International Journal of Latest Research in Humanities and Social Science (IJLRHSS)
Volume 06 - Issue 06, 2023
www.ijlrhss.com || PP. 183-189

Peer Mentoring for Academic Performance of Students in Science

Guarin S. Maguate*,
Northern Negros State College of Science and Technology
Department of Education, Philippines

Judith S. Rabacal,
Northern Negros State College of Science and Technology
Research and Development Office, Philippines
**Correspondence*

Abstract: This paper explored the effects of Peer Mentoring on the academic performance of Grade 8 students in Science. The subjects/respondents of the study were composed of sixty (60) Grade 8 students enrolled in one public secondary high school in A.Y. 2022 – 2023. The sample of the study was divided into two groups, the first group was Grade 8 – Fortitude which is composed of 30 students and served as the Experimental Group. The other group was Grade 8 - Piety which is composed of 30 students and served as the Control Group. A quantitative descriptive research design was utilized to determine the effect of Peer Mentoring on the academic performance of Grade 8 students in science. This study used a researcher-made test and was administered to the control and experimental groups. The mean or the median scores of the Pre-test, as well as the Post test of the control group and Experimental Group, were used to determine the performance of Grade 8 students in science before and after the intervention. Paired Sample T-test was utilized to determine the significant difference between the pre-test and post test scores of the Control Group and Experimental Group. The same statistical treatment was used to determine the significant difference between the post test scores of the Control Group and the Experimental Group. The result of this study revealed that Peer Mentoring had significantly improved the academic performance of the students exposed to the intervention. The study recommended the teachers not to utilize Peer Mentoring as their primary instructional method, but rather as an additional and supportive tool.

Keywords: Academic Performance, Grade 8 Students, Peer Mentoring, Science

Introduction

The pandemic has altered the nature of education as a whole. We changed from the traditional classroom learning model to the contemporary technological learning methods. From the convenience of our homes, we could access all study materials and learn anything. During this pandemic, the tasks and responsibilities of teachers have expanded. To better prepare themselves for their new voyage, they had to learn more than the pupils did (Schoo Ped, 2021).

In this new normal, designing a learning program that will have significant effects on students' learning improvement is a great challenge for teachers. Since teachers will have to deal with the aftershocks of the pandemic, where students are being taught through printed modular distance learning modality, teachers must develop a certain strategy that will match the new learning styles of the students to ensure an efficient teaching-learning process in this new normal.

In response to the comeback of in-person classes, the researcher believes that learning can be also strengthened with the use of peer mentoring. During the pandemic, students exhausted all learning resources they could get in the absence of teachers. One of their resources is their fellow students. They learn through virtual brainstorming using social media or other online applications. Furthermore, the researcher also conforms with the statements of Andere r(2020) when he said that "a student's social interactions and circles impact one's academic fate".

Methods

This chapter contains a comprehensive description of the research design, the research participants or respondents, the research instrument, instrument validation, the data gathering procedure, the analysis of data, and the statistical treatment of data.

Research Design: The quantitative research design using the quasi-experimental approach was employed in this study to determine the effect of Peer Mentoring on the academic performance of Grade

8 students in science. Likewise, the said design is appropriate for this study to determine the significant differences between the scores of the control and experimental group in terms of pre-test and post-test

Subjects of the Study: The subjects of the study were the two sections of Grade 8 of Andres Gumban Memorial National High School officially enrolled during the School Year 2022-2023. The two groups (control and experimental groups) were determined through purposive sampling. The control group was the Grade 8 – Piety and the experimental group was the Grade 8 – Fortitude. Some inclusion criteria were set to obtain relevant data. The researcher administered a test taken from modules released by the Department of Education to the participants of the study.

Research Instrument

The study utilized a researcher-made test in which items were taken from modules and books released by the Department of Education. The test was based on the Most Essential Learning Competencies (MELCs) for the second quarter which determines the academic performance of students before and after the intervention. The research instrument was consisting of two parts: The respondents' profile and the researcher-made test in science. This instrument was subjected to content validation and reliability test to ensure that it will serve its purpose in the study.

Validity of the Data Gathering Instrument

For the validation of the research instrument, the researcher presented and asked the opinion of validators who were considered experts in their own field. After the experts reviewed the instrument, it was then validated using the Content Validity Ratio devised by Lawshe (1975).

The validity of the research instrument was established by the five validators who were considered experts in the field of science. The evaluation instrument formulated by Lawshe was used in providing numerical ratings which resulted in a computed alpha of 1.00 which further means that the instrument is valid and appropriate for its purpose in the study. Suggestions and comments were also considered for the improvement of the instrument.

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'.

Data Gathering

Pre – Implementation

The researcher obtained the necessary measures and protocols regarding the conduct of the study. First, the researcher chose a topic of his 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. Two sections from Grade 8 were identified to be the respondents of the study. They were then categorized into an experimental group (consisting of thirty students) and a control group (consisting also of 30 students). In the experimental group, the researcher identifies the mentor and the mentee based on their grades during the previous quarter. The student who has the highest grade in science was paired with the student who obtained the lowest grade during the previous quarter. After the respondents were identified, the researcher proceeds in making a research instrument appropriate for the study. A researcher-made test was then validated and tested for its reliability. A letter of approval for the conduct of the study was then sent to the office of the principal/supervisor.

Implementation

After getting approval for the conduct of the study, the researcher administered the pre test to the respondents. The researcher checked and recorded their scores to be used later in determining the academic performance of the respondents. The intervention which is peer mentoring was then administered to the experimental group while control group has no intervention. During class and activities, the mentor and mentee sat together to study and discuss the things that the mentee find it hard to understand. The researcher will be there to facilitate, guide and clarify if there were some misconceptions. The intervention was administered for six weeks. A post test was then given to

experimental and control groups. 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 will be properly addressed.

Data Analysis: The following statistical tests were employed by the researcher in answering the different questions about the study. In finding the academic performance of the students in science, descriptive statistics were used. For significant differences, inferential analysis was used.

For problem 1, the mean or the median scores of the Pre-test of the Control Group and Experimental Group was used to determine the performance of Grade 8 students in science before and after the intervention.

For problem 2, the mean or the median scores of the Post test of Control Group and Experimental Group was used to determine the performance of Grade 8 students in science before and after the intervention.

For problem 3, Paired Sample T-test was utilized to determine the significant difference between the pre-test and post test scores of Control Group and Experimental Group.

For problem 4, Paired Sample T-test was utilized to determine the significant difference between the post test scores of Control Group and Experimental Group.

Ethical Considerations

Ethical considerations are the principles that must be followed in conducting any type of research. Ethical considerations make sure that no human rights are violated, and research being conducted has no hidden agenda (Bhasin, 2020). Research ethics matter for scientific integrity, human rights and dignity, and collaboration between science and society. These principles make sure that participation in studies is voluntary, informed, and safe for research subjects (Bhandari, 2021). For that case, the researcher made considerations of ethical issues in this study in each stage.

A letter for the conduct of the study was sent to the office of the school principal. Before the data collection, the researcher explained clearly to the respondents the purpose of the study and the benefits that may result in their participation. The researcher made clear that the purpose of the study was only for academic purposes and won't have any negative or positive impact on their jobs or daily lives. The respondent's demographic profiles remained anonymous in the study and the information they provided were treated and kept confidential. The participants of this study were informed to participate voluntarily.

In addition, the respondents assured that all written information were deleted as soon as the report of the study will be submitted. No one will have access to the information except the researcher and adviser if necessary. Lastly, the researcher asked all the respondents to freely affix their signature to the letter which contains that they agree to be one of the participants in the study.

Results and Discussion

This chapter presents in detail the presentation, analysis, interpretation of data, and discussion of results based on the gathered data from the respondents. Pre- and post-test data were used to create results and conclusions, and over time, they gave researchers a thorough grasp of how peer mentoring affected students' academic performance in science. The purpose of this section was for the researcher to determine the effectiveness of Peer Mentoring on the academic performance of Grade 8 students. By administering pre-and post-tests to the students, the researcher was able to acquire the necessary data. The test was given to Grade 8 – Fortitude as the Experimental Group consisting of 30 respondents and Grade 8 – Piety as the Control Group consisting of 30 respondents.

The pre-test was conducted before giving the treatment of Peer Mentoring in Grade 8 - Fortitude (Experimental Group) and no treatment in Grade 8 – Piety (Control Group). The pre-test results revealed the respondents' academic performance in science. After getting the pre-test results, the researcher gave treatment to the respondents by pairing the respondents according to their academic performances in Grade 8 - Fortitude (Experimental Group) and no pairing in Grade 8 – Piety (Control Group). After doing the treatment for 6 weeks, the researcher gave a post-test. To describe the data from the respondent's test result, the researcher showed the following scale with a descriptive equivalent.

The researcher gave a pre-test and post-test which contained the same questions. The respondents' scores in both pre-test and post-test were presented as follows:

Table 1 Performance of Students Experimental and Control Group during Pre-test

Group	**Pre-test**		
	Mean	Std. Dev.	Description
Control Group	6.7742	3.00787	Low
Experimental Group	7.3000	2.14061	Low

*Scale: 1.0-6.0-very low; 6.1-12 –low; 12.1-18-average; 18.1-24-high; 24.1-30-very high

Table 1 reflects the performance of Grade 8 – Fortitude (Experimental Group) and Grade 8 – Piety (Control Group) in science during pre test. As shown in this table, the obtained score of Grade 8 - Fortitude (Experimental Group) results in a mean of 7.30 (SD = 2.14), and Grade 8 – Piety (Control Group) obtained a mean of 6.77 (SD = 3.01) which indicates that the performances of both groups are low. Moreover, Grade 8 – Fortitude (Experimental Group) obtained a higher mean than Grade 8 – Piety (Control Group. Therefore, the results indicated that Grade 8 – Fortitude (Experimental Group) shows a better performance in Pre test for it has a mean of 7.30 than the Grade 8 – Piety (Control Group) as it only has a mean of 6.77. It also further showed that since the pre test mean scores of both groups were low, both groups neither had any prior knowledge of the topics before the implementation of the intervention. Moreover, both groups had the same level of skills in Science before the implementation of the intervention. This was also agreed by Altun et al. (2019) where in his study, it was found out that there was no significant difference on the result of pre tests between experimental and control group.

However, the above statements were negated by Ekiz (2016) where the result of the analyses in his study was seen that the t- value obtained with regards to the difference between mean scores was significant.

Table 2 Performance of Grade 8 – Fortitude (Experimental Group) and Grade 8 – Piety (Control Group) during Post-test

Group	**Post- test**		
	Mean	Std. Dev.	Description
Grade 8 –Piety (Control Group)	10.1333	1.53080	Low
Grade 8 – Fortitude (Experimental Group)	18.5000	2.32020	High

**Scale: 1.0-6.0-very low; 6.1-12 –low; 12.1-18-average; 18.1-24-high; 24.1-30-very high*

Table 2 reflects the performance of Grade 8 – Fortitude (Experimental Group) and Grade 8 – Piety (Control Group) in science during post-test. As shown in this table, the obtained score of Grade 8 - Fortitude (Experimental Group) results in a mean of 18.50 (SD = 2.32) which was interpreted as high. This indicates that Grade 8 – Fortitude performance was high during post-test. On the other hand, Grade 8 – Piety (Control Group) obtained a mean of 10.13(SD = 1.53) which indicates that the performance of control group was low. Moreover, Grade 8 – Fortitude (Experimental Group) obtained a higher mean than Grade 8 – Piety (Control Group. This indicates that Grade 8 – Fortitude (Experimental Group) showed a better performance in post test for it has a mean of 18.50 than the Grade 8 – Piety (Control Group) as it only has a mean of 10.13. Therefore, Grade 8 – Fortitude (Experimental Group) had a better performance in post test than Grade 8 – Piety (Control Group).

It was also seen in the study of Kapri (2017) wherein the post test score of the experimental group was higher compared to control group which shows the significance of the study.

The above statement was negated by the research conducted by Bulut (2019) where he concluded that although the post-test scores of experimental group was higher compared to the control group, the difference in the outcome of the test result was not statistically significant.

Table 3 Significant Differences between Pre-test and Post- test Scores of Grade 8 – Piety (Control Group) and Grade 8 – Fortitude (Experimental Group)

Group	Pre-test	Post-test	T	p	Interpretation
Control	6.7742	10.1333	7.791	.000	highly significant
Experimental	7.3000	18.5000	23.984	.000	highly significant

Table 3 shows the significant differences between pre test and post test scores of Grade 8 – Piety (Control Group) and Grade 8 – Fortitude (Experimental Group). Based on the gathered data, Grade 8 – Piety (Control Group) got a pre test mean score of 6.77 and post test mean scores of 10.13, with a mean gain of 3.3548 and obtained a p-value of 0.00 which was interpreted as 'highly significant'. The table also revealed that Grade 8 – Fortitude (Experimental Group) got a pre test mean score of 7.30 and post test scores of 18.50, with a mean gain of 11.2414 and obtained a p-value of 0.00 which was interpreted as 'highly significant'. This indicates that there is a highly significant difference between the pre test and post test scores of the control and experimental group.

The above statement concurs with the study of Altun, et al. (2016) where it was found that all experimental groups showed a significantly higher difference when compared to the control group. Thus, the experimental method applied in all experimental groups was more effective than the control group.

Table 4 Significant Differences between the Post-test Scores of Grade 8 – Piety (Control Group) and Grade 8 – Fortitude (Experimental Group)

Variable	Control	Experimental	T	P	Interpretation
Pre-test	6.7742	7.3000	.867	.389	not significant
Post-test	10.1333	18.5000	14.756	.000	highly significant

Table 4 shows the significant difference between the pos ttest scores of Grade 8 – Piety (Control Group) and Grade 8 – Fortitude (Experimental Group). Based on the data gathered, the post test scores of Grade 8 – Piety (Control Group) and Grade 8 – Fortitude (Experimental Group) obtained a p-value of 0.00 which was interpreted as 'highly significant'. This means that there is a significant difference between the post test scores of the control and experimental group.

This was also agreed by the study of Altun, et al. (2016) where the experimental group showed a significantly higher difference compared to the control group.

Conclusions

This study investigated the effect of Peer Mentoring to the academic performance of Grade 8 students in Science. Based on the results and analyzed data, the following conclusions were derived:

It was determined that the academic performance of both the Grade 8 – Piety (Control Group) and Grade 8 - Fortitude (Experimental Group) on the given pre-test was both low and are statistically non-significant. It's possible that the results that were shown were because neither group had any prior knowledge of the material covered in Science for the second quarter.

The results of the post-test provide evidence that the participants from Grade 8 - Fortitude (Experimental Group) appeared to have significantly better performance than the students from Grade 8 – Piety (Control Group). This difference in performance may be an indication of the merits or effectiveness of Peer Mentoring in Science over more traditional teaching techniques for Grade 8 students.

This study also attempted to determine whether there was a significant difference statistically between the given pre-test and post-test scores of Grade 8 – Piety (Control Group) and Grade 8 - Fortitude (Experimental Group), but it discovered that both groups performed similarly before and after the intervention since the result indicates high significance. This further revealed that the large improvements in the preceding conclusions were not solely the product or result of the intervention, but

rather of other factors such as the availability of learning resources and the students' capacity and flexibility to adapt to the new way of learning.

The results of a comparison of the post test scores of Grade 8 - Fortitude (Experimental Group) revealed that it was statistically significant from the Grade 8 – Piety (Control Group). Further, it suggested that the students who were exposed to the intervention benefited from Peer Mentoring with a significant improvement in their academic performance.

Summary of Findings

The following are the findings of the study that uses descriptive and inferential statistics to analyze the data:

The performance of the Control group (Grade 8 – Piety) and Experimental group (Grade 8 – Fortitude) during the pr test are both low which was indicated by their mean scores and has no significant difference.

The performance of the Control group (Grade 8 – Piety) during the post test was low as shown in their scores, while the performance of the experimental group (Grade 8 – Fortitude) was high as indicated by their mean scores.

The pre-test and post test scores of the Control Group (Grade 8 – Piety) and Experimental Group (Grade 8 – Fortitude) are both statistically significant.

There is a significant difference between the post test scores of the Control Group (Grade 8 – Piety) and the Experimental Group (Grade 8 – Fortitude.

Conflicts of interest: The authors declare that for this article they have no actual, potential or perceived conflict of interests.

Financial Disclosure: The research work was funded by the researcher.

Acknowledgements: The author thanks the Northern Negros State College of Science and Technology, Philippines and Department of Education, Philippines for providing the essential infrastructure facilities to complete the work.

References

[1]. Altun, et al. (2017). Investigation of the Effects of Brain Teasers on Attention Spans of Pre-School Children. Retrieved from https://files.eric.ed.gov/fulltext/EJ1118315.pdf.

[2]. Bercasio, R. R. & Cabrillas, Z. (2017). Effectiveness Of Peer Mentoring In Enhancing The Mathematical Problem-Solving Skills of College Students in Bicol University. 3 Bercasio Cabrillas_35-55.pdf (bicol-u.edu.ph)

[3]. Berso, L. B., &Lorente, R. M. (2020). Peer Tutoring: Exploring the Effects On Learning Grade 9 Mathematics. People: International Journal of Social Sciences, 5(3), 881–894. https://doi.org/10.20319/pijss.2020.53.881894

[4]. Chan, N. N.-U. (2017). Peer Assisted Learning in Higher Education: Roles, Perceptions, and Efficacy. http://www.pertanika.upm.edu.my/.

[5]. Ekiz, A. (2017). Investigation of the Effects of Brain Teasers on Attention Spans of Pre-School Children. INTERNATIONAL JOURNAL OF ENVIRONMENTAL & SCIENCE EDUCATION. 11. 8112-8119.

[6]. Engler, A. (2017). Understanding How Peer Mentors Make Meaning of Their Role. Retrieved from https://core.ac.uk/download/pdf/213846545.pdf

[7]. Gacosta, M.L. (2021). Gender Pairing Variations in Peer Tutoring: The Case Of Senior High School Students In Eastern Visayas, Philippines (October 23, 2021). Available at SSRN: https://ssrn.com/abstract=3948309 or http://dx.doi.org/10.2139/ssrn.3948309

[8]. Glynn, L. G., & MacFarlane, Anne M. K. (2018). Helping each other to learn- a process evaluation of peer assisted. http://www.biomedcentral.com/1472-6920/6/18

[9]. Igot, J. et al (2019). Peer-Assisted Dynamic Learning Program and its Influence on Students' Performance in Science. Retrieved from https://www.academia.edu/42803207/PEER_ASSISTED_DYNAMIC_LEARNING_PROGRAM_AND_ITS_INFLUENCE_ON_STUDENTS_PERFORMANCE_IN_SCIENCE.

[10]. Owiti, J. (2022). The Power of Peer Mentoring. Retrieved from https://www.liberty.edu/casas/blog/the-power-of-peer-mentoring/#:~:text=Peer%20Mentoring%20is%20a%20relationship,as%20knowledge%20and%20skills%20transfer.

[11]. Rose, L. (2018). Introduction to Peer Mentoring for Schools. JFA Purple Orange. Retrieved from https://inclusiveschoolcommunities.org.au/resources/toolkit/introduction-peer-mentoring-schools

[12]. Yang Song, G. L. (2017). Heterogeneous effects of peer tutoring: Evidence from rural Chinese middle schools. www.eksevier.com/locate/rie.