THE EFFECT OF INSTRUCTIONAL MATERIALS IN THE JUNIOR SECONDARY SCHOOL MATHEMATICS ACHIEVEMENT IN ENUGU NORTH LOCAL GOVERNMENT AREA

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Abstract

Many secondary school teachers of mathematics (each mathematics in recent times without instructional materials. The newly employed teachers of mathematics are also guilty of this. They feel that the use of instructional materials are only necessary during their leaching practice examination period. Some teachers of mathematics who are guilty of this argue that leaching mathematics with instructional materials makes no difference with teaching mathematics without instructional in terms of students' achievement in mathematics. This study therefore sought to find if their exists any significant difference in performance between students taught some mathematics topics with instructional materials and those taught the same topics without instructional materials at p<.0.()5. The result showed that students taught with instructional material performed better in mathematics achievement test administered after the teaching than student taught without instructional materials.

Introduction

Ezike and Obodo (1991) define instructional materials as those instruments teachers use in class room for teaching. Instructional materials for teaching mathematics are those instruments teachers of mathematics use in classroom situations which they hope are capable of eliciting in concrete terms the concept and principles of mathematics which many seem abstract without the use of the materials. Oluiche and AM (1989) assert that mathematics should be a practical and activity oriented subject which may best be learnt through manipulation of objects and symbols. Onyejemezi (1986) in F,ze (1996) states that when children see mathematics outside the classroom in concrete terms, the abstraction associated with (he subjects is made minimal. Eze (1996) slates that instructional materials for teaching mathematics abound in our environment yet many teachers of mathematics do not utilize them for teaching mathematics both in junior and senior secondary schools in our country. Agwagah (1996) also discovered in a study that teachers of mathematics do not use instructional materials to teach some mathematical concepts. Inspite of the fact that many educationists have highlighted the importance of instructional materials in the teaching and learning process. Some mathematics teachers do not make use of instructional materials in teaching some mathematics topics that obviously may require the use of instructional materials. Some of these teachers argue that there is no need for the use of these materials since the teacher can easily draw them on the chalk board if the need arises, Agwagah (2001) slated that some of these mathematics teachers believe that instructional materials for teaching such concepts in mathematics do not exist or are undiscovered. There has been consistent poor performance of students <H Junior School Certificate examination mathematics over the years this has been a concern to many. There is (he need therefore to investigate whether the non-utilization of teaching-aids in teaching mathematics which is prevalent in recent Nigerian Secondary Schools affects students' achievement in mathematics at Junior Secondary School (JSS) level.

Problem

Secondary School students' achievement in mathematics has been degenerating as years go by at an alarming rate. The high rate of poor achievement of secondary school students in mathematics has become a subject of serious concern (o the nation as a whole, since the situation will obviously affect the nation's objective towards science and technology development if the situation is allowed to continue. Ali (1989) and Fajemidagba (1987)identified the idiosyncrasy of mathematics instruction as a major factor tor students' poor performance. Sule (1997) traced this idiosyncrasy of mathematics instruction to mathematics teaching problems. One of such teaching problems may be teaching mathematics without instructional material which is now common in our secondary schools. It is therefore necessary to find out the effect of instructional materials on Junior Secondary mathematics achievement.

Purpose Of The Study

The main purpose of this study is to find out whether the use of instructional materials in teaching mathematics at the Junior secondary school is more effective than teaching mathematics without instructional materials at that level. Specifically, the study sought to find out whether the students taught some mathematics concept using instructional materials would have a better achievement than students taught without instructional materials.

Research Questions

1. What are the mean scores and standard deviations of students taught with instructional materials and those taught without instructional materials in the mathematics achievement test (MAT)?
2. What are the mean scores and standard deviations of male and female students taught with instructional materials and students taught without instructional materials in mathematics achievement test (MAT)?

Research Hypotheses

1. There is no significant difference between the mean performance of students taught with instructional materials and students taught without instructional materials as measured by MAT.
2. There is no significant difference between the mean performance of male and female students taught with instructional materials and those taught without instructional materials as measured by MAT.

Methodology

The research design for this study is quasi-experimental. This implies that the study was not a pure experimental study. A pure experimental design is not always possible for research in Education because there should always exist some extraneous variables beyond the researcher's control. The study was carried out in Enugu North Local Government Area of Enugu State. The target population of the study consists of all Junior Secondary School Two (JSSI1) students in the schools in Enugu North Local Government Area. There are seven secondary schools in Enugu North Local Government Area.

Sample

Two male schools and two female schools were randomly chosen from the schools in the Local Government Area by balloting method. Out of the schools chosen, forty subjects were randomly selected through balloting method. These subjects constitute the sample for the study-a total of 320 subjects (160 boys and 160 girls). In each school selected, one sample class was taught with instructional materials. The classes taught without instructional materials constitute Group A (The Experimental Group) and the classes taught without instructional materials constitute Group B (The Control Group).

The Instrument

The instrument for the study was a mathematics achievement test (MAT)'which was made up *of* essay questions selected from Junior Secondary School Two (J.S.S. 11) mathematics curriculum. The topics involved were from the list of difficult concepts in mathematics for J.S.S. 11 which were established during the Federal Ministry of Education Teacher vacation course held at Enugu in 1991. The topics were taught the student used for the study for a period of two months.

I The topics were:

1. Directed Numbers
2. Simple Equations
3. Areas and Volumes of plane and solid shapes.
4. Construction of triangles.
5. The Cartesian plane and co-ordinates

The MAT was developed by first constructing a table of specification or test blue print for the different topics in mathematics used for the study. At the end of the teaching which lasted for two months, the MAT was administered to the students.

Validation Of The Instrument

The instrument was validated by three experts in measurement and evaluation and three experts in mathematics education. The same experts validated the test blue print, The advice of these experts helped to delete, modify and replace an item where necessary.

Reliability Of The Instrument

The reliability of the instrument was determined using Cronbach alpha (Oi). This was found to be 0.68. The index is high considering the facts that the MAT was an essay test.

Conductor The Study

The two teachers used for the study were trained in the same university, they were graduates of mathematics education with the same years of experience in mathematics teaching; Each teacher was allowed to write his own lesson plan. One of the teachers taught the experimental group with instructional materials while the other teacher taught the control group without instructional materials.

Test Administration And Scoring

At the end of the two months teaching, the MAT was administered on the students . The MAT which contained twenty-five items was answered by the students under two hours. The researcher did the scoring using the marking scheme he developed.

Method Of Data Analysis

The research questions were answered by computing the means and the standard deviations using the students scores in each group.

The two hypotheses for the study were tested using the t-test statistic at $p < 0.05$.probability level

Results:

Tables 1 and 2 present the mean scores and the standard deviations on MAT Scores,

Tables 1: Mean and Standard Deviation on Scores of the Students

Statistic	Group A Experimental Group	Group B Control Group
Mean Standard Deviation	62.0 13.4	53.2 12.8
Number	N-100	N-100

Table 2: Mean Scores and Standard Deviation of Male and Female Students in MAT

	Experimental	Group	Control	Group
Statistic	Male	Female	Male	Female
Mean	64.5	59.5	55	51.4
Standard Deviation	10.2	9.8	10.5	!0.1
Number	N = 80	N = 80	N = 80	N = 80

Tables 3 and 4 present the t- test in the achievement test.

HYPOTHESIS !: t - Test Result in Achievement Test of the

Students.

Group	Mean Score and Standard Deviation	Calculated t	DF	Table Value of t	Result
(a) Taught without Instructional Materials	X = 62 S, = 13:4	6.0	318	1.96	Significant
(b) Taught without Instructional Materials	X:- 53:2 c; —i 9-8				

HYPOTHESIS 2:

Table 4: t -Test Result- in Achievement Test of Male and Female Students

Group	Mean scores of Standard Deviation	Calculated t - value	DF	Table Value of t	Result
(A) Taught with instructional materials	X, =64.5 S, = 10.2	5.09	.158	1.96	Significant
(B) Taught without Instructional materials	X_2-51.4 S_2 = 10.1				

The result in Table 1 shows that the students taught with instructional materials had a higher mean score ,62) than those who were taught without instructional materials who had the mean score of 53.2

The result in Table 2 shows that male students taught with instructional materials had a higher mean score 64.5 than the female students taught without instructional materials who had the mean score of 51.4 in mathematics achievement test (MAT).

The result showed also that the females students taught with instructional materials had a higher means score (59.5) in MAT than their male counterparts taught without instructional materials who had the mean score of 55.

The analysis in Table 3 showed a significant difference in the mean achievement scores of subjects taught with instructional materials and students taught without instructional materials at ($p < 0.05$) in MAT.

Also the analysis in Table 4 showed a significant difference in the mean achievement scores of male and female students taught with instructional materials and students taught without instructional material at $P< 0.05$

Discussion

The result of the study as shown in Tables I and 3 reveals that students taught with instructional materials performed better than students taught without instructional materials in MAT. The t- accelerated (6.0) is greater than the table I of 1.96.

Also the results in Tables 2 and 4 indicated that male students taught with instructional materials performed better than female students taught without instructional materials. The females students taught

with instructional materials performed better than the male students taught without instructional materials. The computed I (5.09) in Table 4 is significantly P < 0.05) higher than (he table value oft-statistic (1.96) indicating that there were significant differences between the male and female students taught with instructional and without instructional materials.

Based on the result discussed above hypotheses one and two were rejected.

These findings are in line with that of Raskoyi (1983) who concluded a Her his study that the more use of instructional materials in the classroom ensures greater learning and motivation of students towards learning. The results of this study are also in consistent with Okpara and Ogenyi (1984) who stated alter their study that the learners learn best when they arc taught practically with the use of instructional materials as it appealed to human senses.

Conclusion And Recommendations

The major result pf this study revealed that students taught with instructional materials performed belter in mathematics achievement test than students taught without instructional materials irrespective of the sex. The study also revealed that teaching mathematics with instructional materials is more effective than teaching mathematics without instructional materials when subjected to evaluation as in this study.. As a result of these findings, the following recommendations are made.

1. Workshops should be organized from time to time for practicing teachers on the need for the use of instructional materials in teaching mathematics in Nigerian Secondary Schools. In such workshops, different teaching materials and their uses should be exposed to the participants - the mathematics teachers.
2. The Ministry of Education should make it as a policy that all topics that require the use of instructional materials must be taught with the exact instructional materials by all mathematics teachers, and that any defaulting teacher towards this should be penalized.
3. Principals of schools should have an annual award for the best mathematics teacher in their school where the use of instructional materials should constitute one of the parameters for judgment.
4. The Stale and Federal ^Government should equip schools with instructional materials in mathematics.

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