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UNDERSTANDING THE USE OF EGG CARTON MATHS MANIPULATIVE TO HELP KINDERGARTEN PUPILS' ADD ONE DIGIT NUMBERS IN THE AKOBIMA MA BASIC SCHOOL, GHANA

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Abstract

The goal of this study was to help Kindergarten pupils at Akobima MA Basic School enhance their composition writing skills. The implementation of the Egg Carton Math manipulative intervention enhanced kids' academic achievement, as indicated by a significantly higher average score (7) at the post-intervention stage compared to the low average score (3) during the pre-intervention stage. The findings also revealed that pupils were more engaged and motivated in the learning process. In order to do this, the Egg Carton Math manipulative was used as an intervention to improve pupil-to-pupil and teacher-to-pupil engagement. Other data-gathering approaches used at the pre-and post-intervention stages, such as observation and interview, verified that the problem was remedied once the intervention was implemented. As a result, the study suggests that the Egg Carton Math manipulative be utilized to help Kindergarten pupils improve their composition writing skills.

Keywords: Action Research, Egg Carton, Kindergarten, Manipulatives.

Introduction

The aim of this study was to help Kindergarten pupils at Akobima MA Basic School enhance their composition writing skills. The use of manipulatives is ingrained in educational theories, research, and practice, particularly in mathematics, where it has been proven that pupils who use

manipulatives in their mathematics classrooms outperform their peers. This advantage applies regardless of grade level, talent level, or topic. Manipulation improves retention and problem-solving scores as well. Pupils' attitudes toward mathematics improve when they are taught with concrete resources by teachers who are informed about how to use those (Clements, 2008).

Manipulatives, according to most practitioners and experts, are effective because they are concrete. They most likely mean objects that pupils can grasp with their hands when they say 'concrete.' Because of their sensory nature, manipulatives appear to be 'real,' connected to one's intuitively meaningful personal self, and so useful.

Good manipulatives are those that are meaningful to the learner, give the learner control and flexibility, have characteristics that mirror or are consistent with cognitive and mathematical structures, and help the learner make connections between different pieces and types of knowledge. In other words, they serve as a catalyst for the growth of Integrated-Concrete knowledge. Both physical and virtual manipulatives can motivate students to make their information explicit, which helps them gain Integrated-Concrete knowledge, when employed in complete, well-planned teaching environments (Sarama et al., 2016).

Statement of the Problem

During the researcher's professional practice, she saw that Kindergarten pupils at Akobima MA Basic School struggled to add whole numbers with one digit. In order to confirm that the problems existed, the researcher employed triangulation, which entails combining numerous approaches, such as observation, previous exercises, home assignments, and interviews. If the issue is not addressed, pupils may lose interest in mathematics.

Purpose of the Study

The goal of the study was to employ an Egg Carton Math manipulative to teach Kindergarten pupils at Akobima MA Basic School to add one-digit counting numbers.

Objectives of the Study

The objectives of the study were to;

1. Use the Egg Carton Math manipulative to assist Kindergarten students add one-digit numbers at the Akobima MA Basic School.

2. Using the Egg Carton Math manipulative to increase the engagement of Kindergarten pupils at the school under investigation by adding a one-digit counting number.

3. Improve Kindergarten pupils' collaboration skills in the school under investigation.

Research Questions

The following research questions guided the study;

1. To what extent will the use of the Egg Carton Math manipulative help Kindergarten pupils to add one-digit numbers at the Akobima MA Basic School?
2. How will the use of Egg Carton Math manipulative motivate Kindergarten pupils of Akobima MA Basic School to add one digit whole numbers?
3. To what extent will the use of Egg Carton Math manipulative enhance pupils' collaborative skills?

Significance of the Study

This project's output will assist Kindergarten pupils at Akobima MA Basic School in overcoming their difficulties in adding one-digit counting numbers. The results of this study will also help the researcher enhance his or her practice with the Egg Carton Math manipulative. Finally, it will serve as a resource for other teachers or academics interested in the subject.

Delimitation of the study

This study's findings were limited to Kindergarten pupils at Akobima M/A Basic School. The study's findings are again confined to the addition of one-digit whole numbers.

Limitations of the study

The collection of data and implementation of the intervention were complicated by the pupils' absenteeism. The researcher was unable to control the impact of private teachers on the pupils in the sample.

Organization of the rest of the Study

The study's content is divided into five sections. Background to the study, statement of the problem, goal of the study, objectives, research questions and relevance of the study, limitation, delimitation, and organization of the project report are all included in the first section. The second section discusses the literature review, which entails a discussion of diverse literature that the researcher discovered to be relevant to the study, as well as a summary of all relevant material.

The project's methodology, comprising small manageable sample size action, research instrument, pre-intervention, intervention, and post-intervention, is discussed in the third section. The fourth section covers data presentation and analysis in relation to the study topics. The summary, conclusion, and recommendations are included in section five.

Literature Review

Many math educators believe it is beneficial, if not vital, for pupils to be able to represent mathematical ideas in a variety of ways. This concept is based on Dienes' Multiple Embodiment Principle and is a central theme in current discussions of multiple, interconnected representational systems. Dienes reasoned that in order to generate an abstract notion, more than one example embodies it and from which the concept is to be abstracted is required (Thompson et al., 1990).

The Constructivist movement argues that children construct their own knowledge via their interactions with their environment and each other, hence manipulatives are used in the teaching and learning of Mathematics. Concrete things that can be felt and manipulated to help understand frequently abstract Mathematical ideas are part of a child's learning environment in the classroom. Pupils can use manipulatives to investigate concepts visually and tactilely, frequently through hands-on experience. Because of a young child's mental immaturity, Piaget argued that using physical items in learning would augment the words and symbols they had yet to develop (Freer, 2006; Shahid, Asif, & Pasha, 2022).

Manipulatives also allow youngsters to draw on their own real-world experience, culture, and ethnicity to better understand topics. Students can learn the reversibility of mathematical procedures by using concrete tasks that lead to abstract notions. In addition, learning entails three steps: acquiring new information, transforming or analyzing the information, and evaluating the

new knowledge. The use of manipulatives allows pupils to go through this learning process in a more natural way (Ambrose, 2002).

Research Design and Methodology

In practice, action research varies from pure research in that it seeks an immediate solution to an identified problem before it progresses to a higher level. Action research involves a systematic process of examining the evidence. The results of this type of research are practical, and relevant, and can inform theory (Riel, 2020; Shahid, Asif, & Pasha, 2022). Action research is different from other forms of research as there is less concern for the universality of findings, and more value is placed on the relevance of the findings to the researcher and the local collaborators. In this study, an action research design was applied. Most action research literature considers action research to be a good problem-solving strategy.

It can provide opportunities for reflection and improvement for the teacher in the classroom, as well as a testing ground for enhancing the instructor's practice. Action research is also considered a personal transforming tool for a teacher's professional practice when used in this way. "Action research is the investigation of a social situation with the goal of increasing the quality of action in that circumstance." Action Research is usually defined with pre-intervention, Intervention, and post-intervention stages (Elliot, 1991).

Population

The population was thirty (30) Kindergarten pupils of Akobima M/A Basic School, which consists of thirteen (13) boys and seventeen (17) girls.

Sample and Sampling Procedure

Purposive sampling was utilized to choose 25 pupils from a total of 30 pupils. The researcher was curious to learn more about pupils who were having trouble adding two-digit numbers. These pupils were chosen specifically because they had certain features.

Research Instruments

The following data-gathering tools were used in this study: pre-test - post-test formative test, questionnaire, and academic performance. The researcher employed the Pre-test and Post-test

designs. The pupils are given a pre-test to determine their level of performance before they are exposed to the strategy, and a post-test to determine their level of performance after they have been exposed to the technique.

Data Collection Procedure Pre-Intervention

The existing and current practices are assessed at the pre-intervention stage. These were discovered through a combination of data gathering approaches, including examining the pupils' work in class, take-home assignments, and oral comments, as well as their assumptions regarding the identified problem. The pre-test is administered at this point. The former class teacher was questioned about the pupils' struggles.

Invention Design and Implementation

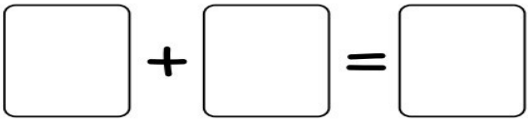
The Egg Carton Math manipulative was used by the researcher to help pupils to enhance their skills in adding one-digit numbers.

Intervention Procedure and Demonstration of the Technique of Egg Carton Math

Have each child bring in an egg carton and a plastic container with some type of little objects. These could be coins, beads, buttons, paper clips, or raw macaroni.

Figure1. Egg Carton Manipulative

Have the pupils shake the closed egg cartons and when they open them, the beads will have landed on some numbers. Have them use the numbers to form a math equation as shown below:



Have them add the numbers together by counting separate beads representing the individual numbers, put them together and count them to complete the equation. Let pupils know that the last number counted after putting the beads together is the required sum.

RESULTS AND DISCUSSIONS

Below tables shows the results of pre-test and post-test in Table 1 and Table 2 respectively.

Table 1: Result of the Pre-Test

Marks (x)	Frequency (f)	fx
1	4	4
2	2	4
3	7	21
4	12	48
Total	**25**	**77**

Source: Author's Field Data

The average score for the pre-test was approximately 4 out of a total score of 10. It can be inferred that all the sampled pupils could not obtain at least 50% of the total score of 10.

Table 2: Result of the Post-Test

Marks (x)	Frequency (f)	fx
6	3	18
7	3	21
9	14	126
10	5	50
Total	**25**	**215**

Source: Author's Field Data

The average score for the post-test was approximately 9 out of a total score of 10. In terms of percentages, it was observed that 100% of the pupils improved in their performance.

Discussions

The triangulation method utilized in this study allowed for a better understanding of the problem and its resolution using Egg carton math. Observation, questionnaires, class exercises, and take-

home assignments were used to verify and validate the problem. The research took five weeks to complete. Pre-intervention, intervention, and post-intervention were the stages of the study.

At the pre-intervention stage, the average score was 4 out of 10. The average score improved to 9 out of 10 after the intervention method, indicating that the intervention was effective and enhanced the pupils' academic performance. Pupils were seen to be more capable of adding single-digit numbers as a group and individually.

Summary of Key Findings

Egg Carton Math Manipulative as an intervention is an effective way to increase kids' academic ability in adding single-digit whole numbers, according to the study's major findings. It has the potential to increase the achievement of up to 100% of the entire number of pupils involved.

Summary, Conclusions and Recommendations

The goal of the study was to employ the Egg Carton Math Manipulative as an intervention to help Kindergarten pupils improve their ability to add one-digit numbers. A sample of 25 pupils was chosen at random from a population of 30 pupils. Through the use of several data gathering methodologies such as observation, questionnaire, exercise, and take-home assignment, triangulation was used in the validation of the problem. The average score improved from 4 to 9 at the end of the trial out of a total score of ten. This was a strong sign that the intervention had improved the pupils' adding skills. All students who had previously scored below average in the pre-intervention stage may now score above average in the post-intervention stage.

Conclusion

The goal of this study was to use the Egg Carton Manipulative technique as an intervention to improve the academic performance of Kindergarten pupils at Akobima M/A Basic School by adding one-digit numbers. The implementation of the intervention improved pupils' academic success, as indicated by a considerably higher average score of 9 at the post-intervention stage compared to a lower average score of 4 at the pre-intervention stage, according to the findings of this study. In comparison to the usual style of teaching, pupils were more actively interested and motivated in the educational process when the intervention was used.

Recommendations

The following recommendations were made based on the findings of this study:

1. The Egg Carton and other instrument like this approach should be promoted as an effective solution for pupils who are having difficulty adding one-digit counting numbers.

2. Because children learn via play, classes should be planned around their interests.

Future Research Directions

Future research could employ a mixed method approach in understanding the comprehensive facets that come with the use of egg carton math manipulative in understanding how children learn to do basic numeracy. This will use both qualitative and quantitative techniques in understanding the views of different stakeholders, including teachers, parents, and Kindergarten pupils on kids' learning habits within basic addition of numbers and mathematics as a whole.

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