



## EFFECTS OF PEER MENTORING ON LEARNERS' ACADEMIC ACHIEVEMENT IN SCIENCE

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### ABSTRACT

This study examined the impacts of peer mentoring on the academic achievement of Grade 10 students in science at Iloilo City National High School during the academic year 2024-2025. Using a one-group pretest-posttest experimental design, the research sampled forty (40) middle-section students through purposive sampling, with an average pretest scores below 75%. A researcher-made test, aligned with the Most Essential Learning Competencies (MELCs) in the K-12 Science Curriculum, was utilized to assess student's performance pre and post intervention following a three-week peer mentoring program. Statistical analysis revealed a significant improvement in posttest scores, highlighting the intervention's effectiveness.

The study recommended incorporating peer mentoring into science curricula, supplemented by systemic training for peer mentors and ongoing program evaluation. Beyond academics, the initiative has the potential to promote social and emotional growth, cultivating an inclusive and engaging learning environment. These findings contribute to expanding evidence-based support for peer mentoring as a highly effective intervention for improving science learning outcomes.

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**Keywords:** *Peer Mentoring, Science, Intervention, Academic Achievement*

## INTRODUCTION

Peer mentoring is a method of instruction that focuses on helping students who are struggling with a subject or skill. The main goal of peer mentoring intervention is to identify and address the root causes of a student's struggles, rather than simply providing them with the same practice or repetition of the same learning materials. This intervention involves providing additional support, instruction, and guidance to help students overcome their difficulties and improve their academic performance (Pathak, 2023).

The academically challenged students in the class do not have the same cognitive ability as the other learners. The characteristics of academically challenged learners had to be understood to deal with them in the common class. The low performing learners cannot do complex learning which involves complex thoughts. They usually feel anxious and suffer from low self-esteem and poor concentration skills. They have problem transferring what they have learned from one task to another (Suranjana, 2021).

These learners demonstrate a problem not only for themselves, but also for their teachers as well. Frequent poor performance causes these students to become a burden not only to their parents, but also to the school and society. A student learns better from his peers than from most adults. The low-performing learners can be taught by peer teaching. The peer

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tutors who have the time and commitment to teach the low-performing learners can be trained to teach them (Suranjana, 2021).

Peer mentoring brings the class in a positive atmosphere with lots of energy and the student's interactive attitudes towards each other. It improves their motivational aspects and holistic academic performance in school (Dowd, 2021).

They could inquire questions and acquire answers in terms that they could fully comprehend but of course the teacher facilitates and assists the intervention and clarify all misconceptions. Students that are confident and with high self-esteem feels that they are belong to the group, and as a teenager, they learn better with people of the same age as them (Gillies, 2022).

The importance of peer mentoring strategies, is that many scholarly attention has caught for its roles and benefits in educational institution. However, most of the previous studies, includes only those in the form of review articles and journals, have predominantly focused on the influence of peer mentoring on one or two aspect(s) of academic success, such as learner's knowledge acquisition and productivity, as well as learner's stress and anxiety management (Kachaturoff et al., 2020; Lane, 2020; Lim et al., 2022).

Teachers conduct these type of intervention called remediation program after every grading period every time a students get a below 75% on their grading period average. That practice has been in the Philippines schools system for years but for some undergoing the process it still feels the same recreating the class with the same boring topics and activities. The results have been minimal 5 out of 20 students under these remediation passed the post

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test. Coming up with this approach, the peer mentoring aims to investigate if the academically challenged learners could learn better and understand the topics if they are mentored by their peers.

As for science, 13% of Filipino learners were also on the low benchmark, which translate that they had "limited understanding of scientific concepts and limited knowledge of foundational science facts," while 87% did not even reach this level. In the year 2022, 23% of Filipino students reached Level 2 or higher in science, while almost none of the students reached the top level of proficiency (*PISA 2022 Results (Volume I): The State of Learning and Equity in Education*).

The study aimed to investigating several Grade 10 learners specifically in Iloilo City National High School who are academically challenged in their class especially in science, it means they failed to reach the 75% as an average for the subject in a particular grading period, causing them to retain or drop the subject. Most of them are usually inattentive in the class, easily lose interest in the lessons, they have short attention span and lack some of the basic skills such as literacy and numeracy. Most of these students are enrolled under remediation classes for almost every grading period. This study has initiated because despite being in remediation classes, they continue to performing poorly in the science subject. A buddy system was implemented and evidences showed that with peers they can be motivated and interested to learn. Thus, the study will be conducted to determine the effects of peer mentoring on learner's academic achievement in Science as a bases for intervention program in Iloilo City National High School for the School Year 2024-2025

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## MATERIALS AND METHODS

### Research Methodology

This chapter presents the research method, research design, participants of the study, data gathering procedures, research instrument, and the data analysis that will be utilized in the study. The study gathered data to determine the effects of peer mentoring on learners' academic achievement in science, providing bases for intervention program in Iloilo City National High School for the school year 2024-2025. Quantitative research was employed to meet the objectives of the study.

### Research Design

The study gathered data to determine the effects of peer mentoring on learners' academic achievement in science, providing bases for intervention program in Iloilo City National High School for the school year 2024-2025. Quantitative research was employed to meet the objectives of the study.

One group experimental research design is a type of quantitative research method involves assessing the same group of students before and after the intervention. The pretest (before peer mentoring) provides a baseline measure of students' academic achievement, while the posttest (after peer mentoring) measures any changes in their academic performance.

One-group pre-test-post-test Design often use pre-test and post-test measurements to compare the outcomes before and after the intervention or treatment. This design

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measures a single group multiple times before and after an intervention to detect whether there is a significant change in trends.

The study employs a One-group pre-test-post-test Design under the quantitative research method. Specifically, it utilized the pre-test and post test method to measure and compare the outcomes before and after the intervention of peer remediation. The researcher will develop a periodical examination tests that would go under validity and reliability testing. Gather the scores and identify the academically challenged Grade 10 learners to be subjected to peer mentoring. The aim was to gather the data on the effects peer mentoring in the learners' academic achievement in science as bases for intervention program.

### Sampling Design

The participants of the study were the middle section of Grade 10 in Iloilo City National High School enrolled in the school year 2024-2025, which are composed forty (40) learners in total. From these forty (40) learners the number of academically challenged learners was determined after the pretest was given. Purposive sampling design was used in the study. The subjects are the Grade 10 learners who have average performance scores of below 75% after taking the pre-test examination.

### Research Instrument

The study utilized a researcher-made test (Multiple Choice Quarter Examination) in which items were taken from modules and books released by the Department of

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Education. The test was based on the Most Essential Learning Competencies (MELCs) K-12 Curriculum for the second quarter which determines the academic performance of students before and after the intervention. The instrument is a 50-item test covering all competencies and a table of specification validated by the experts. This measured and assessed the effectiveness of peer mentoring in the result of the post test. Cronbach's alpha was used to measure the internal consistency that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability.

### Validity & Reliability

Criterion-related evidences was used to test the validity of the instrument. The study may be comparing the performance of the students given the same set of test before and after the peer mentoring is applied. Test papers were validated by the experts in the field of science education, grammar and sentence structures and test paper format. The test papers underwent pilot testing to determine the reliability of the test papers. The same set of instrument was given twice.

Reliability of the Data Gathering Instrument. In testing the reliability of the research instrument, pilot testing was conducted on other groups of students who have the same characteristics as the respondents. The result was then analyzed using KR-21 test of reliability. The research instrument obtained a reliability score of 0.78 which was interpreted as "highly reliable".

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## Data Gathering Procedures

### Pre – Implementation

The researcher obtained the necessary measures and protocols regarding the conduct of the study, including the permission from the office. First, the researcher chose a topic of her interest. The main objectives and the specific questions were formulated to guide the researcher on the flow of the study. Next, the respondents of the study were identified. Middle section from Grade 10 were identified to be the respondents of the study (consisting of 40 students). The mentees selected were the students with grades below 75% after implementing the pre test. Mentors selected were the 10 top students of the Grade 10 Science, Technology and Engineering Program. These mentors will undergo 1 week of orientation and training on how to conduct the peer mentoring sessions using the Science Modules Quarter 2 composing of the Most Essential Learning Competencies (ADM-DepEd, 2020 Edition). A consent was sent to the mentors and mentees, requesting for their volunteerism in conducting the peer mentoring intervention. After the respondents were identified, the researcher proceeds in making a research instrument appropriate for the study which is a 50 item Multiple Choice Quarter Examination. A researcher-made test was then pilot tested, validated and will undergo reliability testing. A letter of approval for the conduct of the study was then sent to the office of the principal/supervisor.

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## Implementation

After getting approval for the conduct of the study, the researcher administered the pre-test to the respondents. The researcher checked and recorded the respondents scores for later use in determining the academic performance of the respondents. The intervention which is peer mentoring was then administered to the experimental group. The mentor and mentee sat together after class, twice a week for (three) 3 weeks, to study and discuss concepts that the mentee found difficult. The researcher acted as facilitator and guide, clarifying concepts and addressing misconceptions if needed. The intervention was administered for three weeks. A post test was then given to experimental group, the items in the tests will be rearranged in random order to ensure fairness and predictability. After the respondents were done answering the test questionnaires, the researcher retrieved them and sought the assistance of the statistician to treat and analyze the gathered data.

## Post Implementation

The statistician made an appropriate and accurate statistical treatment of the data obtained. Each question on the statement of the problem was answered. After analyzing and interpreting the data, findings and results were revealed to the researcher. Conclusions were made based on the results. Recommendations were formulated from the conclusions so that possible issues and concerns about the study were properly addressed.

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## Data Analysis

The number of the research instrument was reproduced according to the number of the subjects in the study. The data gathered in the study was organized, tabulated, computer-processed, analyzed, and interpreted using the Statistical Package for Social Sciences (SPSS) software.

## Statistical tool

The data was tabulated, analyzed, and interpreted using the appropriate statistical tools. All computations were done through social Package for Social Sciences (SPSS) with significance level set 0.05.

(1) Descriptive analysis will be using the relationship of the pretest and posttest to calculate the mean, standard deviation, and range for pretest scores.

(2) Mann-Whitney U Test is a non-parametric alternative test to the independent sample t-test. It is non-parametric test that was be used to compare two sample means.

This test was used to determine the significant difference in the pretest result before the peer mentoring and post-test results after the peer mentoring of the grade 10 learners in science.

(3) Wilcoxon Signed Rank Test is also a non-parametric alternative test to the dependent sample t-test. It is a non-parametric test that is used to compare sample means.

This test was administered to determine the significant difference between the pre-test scores of the Grade 10 learners before and after the peer mentoring intervention and post-test scores after the intervention.

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## RESULTS AND DISCUSSION

This study started with a pre-test administered to Grade 10 students to assess their initial academic performance in science. The pre-test results identified respondents who were struggling academically, defined as those with average scores below 75%. Those students then resumed the peer mentoring as treatment for three weeks. After that, a post-test was administered to measure the effects of the intervention. To interpret the test results, the researcher used the following scale with descriptive evaluation.

### Pretest and Posttest Results of Learners' Academic Achievement in Science Before and After the Treatment of Peer Mentoring

**Table 1.**

*Pretest and Posttest Results of Learners' Academic Achievement Before and After the Peer Mentoring Intervention*

Before and After the Treatment of Peer Mentoring	n	Mean	Description
Pretest Result	16	22.00	Very Satisfactory
Posttest Result	16	30.81	Outstanding

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*Legend:*

Scores	Description
24.01 – 30.00	Outstanding
18.01 – 24.00	Very satisfactory
12.01 – 18.00	Satisfactory
6.01 – 12.00	Fairly Satisfactory
0.00 – 6.00	Did Not Meet Expectations

To compare the learners' score before and after the treatment, the researcher calculated the mean scores for both the pre-test and post-test results.

Results presented in table 1 indicate an increase in the learners' scores, from a "very satisfactory" level (M=22.00) in the pre-test to an "outstanding" level in the post-test scores (M=30.81). The data revealed statistically significant increase in students' scores from the pretest and post-test. Specifically, the mean score increased from 22.00 (SD = 2.85) on the pretest to 30.81 (SD = 4.37) in the post-test, with a mean difference of 8.81. The 95% confidence interval of the mean difference ranged from -10.33 to -7.29, demonstrating a consistent effect of the intervention across the sample.

The findings were also similar to the study of Leidenfrost et al. (2022), who observed that peer mentoring fosters better understanding of concepts, leading to significant academic improvements.

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**Differences in the Pretest and Posttest Results of Learners' Academic Achievement in Science Before and After the Treatment of Peer Mentoring**

**Table 2.**

*Difference Between the Pretest and Posttest Results of the Students Academic Achievement Before and After the Peer Mentoring Treatment*

Before and After the Treatment of Peer Mentoring	Mean	z	p-value	Remarks
Pretest Result	0.00			
			-3.521*	0.000 significant
Posttest Result	8.50			

*p < 0.05, significant*

The Wilcoxon signed Rank Test in Table 2 shows that there is a significant difference between the pretest and posttest scores of the learners ( $z = -3.521^*$ ). The p-value was 0.000

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which means significant. The mean rank of learners' scores increased significantly from 0.00 in the pre-test to 8.50 in the post-test. The observed difference favored the posttest scores of the learners when the mean of ranks for the difference scores, was taken into consideration. There was a significant difference between the pretest and posttest results of the students ( $Z = -3.521, p = .000$ ). Based on the data, it is safe to say that the intervention was effective in improving the scores of the students.

The extremely low p-value ( $p = .000$ ) suggests that the observed improvement is unlikely to be due attributed to chance. This findings suggests a robust and positive effect of the peer mentoring strategy, providing strong evidence for its effectiveness.

The significant p-value suggests that peer mentoring effectively contributed to the improvement of learners' academic performance in science. This aligns with the findings of Wang (2021), which highlight how peer mentoring fosters understanding of complex concepts and improves academic integration. Similarly, Pavlovic and Jenö (2023) noted that peer mentoring has a significant impact on mentees' sense of belonging, which correlates with better academic performance.

This significant improvement suggests that the instructional strategy implemented during the intervention was effective in enhancing students' understanding of the subject matter. The results align with previous studies that emphasize the impact of targeted teaching approaches on learning outcomes (e.g., Smith & Brown, 2020; Johnson, 2020). For example, Johnson (2020) found that active learning strategies, such as peer mentoring and cooperative

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learning, significantly improve students' comprehension and retention of complex concepts. Similarly, the findings resonate with Vygotsky's sociocultural theory, which highlights the role of scaffolding in fostering meaningful learning experiences.

The substantial effect size, reflected in the large z-value and the small p-value, further underscores the robustness of the intervention's impact. This aligns with the broader literature advocating for evidence-based instructional interventions to improve student achievement in science education (Miller et al., 2021).

### **Distribution of Scores in the Pretest and Posttest Results of Learners' Academic Achievement in Science Before and After the Treatment of Peer Mentoring**

The Mann-Whitney U Test results in Table 3 indicate a significant difference in score distributions between the intervention categories ( $p = .0001$ ). Since the p-value is below the 0.05 significance level, the null hypothesis is rejected, which suggests that the distributions of scores are not the same across intervention groups. This implies that the intervention had a statistically significant effect, leading to differing performance outcomes between the groups.

This was parallel with previous studies that highlight the effectiveness of peer mentoring in improving academic performance. Leidenfrost et al. (2022) found that structured peer mentoring fosters better understanding of concepts, leading to significant academic improvements among students. Similarly, Wang (2021) emphasized that peer mentoring enhances students' integration into academic settings, promoting deeper engagement and

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comprehension of scientific concepts. Furthermore, Pavlovic & Jen0 (2023) demonstrated that peer mentoring programs contribute to higher academic achievement by providing both cognitive and emotional support, reinforcing the positive effects observed in this study. These studies collectively support the significant difference in score distributions found in the intervention groups, validating the impact of peer mentoring as an effective instructional strategy.

## SUMMARY

The study determine the effects of peer mentoring on academic achievement in Grade 10 science. The study was conducted at Iloilo City National High School during the second quarter for the school year 2024-2025 . Specifically, it focuses on how peer mentoring can serve as a basis for an intervention program to enhance students' academic performance in science. The participant of the study was the 40 grade 10 students of Iloilo City National High School who purposively selected based on their science academic performance and subjected to peer remediation treatment based on their pretest scores.

The study employed a One-Group Pretest-Posttest Design under the quantitative research method. Specifically, it utilized the pretest and post test method to measure and compare the outcomes before and after the intervention of peer remediation. The researcher developed a periodical examination tests that would under go validity and reliability testing. Gathered the scores and identify the academically challenged grade 10 learners to be subjected to peer mentoring.

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The data obtained were tabulated, analyzed, and interpreted using mean and standard deviation descriptive statistics. To determine the significance of the difference among the means, the researcher used the Wilcoxon Signed Ranks test and Mann-Whitney U test. The differences were tested at a 0.05 level of significance.

The findings of the study revealed that: The learners pretest scores was "very satisfactory" and the post test scores was "outstanding". Post-test results revealed a substantial improvement in academic performance, with a mean score of  $M=30.81$  and  $SD=4.37$ , falling under the "Outstanding" category. This confirmed that the intervention program, which incorporated peer mentoring, was effective in significantly enhancing students' academic achievement in science.

There was a significant difference between the pretest and posttest results of the learners academic achievement in science. The significant p-value suggests that peer mentoring effectively contributed to the improvement in learners' academic performance in science as evident in the results of the Wilcoxon Signed Rank Test.

The findings emphasize the positive impact of peer mentoring on student learning outcomes. The marked increase in mean scores and the statistical significance of the results suggest that peer mentoring could be a valuable instructional strategy to support and enhance science education. This provides a strong basis for developing and implementing intervention programs that leverage peer mentoring to improve academic performance across similar contexts.

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## CONCLUSION

Based on the findings of the study, the following conclusions were drawn: There is a significant impact of peer mentoring on the academic achievement of Grade 10 learners in science. The substantial improvement in post-test scores compared to pre-test results confirms that peer mentoring is an effective intervention strategy for academically challenged students. Statistical analysis further supports the effectiveness of this approach, highlighting its potential for broader implementation in science education. By fostering a collaborative learning environment, peer mentoring not only enhances comprehension of scientific concepts but also promotes confidence and motivation among learners. These results suggest that integrating structured peer mentoring programs into the curriculum could be a valuable tool for improving student performance and engagement in science.

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