

THE EFFECT OF CONTEXTUAL TEACHING-LEARNING APPROACH ON SENIOR SECONDARY SCHOOL STUDENTS' ATTITUDE TO MATHEMATICS IN KADUNA STATE

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Abstract

The study investigated the effect of Contextual Teaching –Learning approach on attitude of Senior Secondary School Students to mathematics in two Educational zones of Kaduna State. The study adopted the pretest and post-test, quasi experimental design. One question and one hypothesis were formulated to guide the study. The population was 1,166 Senior Secondary Schools in Zaria and Giwa educational zones. Simple random sampling technique was used to select one intact class from six schools in the zones. The sample of the study was 49 Senior Secondary School three (SSIII) students. The instrument used was mathematics attitude questionnaire (MAQ) which was adopted from Schackow (2005). The content validity of the instrument was established and the reliability coefficient was 0.94. The data collected was analyzed and the hypothesis tested using t-test. The finding of the study showed that there was positive change in attitude of students towards mathematics. It is recommended that mathematics teachers in Kaduna State should adopt the contextual Teaching-Learning approach in the teaching of mathematics.

Keywords: Contextual teaching-learning approach, attitude, plane geometry.

Introduction

Mathematics along with science are critical subjects which are essential for the technological advancement in any country. The fundamentals of these subjects are played out at the secondary school level of Education. The acquisition of mathematics knowledge is universally useful and utilitarian in the solutions to human problems (Iyekekpolo, 2007). The wealth, strength, social and economic well being of any society or nation are measured in terms of its technological advancement and development (Obodo, 2004). Nigeria is struggling to be self reliant and independent technologically as stipulated in the national policy on Education (FRN, 2004). As a direct consequence of this, the federal government of Nigeria in the national policy of Education (FRN, 2004), paid particular attention to mathematics and made it a compulsory subject from the basic education level to senior secondary. All students must learn and pass it at credit level at junior and senior secondary school levels before they can advance to higher institutions (FRN, 2004). According to Nworgu and Ezeh (2009) there is evidence to show that students' achievement in mathematics in both internal and public examinations is far from being satisfactory. They also opined that there is generally low interest in the study of mathematics and mathematics related disciplines which have come out of a general hatred for

mathematics by students when it ought to be loved. This hatred springs from the general tendency for students to be phobic where mathematics is mentioned. This phenomenon has been described as mathematics phobia (Obodo 2004). Mathematics phobia is the result of negative attitude and low interest in the subject. Despite the relevance, importance and practical nature of mathematics, the subject is the most poorly taught, widely hated and feared, profoundly misunderstood and failed among secondary school students in Nigeria and their performance have not been impressive at all and have deteriorated over the past decade (Azuka, 2006). In spite of different efforts made at different times towards improving the teaching and learning of mathematics, the poor performance in mathematics in SSCE persisted (Odili, 2006). Researches were carried out to find the causes and proffer solutions. They attributed the problems to lack of instructional materials, negative attitude of students to mathematics, and poor teaching methods by teachers. Omenka (2010) observed that when poor teaching methods are used to teach mathematics the subject seems absurd and abstract. Many of the methods currently used in teaching have shown that they are relatively ineffective on students' ability to master and then retain important concepts. This is particularly true of conventional method (Wood and Gentile 2003). This study is concerned with the use of contextual teaching-learning approach to enhance positive attitude towards mathematics. This is based on the assumption that the contextual teaching-learning approach can offer the students more than what "chalk and talk" method can do.

Contextual Teaching-Learning (CTL) approach represents the concept that involves connecting the content students are learning with the context in which the content would be used (Berns and Erickson, 2001). This is an important method of bringing meaning to the learning process. The centre of occupational research and development (CORD) described a strategy that can be used in implementing the contextual teaching learning approach in class room activities which are structured to encourage five essential principles of learning under the acronym REACT. The five essential principles can help students improve their learning (Crawford, 2001). They are as follow: in relating principle students' life experiences or preexisting knowledge with mathematic concepts being taught by the teachers. In experiencing – teachers are to help students construct new knowledge with hands-on experiences that occur inside the classroom. In experiencing students are learning by doing through exploration, discovery, and convention. Applying principle is defined as learning by putting the concepts learned to use. Students implement the concept when they are engaged in hands-on problem solving activities while teachers' motivate the students by assigning realistic and relevant exercises. Cooperating- In this stage the student learns to share, respond and communicate with other learners. By so doing learners feel less self-conscious and they can ask questions without feeling embarrassed. When they work with peers in small group discussions, teachers make sure that all students are individually accountable for completing assignments and not letting them to rely overly on the work of others. In transferring principles the majority of students can now see the connections between what they are learning and how it can be used in their daily lives. Musa and Agwagah (2006) asserted that if students find the study

of mathematics more appealing, then performance can be better because they will perceive the subject matter as interesting, motivating, useful and relevant to their daily living. Ekwue and Umukoro 2011 observed that students learn, retain and understand when what they are taught are linked correctly and meaningfully to their experiences and when real life examples are used. Contextual learning approach therefore focuses on making sense of mathematics concepts in students' own understanding since the mind naturally seeks meaning in relation to the person's current environment context. Therefore teachers are to develop positive attitudes in students through adjective function. Mathematics teachers are expected to teach the subject in such a way that it should be beneficial to students, and be taught in a way that makes students feel that there is something very important to benefit by learning the subject. All these exposures will open their minds to a lot of excitement and experience and arouse their interest, change their attitudes and make them confident in their studies. CTLA in teaching mathematics will create the zeal for change in attitude. This study then wants to focus on the effect of CTLA on Senior Secondary School Students' attitude in mathematics in Kaduna State using REACT strategy to experimentally teach plane geometry and to observe the effect on attitude of students. Demap (1992) had observed that Geometry is a core topic in the Nigerian curriculum of mathematics and yet students and teachers have problems with it. The Chief Examiner's report on students' area of deficiency in school certificate examinations showed that students least understand geometry concepts as reflected in their achievement (WAEC, 2007). Research reports indicate that many reasons account for students' poor achievement in geometry. Among these are poor teaching approach (WAEC, 2007 Olunloye, 2010), lack of confidence in the subject (Basturle and Yavuz, 2010), and poor learning environment (Olunloye, 2010). Attitude as a concept is concerned with an individual way of talking, acting and behaving. It has a very serious implication for the learner, the teacher and the immediate social group with which the individual learner relates with the school system. The way and manner a subject matter is handled affects the attitude of learners either negatively or positively. Hornby (2006) defines attitude as a mental position consisting of a feeling, emotion, or opinion evolved to an external situation. Murkerjee in Kazi (2007) sees attitude as someone's feelings, thoughts, and predispositions to have in some preferred manner toward some objects, issues or some aspects of one's environment. An attitude can be momentary or can develop in a habitual position that has a long term influence on an individual behavior. Therefore positive attitude is seen as an endeavor of ones capabilities and willingness to direct his best efforts toward doing something. For positive attitude to be developed, pleasant events must exist during the time the student is encountering the subject matter. A lot of empirical evidence such as Chamdimba, 2008; Yara, 2009) shows that attitude adopted by the students play a major role in teaching and learning out-comes. Ale & Adetula (2009) observed that, it is a well known fact that many secondary school students are not studying the course they are intend to study because of their poor performance in mathematics resulting from poor attitude toward to subject. Reports have shown that improved instructional strategy affects the attitude of students. For instance Oloorukoba (2001)

reported that students taught using cooperative learning strategy had positive attitude to the educational benefits derived from group work. However, there is no report showing the effects of contextual teaching-learning approach on the attitude of students in mathematics. This research therefore sought to find out the effect of CTLA on the attitude of students in mathematics in Kaduna State.

Purpose of the study

The general purpose is to determine the effect of contextual teaching-learning approach on Senior Secondary Schools students' attitude in mathematics.

Research question

What is the effect of contextual teaching-learning approach on Senior Secondary School Students attitude in mathematics?

Hypothesis

Ho₁: There is no significant difference between the mean attitude scores of students before and after teaching mathematics with CTL approach.

Methodology

The design used for this study was quasi experimental of pretest and posttest which was proposed by Kerlinger (1993). The population of the study was 1,166 Senior Secondary School three students. Six schools were selected randomly from 19 state own Senior Secondary Schools in Zaria and Giwa educational zones. In each of the six schools one intact class was randomly selected. Simple sampling method employing balloting was used to select one intact class. The sample for this study was 49 Senior Secondary School three students.

The instrument used for this study is mathematics attitude questionnaire (MAQ) which was adopted from Schackow (2005). It consisted of 40 statements that reflected overall attitude towards mathematics therefore all the statements were adopted without any modification. The content validity of the instrument was established and the reliability coefficient was 0.94. The Contextual Teaching-Learning Approach (CTLA) package using REACT strategy was used. The researcher developed a CTLA package on the REACT strategy containing concepts and activities in plane geometry. The package was developed in order to ensure all subjects, irrespective of their socio-economic backgrounds had equal access to the relevant instructional materials. The package was assessed by three mathematics Educators and three Secondary School mathematics teachers. The assessment was done based on the adequacy in terms of Senior Secondary syllabus coverage and relevance to the questions and activities. Based on their suggestions, some activities were restructured to suit time table arrangement. The logical validity index for the instructional package was 0.78. All necessary instruction materials for the study were made available to the teacher before the commencement of the study.

MAQ was administered by the teacher as pretest attitude and collected back before the lesson started. The students were taught plane geometry using CTLA using

REACT strategy. The normal period of 40 minutes was observed per lesson. The researcher supervised while the lesson was going on to be sure the treatment was properly carried out. The study lasted for four weeks. The researcher administered MAG as post test attitude at the end of the study to the sample. MAG was administered to the sampled group by the researcher before the treatment and after treatment to determine attitude change. No time limit was given for the completion of the questionnaire. The responses to the MAQ were based on Likert four points scale of Strongly Agree, Agree, Disagree and Strongly Disagree which were assigned numerical values of 4,3,2,1 respectively. The data obtained from MAQ was used to compare the change in attitude of subjects towards mathematics. The research question was answered using the mean, standard deviation while t-test statistics was used to test hypothesis at 0.05 level.

Results:

The results of the study are presented according to the research question and the corresponding hypothesis.

Table 1: Mean and Standard Deviation scores of students Pretest and Posttest attitude Scores

Variable	N	Mean	SD	SE
Attitude (Pretest)	49	43.12	7.58	1.91
Attitude (Posttest)	49	73.27	7.34	1.05

In table 1 the results of the calculated mean and standard deviation for pretest attitude and posttest attitude scores show the posttest attitude mean score was higher than the pretest mean scores.

This implies that there is a significant effect as a result of the treatment and it shows that a positive attitude was exhibited by subjects after exposure to the treatment.

Hypothesis one:

Table 2:

Showing t-test statistics for difference in Pretest Attitude and Posttest attitude mean scores.

Variable	N	Mean	SD	SE	df	t-cal	t-cri
Attitude Pretest	49	43.12	7.58	1.91	48	12.03	1.96
Attitude Posttest	49	73.27	7.34	1.05			

The statistics in table 2 above showed that a significant difference exists between pretest attitude and posttest attitude of students. The calculated t-value 12.03 is higher than the t-critical value of 1.96 at df 48. Their mean attitude scores were 43.12 and 73.27 in their pre mathematics attitude and post mathematics attitude respectively. This implies that there is a significant effect as a result of the treatment.

This also implies that their mean attitude scores have significantly increased as a result of the treatment. Therefore Null hypothesis which stated that there is no significant effect of the treatment in the mean attitude among students is hereby rejected.

Discussion

The result revealed that CTL Approach can influence students' attitude toward mathematics positively, as subjects were observed to have developed a more positive attitude towards mathematics. This answered the research question and confirmed the test of hypothesis 1 which states that there was no significant difference in attitude of students towards mathematics when exposed to contextual teaching-learning approach.

The change in students' attitude towards mathematics could be linked to the CTL approach which has related concepts learned and real life experiences they undergo. This showed that what is learnt can be used in natural life. It also engaged students in meaningful learning. Thus when students are actively engaged in real-world experiences that motivate them to connect a sense of personal relevance, value and meaning with the content of what is learned there is usually improved learning (University of Georgia, 2001). Olowojaiye (2000) also confirmed that effective teaching strategies can create positive attitudes by students toward school subjects. This was further confirmed in a study by Ebenezer and Zoller (1992) in Canada. These studies showed that context based approach increases students' attitude positively toward science subjects and students are more able to establish a close link between science, technology and society than their peers in traditional classes. Contextual teaching-learning approach reduces the abstract levels of concepts and this enables meaningful learning by reducing difficulties in learning and in this way help to improve the attitude of learners toward concepts in mathematics. The contextual teaching-learning approach improved student's attitude towards mathematics.

Conclusion

Mathematics is a key factor in the development of any nation. It is a well known fact that many secondary school students are not studying courses they intended to study as a result of negative attitude as shown in this paper.

The contextual teaching-learning approach affected the attitude of students towards mathematics. Students taught with the contextual teaching-learning approach showed positive attitude after exposure to the treatment. Therefore the use of contextual-learning approach improved the attitude of senior secondary school students toward mathematics.

Recommendations

It was established that the method had impact on students' attitude towards mathematics. Teachers using this method can improve the attitude of students in their classrooms. Parents can also improve their wards' attitude toward mathematics by sensitizing their children in seeing the relationship between things in their homes, the

community and daily experiences through mathematics. They can also buy mathematically related games like lido, monopoly and others in order to increase their children's attitude towards mathematics. State governments should finance the training of teachers in seminars, workshops, conferences and in-service training courses that focus on contextual teaching-learning approach.

Contextual teaching-learning approach should be used by curriculum planners and text books writers in developing curriculum and textbooks for teachers to use. Other stake holders like Mathematics Association of Nigeria (MAN) and National Educational Research and Development Centre should incorporate contextual teaching-learning approach into mathematics curricula at Senior Secondary School level to support the use of the approach by mathematics teachers.

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