

# Impact of Instructional Materials on Students' Academic Performance in Mathematics in Secondary Schools in Ekiti State, Nigeria

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# ABSTRACT

The paper investigated the efficacy of the use of instructional materials on the academic performance of students in Mathematics. The study was a quasi- experimental research design that employed pretest, post-test non randomized control group design. The population of the study comprised all the students in Junior Secondary Schools in Ekiti State. The sample consisted of 90 students selected from nine secondary schools in Ekiti State. The sample consisted of 90 students selected from nine secondary schools in Ekiti State through the multistage sampling technique. A self-designed instrument tagged Mathematics Students Achievement Test (MSAT) was used to collect data for the study. The responses obtained were analyzed using Achievement Mean Scores, Multiple Bar Charts and Analysis of Covariance at 0.05 level of significance. The findings shows that the pretest mean scores of both experimental and control groups are 6.63 and 7.43, respectively while the posttest mean scores are 11.35 and 8.40, respectively. This study also revealed that significant difference exists between the performance of students taught with instructional materials and those taught without instructional materials. It was recommended that principals and officials of the Ministry of Education should ensure regular supervision to enhance effective use of instructional materials and resources in the teaching of Mathematics in schools.

**Key words:** Instructional Materials, Academic Performance, Classroom Teaching. \*Corresponding author. E-mail: doctorolufemiadebule@yahoo.com.

### INTRODUCTION

The role of Mathematics in the understanding of the foundations and structure of Science, technological advancement, economical development as well as in the understanding of inter-relationship between disciplines is a very significant one. Also, Mathematical methods have strongly penetrated many fields of knowledge and human endeavour (Adelusi, 2006; Adebule, 2009; Ayoola, 2015). Mathematics is a compulsory subject in all primary and secondary schools in Nigeria. As important as this subject is, students are failing at an alarming rate. Students are expected to have mastery on any aspect of Mathematics to enhance some development in science

and technology. However, students are biased that Mathematics is a difficult subject to understand and this is transferred to the classroom teaching, consequently, subjects where an aspect or element of Mathematics is not perfectly learnt. Also needed such as physics, chemistry, geography and economics are not perfectly learnt. Also, it has been observed that teaching and learning difficulties in Mathematics may be traced to abstract nature of the subject, language problem, students' attitude towards the subject, student inability to visualize correctly, lack of mathematical models, teachers' attitude towards the concepts and lack of

Variables	N	pretest		posttest			
		x	SD	x	SD	Percentage mean gain	
With instructional material	60	6.63	1.90	11.35	2.47	71.2	
Without instructional material	30	7.43	1.38	8.40	0.89	13.1	

 Table 1. Impact of instructional materials on student's achievement in JSS Mathematics.

# qualified teachers.

In recent years, attention was focused on the use and role of instructional materials in Mathematics to improve students' academic performance. This implies that the teaching of Mathematics without the use of instructional materials may certainly result in poor academic performance. Students get motivated when they are actively involved in the teaching learning process and this will minimize teaching of Mathematics in abstraction. Adebanjo (2007) affirmed that the use of instructional materials in teaching and learning of Mathematics makes students to learn more and retain better what they have been taught and that it also promotes and sustains students' interest. It also allows the learners to discover themselves and their abilities. Students learn more when they see what they are being taught. There has been much concern expressed about the apparent fall in the standard of education at the secondary school level (Adebule, 2009). The problem of this study is that students are failing Mathematics at an alarming rate despite its importance. It is worth knowing that failure in this subject may hinder a student from being promoted to the next class or from gaining admission into a higher institution of learning for further studies. The study is guided by these research questions: (1) Will the use of instructional materials enhance the performance of JSS students in Mathematics? (2) Will there be any significant difference between the performance of students taught with instructional materials and those taught without instructional materials in Mathematics? And (3) Will there be any significant difference between the performance of male and female Mathematics students taught using instructional materials.

### **RESEARCH METHODS**

The study was a quasi-experimental research design that employed pretest, posttest, non-randomized control group design. The population of the study consisted of all Junior Secondary School Mathematics students in the state. A sample of 90 JSS III students was selected using multistage sampling technique. The first stage involved the random selection of two local governments from each of the three senatorial districts. This made a total of 6 local governments. Second stage, three (2 public and 1 private) schools were selected from each of the two local governments (that is, each senatorial district) through simple random sampling technique. This made a total of nine schools. The final stage involved the selection of ten students from each of the sampled schools using the stratified random sampling technique (to cater for sex variables). This gave a total of 30 students from each senatorial district and a grand total of 90 students from the nine schools. 60 students were in the experimental group while 30 students were in the control group.

### **Research Instrument**

A self-designed instrument tagged Mathematics Students Achievement Test (MSAT) was used for the purpose of data collection. The instruments consisted of twenty multiple choice objective items based on the topic considered as central topics in Mathematics ( Plane Shapes: Properties, Perimeter and Area). Using test retest method, the reliability of the instrument was 0.73. The instrument was used for both pretest and posttest.

### **RESULTS AND DISCUSSION**

The following tables show the analysis of data: Question 1: Will the use of instructional materials enhance the performance of students in JSS Mathematics? The result in Table 1 above shows that students exposed to use of instructional materials and those not exposed had pretest mean scores of 6.63 and 7.43, respectively. After exposure to treatment, the group taught with instructional materials had higher achievement mean score of 11.35 than their counterpart in the control group with x = 8.40. This implies that instructional materials enhanced student's achievement in Mathematics. From Figure 1 there is a remarkable difference in the bars indicating the performances of students taught with instructional materials (unlike the bars representing the performance of students taught without the use of instructional materials). This shows that the use of instructional materials in the teaching of Mathematics enhanced their performance greatly. Question 2. Will there be any significant difference between the performance of students taught with instructional materials and those taught without instructional materials?

Table 2 shows that F-cal (50.853) is greater than F-tab (3.92) at 0.05 level of significance, that is, 50.853 > 3.92.



Figure 1. Impact of instructional materials on student's achievement in JSS mathematics.

 Table 2. ANCOVA summary showing the effect of instructional materials on student's achievement in mathematics.

Source	Sum of squares	df	Mean of squares	F-cal	F-tab
Corrected model	211.836	2	105.918	26.705	3.07
Covariate (pretest)	37.786	1	37.786	9.527	3.92
Group	201.694	1	201.694	50.853	3.92
Error	345.064	87	3.966		
Corrected total	556.900	89			
Total	10229.000	90			

P< 0.05.

Table 3. ANCOVA summary showing the students taught with instructional materials by gender.

Source	Sum of squares	df	Mean of squares	F-cal	F-tab
Corrected model	53.329	2	26.665	4.962	3.15
Covariate (pretest)	42.913	1	42.913	7.985	4.00
Gender	3.562	1	3.562	0.663	4.00
Error	306.321	57	5.374		
Corrected total	359.650	59			
Total	8089.000	60			

p>0.05.

The null hypothesis is rejected. This implies that there is a significant difference between the performance of students taught with instructional materials and those taught without instructional materials in Mathematics. Question 3. Will there be any significant difference between the performance of male and female students taught Mathematics using instructional materials? The result in Table 3 shows that there is no significant difference in the performance of male and female Mathematics students taught with instructional materials in secondary schools (F= 0.663, p= 0.05). The null hypothesis is accepted.

The strategic and vital role of instructional materials and resources in the successful teaching and learning of Mathematics in secondary schools cannot be overemphasized. The findings revealed that there was a significant effect of treatment on students' achievement in Mathematics. The researcher found out that the students who were taught Mathematics with the aid of instructional materials achieved statistically significantly higher scores in the MSAT compared to those in the control group. This finding is in line with Ayoola (2015), Adelusi (2006), Adebule (2009), Adeosun (2001), Fakomogbon (2012) and Isola et al. (2011) that observed that the use of improvised instructional materials make students to achieve better in their studies. The findings also revealed that the experimental group performed better than the control group. That is, significant difference exists in the performance of students taught with instructional materials and those taught without instructional materials. This is in line with Meremikwu et al. (2012), Adetunberu (2005), Umameh (2011) and Adebule (2009). It was also found that there was no significant effect of gender on students' achievement in Mathematics. This implies that both male and female students achieved equally under the same condition during teaching and learning process, since achievement has to do with mental and intellectual ability and not gender. This is in support of the findings of Ayoola (2015), Isola et al. (2011), Afolabi and Adeleke (2010) and Isaya and Thankgah (2007).

#### **CONCLUSION AND RECOMMENDATIONS**

From the findings of the study, it could be concluded that pupils taught using instructional materials performed significantly better compared to the control group. In general, students will perform better in Mathematics provided they are allowed to interact or participate effectively in the teaching learning process through the use of instructional materials. Based on the findings it was recommended that principals, proprietors and officials of the Ministry of Education, Science and Technology should ensure regular supervision to enhance effective use of instructional materials and resources in the teaching of Mathematics in Schools. Also, emphasis should be placed on the use of instructional materials in preparing teachers and provision of in service training to update skills.

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