kundi kapwa estudyante rin—pero kailangang may gabay si Ma’am.” (No one can help a fellow student better than another student—but guidance from the teacher is still essential) Ultimately, peer tutoring proved effective but works best within a structured, teacher-supported environment.

AcknowledgEments

I would like to express my heartfelt gratitude to all those who supported me throughout the completion of this thesis. To my adviser, thank you for your guidance, patience, and encouragement. To my family and friends, your love and support kept me going. To my respondents and the school community, thank you for your cooperation and participation. This work would not have been possible without your help

Authors’ Contributions

As the sole author of this study, I contributed to all aspects of its development and completion, including the identification of the research topic, design of the methodology, data collection, analysis, and interpretation. I conducted the interviews, ensured the confidentiality of the respondents, and synthesized their responses into meaningful insights. Additionally, I wrote and revised the entire manuscript and sought guidance from mentors and reviewers to improve the quality and accuracy of the work.

Consent (where ever applicable)

I affirm that the respondents voluntarily agreed to participate after being fully informed about the purpose, nature, and potential implications of the study. Their responses have been collected with utmost respect for their privacy and confidentiality, in accordance with ethical research guidelines.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

I acknowledge that I have used Copilot for only refining some of the sections in the document.

Ethical approval (where ever applicable)

The study was conducted with the approval and in accordance with the standards of the college. No ethical approval was required, as the research followed all applicable ethical guidelines, ensuring respect for the respondents’ privacy and confidentiality.

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