

EFFECTIVENESS OF USING INSTRUCTIONAL MATERIALS IN GUIDING YOUNG SCHOOL CHILDREN IN MATHEMATICS INSTRUCTION

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Abstract

This study examined the effectiveness of using instructional materials in guiding school children in mathematics instruction. The study was guided by four (4) research questions. A descriptive survey design was adopted to carry out the study. The population of the study was five hundred and eighty-six (586) teachers. Simple random sampling technique was used to draw a sample of one hundred (100) primary school teachers from the population. The questionnaire developed for the study contained twenty (20) items which was used as an instrument for data collection. The validation of the instrument was done by three lecturers, one from Early Childhood and Primary Education and two from Education Foundation. The reliability of the instrument was determined using Person Product Moment Correlation Coefficient which gives a reliability index of 0.75. The analysis of the data collected was done using statistical mean. The result of the analyzed data revealed that the utilization of instructional materials in teaching Mathematics to children help to catch their attention span. Furthermore, among others, it was revealed that the usage of these materials tend to enhance the performance of school children in Mathematics as it makes the abstract concepts in mathematics easier to understand. Recommendation were made that teachers should incorporate or involve instructional materials in their Mathematics lessons to enable them achieve their lesson objectives as well as to help their pupils learn the intended lesson objectives. Furthermore, educational administrators should train and retain teachers on the use of instructional materials in teaching and to lay down guidelines for mathematics instruction.

Introduction

Young children finding it hard to understand mathematics lesson has been in the increase. Teachers guiding these young children seem to have failed to adapt positive instructional techniques in order to ease the difficulty of the lesson and make the lesson easy for the children to understand. Learning theorists like Piaget (1971) and Dienes (2019) have suggested through their research findings that children develop concepts through direct interaction with the environment and the provision of learning materials. Both are vehicles through which effective learning happens. For example, if a teacher provides a learning material which is directly related to the concept being thought to the child, it will not only ease the difficulty in learning but will also draw the child closer to the learning activities. Dienes (2019) whose work specifically relates to mathematics instruction suggested that children need to build or construct their own concept from within than rather having those concepts imposed upon them. Dienes work suggested that, rather than having these concepts imposed on children, it is better to guide the children to construct their own concepts and other possible ways of solving the similar

concept through exposing them to numerous instructional materials that will help them do so. Mathematics programs are mostly dominated by the use of textbooks and workbooks which create a mismatch because it lacks the aid to connect the child between the nature of the content or concept and how it will be assimilated and understood easily. However, this problem can be solved using direct interaction with the concept through the provision of instructional materials to assist learning.

Instructional materials are materials which assist teachers to make their lesson explicit to learners, thereby making it easier for them to understand the lesson Barrington M. (2019). Instructional materials include both visual and audio-visuals such as pictures, flashcards, posters, charts, radio, video, television, computers and many more. It also includes manipulatives which are more concrete physical small toys and pebbles. All these help children to perform well in learning mathematics.

When instructional materials are used in mathematics, children learn the mathematics concept better, participate in the learning process, and thereby develop likeness for Mathematics (Dorren, & Hansen, 2020). According to these authors, the percentage of children who run away or dodge from mathematics will reduce thereby promoting love of science and technology and mathematics which is the root of development in this 21st century.

Mathematics is the study of measurement, properties and relationship of quantities, sets, numbers and symbols Margret M.K. (2018).

David (2018) explained that mathematics is all around us, in everything we do and is the building block for everything in our daily lives even as children. Young children need the knowledge of mathematic which will help them to adapt well in the changing world after leaving school where they will get in touch with measurement, number, quantities situations that requires them to apply the mathematical thinking they have learnt to succeed. According to Anibehe, (2020), it is because of its important that it must be credited by pupils before gaining admission or promotion into the next class or level. The importance of this subject makes it necessary that relevant instructional materials should be used to teach children. Margret (2018) and Kelly (2019) asserts that visual aids make lesson come alive and helps pupils to learn better. It is against this background that this study attempt to examine the extent to which the use of instructional materials could advance young children's performance in mathematics.

This study therefore examines the effectiveness of the use of instructional materials in helping young children to learn mathematics.

Research Questions

In order to achieve the objectives of this study, the following research questions were raised to guide the study:

1. How effective is the use of instructional materials in teaching and learning?
2. What is the influence of instructional material utilization in teaching of mathematics to primary school children?
3. To what extent does the use of instructional material influence the learning of mathematic by school children?

4. What is the difference in academic performance of school children in mathematics due to the use of instructional materials?

Methods

Descriptive survey research design was adapted for the research study. This study was carried out in Awka South Local Government Area of Anambra State. The population of the study was made up of teachers in public primary schools in the study area. Total number of public primary school in the study area is forty-three (43) with total of 586 teachers. Twenty (20) schools were randomly selected from the 43 schools in Awka South Local Government Area as sample for this study. Then in each school, five (5) teachers were randomly selected making a total of 100 teachers. Therefore the sample of the study is made up of one hundred (100) primary school teachers from Awka South local Government Area. The instruments used for data collection was a structured questionnaire. It contained 20 items based on the specific purpose and research questions of the study. The questionnaire has two sections, A and B. Section A contains demographic, personal information from the respondents while section B contains the items that addressed the researcher questions. The items were structured on a point rating scale. The option or rating scales include: Strongly agree (SA) with four (4) points, Agree (A) (3) points, and Disagree (D) (2) points, Strongly Disagree (SD) (1) point; except for research question three that was structured using Very High Extent (VHE) (4) point, High Extent (HE) (3) points, Moderate Extent (ME) (2) point and Low Extent (LE) (1) point. The face and content validity of the instrument were carried out by two lecturers. One in the department of Early Childhood and Primary Education, while the other was from department of Education Foundation, Faculty of Education, Nnamdi Azikiwe University Awka.

The test-retest method was used to establish the reliability of the instrument. Copies of the questionnaire were given to ten (10) selected primary school teachers from Awka North local Government Area. The same questionnaire was later re-administered to the teachers with the interval of two weeks. The scores gotten from the two administration of the questionnaire were correlated using Person Product Moment Correlation Coefficient as supported by Agu (2007). The scores gave a reliability coefficient of 0.75. 100 copies of questionnaire were administered personally by the researcher to the respondents and collected back at the end of the exercise. The data was analyzed using statistical mean. Items with mean score of 2.50 and above are considered accepted while any item with mean score below 2.50 was rejected.

Results

Research Question 1

How effective is the use of instructional materials in teaching and learning?

Table 1: Teacher's Mean Responses on the Effectiveness of using Instructional Materials in Teaching and Learning.

Items	SA	A	D	SD	\bar{x}	Decision
Instructional materials:						
Helps teachers to control the teaching and learning process.	65	30	5	-	3.6	Accepted
Serves as a vehicle for teachers to teach, achieve and drive home their lesson objectives to their learners.	73	27	-	-	3.7	Accepted
Helps to reduce classroom misbehavior during mathematic lesson.	55	40	5	-	3.5	Accepted
Serves as a source of motivation for both teachers and learner, especially for the children to connect to the learning process.	63	30	7	-	3.59	Accepted
Makes the teaching and learning process interesting and fun for both teachers and learners.	70	25	2	3	3.62	Accepted

In Table 1, the mean scores include: 3.6, 3.7, 3.59 and 3.62 with the cluster mean of 3.60. Since cluster mean is greater than the cutoff point of 2.5, it then mean that the respondents agree with the view that with a cluster mean of 3.60 which show that the respondents agree with the view that instructional material is effective in teaching and learning process.

Research Question 2

What are the influences of instructional materials utilization in teaching of math to primary school children?

Table 2: Teachers' Mean Responses on the influence of Utilizing Instructional Material in Guiding Primary School Children in Mathematics.

Items	SA	A	D	SD	\bar{x}	Decision
Instructional materials:						
Facilitates teaching and learning process	60	40	-	-	3.6	Accepted
Makes explanation of concepts easier	75	25	-	-	3.75	Accepted
Maintains the attention span of pupils and keep them engaged in the learning process	64	36	-	-	3.64	Accepted
Brings the abstract concept to physical realworld experience for easy comprehension.	41	59	-	-	3.4	Accepted

Reduces too much use of words to explain concepts	40	30	30	-	3.1	Accepted
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In Table 2, the mean scores presented includes: 3.6, 3.75, 3.64, 3.4 and 3.1 with a cluster mean of 3.5. These show that the respondents concord that using instructional materials in teaching mathematics influences primary school children.

Research Question 3

To what extent does the use of instructional materials influence the learning of mathematics by school children?

Table 3: Teacher's Mean Responses on the Extent the use of instructional Materials influences School children in learning Mathematics.

Items	VHE	HE	ME	LE	\bar{x}	Decision
Instructional materials:						
Motivates exploration of content as well as trial and errors	40	19	30	11	2.88	H.E
Enables children understand and complete task given to them	50	35	15	-	3.35	H.E
Children tend to pay more attention when manipulatives are used in the learning process	50	30	20	-	3.3	H.E
Stimulate and motivate learners to learn as they became active learners rather than passive learners.	65	-	35	-	3.3	H.E
Promotes connection and interaction between the teachers and learners in the learning process.	50	25	25	-	3.25	H.E

In table 3 above, the mean scores presented includes: 2.88, 3.35, 3.3, 3.3 and 3.25. This indicates that the respondents agree that the use of instructional materials influences school children in learning mathematics to a high extent.

Research Question 4

What difference will there be in the performance of school children in mathematic due to the use of instructional materials?

Table 4: Teachers' means responses on the Academic Performance of School Children in mathematics due to the use of Manipulatives.

Items	SA	A	D	SD	X	Decision
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Then they move from concrete representation to abstract ranking.	35	50	15	-	3.2	Accepted
The use of manipulatives for solving problems in mathematics.	35	50	10	5	3.15	Accepted
Mathematics activities related to connections between abstract concepts and real life experiences.	52	48	-	-	3.52	Accepted
The understanding of abstract explanations aftertime	40	40	20	-	3.4	Accepted
The general performance of mathematics as a whole	45	30	15	10	3.1	Accepted

Table 4 above presented the mean scores as 3.2, 3.15, 3.52, 3.4 and 3.1 which shows that the respondents agree that there will be a difference in the performance of pupils in mathematics due to the use of instructional materials.

Discussion

The findings of this study revealed that instructional material is effective in teaching and learning process as it helps teachers to have control over their teaching and learning process and achieve their learning objectives among others. This is in agreement with Pham (2020) who observes that instructional materials are pupil and teacher friendly because with the use of instructional materials, teachers teach better and pupils learn joyfully and retain what they learn. The study revealed the importance of using concrete manipulatives in instruction which influences primary school children to make connection between concrete and abstract content and also reduces too much use of words to explain concepts. These findings are in accordance with Barrington (2019) observations that instructional materials influence the teaching of concepts and ideas in any subject matter. According to the author, children understand, comprehend and perform better in mathematics class activities especially when manipulatives and simulation are part of the instructional medium. This findings is in agreement with Barlis (2015) who reported that teachers of young children should always use instructional materials to teach because the extent children construct their own meaning, be active in learning and have a better understanding of what is taught is highly appreciated and encouraging when instructional materials are available for them to use. The author further averted that, children always learn the content of mathematics concepts to a greater extent when exposed to instructional materials.

The research also revealed that there is a difference in the performance of pupils in mathematics due to the use of instructional materials as they move from concrete presentation to abstract thinking. This finding is supported by Lucie & Jamie (2019) who noted that, manipulatives and instructional materials are the key to the teaching of abstract contents especially in science subjects like mathematics. They observed that manipulatives are the gateway between abstract activities and real life experiences.

Conclusion

Based on the findings of the study, it can be seen that the teachers asserted that the use of instructional materials is important part in mathematics instruction and is effective in holding children in mathematics learning. Teachers believes that it gives pupils the needed opportunities to explore lesson content, tangible or non-tangible to make connections between concrete and abstract concepts in mathematics as well as gives the pupils room for trial and errors.

Recommendations

Based on the research, the following recommendations were made:

1. Teachers should use the instructional material for learners irrespective of their learning abilities.
2. They should also establish guidelines and standards on how mathematics lesson should be taught and carried out both by practicing and aspiring teachers. This will make it obligatory for them to adapt to the change and follow the laid down standards and avoid adapting any teaching method of their convenience.
3. The government may be of help or assist in achieving this by providing funds to school to acquire instructional materials or provide instructional materials to schools. This will increase the level of instructional materials accessibility for the teachers.
4. The government bodies and education related Non-Governmental Organisation can also establish programs to train and re-train teachers on the use of manipulatives effectively.

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