

The Effect of Instructional Materials on Senior Secondary School Students Performance in Mathematics in Jos North Local Government Area, Plateau State

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Submitted: 01-08-2021

Revised: 14-08-2021

Accepted: 17-08-2021

ABSTRACT

The purpose of this study is on the effects of instructional materials on senior secondary school student's performance in mathematics in Jos north local government area, Plateau state. The objectives of the study were: to determine whether or not use of instructional materials in mathematics classroom has an effect on students' performance in senior secondary school, to find out the extent to which use of instructional materials in mathematics classroom has help teachers impart the expected knowledge to the students effectively in senior secondary school, to determine the extent to which of instructional materials in teaching and learning has helped students learn mathematics effectively in senior secondary schools. The study adopts an experimental method. Data was collected using achievement test. These were administered to thirty students from both schools in which data collected were analyzed using t-test for unrelated sample. Findings indicated that there is a significance difference between the students taught with instructional materials and those taught without instructional materials. The study has the following recommendations: the school administrator should provide instructional materials for their schools, the teachers should be encourage to provide instructional materials for mathematics instructions in order to teach the subject effectively, teachers should always use instructional materials in teaching mathematics, parents should encourage the students by supporting them through provision of mathematical set as well as other tools necessary for the understanding of mathematics, educational administrator should organized workshop, conferences and seminar on the effects of instructional materials in teaching-learning of secondary mathematics for all mathematics teachers.

I. INTRODUCTION

The literal meaning of mathematics is "things which can be counted" now one can think that counting has a vital role in our daily life, imagine how would it be possible for us to count days, months and years, if there were no mathematics at all? Mathematics is one of the compulsory subjects that students must offer in senior secondary school, not minding whether such students are in science, commercial, art or social science class. In secondary school curriculum according to National policy on education (2004), there are core subjects as well as electives that students must offer. Mathematics is one the core subjects. According to Gouba (2008) "education should be started with mathematics. For it form well designed brains that are able to reason right. It is even admitted that those who have studied mathematics during their childhood should be trusted, for they have acquired solid bases for arguing. This becomes to them a sort of second nature" On a basic level you need to be able to count, multiply, subtract, add and divide. Mathematics is around us. It is present in different forms whenever we pick up the phone, manage the money travel to some place, play soccer meet new friends; unintentional in all these things mathematics is involve. There are huge examples that testify the present of mathematics in everything that we are doing. Few among others includes; cooking: the idea of proportion, percentage: we can find percentage of different labels, medicine/pharmacy: dosage, Bank: saving and credit, with some good understanding of simple and compound interest, you can manage the way your money grows, change to win lottery: probability, Area: if you want to calculate how much paint, wallpaper, flooring, carpeting or tile

you have to buy for your project you must know the area of the wall or floor, Geometry: this can be seen in our clothing and decoration, Symmetry in future: a flower etc. For future career most university degrees require mathematics. Students who choose not take mathematics seriously or ignore it in high school forfeit many future career opportunities that they could have. They essential turn back in more than half of the job market. The importance of mathematics for future career cannot be over-emphasized. To get degrees in physical sciences, business and commerce, engineering, social sciences, technical sciences medicine and actuarial science. One needs to have good knowledge of mathematics and statistics.

But there is high failure rate in both the internal and external examination that is being administered to students. Results announced by the Head of west Africa Examination Council (WEAC), Mr. Charlse Eguridu, at the WEAC National office Lagos. Showed that in May/June 2012, 38.81% candidates obtained credit and above in mathematics. In 2013 it went down to 36.57% and in this year 2014 we have 31.28%. (Tide news online, 2014). The story is not any way different with the National Examination Council (NECO), since its inception in 2000. According to Matawal (2013), the 2010, 2011 and 2012 NECO reports released by the registrar/chief Executive Prof. Promise Okpala showed that in 2010, 2011 and 2012, 24.9%, 25.14% and 11.3% candidates had credit and above respectively in mathematics. One can observe that the outcome of the examinations did not record a pass mark, in both WEAC and NECO as the least pass mark is 40% what then is the problem?

The above results might have arisen from the fear already inculcated in the mind of the students that it is very difficult. It might be from the teachers who taught them, that is they might had handle the subject poorly, by not using the appropriate teaching strategies/methods that will foster better understanding of the subject. The teachers seem not to be using instructional materials in teaching the subject. This seems to make the subject lesson boring and difficult instead of making it more concrete and interesting for the students.

Teaching methods/strategies are vehicle through which the content materials as spelt out by the curriculum are conveyed to the learner. Due to their importance, they are indispensable in every teaching-learning in all the subjects and mathematics is not an exception.

for the subject. The choice of instructional materials as the most viable teaching strategies for

mathematics concepts goes along way to function as a discovery and a problem solving method. Infact instructional materials give room for observing, instructing and analyzing a problem and draw conclusion in order to find means of solving problem in life situation.

The main objective of this study is to find out the effects of instructional materials on senior secondary school students performance in mathematics. Other objectives of the study include; to determine whether or not use of instructional materials in mathematics classroom has an effects on the students'

Research Questions

The following questions are formulated to guide the researcher.

- i. What method will a teacher adopt to make teaching and learning of mathematics more effective?
- ii. How can we improve students' performance in geometric construction?

Research Hypothesis

A null hypothesis is formulated to guide the researcher.

There is no significant difference between the performance of students taught with instructional materials and those taught without instructional materials in mathematics classroom ($U_1=U_2$).

Research Design/Sampling

The design for this study is experimental research design. Experimental method is a scientific approach to research in which the researcher manipulate one or more variables, control and measure any change in the other variable. Experimental method is conducted to be able to predict occurrence constructed, to be able to explain an effect. The researcher will be working with two groups (experimental and control group) to be able to determine the effect of instructional materials on students' performance in mathematics, for the purpose of this study.

A sample of thirty (30) students from two (2) schools were purposively selected and documented for this study, from the study area. Senior Secondary School 2 (SSS2) students were used because they are among those offering Geometry construction. The sample are divided equally into two groups experimental and control. The two group were taught Geometric Construction differently. The researcher adopts experimental teaching method and lecture method considering the basis cognitive objectives of the students, group A that is, the experimental group,

experimental/laboratory method was used by using the prepared instructional materials in the laboratory to design, operate and interpret the manual objective of the teacher, while group B that is, control group, lecture method was used in teaching them, without instructional materials.

Instrumentation

The instruments used for data collection are teaching and achievement test. After the teaching 10-items objectives with options (A-C) and 2- items of essay question was constructed by the researcher On geometric constructions. In ascertaining the content validity of the test items, the questions were approved by two experts from the department of science and technology education. This is to make sure that the test is in conformity with the content taught. To determine the reliability of the instrument, scorer or rater reliability will be use. That is, by given the same marked scripts by the researcher to two other

experts (mathematics teachers) to remark the scripts. Then the two scores by these experts was correlated the inter-scorer or inter-rater reliability coefficient was determined.

The same test items was administered to both sample groups (students) at the end of the teaching by the researcher. Marks obtain by each student in the groups provide data for the analysis.

II. DATA ANALYSIS AND HYPOTHESIS TESTING

The data shall be subjected to analysis by t-test method. This will be used to determine the effects of instructional materials on students' performance in mathematics. Awotunde (2007), we want to determine whether any difference exist between two different samples on a given dependant variables. The t-test of independent or unrelated sample is applied.

Table one; achievement test scores for both the experimental and control group.

S/N	EXPERIMENTAL	CONTROL
1	26	20
2	18	16
3	29	25
4	22	16
5	28	20
6	29	15
7	30	15
8	24	12
9	26	14
10	20	12
11	18	22
12	30	18
13	16	16
14	27	22
15	25	17

Table two; experimental group scores for the hypothesis

Class Interval	f	mid-point (X)	fX	$X - \bar{X}$	$(X - \bar{X})^2$	$f(X - \bar{X})^2$
15-17	1	16	16	-8.6	73.96	73.96
18-20	3	19	57	-5.6	31.36	94.08
21-23	1	22	22	-2.6	6.76	6.76
24-26	4	25	100	0.4	0.16	0.64
27-29	4	28	112	3.4	11.56	46.24
30-32	2	31	62	6.4	40.96	81.92
Total	15		396			303.52

Table two; control group scores for the hypothesis

Class Interval	f	mid-point (X)	fX	$X - \bar{X}$	$(X - \bar{X})^2$	$f(X - \bar{X})^2$
12-14	3	13	39	-4.4	19.36	58.08

15-17	6	16	96	-1.4	1.96	11.76
18-20	3	19	57	1.6	2.56	7.68
21-23	2	22	44	4.6	21.16	42.32
24-26	1	25	25	7.6	57.76	57.79
27-30	0	28	0	10.6	0	0
Total	15		261			177.6

Table four; t-test analysis for the hypothesis

Group	N	$\bar{X}s^2$	d.f	cal. t-test	tab. t-test
Experimental	15	24.6	21.7	14	4.77
Control	15	17.4	12.7	14	
Total				28	

From Table four the researcher obtained the following results, computed for t-test on the hypothesis.

- Calculated t-valued = 4.77
- t-tab valued (α) = 1.70
- degree of freedom (df) = 28
- level of significant = 0.05

Observed from the above results the calculated t-valued is 4.77 which is greater than the t-tab valued of 1.70. Thus, we have no sufficient evidence to retain the null hypothesis, hence is rejected. This implies that there is a statistical significant difference between the performance of students taught with and without instructional materials in mathematics classrooms.

III. DISCUSSION

The computation shows that, the use of instructional materials help the students in the understanding of mathematics. This is in consonance with the words of Abiri in Bourschak (2000), that instructional material serve to make learning easier and more influential, they aid both the teachers and learners. It is also in line with Ema & Ajayi (2006) that, viewed instructional materials as acts of giving help normally by teachers to provide encouragement to students and pupils in learning activities. It's therefore, the principle strategies and method that bring together men and materials in systematic cooperation to effectively solve educational problems. The used of instructional materials could be the motivating factors as it brings the concept to reality. Therefore, teachers are encouraged to utilize instructional materials at the cause of their teaching.

IV. CONCLUSION AND RECOMMENDATION

The following are the major findings of the study; there is a statistical significant difference between the performance of students taught with instructional materials and without instructional

materials. There is a significant difference between the school taught with instructional materials and those taught without instructional materials.

For effective teaching and learning of mathematics in our senior secondary schools, the following are the recommendations made based on the findings; The school administrators should provide relevance instructional materials to their schools, teachers should be encouraged to use instructional materials for mathematics instructions in order to teach the subject effectively, Parents should encouraged the students by supporting them though provision of mathematical set as well as other tools necessary for the understanding of the subject (mathematics), Educations administrators should organized workshop conferences and seminar on the effects of instructional materials in the teaching-learning of secondary schools mathematics for all teachers.

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