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**EFFECTS CONSTRUCTIVIST BASED INSTRUCTIONAL STRATEGY
ON STUDENTS' LEARNING OUTCOME IN MATHEMATICS**

Philomina I. ONWUKA
Mathematics Department, College Of Education

ABSTRACT: This paper examines the impact of constructivist –Based instructional strategy on students’ achievement in Mathematics. The study employed a quas:- experimental design carried out in Delta State, Nigeria. The researcher generated one research question and one hypothesis which were answered/tested with mean, standard deviation and t-test respectively. A sample of 215 was composed with 104 assigned to experimental and 111 control group. The instrument for the study was Mathematics Achievement Test (MAT). The reliability coefficient of 0.81 was established using Crombach’s Alpha method. The result of the experiment indicates that those in experimental group performed significantly better. It was recommended that Mathematics teachers should be retrained in modern instructional strategies such as constructivist Based Instructional Approach.

Keywords: Mathematics, constructivist, instructional strategy.

INTRODUCTION

Mathematics is one of the subjects that is offered in school systems in Nigeria. It is a cone subject at the primary and secondary educational levels. It is a basic tool for all scientific and technical know- how, and it plays an important role in the economic development of any nation (Ogbonna, 2007). In fact, according to Moseri, Onwuka, Iwaka (2010), mathematics is very important in everyday living and it is maximally utilized in science and non- science subjects.

Inspite of the important role mathematics plays in the development of any nation, its performance in the primary and secondary schools in Nigeria is poor. The table below, shows the students’ result in the senior secondary school organized by the West African Examination Council (WAEC), from 2000 to 2009

Table 1; Result Of Senior Secondary School Mathematics By WAEC, From 2000 To 2009

Years	% with credit and above	% with pass and below
2000	32.81	67.19
2001	36.55	63.45
2002	34.50	65.50
2003	36.91	63.09
2004	34.52	65.42
2005	35.55	64.45
2006	39.92	60.08
2007	15.56	84.44
2008	23.00	77.00
2009	31.00	69.00

From the table, it is obvious that the performance of Mathematics at the secondary school level is poor. The story is not different from other educational levels. Educationists and researchers have adduced different reasons for this ugly phenomenon(poor performance). Galadinma(1998) and Ojo(1998) in their findings linked the poor performance to poor quality of instructional techniques employed by teachers as the major cause of while Bello(2006) and Adamu(2007) identified the root causes to be: i. overcrowded nature of the classes, ii. Teacher’s poor method of teaching.

From the foregoing, there is need therefore to explore means of teaching that can bring a better understanding which can improve performance. Steen(2003)advocates that teachers can stimulate students to learn Mathematics

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*Corresponding author: Philomina .I. ONWUKA - e-mail: philonwuka@yahoo.com

through the process of constructing patterns in addition to devising strategies for solving problems and discovering the application and beauty of Mathematics. The above method is in consonance with constructivist teaching view.

Constructivist perspective holds the view that it is about knowing and learning that emphasizes the active role of learners in constructing their own knowledge (Von Glaserfeld, 1989). It suggests that learners construct knowledge out of experience; knowledge is constructed in trying to integrate existing knowledge and new experiences (Moseri, et al).

Brooks and Brooks (1993) enumerated five important principles of constructivist pedagogy which include:

1. Proposing problems of emerging relevance.
2. Constructing learning around primary concepts
3. Seeking and valuing students points of view.
4. Assessing student's learning.
5. Adapting curriculum to address students suppositions.

When these principles are applied in the Mathematics teaching, it could ameliorate the problem of poor achievements in the secondary schools. Against this background there is need to dry the instructional strategy (constructivist)

STATEMENT OF PROBLEM

Mathematics as an important and compulsory subject at the primary and secondary school levels in Nigeria, is maximally utilized in science, technical and almost all sphere of life. In spite of its utility, the achievement is very poor at these educational levels. Educationists and researchers have been worried and concerned on how this poor mathematics performance can be remedied.

Constructivist Based-Instructional strategy is a relatively new approach to teaching and has been effective in some countries. It can equally be effective in Nigeria, particularly in Delta State. Hence, what is the impact of constructivist based- instructional approach on student's achievement in mathematics?

PURPOSE OF STUDY

The purpose of this study is to determine if there is difference in the performance of students taught mathematics using constructivist strategy and those taught using conventional learning strategy.

RESEARCH QUESTION

What is the difference in the mean achievement score of students taught mathematics using constructivist-based learning strategy and those taught and those taught using conventional method?

HYPOTHESIS

The hypothesis below was formulated to guide the study and tested at point 05 level of significance.

Ho: There is no significant difference in the mean achievement scores of students taught mathematics using constructivist- based instructional approach and those taught using conventional learning strategy.

METHODOLOGY

The study employed a quasi- experimental design of non-equivalent post-test, control group design. Intact classes were used, to avoid disrupting the normal school programmes for experimental purpose. The study was restricted to senior secondary school one (SSS 1) students and the topic taught was geometry. The area of study was Ika South local government Area of Delta State of Nigeria. Three schools out of the 18 senior secondary schools in Ika South local Government Area were randomly composed for the study and this gave rise to a sample of 215 students.

The experiment was for a duration of four weeks and the students in the three schools were taught the same topics. In each school, there were two classes; one for experimental and the other, control. The experimental groups were students taught mathematics with constructivist based- instructional strategy, while the control group were those taught with conventional instructional strategy. 104 students were in the experimental groups while 111 were in control groups.

The instrument for the research was Mathematics Achievement Test (MAT) which was administered at the end of the treatment. MAT contains ten essay items. The research question was answered with mean while the hypothesis was tested with statistical tool, t-test, at 0.05 level of significance.

RESULTS

Research Questions:

What is the difference in the mean scores of the students taught mathematics using constructivist-based learning strategy and those taught using conventional method?

The answer to this question is presented in table 2

Table 2: Mean And Standard Deviation (SD) Of Constructivist And Conventional Methods.

Group	Mean	SD	N	Mean difference
Constructivist	31.30	8.19	104	7.88
Conventional	23.42	5.80	111	

From the table 2, the mean score of students taught mathematics with constructivist approach is 31.30 and those taught with conventional method is 23.42. their standard deviations are 8.19 and 5.80 for constructivist approach and conventional method respectively. The difference in their means is 7.88 which appears high.

Hypothesis

There is no significant difference in the mean achievement scores of students taught mathematics using constructivist- based instructional strategy and those taught using conventional method.

The test of the hypothesis is presented in table 3

Table 3:t-Test Showing Students' Achievement In Mathematics Using Conventional Method.

Group	Mean	SD	N	Df	Calculated	Sig.
Constructivist	31.30	8.19	104	213	14.85	0.00
Conventional	23.42	5.80	111			

From the table, the level of significant (0.00) is less than the set .05 hence, there is a significant difference in the students' performance. The implication is to reject the null hypothesis of no- significant difference.

DISCUSSION

The mean score of students taught with constructivist- based learning strategy is 31.30 while the students taught using conventional method had a mean score of 23.42. When this was tested statistically using t-test, the difference in their means was significant. This led to the rejection of the null hypothesis and upholding of the alternative hypothesis. This implies when students are taught with constructivist instructional approach, it can produce a better result compared to the conventional method.

These findings, agree with the findings of previous researches such as (Alio, 1997 and Ogbonna, 2007). In their studies, the experimental group performed better than the non-experimental group. This affirms that appropriate instructional materials yields a better performance.

CONCLUSION/RECOMMENDATION

The study looked into the impact of constructivist learning strategy on secondary school students' performance in Nigeria. The result of the study indicates a significant difference in the two teaching approaches employed in favour of constructivist learning strategy. It can be deduced therefore that constructivist learning strategy is effective in the teaching of mathematics.

Based on the above, the following recommendations are made;

- (i) Constructivist- Based learning strategy should be incorporated in the mathematics curriculum for the pre-service teachers' programme.
- (ii) Workshops should be organized for the in-service mathematics teachers to enable them learn constructivist approach.

- (iii) Authors and publishers of mathematics textbooks should incorporate the approach into their books with worked examples.
- (iv) Ministries of Education (Federal, State, Local Government) Education boards, professional bodies such as Mathematical Association of Nigeria (MAN), Science Teachers Association of Nigeria (STAN) should all endeavor to promote this new approach.

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