



EFFECT OF ADVANCE ORGANIZER ON STUDENTS' MATHEMATICAL ACHIEVEMENT IN PUBLIC SECONDARY SCHOOLS IN OKRIKA LOCAL GOVERNMENT OF RIVERS STATE

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ABSTRACT

This study assessed the effects of advance organizer on students' mathematical achievement in public secondary schools in Okrika Local Government Area of Rivers state. Quasi experimental post-test only control group design was adopted for this study. The population for the study comprised junior secondary school (basic II) students in Okrika Local Government Area Rivers State. Using purposive sampling technique, a total of 74 students were used for the study. The instrument for data collection was a 'Teacher-Made Achievement Test (TM AT). Three objectives, three research question, and two hypotheses guided the study. Mean and standard deviation were conducted to answer research questions, while t-test was used to test hypotheses. Findings of the study showed that advance organizer enhanced students' understanding of mathematical concepts; and had positive effect on academic achievement of learners. The study also showed that there was no significant difference between the academic achievement of male and female students taught mathematics using advance organizer teaching strategy. Based on the above findings it was recommended that teachers should be exposed to innovative teaching strategies that have the capability to improve students' academic performance. This could be achieved when seminars and workshops are organized to enlighten teachers on the affordances of techno-pedagogical tools such as advancer organizer in teaching and how to utilize these tools in the classroom in both junior and secondary school levels to teach mathematics.

KEYWORDS: *Advance organizer, Achievement, Conventional lecture method, Technology*

INTRODUCTION

The role of technology in teaching and learning mathematics is becoming one of the most important and widely discussed issues in this 21st century. Technology has become an essential tool for comprehending basic mathematics concepts in today's world (Charles & Gladys, 2016). Technology can facilitate mathematical problem solving, communication, reasoning, and proof;

moreover, technology can provide students with opportunities to explore different representations of mathematical ideas and support them in making connections both in and outside of mathematics. To achieve the desired objectives, government in developing countries of which Nigeria is one, has made substantial investments on both manpower, learning materials and infrastructure on mathematics education



at both junior, secondary and tertiary levels on their educational system. Despite all this substantial investment on mathematics education, there is an increasing in the poor performance of students in mathematics examination. According to Sufiyanu, Sagir and Zainab, (2018). The cause of poor performance of students in mathematics subjects at senior secondary school certificate examination SSCE in Nigeria has remained an issue of concern to all stakeholders. It is generally believed that the cause of this poor performance of students in mathematics is attributed to the fact that mathematics is abstract and difficult.

The sorry state of performance in mathematics has been attributed to methods of teaching among other factors. Various methods of teaching have been adopted by different teachers due to individual differences. A particular teacher could also use different methods of teaching to various arms of the same class depending on the number of students in each class and the environment in which the lesson is being conducted. Some methods of teaching used by most teachers include: lecture method, discussion method, Socratic method, talk/chalk recitation method, field trip method to mention a few. Teachers know that no one method is superior to the other. However, advance organizer has been proposed as a model in which students learning occurs at the three level of bloom's taxonomy (cognitive, affective and psychomotor). Blooms taxonomy is a hierarchical ordering of cognitive skills that can, among countless other uses, help teachers teach and students to learn (Terry, 2018). Various scholars around the world have investigated the effect of advance organizer on teaching and learning. According to Kevin, Fred and Zephania (2018) advance organizers are strategies that enables learners to connect new information to already known material and also construct their own ideas. It is also seen as organizational framework that teachers present to students prior to teaching new topic to prepare them for what they are about to learn. Advance organizer refers to a relatively short arrangement of material introduced to the learner before the beginning of a lesson.

STATEMENT OF THE PROBLEM

Mass failure in mathematics at the senior school certificate examination (SSCE) level has been a matter of serious concern to every stakeholder in the education system. Various reasons have been adduced for this. Among these reasons, focus is on the teaching methods adopted by the teachers. Teachers know that no one method is superior to the other. However, advance organizer has been proposed as a model in which students learning occurs at the three level of bloom's taxonomy (cognitive, affective and psychomotor), thus

enhancing better achievement by students. This model (advance organizer) has not been widely tested in teaching of mathematics in some parts Nigeria. Hence this study tends to find out if adopting advance organizer as a strategy can improve students' achievement in mathematics.

AIM AND OBJECTIVES OF THE STUDY

The aim of this study is to investigate the effect of advance organizer on junior secondary school student s' academic achievement in Mathematics in Okrika Local Government Area of Rivers State.

Distinctively the study sought to:

1. ascertain the effect of advance organizer on junior secondary school students' achievement in Mathematics
2. determine the effect of gender on the academic achievement of junior secondary school students' taught Mathematics with advance organizer
3. ascertain the joint effects of gender and advance organizer on junior secondary students' academic achievement in mathematics.

RESEARCH QUESTIONS

The following research questions guided the study:

1. What is the effect of advance organizer on junior secondary school student's academic achievement in Mathematics?
2. What is the effect of gender on the academic achievement of students' taught with advance organizer?
3. What are the joint effects of gender and advance organizer on the academic achievement of students in mathematics?

HYPOTHESES

The following null hypotheses guided the study:

1. There is no significance difference between the mean achievement scores of students taught Mathematics with advance organizer.
2. There is no significance difference between mean achievement scores of male and female students taught Mathematics with advance organizer

METHODOLOGY

The study adopted a quasi-experimental pretest post-test control group design. The design was used to access the effectiveness of advance organizer teaching strategy. The design involves assigning the subjects into groups that is, the treatment or experimental group and the control group, using purposive sampling techniques.



The population for the study consisted of junior secondary school two (Basic II) students in Okrika L.G.A. A sample size of 74 students was used for the study using intact classes. Purposive sampling technique was used to select the schools used, this was based on schools with several arms, administrative consent as well as individual consent. The experimental group consisted of 39 students while 35 students were in the control group. Instrument for data collection was a teacher-made achievement test (TMAT) constructed to assess the effectiveness of the advance organizer teaching strategy.

Face and content validity of the instrument was determined by two experts in Measurement and Evaluation as well as an expert in Curriculum Studies and Education Technology. Test re-test method was employed to determine the reliability coefficient of 0.79 which was calculated using Kuder-Richardson 21 (K-R 21). The data collection procedure was done in phases. First, the researcher visited the selected school to seek for administrative consent. After which the pretest and

readiness assurance were administered. Treatment was administered on both experimental and control groups concurrently and lasted for three weeks. Advanced organizer was given to each of the students in experimental group and served as the guide through a class discussion to ascertain their understanding of the subject matter. Each of the groups were taught a lesson on statistics and at the end of three weeks, the pretest was rearranged and administered to both groups as a posttest. Data was analyzed using the Statistical Package for Social Science (SPSS) version 21.0. Research questions were answered using mean and standard deviation. While hypotheses were analyzed using t-test.

RESULTS

Research question one: What is the effect of advance organizer on junior secondary school student's academic achievement in Mathematics?

Table 1: Mean and Standard Deviation (SD) of difference in the mathematical achievement of students.

GROUP	N	MEAN	SD
EXPERIMENTAL	39	67.4359	14.54900
CONTROL	35	56.4286	10.95253

Table 1: shows that there is a mean difference in the mathematical achievement of students taught using advance organizer (M=67.4359, SD=14.54900) and those taught without advance organizer (M=56.4286, SD=10.95253) in favor of those taught with advance organizer. This is an indication that the advance

organizer has positive effects on the student's mathematical achievement.

Research question two: What is the effect of gender on the academic achievement of students taught with advance organizer?

Table 2: Mean and Standard Deviation (SD) of difference in the mathematical achievement of male and female students taught using advance organizer.

SEX	N	MEAN	SD
MALE	19	65.2632	15.85294
FEMALE	20	69.5000	13.26848

Table 2: shows that there is a mean difference in the mathematical achievement of male (M=65.2632, SD=15.85294) and female (M=69.5000, SD=13.26848) student taught using advance organizer in favor of the female students.

Research question three: What are the joint effects of gender and advance organizer on the academic achievement of students in mathematics?



Table 3: Mean and Standard Deviation (SD) on the joint effects of gender and advance organizer on the mathematical achievement of students.

GROUP	SEX	MEAN	SD. DEVIATION	N
EXPERIMENTAL	MALE	65.2632	15.85294	19
	FEMALE	69.5000	13.26848	20
	TOTAL	67.4359	14.54900	39
CONTROL	MALE	56.9444	11.26406	18
	FEMALE	55.8824	10.93093	17
	TOTAL	56.4286	10.95253	35

Table 3: shows that female students (M=69.5000, SD=15.85294) and taught with advance organizer performed better, followed by male students (M=65.2632, SD=13.26848) taught with advance organizer next to male (M=56.9444, SD=11.26406) students not taught with advance organizer followed by

female students (M=55.8824, SD=10.93093) not taught using advance organizer.

Hypothesis One: There is no significance difference between the mean achievement scores of students taught Mathematics with advance organizer.

Table 4: Summary of t-test analysis on the difference in the mathematical achievement of students taught with advance organizer and those taught without advance organizer.

GROUP	N	X	SD	t	df	p-value
EXPERIMENTAL	39	67.43	14.55	3.64	72	0.001
CONTROL	35	56.43	10.95			

Table 4: shows that there is a significance difference between the mathematical achievement of students taught using advance organizer and those taught without advance organizer (t 72, 0.001, p<0.05). Therefore, the null hypothesis one was rejected.

Hypothesis Two: There is no significance difference between mean achievement scores of male and female students taught Mathematics with advance organizer

Table 5: Summary of t-test analysis on the difference in the mathematical achievement of male and female students taught using advance organizer.

GROUP	N	X	SD	t	df	p-value
EXPERIMENTAL	19	65.26	15.85	-0.907	37	.370
CONTROL	20	69.50	13.27			

Table 5: shows that there is no significance difference between the mathematical achievement of male and female students taught using advance organizer (t37, .370, p>.05). Therefore, the null hypothesis two was retained.

using advance organizer compared to those taught using conventional teaching methods.

Also results revealed that there is a mean difference in the mathematical achievement of male (M=65.2632, SD=15.85294) and female (M=69.5000, SD=13.26848) student taught using advance organizer in favor of the female students. This finding is in disagreement with the study of Auwal (2017), that there is no significant difference between the mean academic performance scores of male and female students taught conservation concepts with advanced organizer.

Furthermore, the result showed that female students (M=69.5000, SD=15.85294) and taught with advance organizer performed better, followed by male students (M=65.2632, SD=13.26848) taught with advance organizer next to male (M=56.9444, SD=11.26406) students not taught with advance

DISCUSSION OF FINDINGS

Result showed that there is a mean difference in the mathematical achievement of students taught using advance organizer (M=67.4359, SD=14.54900) and those taught without advance organizer (M=56.4286, SD=10.95253) in favor of those taught with advance organizer. This is an indication that the advance organizer has positive impact on the student's mathematical achievement. This finding is in agreement with the study of Kevin, Fred and Zephania (2018), that there was statistically significant difference in achievement between learners in favour of those taught



organizer followed by female students ($M=55.8824$, $SD=10.93093$) not taught using advance organizer.

CONCLUSION

From the findings of this study, it is concluded that advance organizer is more effective in evaluating student's achievement in mathematics. Also students taught with advance organizer performed better than those not taught with advance organizer. Finally, there is no significant difference between the mathematical achievement of male and female students taught using advance organizer.

Recommendation

Based on the findings and conclusion of this study, the following recommendations are made:

1. School administration should organize seminar and workshops to organize and educate teachers on the importance of advance organizer in teaching.
2. It is also endorsed that advance organizer teaching strategy be adopted in all classes of both junior and secondary school levels in the teaching of mathematics.
3. Teacher should adopt advance organizer in the teaching of other science subjects.

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