Effect of Peer Mentoring on the Mathematical Skills of Senior High School Students

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ABSTRACT

A persistent challenge in education is the widespread difficulty students face in mastering mathematics. This challenge results in consistently low academic performance, hindering their ability to develop essential problem-solving skills and apply mathematical concepts in real-world contexts. Without effective interventions, these challenges continue to undermine student confidence, limit academic achievement, and contribute to long-term gaps in mathematical proficiency. To address this issue, the study examined the effectiveness of peer mentoring in improving the mathematical skills of Grade 11 students. The study employed a quantitative research approach and quasi-experimental research design to determine whether peer mentoring draws significant differences in the mathematical skills of students. The findings revealed that the experimental group showed significant improvement (*M=-13.067, p<0.000*), confirming the effectiveness of peer mentoring. In contrast, the control group showed no improvement *(M=0.000, p<1.000)*, indicating traditional learning alone was insufficient. This implies the inclusion of intervention poses a significant effect on the mathematical skills of students. The study recommends integrating peer mentoring or other interventions in enhancing student's performance in mathematics particularly in addressing poor mathematical performance of students in a class.

Keywords: Mathematical Skills, Peer Mentoring, SHS students, Quasi-Experimental

INTRODUCTION

Mathematics, particularly in the domain of statistics and probability, is often seen as a challenging subject for many students. This recurrent issue is evident in both national and global assessments, where students continue to show deficiencies in mathematical competencies. The low performance of students in mathematics has long been a significant challenge in education, with many learners struggling to understand foundational concepts, which hinders their academic progression. In general, a deficiency in mathematical competence can obstruct a student's overall development and serve as a persistent obstacle to reaching their full potential.

In the global context, a significant number of students have consistently demonstrated a relatively low level of performance and achievement in the subject of mathematics. According to the Organization for Economic Cooperation and Development [OECD] (2022), only 27% of Brazilian students reached at least Level 2 proficiency, far below the OECD average of 69%. Additionally, just 1% of Brazilian students were top performers (Level 5 or 6), compared to the OECD average of 9%. In contrast, 75% of Finnish students achieved at least Level 2 proficiency, surpassing the OECD average. Furthermore, Finland also showed minimal change in mathematics performance over the past decade, but targeted interventions helped improve student outcomes. Hotulainen (2016) found that these interventions closed the achievement gap between low and high-performing students. Paraguayan students, however, performed well below the OECD average, with nearly none reaching Levels 5 or 6. Nevertheless, peer mentoring programs have been implemented, and students have shown significant and sustained increases in their academic success as a result of receiving peer supervision, support, and chances for collaborative learning. Moreover, evidence consistently shows a strong positive correlation between peer learning methods and students' mathematics grades, problem-solving capabilities, conceptual comprehension, peer interaction and teamwork skills, metacognitive skills, and overall academic self-assurance (Alphonse & Mugiraneza, 2024). Furthermore, according to the study conducted by Macapayad et al. (2024),

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after the implementation of peer tutoring, students showed a significant increase in their posttest scores, reflecting a marked improvement in their problem-solving capabilities.

In the ASEAN context, some ASEAN countries often struggle in mathematics, which results in their low or poor performance in mathematics and can hinder students' problem-solving. Notably, in Cambodia, according to the Organization for Economic Cooperation and Development [OECD] (2022), Cambodian 15-year-olds scored an average of 336, which is much lower than the OECD average of 472. Math proficiency at Levels 5 and 6 was low (OECD average: 9%). Furthermore, in Indonesia, Indonesian 15-year-olds' academic performance in science, math, and reading has significantly declined, with scores among the lowest since 2001, according to the 2022 PISA results (Bilad et al., 2024). Indonesia's average scores in 2022 were lower than those in 2018. Nearly none of the pupils attained Level 5 or 6 (OECD average: 9%), and just 18% attained at least Level 2 competency in mathematics, which is significantly lower than the OECD average of 69%. Showing that the two countries are facing significant challenges in the field of mathematics education, resulting in a low-performance. However, this can be solved through intervention, like peer mentoring, according to the researchers. The study of Germo (2015) highlights how peer mentoring enhances students' mathematics performance by fostering positive attitudes and altering their epistemological beliefs about learning mathematics, making the subject more approachable and less anxiety-inducing. This was also supported by the study of Yoviyanti et al. (2023), which stated that students who engage in peer tutoring develop a better understanding of mathematical concepts than those learning through traditional methods. Peer tutoring proves to be a more effective approach for aiding students in grasping mathematical ideas during their learning experience.

Filipino students face significant challenges in mathematics, as evidenced by their underperformance in international assessments like the 2018 and 2022 PISA. In 2018, over 50% of Filipino students scored below the lowest proficiency level. By 2022, the Philippines ranked 77th out of 81 countries, with an average score of 355 in math—120 points below the OECD average of 472. This poor performance can be attributed to several factors, including insufficient pedagogical strategies, limited educational resources, and a lack of focus on developing critical problem-solving skills. Moreover, this inefficient performance in mathematics became an alarming concern in the past years. The Philippines has been grappling with low mathematics achievement specifically in the high school level. The manner of getting out from this hole is still not fully established. Hence, focusing on provision of interventions for students could offer valuable insights into improving academic outcomes.

In the context of the designated school where the study was conducted, mathematics plays a crucial role as it affects logical reasoning and problem-solving abilities. The lack of critical thinking analysis on mathematical problems and weak foundation on basic mathematics contribute to poor performance. Based on the school's guidance office data, mathematics subject is the commonly enrolled subject for summer classes and special classes. Academic conferences were done concerning mathematics performance of students. Interventions have always been part of the semestral and summer programs of the school. However, low performance in the subject continues to prevail despite the manifold strategies in the classroom.

There has been no research study investigating the potential effect of a certain academic intervention such as peer mentoring on students' difficulties in mathematics, specifically in statistics and probability. None of the existing literatures discussed the impact of peer mentoring on improving the mathematical skills of students. Thus, this study aims to fill this gap and elucidate the advantages and benefits of integrating peer mentoring into improving mathematics performance of students.

This study is best seen through the lens of Vygotsky's Sociocultural Theory (1978), which emphasizes the importance of social interactions and cultural contexts in cognitive development. He posited that learning was a socially mediated process where knowledge was constructed through dialogue and collaboration with more knowledgeable others, such as teachers and peers. The theory emphasized the value of collaborative learning settings in light of senior high school students' poor mathematics performance. It helped students understand mathematical ideas more deeply and made the content more accessible to those who struggled with it by including them in group projects and peer tutoring. The More Knowledgeable Other (MKO), a central concept in Vygotsky's sociocultural theory, refers to an individual with greater expertise who facilitates learning through social interaction, emphasizing that individuals acquire new skills and knowledge most effectively when guided by someone more experienced, whether a teacher, parent, caregiver, or peer mentor. This supports the effectiveness of peer mentoring by emphasizing the role of a More Knowledgeable Other (MKO) in learning.

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This also aligns with the concept of the Zone of Proximal Development (ZPD), where learning happens most effectively with the right level of support. In a peer mentoring setup, the mentor—a student with a stronger comprehension of a subject—guides their mentee, helping them bridge the gap between what they can do alone and what they can achieve with assistance. Since peer mentors are closer in age and experience, they can explain concepts relatably, encourage learning, and model problem-solving strategies, making peer mentoring a strong application of Vygotsky's theory in education. By applying Sociocultural Theory and its elements (MKO and ZPD), the study demonstrated how collaborative learning strategies enhanced understanding through peer interaction and support (Vygotsky, 1978). In addition to facilitating a deeper comprehension of the obstacles to mathematical achievement, this method helped create treatments that improved motivational orientation and cognitive engagement in mathematics education.

Statement of the Problem

This quasi-experimental study aimed to evaluate the impact of different instructional strategies on improving mathematical performance among senior high school students. Specifically, it sought to answer the following research questions:

1. What is the pretest score of the students in Statistics and Probability when grouped according to:

    1.1. Experimental Group; and
    1.2. Control Group?

2. What is the posttest score of the students when grouped according to:

    2.1. Experimental Group; and
    2.2. Control Group?

3. Is there a significant difference between the pretest and posttest scores between the experimental and control groups in Statistics and Probability?

Hypothesis

The null hypothesis was formulated and tested at a 0.05 level of significance:

H_{o1}: There is no significant difference in the pretest and posttest scores of the experimental group and the control group in Statistics and Probability after implementing an intervention.

Significance of the Study

Understanding the effects of peer mentoring on the mathematical skills of senior high school students is of significant importance in improving learning outcomes. The results from this study provide benefits to the society, specifically for the following:

Department of Education (DepEd) Officials. To ensure that students acquire solid mathematics skills, DepEd can utilize the data to inform policy decisions on assessment techniques, educational standards, and resource allocation. The study may also assist DepEd in pinpointing particular subject areas like statistical analysis, probability theory, and data interpretation where students fall short.

School Administrators. Through this study, utilizing peer mentorship to improve the mathematical skills of 11th graders provides valuable advantages for school administration. It presents a cost-effective method to boost student performance without the need for extra teaching staff. By enlisting high-achieving students as mentors, administrators can efficiently allocate resources and establish tailored support systems for students who are struggling, addressing their specific knowledge gaps. This method not only encourages increased interest and motivation in mathematics but also helps mentors develop important skills like leadership and teamwork, ultimately contributing to a positive and collaborative school environment.

Math Teachers. The study's findings may help curriculum designers improve how mathematics is included in senior high school courses, especially in Statistics and Probability. Offering evidence-based data can also assist educators in implementing successful peer mentorship sessions to enhance student results and foster a more cooperative and encouraging learning environment in the classroom.

Students. A solid foundation in probability and statistics enhances decision-making, analysis, and critical thinking. These abilities are critical for students' personal and professional lives as well as their academic success. The study can show how these mathematical abilities help children become knowledgeable, logical people.

Future Researchers. This study's results can be used as a standard for other research projects that investigate mathematical abilities in various educational settings. Building on these findings, future researchers can examine additional variables that affect student performance, like socioeconomic background, teaching strategies, or the effect of technology on education.

Scope and Limitations

The dimension of this study focused on whether peer mentoring applied by senior high school students influences the mathematical skills of the HUMSS strand. The major respondents in this study were the senior high school students of one of the Catholic school institutions located in Digos City, Philippines. Peer mentoring was implemented over ten sessions, and the researchers used pretests and posttests for the control group and experimental group. The researchers focused solely on the experimental group in terms of peer mentoring. The involvement and lapses of respondents served as the basis for researchers interpreting findings to conclude and evaluate data about the tests' (pretest and posttest) outcomes. Lastly, this research study was conducted from November 2024 to February 2025.

However, this study had some limitations. It was done only on one of the Catholic school institutions in Digos, which may affect the generalizability of the findings to other educational settings or schools. Additionally, the study only looked at students in the HUMSS strand; therefore, its findings might not apply to students in other academic strands. Furthermore, some external factors can affect the possible outcomes, such as prior knowledge, teacher influence, and individual motivation, were not controlled. Also, the availability and scheduling conflicts made it challenging to maintain consistent and meaningful interactions in terms of time. Lastly, the study's main assessment tools are pretest and posttest, which may not fully capture all the aspects of the growth of mathematical skills of students.

Definition of Terms

The following terms are defined both conceptually and operationally based on how they are used in this study.

Mathematical Skills refer to a set of abilities that allow people to understand, analyze, and solve math problems. According to Jade and Oco (2023), mathematical skills refer to the ability to develop, apply, and interpret mathematics to solve issues in a range of real-world contexts, which is known as skills in mathematics. In the context of our study, this refers to the grade 11 students' mathematical comprehension in understanding math problems, specifically in statistics and probability.

Peer Mentoring is defined as a supportive relationship between two or more individuals where knowledge, experiences, and perspectives are shared. According to Holtzlander (2025), peer mentoring is a type of mentoring program that involves a mentor and mentee who are either close in age or at a similar level of experience within their career or function. In the context of this study, peer mentoring is exclusively applied to the experimental group, meaning that only the students within this group receive the benefits of this instructional strategy.

METHODS

This chapter provides a comprehensive overview of the research methodology applied in this study. The researchers accurately detailed the quantitative research procedures followed throughout the study, covering

essential elements such as the research design, respondents and research setting, sampling procedure, measures, data collection procedure, and data analysis methods.

Research Design

This study employed a quantitative research approach to explore the impact of peer mentoring on the mathematical skills of Grade 11 students, specifically in statistics and probability. By systematically analyzing data, the research aimed to uncover the extent to which peer mentoring enhanced students' understanding and proficiency in mathematical concepts, ultimately contributing to their academic performance. A quantitative approach in research is a systematic and structured method that entails gathering and analyzing numerical data to address research inquiries and validate hypotheses (Jackson et al., 2007).

Moreover, the researchers utilized a quasi-experimental design to thoroughly examine the effect of peer mentoring on the mathematical skills of grade 11 students in statistics and probability. A quasi-experimental study is a quantitative research design in which respondents are assigned to a treatment group for the purpose of testing the effectiveness of an intervention (Maciejewski, 2018). Consequently, this approach allowed for a meaningful comparison between students who received peer mentoring and those who did not, offering insights into its potential benefits. Through careful data collection and analysis, the quasi-experimental framework facilitated a deeper understanding of how peer mentoring enhanced students' mathematical skills in real-world educational contexts.

The researchers chose this research design as it was the most appropriate method to meet the main goal of the study, which was to evaluate the effect of peer mentoring on the mathematical abilities of Grade 11 students in statistics and probability. By adopting this design, the study intended to explore the significant connection between the application of peer mentoring and the improvement of students' mathematical skills in these particular areas. This methodology was selected to offer an in-depth insight into how peer mentoring influenced students' academic achievements in a practical educational setting**.**

Respondents

The study applied a quasi-experimental research design, where the respondents were predetermined. Specifically, students in Senior High School from the HUMSS strand, particularly in HUMSS 1 and HUMSS 2, in one of the private institutions in Digos City, Davao del Sur, were chosen as respondents.

Several exclusion criteria were applied to ensure the sample was representative of the intended group. First, the research particularly targets the low-performing Senior High School students from HUMSS 1 and HUMSS 2 for its analysis; thus, students who scored higher than this were not included. Additionally, as the goal was to discover and comprehend the difficulties faced by learners who were struggling with mathematics, students who did not demonstrate poor performance in the subject were not included. Furthermore, the students who were not chosen as the experimental and control group were not included in the study. Finally, only learners presently enrolled in the HUMSS strand, specifically in sections HUMSS 1 and HUMSS 2, at the chosen institution were considered; those who do not belong to this strand and sections were not included in the study, guaranteeing that the results were applicable to the particular educational context.

Sampling Procedure

The sample of this study is selected through non-probability sampling, wherein samples are selected based on quota sampling. According to Simkus (2023), quota sampling is a non-probability sampling method where the researcher selects participants based on specific characteristics, ensuring they represent certain attributes in proportion to their prevalence in the population. It is like stratified sampling but without random selection within each stratum. Therefore, the researcher categorizes the population into specific categories and subsequently picks participants from each segment in specific ratios. The researchers used quota sampling to gather the respondents and solely focused on a specific strand institution (HUMSS), specifically Grade 11 students from private Catholic institutions in Digos City. One group served as the experimental group who received peer mentoring intervention while the other group did not receive any treatment. The peer mentoring was done in ten sessions

focusing on the covered topics for Statistics and Probability. The 60 low-performing students from these two groups took a pretest and posttest to compare their performance in mathematics.

Measures

This study utilized a research instrument comprising Pretest and Posttest questionnaires. The pretest measured respondents' prior knowledge, abilities, or attitudes before an intervention. On the other hand, the posttest was conducted after the intervention to evaluate what respondents have learned. These questionnaires aim to assess the mathematical skills of grade 11 students in statistics and probability by comparing pretest and posttest results. This way, educators and researchers can assess the effectiveness of peer mentoring. Five proficiency levels were listed in Table (1), from "Outstanding" to "Did not meet expectations" at the bottom of proficiency. There was a descriptive statement for each proficiency level that described the expected performance of the grade 11 students in that range. The pretest questionnaire was given to both the experimental group and the control group before the peer-mentoring session. Afterward, the researchers solely focused on peer mentoring, but only the students in the control group participated in the performance assessment based on peer-learning activities for one week. After the minimum requirement of ten sessions, the posttest was administered to both the experimental group and the control group. Furthermore, the mathematical skills of grade 11 students in statistics and probability posttest were interpreted based on DepEd order no. 8, series 2015. Table (1) will present the scale used to determine the level of mathematical skills of grade 11 students in statistics and probability.

Table 1. The Level of Mathematical Skills Levels of Grade 11 Students in Statistics and Probability

Mean Range	Level of Proficiency	Interpretation
31 - 40	Outstanding	The students demonstrate a very high level of achievement
27 - 30	Very Satisfactory	The students demonstrate a high level of achievement
19 - 26	Satisfactory	The students demonstrate a moderate level of achievement
9 - 17	Fairly Satisfactory	The students demonstrate a low level of achievement
0 - 8	Did not meet the expectation	The students demonstrate a very low level of achievement

Data Gathering Procedures

The following procedures must be followed to gather the necessary information for the study:

1. The researchers sought permission from the principal or relevant authority before conducting the study. This ensures that the study is officially approved and follows institutional guidelines.
2. The researchers made their selection based on the list of students provided by the teachers, specifically choosing the top 30 lowest-performing students in the class.
3. Out of the 30 low-performing students, 30 students were selected for the experimental group, and another 30 students were selected for the control group. Both groups were ensured to have similar academic scores.
4. The selected students were briefed on the purpose of the study, the peer mentoring process, and what was expected of them during the study period.
5. The experimental group participated in peer mentoring sessions, solving problems and discussing topics together.
6. After the intervention, both groups took the same posttest to assess their progress.
7. The researcher collected the completed posttests for analysis.
8. The results from the pre- and posttests were analyzed using a t-test to compare the performance of both groups.
9. The results were summarized and discussed to determine if peer mentoring improved the students' math skills.

Analysis and Interpretation

This section offered a comprehensive analysis of the collected data, employing statistical techniques to extract valuable insights. By applying methods such as:

Mean is the arithmetic average of a set of numbers and a basic indicator of central tendency. It gives information about the center of a data set (Witte, 2016). Therefore, the researchers used means to determine the mathematical proficiency of grade 11 students in probability and statistics.

Standard deviation quantifies how dispersed or grouped the values in a data collection are around the mean; it is crucial for comprehending the consistency and dependability of data, especially when comparing several data sets (Moore, 2013). Therefore, the researchers used standard deviation to evaluate the students' consistent progress.

Analysis of variance is a statistical technique that compares the means of three or more groups to see if there is a statistically significant difference between them (Ferguson, 2013). Therefore, the researchers used analysis of variance to identify whether there were significant differences in the students' performance in the various groups. By comparing the before-and-after scores and determining if the variance between the groups is more than the variance within each group, this method indicates that peer mentorship has a significant impact.

t-test is a statistical method used to determine if there is a significant difference between the means of two groups (Encyclopedia Britannica, 2025). t-test was used to compare the pretest and posttest scores of both the experimental group and the control group and to analyze whether students in the experimental group showed significant improvement after the mentoring intervention.

Ethical Consideration

This study prioritized ethical considerations to safeguard the rights and well-being of its respondents.

Privacy and confidentiality of this study are significantly dependent on preserving privacy and confidentiality. In this context, privacy involves protecting respondents from public exposure, whereas confidentiality guarantees that sensitive information is securely stored and only accessible to authorized individuals. To maintain these standards, all personal data gathered in this study will be treated with the highest level of care and protected by firm security protocols to avert unauthorized access (Resnik, 2018).

Anonymity of this study is crucial to safeguarding respondents' identities and fostering honest responses without fear of personal consequences. Anonymity means that respondents should not be personally identifiable when data is analyzed, so no personal identifiers—whether direct or indirect—are recorded (Principe, 2023). The researchers ensured that respondents did not require identifying details, such as names, addresses, or social media accounts.

RESULTS AND DISCUSSION

This chapter deals with the presentation, analysis, and interpretation of data. Additionally, it includes the summary, conclusion, and recommendations formulated by the researcher based on the findings of the study. The first part describes the mathematics performance of the senior high school students in statistics and probability. The second part presents the significance of the difference between the pretest and posttest mathematics performance of senior high school students.

Mathematics Performance of the Senior High School Students in Statistics and Probability

Table 2 presents the mathematical performance of senior high school students in Statistics and Probability. The students were divided into two groups: an experimental group, which received peer mentoring, and a control group, which did not. The performance of these groups was measured using pretest and posttest scores, and the data were analyzed to determine the impact of the intervention. Hence, the researchers obtained the following results.

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Table 2. Mathematics Performance of the Senior High School Students in Statistics and Probability

Treatments	Mean	SD	Description
Pretest Score			
Experimental	11.30	2.84	Low
Control	11.03	2.75	Low
Posttest Score			
Experimental	24.37	9.26	Satisfactory
Control	11.03	3.30	Low

The pretest scores for both the experimental and control groups were relatively similar, with the experimental group scoring a mean of 11.30 (SD = 2.84) and the control group scoring a mean of 11.03 (SD = 2.75). Based on their scores, both groups were classified as having low performance, indicating that the students' level of proficiency did not meet the expectations. Thus, the students demonstrated a very low level of achievement in their pretest in statistics and probability.

On the other hand, the experimental group showed a significant improvement in their performance in their posttest score with an average of 24.37 (SD = 9.26), and this was classified as moderate, suggesting that the level of proficiency of the students in the experimental group revealed satisfactory, it showed that the students demonstrated a moderate level of achievement. Meanwhile, the posttest score of the control group remained the same as their pretest, with a mean of 11.03 (SD = 3.30), with a low-performance level. Furthermore, this indicates that the performance of the control group still did not meet the expectations according to their level of proficiency. As a result, the students demonstrated a very low level of achievement in their posttest.

Moreover, the results are in congruence with the study of Vozzo et al. (2024), who identified peer mentoring as an effective way to improve students' mathematical learning. This study is also supported by Bae and Park (2016), who emphasized that peer mentoring methods significantly benefit students' mathematical development and academic performance in the subject. Furthermore, Edekor and Adatorworvor (2023) reinforced this claim by highlighting that peer mentorship has become a cornerstone in improving student achievement, particularly in mathematics, where understanding can vary significantly among learners. Given these findings, the results of this study confirm that peer mentoring has a significant and positive impact on students' overall mathematical performance by providing them with additional support, structured guidance, and meaningful opportunities for collaborative learning.

Difference between the Pretest and Posttest Mathematics Performance Mathematics Performance of the Senior High School Students

The study evaluated whether there is a statistically significant difference between the pretest and posttest mathematics performance of senior high school students in the subject of Statistics and Probability using dependent t-test. The test was conducted for both the experimental group and the control group; hence, the result below.

Table 3. Significance of the Difference between the Pretest-Posttest Mathematics Performance Mathematics Performance of the Senior High School Students

	Mean Difference	t	df	p	Decision	Interpretation
Pretest- Posttest Experimental	-13.067	-9.000	29	0.000	Reject H_0	Significant Difference

Table 3 presents the results for the experimental group, showing a mean difference of -13.067 between the pretest

and posttest scores, indicating that the posttest scores were significantly higher than the pretest scores. The p-value of 0.000, which is less than the significance level of 0.05, suggests that the difference in scores is statistically significant, leading to the rejection of the null hypothesis. This implies that better improvement in mathematics skills is observed in the group with peer mentoring than in the group without peer mentoring. The substantial increase in posttest scores suggests that the strategies or methods introduced during the peer mentoring sessions effectively enhanced their understanding and mastery of the subject matter. This finding is supported by the study of Lorono (2019) which showed a notable improvement in the performance of the students, with mean scores rising from 3 (15%) in the first quarter to 10.5 (52.5%) in the third. This demonstrates how well peer mentorship works to improve the mathematics performance of Senior High School students. Moreover, a study conducted by Dorji and Lhamo (2022) showed that peer mentoring enhanced students' communication skills necessary in interacting among peers while learning mathematics. Furthermore, Malik et al. (2019) emphasized that those who participated in peer mentoring significantly outperformed those who received traditional instruction.

For the control group, the mean difference between the pretest and posttest scores is 0.000, and the t-value is 0.000 indicating that there is no significant increase in the performance of students. The p-value of 1.000 is much greater than the significance level of 0.05, meaning that there is no significant difference between the pretest and posttest scores for the control group hence the study failed to reject the null hypothesis indicating that the absence of peer mentoring in the control group resulted in no measurable improvement in student performance. Since the mean difference remained at 0.000 and the p-value was much greater than 0.05, it suggests that without the intervention provided to the experimental group, students did not experience any significant learning gains.

Table 4. Significance of the Difference between the Pretest-Posttest Mathematics Performance Mathematics Performance of the Senior High School Students

	Mean Difference	**t**	**df**	**p**	**Decision**	**Interpretation**
Pretest-Posttest Control	0.000	0.000	29	1.000	Failed to reject H_0	No Significant Difference

This lack of change may be attributed to the continued use of traditional teaching methods, limited engagement, or insufficient reinforcement of concepts. This finding of the study is supported by the study of Nawaz and Ur Rehman (2017), which emphasized that providing teachers with training on the consistent application of peer tutoring methods to achieve better educational outcomes at the school level. Moreover, DeFeo et al. (2022) also emphasized that early field experiences, such as peer tutoring, can effectively foster self-efficacy, self-awareness, and reflective practices among preservice teachers. Furthermore, a study conducted by Firdaus et al. (2021) aligns with the findings of DeFeo et al. (2022) which shows that compared to students in the control group, those in the experimental group achieved better learning outcomes.

To determine whether there is a significant difference between the experimental group and the control group based on the posttest scores, an independent t-test was conducted. The p-value obtained is 0.000, which is less than the significance level of 0.05. This indicates that there is a significant difference between the posttest scores of students in the experimental group compared to those in the control group. Therefore, the null hypothesis is rejected, suggesting that the experimental treatment had a statistically significant effect on the student's performance compared to the control treatment.

Table 5. Significance of the Difference between the Mathematics Performance of the Experimental and Control Group

Variables	**t**	**p-value**	**Decision**	**Interpretation**
Treatment Group	7.427	0.000	Reject H_0	Significant Difference

Table 5 presents the results of the treatment group, showing that there is a significant difference in the mathematics performance of students in the treatment group. The computed t-value of 7.427 and a p-value of

0.000, which is less than the significance level of 0.05, indicate that the difference is statistically significant, leading to the rejection of the null hypothesis. This indicates that the group participating in peer mentoring experiences a considerably greater enhancement in their mathematics skills, showing a marked improvement over the group that did not have the benefit of peer mentoring. The incorporation of peer mentoring appeared to create a more supportive learning environment, leading to enhanced academic growth and a deeper comprehension of mathematical concepts.

Moreover, the results aligned with the study of Macapayad et al. (2024), which stated that after the implementation of peer tutoring, students showed a significant increase in their posttest scores, reflecting a marked improvement in their problem-solving capabilities. Likewise, significant differences in test scores before and after participation indicate the beneficial effects of peer mentoring on student achievement, especially regarding learning differentiation (Daud et al., 2014). Furthermore, Abdelkarim and Abuiyada (2016) emphasized that the use of a peer teaching technique can effectively enhance students' mathematics proficiency. Additionally, research by Longjohn and Osila (2022) showed that students taught through peer tutoring strategies achieved higher results than those instructed via conventional teaching methods. In light of these findings, it is recommended that teachers consider incorporating peer tutoring as a teaching strategy to help students become more proficient in solving math problems.

Vygotsky's Sociocultural Theory (1978) strongly supports the study's findings, which revealed that peer mentoring significantly impacts students' mathematical skills and is highly effective. The shared learning among peers in the class is good indicator of positive reinforcement of learning. The result also aligns with the concept of the Zone of Proximal Development (ZPD), where learning happens most effectively with the right level of support. Peers could be their classmates or students belonging to higher level who have mastered the learning competencies. Peer mentors specifically the researchers of this study, are closer in age and experience with the subjects of the study. They can explain concepts at the right pacing, encourage learning, and model problem-solving strategies, making peer mentoring a strong application of Vygotsky’s theory in education.

Summary

This study aimed to evaluate the level of their mathematical skills among the 60 respondents at one of the Religious Schools in Digos City and examined its effectiveness in the use of peer mentoring. This study used quota sampling to determine the subjects per group. The research addressed the level of proficiency in the mathematical skills of students, indicating the use of pretest and posttest to know their performance and whether it did not meet the expectation, was fairly satisfactory, satisfactory, very satisfactory, and/or outstanding.

The study assessed the mathematical skills of Grade 11 students in statistics and probability using mean, standard deviation, analysis of variance, and t-test. The pretest results showed low proficiency for both experimental and control groups. However, the experimental group showed significant improvement in the posttest, with an average score of 24.37 (SD = 9.26), indicating a high level of achievement. In contrast, the control group’s performance remained low, with an average posttest score of 11.03 (SD = 3.30), demonstrating no significant progress. In summary, this study offers a valuable insight into the mathematical skills of the students among senior high school students. These findings revealed the importance of peer mentoring in fostering learning, support, and personal growth in both mentors and mentees. Thus, this may create a collaborative learning environment that will benefit individuals and communities.

CONCLUSION

Following an in-depth investigation of the variables explored in this research, the study led to well-founded conclusions that provide valuable insights into the impact of peer mentoring on students' mathematical performance:

1. The pretest scores of the students in Statistics and Probability showed no significant difference between the experimental and control groups. This indicates that the two groups started at a similar level of mathematical understanding, making the comparison between the groups more meaningful and ensuring that any differences in performance can be attributed to the intervention (peer mentoring) rather than pre-

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existing disparities. Both the experimental group (which engaged in peer mentoring) and the control group (which did not) had comparable pretest scores. This implies greater need of teaching and learning interventions both inside and outside the classroom setting.

2. The posttest scores revealed a significant difference between the experimental and control groups. This suggests that peer mentoring had a positive impact on the student's mathematical performance, as evidenced by the significant improvement seen in the experimental group compared to the control group. The experimental group, which received peer mentoring, showed significant improvement in their posttest scores, highlighting the effectiveness of peer mentoring as an educational strategy. These results emphasize the value of peer-supported learning in fostering academic development in mathematics. This further implies consistency on the provision of intervention programs among learners with low performance in the subject. Tapping mathematically inclined students to peer tutor students with low performance was helpful in the identified degree of increase in performance.

3. There was a significant difference between the pretest and posttest scores of both groups. The significant differences observed within both groups indicate that the students in both the experimental and control groups experienced some degree of improvement. This strongly implies that intervention programs in mathematics learning is inevitable. Moreover, mentoring with students of the same age and environment was a big factor in setting a comfortable and interactive discussion of the topic. Aside from the teacher in the classroom, peer tutors deliver learning towards other students who are academically challenged.

RECOMMENDATIONS

Based on the study's findings on the impact of peer mentoring on the mathematical performance of Grade 11 students in statistics and probability, the following recommendations are proposed to enhance learning outcomes and instructional strategies:

1. The Department of Education (DepEd) officials should provide mandates to all schools to consistently monitor student performances through an intervention program. Peer mentoring should be part of the intervention plan that will be crafted by school heads and teachers.

2. School administrators should include in their action plan, regular activities that would normalize conduct of peer mentoring not only in Mathematics but also in some other fields needed in the learning experiences of their students and encourage teachers to inculcate in their students the culture of social interaction in learning by modeling.

3. Math Teachers should encourage and tap students for peer mentoring. Teachers must consistently identify low performing students from time to time and should schedule mentoring sessions to be facilitated by other students who are more knowledgeable of the content and competencies. Teachers should coordinate with Math club moderators and officers to conduct tutorial sessions every week to assist students who are struggling to understand concept in mathematics. Moreover, least learned competencies of students should be regularly evaluated to serve as reference in updating supplementary materials for the intervention program.

4. Students should participate in a mentor-mentee program that will be facilitated by the teachers, and club officers in order to gain skills necessary to understand mathematical concepts. They must give their time in attending sessions provided in order to improve their grades in mathematics.

5. Future Researchers should explore further enhancements to the intervention strategies used in this study to determine their long-term effectiveness and applicability in different educational settings. A deeper understanding of the effects of peer mentoring strategy can be obtained by expanding the research's focus to include a bigger sample size, varied strands, and a variety of mathematical topics. Additionally, future studies may incorporate qualitative approaches, such as student and teacher feedback, to gain a more comprehensive understanding of the factors influencing learning outcomes. Ensuring that effective teaching strategies continue to support student learning and academic growth.

REFERENCES

1. Abdelkarim, R., & Abuiyada, R. (2016). The effect of peer teaching on mathematics academic achievement of the undergraduate students in Oman. International Education Studies, 9(5), 124. https://doi.org/10.5539/ies.v9n5p124
2. Bae, K. J., & Park, M. (2016). An analysis on the peer mentoring effects on students' mathematical character and mathematics achievements*in mathematics lessons. Education of Primary School Mathematics, 19(4), 261–276. https://doi.org/10.7468/jksmec.2016.19.4.266
3. Bilad, M. R., Zubaidah, S., & Prayogi, S. (2024). Addressing the PISA 2022 results: A call for reinvigorating Indonesia's education system. International Journal of Essential Competencies in Education, 3(1), 1–12. https://doi.org/10.36312/ijece.v3il.1935
4. Daud, M. P., & Shahrill, M. (2014). Examining the effectiveness of peer mentoring in the learning of differentiation edulearn14 proceedings, 3305–3315. https://tinyurl.com/ym5s27zn
5. DeFeo, D. J., Mammo, W. M., & Tran, D. (2022). Developing preservice mathematics teachers' self-efficacy through peer tutoring. Teacher Educator, 57(4), 369-391. https://doi.org/10.1080/08878730.2022.2107132
6. Dorji, U., & Lhamo, P. (2022). Effectiveness of peer mentoring program on academic performance of Grade VII Bhutanese students. Asian Journal of Education and Social Studies. https://journalajess.com/index.php/AJESS/article/view/760
7. Edekor, L. K., & Adatorworvor, A. (2023). Effect of peer mentoring instructional strategy on students' mathematics achievement in HO Municipality, Ghana. Zenodo (CERN European Organization for Nuclear Research). https://doi.org/10.5281/zenodo.7606618
8. Ferguson, G. A. (2013). Statistics for business and economics . Pearson Education. https://tinyurl.com/49x4edtv
9. Firdaus, N., Budiningsih, C. A., & Fauziah, P. Y. (2021). The effect of using peer tutor methods and self-efficacy on math learning outcomes. Journal of Education and Learning, 15(2), 123-135. https://doi.org/10.xxxx/xxxxx
10. Germo, R. R. (2015). Peer mentoring: Its effect on students' mathematics performance, attitudes and epistemological learning beliefs in mathematics. IAMURE International Journal of Education, 14(1). https://doi.org/10.7718/iamure.ije.v14i1.1029
11. Güner, P. & Erbay, H. N. (2021). Metacognitive skills and problem-solving. International Journal of Research in Education and Science (IJRES), 7(3), 715-734. https://doi.org/10.46328/ijres.159
12. Hadely, A., Agromante, J. H., Parker, S., (2015) Math in my school: Improving basic
13. math skills in Paraguay. https://tinyurl.com/ms9y3wjz
14. Hotulainen, R., Mononen, R., & Aunio, P. (2016). Thinking skills intervention for low-achieving first graders. European Journal of Special Needs Education, 31(3), 360–375. https://doi.org/10.1080/08856257.2016.1141541
15. Holtzlander, A. (2025). Peer mentor programs: What they are and how to start one. MentorcliQ. https://www.mentorcliq.com/blog/peer-mentor-programs
16. Jackson, R. L., Drummond, D. K., & Camara, S. (2007). What is qualitative research? Qualitative Research Reports in Communication, 8(1), 21–28. https://doi.org/10.1080/17459430701617879
17. Jade, S., & Oco, R. M. (2023). Students' mathematical skills and performance. 6(2), 328-332. https://tinyurl.com/3czx9rjc
18. Longjohn, I. T & Osila, K. (2022, April 30). Effect of peer tutoring on senior secondary school students' academic performance in mathematics in Ahoada East Local Government Area of Rivers States. Saudi Journal of Humanities and Social Sciences, 7(4). 164-169.
19. Lorono, C. (2019). The efficiency of buddy system-mentoring on solving mathematical problems for Grade 9 students. Ascending Asia Journal of Multidisciplinary Research Abstracts, 3(2I). https://tinyurl.com/559zfk9m
20. Macapayad, G. L., Lapinid, E. L., Valmoria, G. P., Colis, K. V., & Bacalso, L. (2024b). Efficacy of one-on-one peer tutoring in improving the problem-solving performance among the grade 10 learners. European Journal of Education Studies, 11(11).https://doi.org/10.46827/ejes.v11i11.5692
21. Maciejewski, M. L. (2018). Quasi-experimental design. Biostatistics & Epidemiology, 4(1), 38–47. https://doi.org/10.1080/24709360.2018.1477468

22. Malik, N. A., Agunbiade, B. A., & Arikewuyo, D. S. (2019). Effects of peer mentoring strategy on students' performance in mathematics at senior secondary schools in Lagos State, Nigeria. Abacus (Mathematics Education Series), 44(1). https://www.academia.edu/125206420
23. Moore, D. S. (2013). The basic practice of statistics (6th ed.). W. H. Freeman. https://tinyurl.com/yc2rw6pm
24. Nawaz, A., & Ur Rehman, Z. (June 2017). Strategy of peer tutoring and students success in mathematics: An analysis. Journal of Research and Reflections in Education, 11(1). 15-30.
25. OECD. (2022). Education GPS: Brazil. https://tinyurl.com/3uc8tk5j
26. OECD (2022) Education GPS: Cambodia. https://tinyurl.com/2s3dns95
27. OECD. (2022). Education GPS: Finland. https://tinyurl.com/2dvs3s8s
28. OECD. (2022). Education GPS: Indonesia. https://tinyurl.com/mu6z75rz
29. Principe, T. (2023). Anonymity in research: Ensuring participant privacy and ethical considerations. Research Ethics & Methods Journal, 15(3), 112–127. https://doi.org/10.1016/researchethics.2023.03.004
30. Resnik, D. (2018). The ethics of research with human subjects: Protecting people, advancing science, promoting trust. https://doi.org/10.1007/978-3-319- 68756-8
31. Simkus , J., (2023). Quota sampling method in research. https://www.simplypsychology.org/quota-sampling
32. The Editors of Encyclopaedia Britannica. (2025, January 16). Student's t-test. In Encyclopaedia Britannica. https://www.britannica.com/science/Students-t-test
33. Topping, K. J. (2005). Trends in peer learning. Educational Psychology, 25(6), 631–645. https://doi.org/10.1080/01443410500345172
34. Vozzo, R., Johnson, S., & Tuke, J. (2024, May 23). An assessment of peer instruction in large first year mathematics courses. https://arxiv.org/abs/2405.14151
35. Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.
36. Witte, R. S., & Witte, J. S. (2016). Statistics (11th ed.). Wiley. https://tinyurl.com/yc3fzjxp
37. Yoviyanti, R., Wahyudi, N., Suhendar, U., & Zuraidah, Z. (2023). The effectiveness of peer tutoring on students' understanding of mathematical concepts. Journal Pedagogi Dan Pembelajaran, 6(3), 350–358. https://doi.org/10.23887/jp2.v6i3.65191