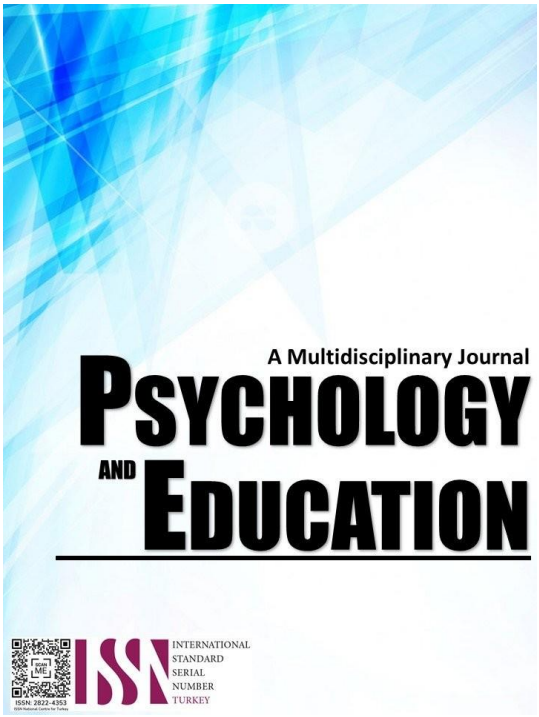
WORKING WITH PEERS IN LEARNING MATHEMATICS AMONG GRADE IV LEARNERS



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Research Article

Working with Peers in Learning Mathematics among Grade IV Learners

Sharanisah P. Maba,* Reynilda C. Alferez
For affiliations and correspondence, see the last page.

Abstract

Working with peer or peer tutoring is a cooperative and active learned technique in which students work in pairs to help one another while also learned. Peer tutoring can take many different forms, depending on the students' academic aptitude, organizational challenges, material availability, and personal resources. With this, the objective of this study was to determine the contribution of working with peers as a strategy in learning Mathematics and in the improvement of their academic performance. The study utilized the quasi-experimental with one-group pretest-posttest design. The researchers chose the Grade IV level class in Pasayanon Elementary School, Matungao District. Based on observation, most of these students struggled with the topics of the mathematics subject. The data revealed that the participants' posttest scores had a significant difference between the pretest scores after the integration working with peers. Thus, the null hypothesis, which states that there is no significant difference between the pretest and posttest scores of the participants after applying the working with peers, was rejected. Based on the findings of the Grade IV students' pretest, most of them received low scores in the pretest, but when the posttest was administered, the researchers found that the pupil's scores had increased. It implies that peer learning in mathematics can significantly improve pupils understanding and overcome their anxiety about learning the subject.

Keywords: *working with peers, peer tutoring, strategy learning, mathematics*

Introduction

Working with peer or peer tutoring is a cooperative and active learned technique in which students work in pairs to help one another while also learned (Alegre-Ansuategui & Moliner-Miravet, 2017). Students of various educational levels saw this teaching style favorably, according to Zapata (2020). Peer tutoring can take many different forms, depending on the students' academic aptitude, organizational challenges, material availability, and personal resources.

The K–12 Basic Education Program shall incorporate pedagogical approaches that are constructivist, inquiry-based, reflective, collaborative, differentiated, and integrative, as per DepEd Order No. 21 series 2019 on Policy Guidelines. Learning through collaboration fosters respect and cooperation by allowing students to exchange ideas with one another. The K–12 Basic Education Program and all of its components are fully explained in the policy, which also offers a precise framework for the program's monitoring and evaluation. to improve the execution of each project, component, and activity under K–12 and to converge the understanding of K–12. It explains in the K–12 curriculum and programs for each stage, describes the learner and his or her abilities at each key stage, and displays the curriculum, instruction, and assessment for each key stage. It also establishes the framework for monitoring and evaluation and aims to "provide the Filipino learners with the necessary skills and competence to prepare them to take the K–12 exams.

The study of Mathematics has been long regarded as an essential part of general education It was believed to have been essential for any worthwhile development endeavor. Different nations and cultures have different ideas about education, particularly when it comes to the teaching and learning of mathematics as it is reflected in their curricula. To master technology, which is present in all aspects of life, Mathematics is needed. Mathematics also improves mental ability as it taught logical ways of thinking.

However, everyone has a unique learning style or method of taking in knowledge. When preparing for many approaches in Mathematics, it is crucial for teachers to keep this in mind while working with pupils in the classroom. As observed by the researchers, some students are facing difficulties in learning Mathematics; some are uneasy and uninterested because they do not know how to go about a certain skill even if how much they tried. Thus, it is important for the teacher to consider the learned styles and interest of the learners in the preparation of lesson as well as in the choice of approaches or strategies in teaching a particular lesson in Mathematics.

Working with peer or peer tutoring, the student with the highest academic proficiency act as the tutor, and the student with the lowest academic proficiency serves as the tutee. The learned strategy is known as peer tutoring when the students do not switch roles during the peer tutoring program, that was, in each pair, the tutor is always the tutor and the tutee is always the tutee. The tutoring method varies from being the pupils receiving instruction to being the one providing instruction and vice versa (Youde, 2020).

As an effective teacher, all the skills for Grade IV learners must be mastered as much as possible. Hence, in this particular study, working with peers has been utilized as a strategy in learned Mathematics. Through this strategy of teaching and learned process, learners may develop self-discipline throughout the activity that they were encountering. This method aspires to combine peer collaboration and teaching strategies that are supported by research.

Knowing the methods for teaching Mathematics, such as intended engaged learning, which offers opportunities for observation, exploration, investigation, experimentation, play, discussion, and reflection, modeling and scaffolding the development of mathematical thinking skills. Learning cooperatively and independently, opportunities for discussion, familiar to young people making

connections across the curriculum to demonstrate how mathematical concepts are applied in a range of various settings. Thus, knowing what methods to use for each student has been made easier by considering what they are best at. Since every learner is unique, each student has a certain method of learned that suits them. Each learner could succeed if their interests, areas of confidence, and learned preferences are taken into consideration. A teacher ought to address the demands of each and every one of students through careful lesson planning. Peer tutoring and working with peers have proven beneficial to academic contexts and subject areas. Peer tutoring has been shown to benefit struggling, learning-disabled, and at-risk students who are capable or proficient (Huber & Carter, 2019; Mahoney, 2019; Sarid et al., 2020).

Few people are aware of how essential Mathematics to our cognitive abilities, reasoning, and attempts to understand the world and ourselves. The researchers' experience providing assistance to the researchers' pupils sparked her interest in teaching Mathematics. Mathematics promotes logical thinking and mental rigor and is a useful method for developing mental discipline. Hence, there is a significance in teaching Math as it is very essential as it can make or break a student's career as it can considered as the foundation of middle grade Math. The key skill area where one has to put more thrust is number operation and interpretation of question instruction.

With this, the objective of this study was to determine the contribution of working with peers as a strategy in learning Mathematics and in the improvement of their academic performance. This study has been conducted on the third quarter of the School Year 2022-2023 to the selected Grade IV learners of Pasayanon Elementary School under Matungao District, Division of Lanao del Norte.

Research Questions

The study aimed to determine the contribution of working with peers in learning Mathematics among the Grade IV learners in Pasayanon Elementary School in the District of Matungao, Division of Lanao del Norte during the 3rd quarter of S.Y. 2022-2023. Specifically, it sought to answer the following questions;

1. What are the pretest scores of the participants before the implementation of working with peers in learning Mathematics?
2. What are the posttest scores of the respondents after the implementation of working with peers in learning Mathematics?
3. Is there a significant difference between the posttest and pretest scores of the participants after applying the working with peers in learning Mathematics?
4. What action plan can be drawn based from the results of the study?

Methodology

Research Design

The study utilized the quasi-experimental with one-group pretest-posttest design. A one-group pretest-posttest design is a type of research design that is most often utilized by behavioral researchers' treatment or strategy on a given sample. This research design was characterized by two features. The first aspect was the work of a single participant group (sometimes known as a one-group design). This characteristic indicates that all participants are part of a single condition and receive the same treatments and evaluations. The second feature is linear ordering that requires the assessment of a dependent variable before and after a treatment was implemented such as a pretest–posttest design (Cranmer, 2022).

A one-group pretest-posttest design has been used since there was only one section of Grade IV learners in Pasayanon Elementary School in the District of Matungao, Division of Lanao del Norte. This section of Grade IV learners has been exposed to a strategy, working with peers in learning Mathematics. A pretest had been administered before the strategy had been implemented. Then, posttest had been given after the strategy. The pretest and posttest would determine the significant difference or an increase in the scores of the respondents.

Respondents

The researchers chose the Grade IV level class in Pasayanon Elementary School, Matungao District. Based on observation, most of these students struggled with the topics of the mathematics subject. Therefore, the participants were limited to this grade level for the school year 2022-2023, and there were 37 students enrolled at the Grade IV level.

Instruments

This study utilized a researcher's-made questionnaire, which consisted of 30 items. The instrument would measure the Grade IV learners with the implementation of working with peers as a strategy. Multiple choice is the type of test that has been used.

Before distributing the instrument to the participants, experts were asked to examine the content validity of the test questionnaire, and to check whether the questions were appropriate for the participants' level. The questionnaire had undergone content validity testing by general department personnel in the Lanao del Norte Division. A pilot testing was done at Culubun Primary School in the Pantao-Ragat District, Lanao del Norte Division, to determine the instrument's reliability. There were 28 learners in Grade IV at Culubun Primary School were invited to answer the questionnaire in the pilot study. A statistician has been consulted for item analysis on the completed questionnaire from the pilot testing.

Procedure

The researchers personally conducted the study and facilitated the gathering of data. The data-gathering process started by complying with the protocols in asking for permission to conduct the study. The researchers wrote a letter to the Schools Division Superintendent and then to the School Principal for the conduct of the study. With the approval of the Schools Division Superintendent, the researchers briefs the participants about the purpose of the study. Since the participants were minors, the researchers asked permission from the parents of the Grade IV learners by providing a consent form.

A consent form had been presented to the parents, and their signatures had been asked for the willingness to let their children participate in the study. With the approval of the parents, the Grade IV learners had been given the pretest. This was to test their knowledge about the lessons for the third quarter. After the pretest, with the used of working with peers as strategy had been implemented.

The "Working with Peers" as a strategy had been implemented on following the steps: (1) Determine goals for each peered tutoring activity; (2) Target specific math skills have been practiced; (3) Select appropriate materials that match learned objectives and that could be implemented within a peered tutoring format (i. e. provided both a prompt sheet that contains problems have been solved and an answered key that could been easily used by your students); (4) Design and teach procedures/behaviors for tutoring; (5) Review classroom rules and teach new rules when appropriate; (6) Pair students of varying achievement levels; (7) Practice peer-tutoring procedures before implementing them with academic tasks; (8) Divide peer-tutoring time into halves so each player had equal time as coach and as player; (9) Signal students when it was time to switch roles; (10) Set goals for tutoring pairs and provided positive reinforcement for tutoring pairs that met goals; and (11) Provide response recorded sheets so you could evaluate the performance of individual students.

The strategy took place during the selected topics in the third quarter. After the strategy, posttest had been administered. Then, statistical treatment had been done to compare the scores of the participants during the pretest and posttest.

During the third quarter "working with peers" was put into practice. A pretest was carried out prior to the implementation of this strategy. Working with peers was implemented as a strategy following the pretest. The goal of this strategy was to raise the Math performance of Grade IV students. The posttest was administered at the conclusion of the third quarter. Scores from the pretest and posttest were then compared to see if there has been an improvement. To determine whether there was a significant difference between the pretest and posttest scores, a statistical analysis had been performed. Moreover, the result of the study could be used to create instructional materials that incorporate peer collaboration as a learning strategy for Mathematics. Thus, an action plan can be designed in utilizing working with peers as strategy in learning Mathematics which would been the output of the study.

Data Analysis

For the analysis of data, the following statistical tools had been employed to answer the problems presented in chapter 1: For problems 1 and 2, frequency and percentage were utilized to identify the result of pretest and posttest. For problem 3, Wilcoxon Signed Rank Test to test the significant difference of posttest and pretest score of the participants.

Results and Discussion

Problem 1: What are the pretest scores of the participants before the implementation of working with in learning Mathematics?

Table 1. *Pretest Scores of the Participants*

Score Range	Frequency Count	Percentage (%)	Description
1 - 6	8	21.6	Poor
7 – 12	22	59.5	Fair
13 – 18	6	16.2	Good
19 – 24	1	2.7	Very Good
25 - 30	0	0	Excellent
Total	37	100.0	

Table 1 presents the pretest scores of the participants. As depicted in the table, the score ranged from 7-12 got the highest frequency count with a description of fair, followed by the score range from 1-6 got the poor, next by the score range from 13-18 got the good, come after by the score range19-24 got the very good while 25-30 got the excellent. It implied that the majority of the pretest scores of the grade four pupils were 7-12 with a description of fair.

According to Foster (2007) since they can't tell which behavior is proper and which isn't, pupils struggle with mathematics because they lack knowledge of acceptable behavior. He explained that sometimes in Mathematics there are problems that require a lot of work while other problems require little to no work (Mathematic Behavior).

For instance, Yang et al. (2012) used an inductive discovery learning strategy to build online learned materials in which students was given identical instances with a different critical feature of the concept. This approached was used to guide students' discovery of the patterns of concepts. Students was given suggestions by Mclaren et al. (2017) to dispel their frequent misconceptions regarding decimals. They ran researched in which they used the game to substitute seven lessons from conventional math's classes. Their

findings demonstrated might enhance learned performance and enjoyment more effectively than a traditional teaching strategy.

Problem 2: What are the posttest scores of the participants after the implementation of working with peers in learning Mathematics?

Table 2. *Posttest Scores of the Participants*

Score Range	*Frequency Count*	*Percentage (%)*	*Description*
1 - 6	0	0	Poor
7 – 12	10	27.0	Fair
13 – 18	19	51.4	Good
19 – 24	6	16.2	Very Good
25 - 30	2	5.4	Excellent
Total	37	100.0	

Table 2 shows the posttest scores of the participants. As shown in the table, scores ranging from 13-18 got the highest frequency count with a description of good, followed by the score range from 7-12 got fair, next by the score range from 19-24 got the very good, come after by the score range 25-30 got the excellent while 1-6 got the poor. It implied that the majority of the posttest scores of the Grade four pupils were 13-18 with a description of good. It implied that the majority of the grade four pupils' performance were improved after the implementation of working with their peers. Furthermore, it was discovered that the approach improves in enhancing the performance of Grade Four students in learning mathematics, particularly in describing figures.

According to Zorfass and Brann (2014), the grasp of mathematical topics by a student could been significantly improved by peer interactions. Teachers should pair students properly, model appropriate interactions, gave students the necessary tools, and gave precise, tailored counsel in ordered to promote peered collaboration. Engaging in conversation with peers who could explained concepts, made processes cleared, and pose and responded to inquiries may been extremely beneficial for struggling students. This "give and take" strategy comprises speaking, writing, making visual representations, and manipulating objects both physically and virtually.

Most people thought that Mathematics was tough (Fritz et al., 2019). Additionally, many people thought that "it's okay—not everyone could be good at math" (Rattan et al., 2012). Many students discontinue studying Mathematics as soon as they were no longer obligated to did so due to these views. Those who considered Mathematics have been "optional" may found it acceptable to stopped learned it, although it would have been severely harmed by this.

Problem 3: Is there a significant difference between the posttest and pretest scores of the participants after applying the working with peers in learning Mathematics?

Table 3. *Difference' Posttest and Pretest Scores of the Participants*

			Statistic	p	Mean difference	SE difference	Effect Size
Post	Pre	Wilcoxon W	703	< .001	6.00	0.445	1.00

Note: 1 – Wilcoxon Signed Rank Test ** - p < 0.01 *** - p < 0.001 ns – p > 0.05 * - p < 0.05

Table 3 presents the difference between the posttest and pretest scores of the participants after applying the working with peers in learning Mathematics. The data revealed that the participants' posttest scores had a significant difference between the pretest scores after the integration of working with peers. Thus, the null hypothesis, which states that there was no significant difference between the posttest and pretest scores of the respondents after applying the working peers, was rejected.

According to Gupta (2020), civilization was centered on Mathematics, and its history was frequently mixed up with that of philosophy. Similar to how cosmological and evolutionary theories had how people view themselves, non-Euclidean geometry had opened up new perspectives on the cosmos, and Mathematical logic theorems had shown the drawbacks of the deductive approached. In art, Mathematics was also present. Math and art had always been intertwined since Pythagoras, the most famous mathematician, found numerical explanations in musical harmony. Because of these features, mathematics serves as a cultural and disciplinary bridge between the humanities and the natural sciences

Gupta (2020) added that everyday activities involve mathematics. Arithmetic was a subject that was part of the studied of the children and as such should been an effort for compression, which typically includes continual practiced. For many kids, Math was monotonous, abstract, lacking in creativity, complex, and very difficult to understand. The fact that high school pupils did not took Mathematics seriously enough was one of the biggest issues in education today.

Teenagers did not consider Math could larger choice a fantastic paid career in the industry. They regard Math as something that was boring, difficult, and irrelevant to their lived. Further, a child got smarter through math. The basis that enables a child to outperform others and himself in Math was the same as strength and endurance in sports. If a child lacks strength and had health issues, he could

not become a major sports star. If a child lacks the ability to thought critically and analytically, he would never been able to became a leader in his profession. Math could aid a child in this area to a considerable amount.

Conclusion

After a careful analysis, the following conclusions were made: The data revealed that the participants' posttest scores had a significant difference between the pretest scores after the integration working with peers. Thus, the null hypothesis, which states that there is no significant difference between the pretest and posttest scores of the participants after applying the working with peers, was rejected.

Based on the findings of the Grade IV students' pretest, most of them received low scores in the pretest, but when the posttest was administered, the researchers found that the pupil's scores had increased. It implies that peer learning in mathematics can significantly improve pupils understanding and overcome their anxiety about learning the subject. In light with the findings and conclusion revealed that the null hypothesis, which states that there is no significant difference between the pretest and posttest scores of the participants after applying the working with peers, was rejected.

According to Vygotsky (1978) argued that learning came about through social negotiation within a cultural context, with language as the primary enabling tool. This Social Constructivist Philosophy has been expanded on recently, introducing the notion of cognitive apprenticeship (Brown, Collins, & Duguid, 1989) through which students learn in a manner similar to traditional apprenticeships. The students access expertise through mentors, whose role was to facilitate rather than teaching, and the aim of learning was to solve realistic and practical problems in an authentic setting. For a peer tutor, this setting was a very realistic human setting. Just as in traditional apprenticeships, learners engage in activities 'on-the-job' rather than through the didactic teaching of abstract concepts. The argument was that students were better equipped to approached non-familiar problems and produced solutions that were appropriate to a given culture. Peer tutoring was aligned with these aspects of social constructivist theory by enhancing social negotiation with the student tutor and tutee, where knowledge construction was promoted through communication and dialogue, which was helpful for the tutees.

The researchers made the following recommendation; the researchers have put these under categories: Pupils may establish enthusiasm and interest in learning Mathematics in order to improve their performance ability. They should have patience in learning Mathematics for them to learn and master it. In this way, they can have more cognitive resources free for understanding and performing increasingly complex mathematical chores.

Mathematics teachers may be productive and resourceful when it comes to discussion inside the classroom. Mathematics teachers in elementary must continue their standard in giving grades to the students and at the same time giving them quality learning. They should always consider that every student has unique skills and talents, and individual ability where he/she is best. They should also consider that pretest-posttest is effective even at present times.

School Heads must plan and improve a program that will encourage communication between parents, teachers, and students. They must likewise create these programs in order to raise pupils' learning in mathematics with the contribution of working peers.

Parents need to look after or check their child improvement or performance in school and try to teach them in the house. Most importantly, they should always give word of encouragement words to their child. If possible, parents should help the child at home also by giving them practice through the use of pretest and posttest.

Future researchers are recommended to conduct a study regarding peer learning mathematics with the use of a pretest and posttest.

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Affiliations and Corresponding Information

Sharanisah P. Maba
Pasayanon Elementary School
Department of Education – Philippines

Reynilda C. Alferez, PhD
St. Peter's College – Philippines