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Influence of Instructional Materials in Eradicating Errors in Children's Number Work in Pre-Schools in Kamukunji Sub-County, Nairobi County

Agnes W. Kibui[1], Jane Muiruri[2]

[1]P.hD, DED – Education

[2]MEd. – Early Childhood Education

Abstract: ***The study investigated the effect of instructional materials in eradicating reflection errors and number omission errors. The population of the study involved 450 children from 15 pre-schools which had been selected by random sampling. The research design used was Quasi experimental. It had both control and experimental group and the data was analysed by means of frequencies and percentages. The study was based on constructivist theory by John Dewey. The study had sought to achieve the following objectives:- (i) The pretest performance of control and experimental group (ii) The posttest performance of both control and experimental group (iii) The relationship between performance of the two groups. The data showed that the control group in both pretest and posttest made many errors while the experimental group which had used instructional materials made few errors and performed better. The findings of the study in the pretest and posttest of the control group in reflection errors recorded 76.5% and 72.5% respectively. There was a 4% improvement. The pretest and posttest of the Experimental group in reflection errors recorded 73.5% and 16.5%. There was 57% improvement. The pretest and posttest for number omission errors in control group showed 68.5% errors and 64.5% respectively. There was a 4% improvement. The pretest and posttest for the Experimental group in number omission errors recorded 64.5% and 21.5%. There was 43% improvement. The study recommended use of adequate and age appropriate materials during instruction. Children should be discouraged from copying other children's work in order to avoid transferring mistakes to their work.***

Keywords: Errors, number writing, number reflection, number omission, instructional materials, teaching style

1. Introduction

In the preschool, the teacher should build on number writing and continue developing number writing skills and concepts through appropriate activities and materials (Abaya 2017). The child centred method places the child at the central point of learning. The child learns by doing that is, colouring numbers, tracing numbers, joining dots, pasting numbers, weaving numbers and number puzzle. The child controls the speed at which he/she learns new ideas. The role of the teacher involves encouraging, guiding, and providing materials required for learning. According to Tucker (2010), young children need to be active in their learning "hands on" and "brains on." It is also known that young children learn best through practical activity. Discovery and investigations are treated as an integral part of doing mathematics (Martin, 2011). Mathematics as a subject is activity oriented and the mastery of mathematics concepts cannot be fully achieved without the use of instructional learning materials. The teaching of mathematics without learning materials certainly results to poor performance. Franzer (1992) stressed that, a professionally qualified teacher no matter how well trained would be unable to put his ideas into practice if the school settings lacks equipment and materials necessary for him/her to translate his/her competency into reality. Mathematics utilization value is one of the most recognized attribute. It is surely this perception which has given the subject its unquestionable compulsory status. It should be noted that mathematics concepts are required by both the young and the old in their daily activities as they assist one to think straight, solve problems and function effectively.

Number Reflection Errors and Omission of Errors

According to Mwaura (1984), number writing is a difficult skill for children. The teacher must therefore provide a variety of activities and materials in order to ensure that children are able to write numbers correctly. When writing numbers for children in the air, the teacher should not be standing opposite the children because the children will see the number in the reverse. The habit of some children copying other children's work and hence copying the mistakes contributed to the number reflection errors. Butler and Wren (1960) assert that on its parts, practical work in mathematics serves not only to stimulate interest but also provides a most effective means of clarifying many mathematical concepts.

Number Omission Errors

In number omission, Kossy (2000) asserts that mathematical errors provides a useful insight for teachers into a child thinking, and understanding. With sensitive handling, it enables the preschool teachers to learn from mathematical mistakes as they view them as learning agents.

Number Spacing Errors

According to Abaya (2017) the teacher must make sure that the children write the numbers correctly from the beginning. To ensure that, this is done, she must observe the children very closely in all activities, and especially when they are learning to write the numbers. Kossy (2000) reports that when children are asked how they felt about making mathematical mistakes, they expressed strong feelings of anger, frustrations and disappointments. According to research carried out by Muiruri (2014) some children write numbers thus: 1,2 345 678910. This gives a different interpretation all together.

Number Sizing Errors

Spooner (2000) suggested that, children should be placed in situations where they feel being in control of identifying mathematical errors. Muiji & Reynolds (2011) acknowledges that early mathematical knowledge is important to children's learning and teaching in primary schools as counting, adding, subtraction and sharing form the basis of much learning in early school teaching.

2. Research Methodology

The study used Quasi experimental research design that examined the effect of instructional materials on eradicating number reflection errors and number omission errors. The target population involved 450 children from 15 preschools. Data analysis was done using frequencies and percentages and presented in graphs. The study sought to achieve the following objectives:

a) To investigate the pretest performance for control and experimental group in number reflection and number omission errors.
b) To establish the posttest performance of control and experimental group in eradicating number reflection and number omission errors.
c) To examine the relationship between the performance of the two groups involving both number reflections and number omission errors.

3. Data Analysis and Presentation

The findings of the study will be presented per each objective.

Objective one: To investigate the pretest performance of control group on number reflection errors

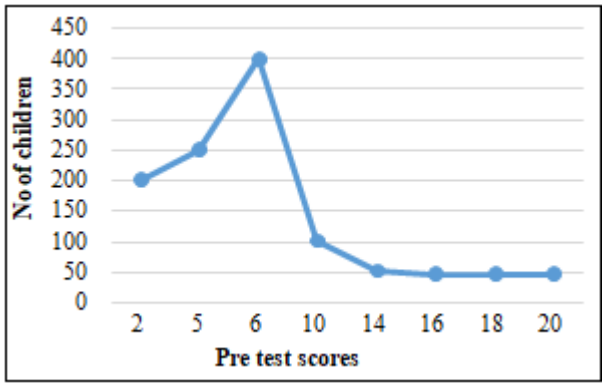

Figure 1: Control group pretest performance for control group in number reflection

Data analysis in Figure 1 shows that the control group only (344) 76.5% of preschool children had reflection errors for example 2 as Z, 3 as Ɛ or m/w, 5 as S, 7 as Γ or L and 9 as P or b. In this group the graph is skewed on the left and learners performed poorly. These children were taught in an abstract manner and the teacher had a difficult time in making them be attentive. Tucker (2010), asserts that young children need to be active in their learning. "Hands on" and "brains on". It is known that young children learn best through practical activity. Discovery and investigations are treated as an integral part of doing mathematics.

Objective 1: Control group posttest performance in Number reflection errors

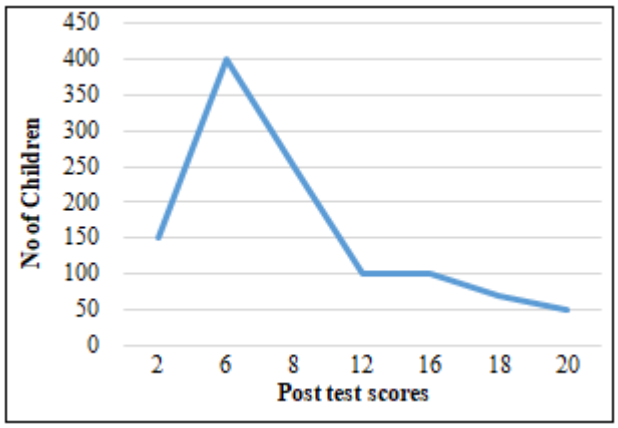

Figure 2: Control group posttest performance in number reflection

The findings in Figure 2 indicated that those who made errors were 226 (72.5%). There was a 4% improvement in error reduction. In the post test scores of the control group, the children continued being taught in an abstract manner. There was a lot of drilling for the children to grasp the number writing concept. Many children got stuck in their work. Butler and Wren (1960) assert that practical work in mathematics serve not only to stimulate interest but also provides a most effective means of clarifying many mathematical concepts and relations through experience of associating them directly with physical things.

Objective 2: Pretest performance for experimental group number reflection errors

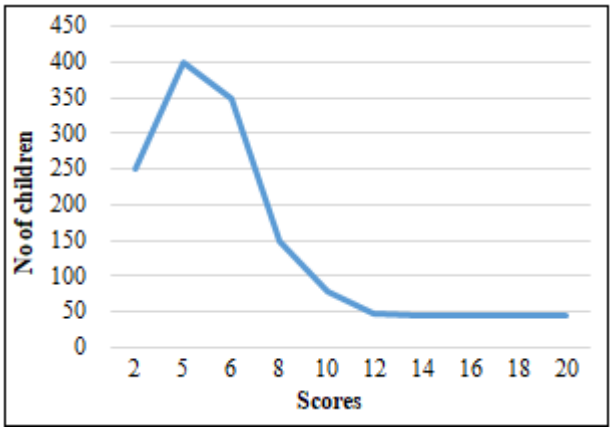

Figure 3: Pretest performance for number reflection errors

Data analysis in Figure 3 showed that in the pretest, the children who made errors were 330 (73.5%). Kossy (2000) reports that when children are asked how they felt about making mathematical mistakes, they expressed strong feelings of anger, frustrations and disappointment.

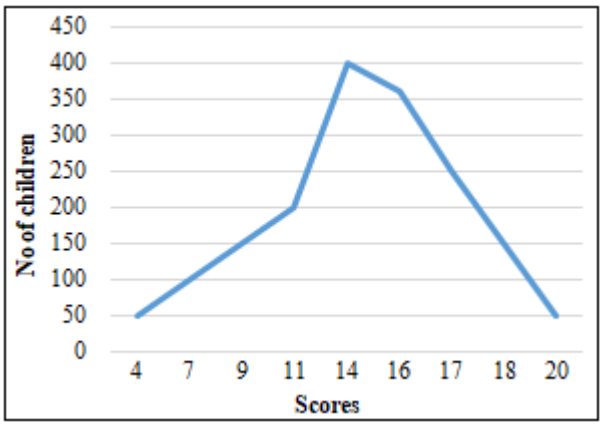

Figure 4: Posttest performance for experimental group in number omission reflection

The findings in Figure 4 indicated that 75 (16.7%) made errors and (73.5%-16.5%) had 56.8% improvement in error reduction. Petty (1993) indicates that one learns better while doing rather than watching or listening. Activity methods are known to increase concentration, perception and retention. Gichumba (2009) asserts that learning experience and accessibility to materials are important in number formation. Modelling, colouring, joining dots etc. The learners' use of materials helped in grasping the number concepts.

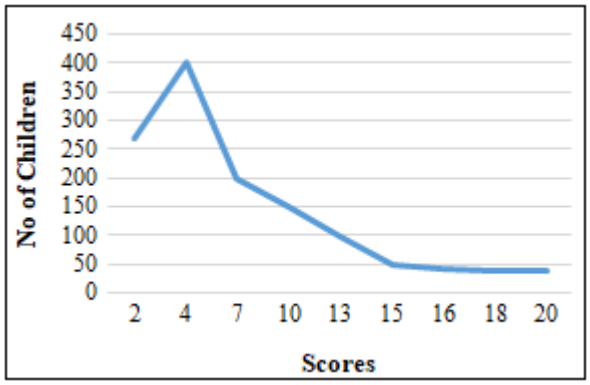

Figure 5: Control group pretest performance in number omission errors

The findings in Figure 5 showed that the graph skewed to the left showing 308 (68.5%) of the children had skipped numbers as they wrote Nos. 1 – 20 in an abstract manner as follows 1, 2, 5, 8, 10 or 0 1 1 1 4 4 4 7 7 10. The teacher was using the traditional method of reciting numbers written on the chalkboard. Farrant (1997) encourages the use of discovery methods in that they encourage all round development in the child.

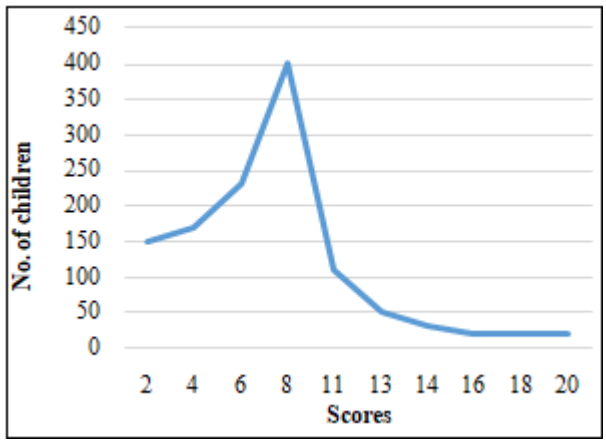

Figure 6: Control group posttest performance in number omission errors

Data analysis in Figure 6 indicated that the number of children who made number omission errors were 288 (64%). There was only 4.5% of performance reduction. The control group continued to work in an abstract manner, learners made noise as they were passive in the teaching learning process.

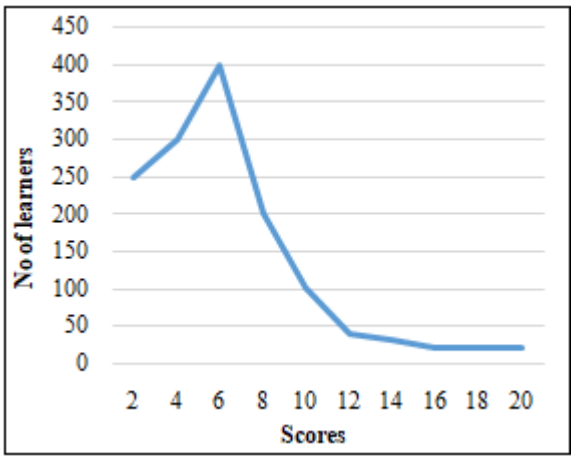

Figure 7: Pretest performance for experimental group in number omission errors

The findings in Figure 7 indicated that the graph skewed on the left showing dismal performance in number writing as 35.5% had written the numbers correctly. According to Macharia (2009) many teachers work in poor and depressed environment with scant resources and little motivation. Mathematics as a subject is activity oriented and the mastery of mathematics concepts cannot be fully achieved without the use of instructional learning materials.

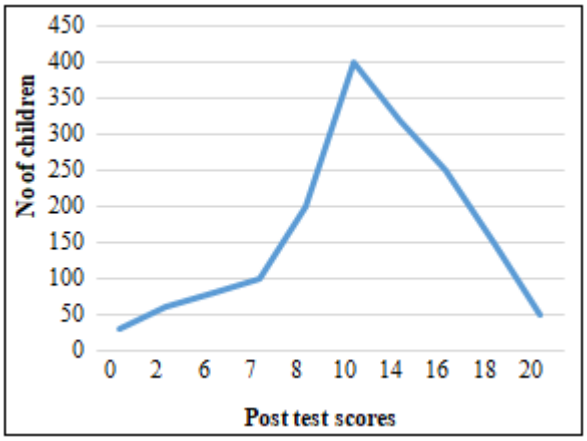

Figure 8: Posttest performance for experimental group in number omission errors

Data analysis in Figure 8 showed that the graph was skewed to the right. The posttest performance increased tremendously to 78.5%. The materials children used included clay, plastacine, glue, papers, beans, coloured chalks, crayons, tracing papers. Muiji & Reynolds (2011) underscored the importance of instructional resources in ECE for purposes of improving children's learning. The child learns by doing and uses his/her own senses. Wales (1975) was of the opinion that the use of instructional resources would make discovered facts glued firmly to the memory of students.

Objective 3: To examine the relationship between performance of the two groups in both areas (Number reflection errors and Number Omission errors)

The third objective examined performance of the two groups in number reflection errors and number omission errors. The pretest performance in control group in the number reflection errors registered 76.5% whereas the posttest recorded 73.5%. That was only 4% reduction. In the pretest performance in the experimental group, 73.5% did not make any errors whereas the posttest performance 16.7% made errors. There was 56.8% improvement in error reduction in number writing through use of age appropriate material activities. The pretest performance for control group in number omission errors registered 68.5% of the children who wrote numbers properly. The posttest performance for the control group was carried after thorough drilling in an abstract manner. The performance registered 64% improvement in error reduction. This was only 4.5% increase which was quite low.

The pre-test performance of experimental group registered 35.5% of children who had no errors. The posttest performance for the experimental group had 78.5% error reduction. This showed 43% increase in performance which was quite remarkable. In both areas, reflection errors and number omission errors those children who had used materials in their activities performed better. Learners were actively involved in the teaching learning process. Jakayinta (2012) commented that "Audio Visual Materials as an integral part of teaching and learning situation help to bring about permanent and meaningful experience. He said they provide firsthand experience where possible.

4. Conclusion

Instructional materials should be taken into considerations in order to stay are attractive and durable. Audio visual materials when made as an integral part of teaching-learning situations help to bring about permanent and meaningful experience. In order to raise the quality of education, its efficiency and productivity better learning materials are needed.

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