

CONTEXTUAL LEARNING APPROACH AND STUDENTS' LEVEL OF RETENTION OF MATHEMATICS CONCEPTS IN RIVERS STATE

by

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Abstract

The study investigated contextual learning approach and students' level of retention of mathematics concepts in Obio-Akpor Local Government Area, Rivers State. The study adopted a Quasi experimental, pre-test, post-test, non-equivalent control group design. The population was all the JSS2 students in public Junior Secondary Schools with a total of seven thousand, nine hundred and sixty-eight (7,968) students. A sample of one hundred and twenty-six (126) mathematics students was selected from two (2) schools through the use of simple random sampling techniques. Two research questions and two null hypotheses guided the study. The instrument was the mathematics performance test with a reliability coefficient index of 0.71 obtained using Kuder-Richardson formula 21. Data were analyzed using mean and standard deviation to answer the research questions and analysis of covariance (ANCOVA) to test null hypotheses at 0.05 level of significance. It was found that the level of retention of mathematics concepts was high among students taught using contextual learning approach than those taught using conventional method. Also retention level in mathematics concepts was higher for the male than the female in both contextual approach and conventional method. Based on the findings, it was recommended that teachers should resort to the implementation of contextual learning approach in their subject area to improve retention.

Keywords: Contextual Learning, Retention, Mathematics, Knowledge.

Introduction

The application of contextual learning was first proposed (at the turn of the 20th century) by John Dewey who advocated a curriculum and teaching methodologies tied to the child's experiences and interests. Contextual learning was designed to help all the children learn demanding academic materials. The contextual learning approach helps teachers to relate the material of lesson to the real situation Johnson (2002). Learning occurs

when students (learners) process new information or knowledge in such a way that it makes sense to them in their own frames of reference (their own inner worlds of memory, experience, and response). Contextual learning is a conception of learning in which teachers relate subject matter to real world situation. It bridges gaps between learners and subject matter Perkins (2007).

Contextual learning motivates learners and can lead to a meaningful learning by students retaining what they have learnt when they take an active part in the discussion by asking questions for clarifications, explaining and justifying their reasons. Perkins (2007), emphasized that many students in schools are unable to make connections between what they are learning and how that knowledge will be used outside the classroom. According to Perkins, he noted that this connection is not covered by the lecture mode of Mathematics instruction. Johnson (2002), defined contextual learning as an educational process that helps students see meaning in the academic subject with the context of their daily lives, that is, with the context of their personal, social, and cultural circumstances which will help in their retention.

Retention is the condition of keeping something. Retention of knowledge is important for future application of concepts. Educators seek to develop student's mathematical knowledge retention to improve student's efficacy in class work, test scores, achievement of standards and preparation of careers. Interactive visuals, feedback during problem solving and incorporation of higher order thinking skills are known to increase retention (Clayton, Andrey and Robert (2017).

Due to the fact that Knowledge deteriorates after long period of non-use. It is important to determine the best way to instruct students so that they retain information and skills. The contextual learning approach is a learning philosophy that emphasis students interest and experiences. In contextual learning practice, it typically involves using one or more of the following teaching approaches which include collaborative learning approach, project based learning, used of instructional media etc. Contextual learning approach offers more than a tool for

defragmenting the educational system, it provides a more effective approach to teaching the majority of students because it is specifically geared to the way these students learn Johnson (2002). The role of contexts in Mathematics teaching and learning has gained much attention. Another important element of contextual learning is parent involvement and the best way to learn how to apply new skills in 'the real world' is to practice. Contextual learning approach could serve as a tool to determine future academic performance in Mathematics and when the students relate what is taught in school to real situation, it will improve their interest and attitude in learning Mathematics, they become confident in their ability to solve Mathematics thereby making them to be self-reliant, reason logically and develop skills that will enable them to function effectively in the society Ekwueme (2003).

Mathematics is the study of measurement, relationships and properties of quantities and sets Ekwueme (2013). Mathematics is used in finding answers to questions and problems which arise in everyday life, in trades and professions (Iji, 2003). Mathematics is the basic discipline for any person who would be well informed and truly educated in science, technology and other fields of human endeavor. Mathematics education cannot be separated from the society in the sense that it helps to develop the nation's human resources by assisting individuals to be competent and skilled. The importance accorded Mathematics in the school curriculum from the primary to the secondary levels, reflects accurately the vital role played by the subject in contemporary society.

In spite of the numerous importance placed on mathematics, students regard it as a difficult subject and performed poorly in examinations. Odili (2006), emphasized that the poor performance was due to the

continuing use of the traditional method of teaching. The traditional method of teaching also referred to as the lecture method does not encourage the active participation of the students. Studies have found that students retain mathematics concepts when they are active rather than passive. The best way to teach concepts in Mathematics so that all students should retain the information is to avail the students the opportunity on how those concepts could be used outside the classroom.

Statement of the problem

Over the years, there has been noticeable low performance in Mathematics among Secondary School students. Many reasons have been presented to account for this poor performance. It has been observed that some teachers hardly apply contextual learning approach in teaching of Mathematics, this is probably because they do not know the best method to apply in teaching Mathematics to the students and those who teach still use the traditional method. Again, teachers that have knowledge of this contextual learning approach, may not effectively use those learning principles the way they ought to.

There is need to find out a better method of teaching mathematics in order to increase the students level of retention of mathematics concepts.

Therefore, the problem of this study tends to find out contextual learning approach and students level of retention of mathematics concepts in Rivers State

Aim and objectives of the study

The aim of this study is to investigate contextual learning approach and students level of retention of mathematics concept in Rivers State

Specifically, the study tends to:

1. Find out the difference between the level of retention of Mathematics concepts between students taught

using contextual learning approach and conventional method.

2. Investigate the level of retention of Mathematics concepts taught using contextual learning approach and conventional method based on gender.

Research Questions

The following research questions guided the study:

1. What is the difference between the level of retention of Mathematics concepts between students taught using contextual learning approach and conventional method?
2. What is the difference between the level of retention of Mathematics concepts between students taught using contextual learning approach and conventional method based on gender?

Hypotheses

The following null hypotheses tested at 0.05 level of significance guided this study.

H₀₁: There is no significant difference between the level of students' retention of Mathematics concepts when taught using contextual learning approach and conventional method.

H₀₂: There is no significant difference between the level of students' retention of Mathematics concepts when taught using contextual learning approach and conventional method based on gender.

Methodology

The research design for this study was a quasi-experiment pretest, post-test, non-equivalent control group design. Quasi experimental research is an investigation

which uses the design suitable for adoption of approximate conditions of true experiment in situations, where control and manipulations of relevant variables are not permitted. (Nwanekezi and Arokoyu, 2016). The population was seven thousand, six hundred and sixty-eight (7968) JSS 2 students. A sample of one hundred and twenty-six (126) mathematics students was drawn from two (2) schools from the fourteen (14) public secondary schools in Obio-Akpor local government area, Rivers state. Out of the 126 students, 59 students were used for experimental group as contextual learners and 67 students were used for control group as conventional learners. This was achieved through the use of simple random sampling techniques.

The instrument used for the study was a researcher developed instrument titled Mathematics Performance Test made up of 20 items derived from the topic under Arithmetic. The Arithmetic was taught using a lesson package designed for both the

experimental and control groups for three weeks, treatment was administered to the experimental group while the control group was taught using conventional method. The test items were based on the mathematics curriculum content for JSS2 pre-test, post-test and post delayed test were administered to both the experimental and control groups and scores were allotted. To ensure validity, the designed instrument by the researcher was given to experts in the field of Educational Technology and Measurement and Evaluation. The Kuder-Richarson formula 21 was used to determine the reliability and the reliability coefficient (r) was obtained as 0.71. Mean, standard deviation and analysis of covariance (ANCOVA) were used to answer research questions and hypotheses respectively.

Results and Discussion

Research Question One: What is the difference between the level of retention of Mathematics concepts between students taught using contextual learning approach and conventional method?

Table 1: Mean Retention scores and standard deviation of the level of retention of mathematics concept based on teaching strategies.

Teaching Strategies	Post-test			Post-delayed test		
	n	\bar{x}	Sd	\bar{x}	Sd	Mean Gain
Contextual Approach	59	61.37	6.66	64.31	7.01	2.94
Conventional method	67	44.53	9.32	45.01	8.22	0.48

The level of retention on the students based on the teaching strategies was calculated using mean and standard deviation

Table 1: shows the analyzed results for the level of student’s retention of Mathematics concepts based on the teaching strategies

employed for the study. It was revealed that the retention level of students taught with the contextual learning approach of 64.31 was higher than those taught with the conventional method with a mean score of 45.01. The findings of the study therefore indicated that students taught with the

contextual learning approach retained Mathematics concepts than those taught with the conventional method.

Research Question Two: What is the difference between the level of retention of Mathematics concepts between students taught using contextual learning approach and conventional method based on gender?

Table 2: Mean Performance Scores and Standard Deviation of the Level of Retention of Mathematics Based on Teaching Strategies and Gender

Teaching Strategies	Gender	Post-test			Post-delayed test		
		n	\bar{x}	Sd	\bar{x}	Sd	Mean Gain
Contextual Approach	Male	28	41.28	10.18	50.31	7.51	9.03
	Female	31	57.16	9.35	63.42	6.40	6.26
Conventional method	Male	30	36.21	7.58	37.11	9.05	0.90
	Female	37	36.57	9.24	37.17	7.54	0.60

In other to calculate the level of retention of the students, mean and standard deviation were used to determine the difference.

Table 2 is the analyzed result showing the students' level of retention on the teaching strategies used based on gender. Upon the application of a post-delayed test on the students using contextual approach, it was revealed that male students had a mean gain retention level of 9.03 while their female counterpart had a mean gain of 6.26. Similarly, male and female students had a

mean gain of 0.90 and 0.60 respectively using conventional method. The findings of the study therefore indicated that retention level in Mathematics concepts was higher for the male than the female using contextual approach and conventional method.

Hypotheses

Ho₁: There is no significant difference between the level of students' retention of Mathematics concepts used in the study when taught with contextual learning approach and conventional method.

Table 3: Summary of Two-Way Analysis of Covariance on Student's Difference between Retention Mean Scores considering Teaching Strategies.

Source	Df	Mean Square	F	P value
Corrected Model	2	5565.413	212.711	.000
Intercept	1	1662.529	63.542	.000
Posttest	1	3084.804	117.902	.000
Teaching strategies	1	508.190	10.423	.000
Error	123	26.164		
Total	126			
Corrected Total	125			

In order to ascertain the retention level of the students, two-way analysis of covariance was used. The analysis of Table 3 showed that the calculated F-value for the Teaching strategies was obtained at 10.423 at a degree of freedom 1 and 123 and a probability level of 0.000 which is less than 0.05 level of probability ($F = 10.423$, $df = 1,123$, $P < 0.05$). The hypothesis is therefore rejected indicating that there is a significant difference between

the level of students' retention of Mathematics concepts used in the study when taught with contextual learning approach and conventional method.

Ho₂: There is no significant difference between the level of students' retention of Mathematics concepts used in the study when taught with contextual learning approach and conventional method based on gender.

Table 4: Summary of ANCOVA on the retention mean scores considering gender in both the contextual learning approach and conventional method

Source	Df	Mean Square	F	Sig.
Corrected Model	2	2793.838	106.447	.000
Intercept	1	1672.117	63.709	.000
Posttest	1	3048.269	116.141	.000
Teaching strategies	1	494.080	18.825	.000
Gender	1	34.187	1.303	.257
Teaching strategies * Gender	1	14.291	.544	.462
Error	123	26.246		
Total	126			
Corrected Total	125			

The F-ratio ANCOVA was used to determine the retention effect of students taught mathematics concept based on their gender.

The result in Table 4 indicated that the calculated F-value for the retention level of male and female students in both the Contextual Learning Approach and the Conventional Method is 0.544 at a degree of freedom of 1 and 123. The calculated F-value is not significant at 0.462 probability level which is greater than 0.05 level of probability ($F = 0.544$, $df = 1/123$, $P > 0.05$). The study therefore retained the hypothesis stating that there is no significant difference between the level of students' retention of Mathematics concepts used in the study when taught with contextual learning approach and conventional method based on gender.

Discussion of Findings

The Retention Scores of Students Taught Mathematics using Contextualized Learning Approach and Conventional Method.

The study indicated that contextualized learning experiences promote greater retention of Mathematics concepts than conventional method. When a person is exposed to contextualized learning experiences, he/she can engage in self-regulated learning, as well as develop critical thinking skills which in turn aid his/her memory. In addition, when students see the practical application of mathematics concept, they are more likely to use it for their everyday living which will in turn facilitate their achievement. This result agrees with that obtained by Nsor (2008), when he found out that contextual learning packages resulted

most in retention among secondary school students in Cross Rivers State in their Physics academic performance in his work on development and validation of contextual learning packages for physics instruction in Secondary Schools in Cross Rivers State.

The Retention Scores of Students Taught Mathematic Using Contextual Learning Approach and Conventional Method Based on Gender.

In regard to question four and the corresponding null hypothesis, the result indicated that in the application of the contextual learning approach, male students contributed more to the overall retention levels than their female counterparts while in the conventional teaching method, male students contributed to high retention level than their female counterparts. It revealed that retention level in mathematics concept was higher for the male than the female when taught with contextual learning approach and conventional method. This disagrees with that of Williams (2006), findings which revealed that no difference existed between the retention scores of students taught Mathematics using the strategies based on gender in his work on the efficacy of a contextual learning instructional package in learners academic achievement in Biology in Omuku in Rivers State.

Conclusion

Based on the findings, it was concluded that contextual learning approach has positive impact on student's levels of retention of mathematics concepts in Junior Secondary schools in Rivers State. Also the retention level in mathematics concepts was higher for the male than the female when taught with contextual learning approach and conventional method. There is significant difference between the level of students' retention of Mathematics concepts used in the study when taught with contextual

learning approach and conventional method. There is no significant difference between the level of students' retention of mathematics concepts used in the study when taught with contextual learning approach and conventional method based on genders.

Recommendations

Based on the findings of the study, the following recommendations were made;

- 1 Teachers should resort to the implementation of contextual learning approach in their subject area if they seek to sustain or improve retention.
- 2 For teachers already in service, trainings and workshops should be conducted to equip them with the principles and practice of contextual learning experience.
- 3 Parents should discourage rote learning and only fact recall by promoting a home environment where students are free to apply what they have learnt in the school to their everyday life.
- 4 Both male and female students should be encouraged to study mathematics, by so doing, it will in turn improve their academic performance in schools
- 5 The ministry of education as well as other governmental actors should collaborate with educational technology firms to improve the availability and utilization of technological tools for students teaching and learning.

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