EFFECTIVENESS OF CONTEXTUALIZED WORKSHEET IN IMPROVING MATHEMATICS PERFORMANCE OF GRADE IV LEARNERS

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***Abstract*— This study sought to determine the effectiveness of contextualized worksheet in improving the Math performance of the Grade IV learners. This study utilized a quantitative type of research using quasi-experimental research design. The result of the pre and post-test of the Grade 4 learners in Anonang Elementary school were analyzed to determine if there were any significant difference between the control group who used purely lecture and the experimental group who used contextualized worksheets which was used as an indicator to determine if contextualized worksheets have an impact on the learner's academic performance in Mathematics. The study reveals that the use of contextualized teaching and learning resources is effective in enhancing the performance of Grade IV pupils of Anonang Elementary School. Grade IV pupils who experienced the implementation of contextualization received better mathematics performance than pupils who were taught using the traditional lecture method in mathematics.**

Keywords— ***Mathematics Learning, Contextualized Worksheet, Elementary Pupils, Grade 4 learners***

I. INTRODUCTION

Mathematics is regarded as one of the core academic subjects. The foundation of scientific and technological knowledge makes a substantial contribution to a country's socioeconomic development. Many people's daily lives depend heavily on mathematics. In light of this, mathematics is a subject that, in varying degrees, has an impact on all facets of human life. According to a study, without a working understanding of mathematics, neither education nor human life can successfully function. Numerous science disciplines, including physics, chemistry, biology, engineering, and IT, as well as non-science fields like accounting, economics, geography, and even physical education, music, and art, are built on the foundation of mathematics in formal education (Ibrokhimovich & Mirzaxolmatovna, 2022). It is one of the most significant subjects in the school curriculum and serves as a link between all other disciplines. Studies emphasized that mathematics is the cornerstone and a tool for every nation's growth in science, technology, and the economy. The general consensus among educators is that without a foundational understanding of mathematics, no one can advance in any field. In addition, without mathematics, science and technology cannot advance and a country cannot become economically independent. Because of this, mathematics is one of the most important basic disciplines taught in schools (Skemp, 2002).

For a nation to generate a workforce that can contribute to science and technology, high mathematics achievement is required. The state of mathematics today is less encouraging, though. The 2018 Programme for International Student Assessment (PISA) International Large-Scale Assessment (ILSA) provides proof of this. The results show that only 27 out of 78 nations significantly exceed the Organization for Economic Co-operation and Development (OECD) average, 5 out of 78 nations do not statistically differ from the OECD average, and 46 out of 78 nations significantly fall below the OECD average, a situation that is similar to the issue raised by Schleicher (2019). In addition, the largest gap achievement between the maximum and minimum performing countries was in mathematics

In 2019, Programme for International Student Assessment (PISA) by the Organization for Economic Cooperation and Development (OECD) found that Filipinos ranked second-lowest in both mathematical and scientific literacy (inquirer.net). Senator Gatchalian described the results of the study as a big problem in the country, indeed a major crisis in the education. Based from this result, Mathematics should be prioritized and must be really taken care of to increase the country's very low percentage (Hopfenbeck, et al., 2018). In a separate 2019 study by the Southeast Asian Ministers of Education Association (SEAMEO) and the United Nations Children's Fund (UNICEF), only a small percentage of grade 5 Filipino children excelled in mathematics, reading and writing. In addition, Filipino students lagged behind other countries in the international assessment for mathematics and science for grade 4, the Trends in International Mathematics and Science Study 2019 (TIMSS). The Philippines only scored 297 in mathematics and 249 in science, which are "significantly lower" than any other participating country. The country also scored the

lowest among all 58 participating countries for both tests. Specifically, only 19% of Filipino students were on the Low benchmark, which means that they had "some basic mathematical knowledge," while 81% did not even reach this level (Balagtas, et al., 2019).

Children frequently view mathematics in the basic grades of secondary school as a dull and monotonous subject, viewing these lessons as the most uninteresting of all. The teachers themselves can be held responsible for this situation because they typically don't try to add anything new to the teaching process and aren't concerned with how engaging they seem to the students. It's crucial to keep in mind that a teacher who employs engaging teaching strategies that kids find easy to understand succeeds with them.

Various schools in the Philippines major concern is how to increase the rating performance of learners in Mathematics. Thus, recent studies from different schools in the country conducted research regarding contextualization of instructional learning materials if somehow effective in improving learner's performance in Mathematics. According to (Cubillas, 2020, Montero, & Geducos,. 2022; Sambayon, 2020), it is significant in improving the performance of learners in their lessons. Contextualization is a process in which the students will learn within the context of learning (Gaña, 2021). It is an application to a deep understanding of concepts. In fact, these researches highly recommend that localized and contextualized learning activities promote a better understanding of the lesson and help address the students' least learned skills.

One of the keys to keeping students interested in the teaching-learning process is contextualization, which allows them to relate their own experiences to the material being taught (Perin, 2011). By connecting the context of the students to the mathematical material presented in school, it gives the lesson meaning and relevance to the students' life. Contextualization is the process of ensuring that the material and teaching methods are appropriate for the students (Department of education [DepEd], 2016). It involves presenting and discussing the subject matter with students using meaningful and pertinent objects, circumstances, and experiences. Contextualization can assist in the development of a more expansive motivational environment for pupils. Students overcome their fear of mathematics when it is genuine and approachable, which results in an understanding of its usefulness. The learning freedom of students is increased through realistic mathematical techniques (Ghefaili, 2003).

The COVID-9 pandemic made it even harder for the students to excel in their math subject. Several researches found out that COVID-19 pandemic devastatingly affected students' learning (Noori, 2021, Mseleku, 2020, Agu, et al., 2021). This case is also evident in Anonang Elementary School (AES). The school formally started limited face to face on the 4th quarter of the School Year of 2022 upon validation from the Division Office and Rizal Municipal Local Government Unit (MLGU) and it is disappointing how the pandemic affected their academic performance especially in solving Math basic problems using the four basic operations. Thus, the researcher wants to conduct a research to find if contextualized worksheets are also effective in improving the academic performance in Mathematics of the students in AES to bridge the gaps made by pandemic.

II. METHODS

This study employed a quantitative approach using a quasi-experimental design to examine the impact of contextualized worksheets on the academic performance of Grade 4 learners in Mathematics. Participants were divided into two groups: the experimental group, which received instruction using contextualized worksheets, and the control group, which was taught through traditional lecture-based methods. The comparison of pre-test and post-test scores between the two groups served as the basis for evaluating the effectiveness of the intervention.

A total of 26 Grade 4 learners from Anonang Elementary School, School Year 2022–2023, were purposively selected as respondents. Each group consisted of 13 learners. The intervention focused on first-quarter mathematics topics, particularly problem-solving involving multiplication.

The research instrument consisted of a 30-item multiple-choice test developed by the researcher to assess learners' mathematical performance. Content validation was conducted by the school's evaluating team prior to test administration.

For the data gathering procedure, permission was secured from the Schools Division Superintendent, Public-School District Supervisor (PSDS) of Rizal, and the school principal. A pre-test was administered to both groups before the intervention. The experimental group then received instruction using contextualized worksheets, followed by a post-test administered to both groups after the intervention period. Data were collected and consolidated into performance scores.

Data analysis utilized the mean to describe performance levels and interpret qualitative ratings. To determine statistical significance, a Paired Sample t-test was used for within-group comparisons (pre-test vs. post-test), and an Independent Sample t-test was used to compare post-test scores between groups.

III. RESULTS

Table 1. Pre- test scores of the Participants

Score Range	Description	Control Group		Experimental Group	
		n	%	n	%
25- 30	Excellent	0	0%	0	0%
19- 24	Very Satisfactory	0	0%	0	0%
13- 18	Satisfactory	1	8%	0	0%
7- 12	Fair	7	54%	7	54%
0- 6	Poor	5	38%	6	46%

Table 1 presents pre-test scores of the participants in the experimental and control groups. It can be shown from the results that for participants in the control group many of them obtained a fair performance in mathematics and are followed by pupils with poor performance. Only 1 participant got a satisfactory rating in the pretests. Meanwhile, participants in the experimental group obtained both fair and poor performance in their pre-test in mathematics.

Table 2. Post- Test Scores of the Participants

Score Range	Description	Control Group		Experimental Group	
		n	%	n	%
25- 30	Excellent	0	0%	4	31%
19- 24	Very Satisfactory	1	8%	7	54%
13- 18	Satisfactory	8	61%	2	15%
7- 12	Fair	4	31%	0	0%
0- 6	Poor	0	0%	0	0%

Table 2 shows the post-test scores of the participants in the control and experimental groups. It can be shown from the data that after the post-test, participants from the control group obtained mostly a satisfactory rating, while it can be noted from the table that participants in the experimental group obtained mostly a very satisfactory rating. There are also pupils who obtained an excellent rating in the experimental group. This may mean that there is a gradual increased in the scores of pupils after the implementation of contextualized teaching and learning in mathematics.

Table 3. Significant Difference between the pre-test and post-test scores in the control and experimental group

Group	Computed value	p- value	Interpretation
Control Group	5.01	0.00	Significant
Experimental Group	12.52	0.00	Significant

Table 3 shows the significant difference between the pre-test and post-test scores in the control and experimental group. Specifically, there is a significant difference in the pre-test and post-test scores of the participants in the control group. This is supported by the probability value of .00 which is lower than .05 significant level. Hence, the null hypothesis is rejected. This means that there is an increased in the scores of participants in the control group. However, the increased in the score is not that high. Meanwhile, with a probability value of .00, there is a significant difference in the pre-test and post-test scores of the participants in the experimental group. Hence, the null hypothesis is rejected. There is a gradual increased in the scores of the participants after the conduct of the intervention which is the contextualization in learning mathematics.

Table 4. Significant Difference in the post-test scores in the control and experimental groups

Group	Mean Score	t-value	p-value	Interpretation
Control Group	14.46	5.82	0.00	Significant
Experimental Group	22.26			

Table 4 presents the significant difference in the prost-test scores of participants in the control and experimental groups. It can be shown from the table that there is a significant difference in the post-test scores of participants in the control and experimental groups. This is supported by probability value of 0.00 which is lower than .05 level of significance. Hence, the null hypothesis is rejected. This means that participants in the experimental group performed better than participants in the control group.

IV. DISCUSSION

Teaching mathematics to young children can be difficult, in part because good education must convey the mathematical relationships while keeping the students' focus on the learning goal. Engaging students in educational activities involving tangible materials, such as contextualization, is one way to overcome this difficulty. This study was done to find out how well contextualized worksheets helped students in grade 4 perform better in math. The findings indicate that both groups had a foundational level of knowledge of the subjects prior to the interventions. In general, subjects scored between fair and poor on their pre-test. In order to attain equity of learning suitable for all types of learners, contextualized learning entails adopting the current environment, setting, and situation alteration. This allows all types of learners to link their understandings in the real context of their life. Educators should take this issue into account as they move forward with the teaching and learning process (Brown, 2002). In order to properly give the lesson, teachers may use the background of the students' life as the lesson's initial point so that the students would feel at home in the classroom. Engagement will happen if the emotional component comes first. Memorization of calculations and formulas is a common component of traditional math instruction, which prevents students from understanding the underlying procedural connections found

within the issues. This method of instruction promotes inadequate approaches to problem solving and a limited knowledge of the concepts and ideas studied (Adonis, 2020). This traditional technique of instruction appears to be the one employed most frequently in the teaching-learning process, and it is believed to lack the real-world application of understanding, particularly in the area of mathematics.

Additionally, both the experimental and control groups' participants' scores increased, according to the results. The experimental group, however, experienced a significant increase, whereas the scores of the participants in the control group just slightly increased. It should be emphasized that participants in the experimental group received the contextualization intervention while those in the control group received the usual lecture mode of instruction. According to the findings, the lecture technique is still a successful teaching approach for mathematics. The findings of earlier investigations support this. According to Hart, et al. (2011), the lecture method of education improves students' test scores by making concepts simpler to understand. The lecture format enables one-on-one instruction and lets the learner move at his own pace (Herrera & Palomo, 2022). Sometimes it is advantageous to have group discussions in class. However, due to the various natures of today's learners, the efficiency of the lecture technique is too constrained. Lectures are equivalent to other modalities when it comes to imparting fundamental knowledge, but they are not more efficient. The lecture method may be used to address the roles that teachers and students are expected to play. Because of this, it's critical that educators embrace 21st century learning techniques that cater to the requirements of their students. (Fan, et al., 2013).

According to the results of this study, contextualization in mathematics can significantly improve students' arithmetic ability. The fact that post-test results of students in the experimental group were much higher than those of students in the control group supports this. The great score that students in the experimental group received on the post-test is another indicator of the efficiency of the aforementioned technique. Context-based instruction would refer to methods based on actual events, circumstances, and activities that provide the mathematics lesson context. When instructional materials and procedures are connected to the experiences and environment of the students, contextualization occurs (Bugay, 2021). The use of local resources and knowledge in the classroom aids in the students' understanding of the mathematical ideas (Agu, et al., 2021). Since students learn to connect lesson plans to problems and circumstances that are significant in their lives, contextualizing instruction is considered to enhance the transfer of mathematical ideas to various contexts. Rich contextualization emphasizes evaluation of advance memory in this way (Gillo, 2019). Contextualized instruction involves integrating learners' cultural context with their real-world experiences (Eze, et al., 2021). It is a method of instruction that ties a subject to a practical use that will pique students' interests (Huang, 2013) In order to address the needs of the pupils, teachers should employ activities, events, topics, or real materials. Utilizing regional resources makes the lesson engaging and appropriate for the students' level of comprehension. Additionally, a community situation might be used as the lesson's opening to grab students' interest and get them involved in their academic work.

V.CONCLUSION AND RECOMMENDATIONS

The study concludes that the use of contextualized worksheets is effective in enhancing the performance of Grade IV pupils of Anonang Elementary School. Grade IV pupils who experienced the implementation of contextualization received better mathematics performance than pupils who were taught using the traditional lecture method in mathematics.

Since contextualization has been shown to improve students' academic achievement, math teachers are encouraged to use them in their lessons.

Other subject teachers may also incorporate the use of contextualization into their classes after conducting a thorough assessment of the strategy's efficacy in raising students' academic performance.

Teachers may also develop more contextualized learning materials for other topics in Mathematics and for other subject areas to address the students' least learned skills.

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