

Effect of Practical Approach on Basic 7 Mathematics Students' Interest and Performance in Fraction in Uyo Akwa Ibom State of Nigeria

Isaac Bennet Ado¹ Andrew Umo Abasi²

1. Department of Science Education, University of Uyo, Uyo, Nigeria

2. Department of Curriculum and Instructional Technology, Cross River University of Technology, Calabar Nigeria

*Email of the corresponding author: andrewabasi@yahoo.com

Abstract

This research was an experimental study carried out to determine the effect of practical approach on mathematics students' performance in fraction in Uyo Local Government Area of Akwa Ibom State. Two (2) research questions were raised to guide the study. The Pretest-posttest non-randomised control design was adopted for the study. A sample of 173 Basic 7 students was randomly selected for the study. Two instruments, Mathematics Performance Test on Fraction (MAPF) and Student Interest Questionnaire (SIQ) were used for the study. MATF and SIQ reliabilities were found to be 0.76 and 0.83 using Kuder-Richardson Formulae 21 and Cronbach Alpha respectively. The data were analysed using mean and the independent t-test. The result showed that students taught using practical approach performed significantly better than those taught using conventional method. Students in the practical approach group developed interest that was significantly better than their counterparts in the conventional group. It was concluded that practical approach significantly enhances students' performance and interest in fraction.

Keywords: Practical Approach, Mathematics Students, Interest, Performance, Fraction

1. Introduction

Mathematics is the foundation of all scientific, technological and economy investigations toward the development of human activities (Beaty, 2000). It is the language and culture common to all studies and in all societies and countries, (Harbour Peter, 2001). It is in light of this that, all over the globe, much effort and time are put in action by mathematics educators and practitioners for the teaching and learning of mathematics to be enhanced. Hence, the assertion that mathematics is used in procuring solution to problems, answer to questions which arises in everyday life as humanity strive to satisfy the needs and wants in all areas of endeavor (Odidli, 2006).

The study of mathematics is a basic preparation for information technology and a gateway into numerous career choices in life (Obodo, 2002). Obodo further acclaimed that the main route to enter into the modern world is through mathematical knowledge. Despite the important of mathematics to livelihood, it is very unfortunate that students' performance in mathematics, starting from the primary, secondary to tertiary level in examination has remained consistently poor, especially in the area of questions on fractions and ratios (Cox, 2007). This problem can be attributed to ineffective teaching strategies which results to students' poor performance in the subject thereby negatively affecting their interest (Nigel, 2003). In this respect, teachers have been advised to use teaching methods or approaches that would enhance students' interest in the learning of fraction thereby resulting into better performance.

Practical approach is a situation in which teachers employed the use of physical objects that can be touched, manipulated and utilized proficiently in the teaching and learning process. In the teaching and learning of fraction, practical approach is considered as the process of improvising materials and/or bringing in real objects that can be used as teaching aids to make the teaching and learning of fractions effective, meaningful, interesting, fun and pleasurable to learners (Salau, 2001). Practical work provides the most effective means by which understanding and comprehending of mathematical concepts can be improved. It enable students to reason out the mathematical ideas which are contained within the various activities, thus make them to become critical thinkers. Practical approach provides the opportunity where the teacher becomes the instructor of the group, providing stimulating learning situation (Koko, 2008). The learners are then guided to find information and understand concept through appropriate activities and demonstrations which encourages them to discover patterns in mathematics leading to rules and formulae.

Mathematical knowledge has much to offer in applying practical approach to everyday living. It can stimulate students' thereby developing confidence and ability in problem solving. It is on this note that, Soyemi (2003)

acclaimed that the teaching and learning of any aspect of mathematics should be of the practical approach method because it would enable students understand and apply it easily to everyday living. Hence, the researchers are investigating into the effect of practical approach on students' performance in fraction.

1.1 Statement of the Problem

The study of fraction is among the topics in mathematics that most students find it difficult to comprehend (Nnadozie, 2002). They have difficulty in recognizing when two fractions are equal, putting fractions in order of magnitude and understanding that the symbol for fraction represents a single number (Cox, 2007). This is due to fewer enhancements of mathematical thinking, reasoning and interest (Tzur, 1999). The question is: would the use of practical approach in the teaching and learning process enhance students' interest in mathematics thereby improve their performance in fraction?

1.1.1 Purpose of the study

The purpose of this study is to investigate the effect of practical approach on students' mathematics performance in fraction: Specifically, it is to:

1. Determine the effect of practical approach on students' performance in fraction.
2. Ascertain the influence of practical approach on students' interest in learning fraction.

1.1.2 Research Questions

This study provided answers to the following research questions:

1. What is the effect of practical approach on students' mean performance scores in fraction?
2. What is the effect of practical approach on students' interest in learning fraction?

1.1.3 Statement of Hypotheses

For the purpose of this study to be fulfilled, the following research null hypotheses were formulated:

1. There is no significant effect of practical approach on students' mean performance score in fraction.
2. There is no significant effect of practical approach on students' interest in learning fraction.

1.1.4 Research Methods

Pre-test post-test non-randomise control design was adopted for this study. This design was adopted because the researcher never wanted to temper with the already existing intact classes in the school. The population of the study consisted of all the Basic 7 students in public schools in Uyo, Akwa Ibom State. The total number of Basic 7 students for the academic session of 2010/2011 was 70,688 from 229 schools. A sample of 173 students was used for the study. Two public schools were randomly sampled; one Basic 7 intact class of each school was used for the study. The treatment and control group were randomly assigned to different intact classes.

Two instruments were used for the study. They were Mathematics Performance Test on Fraction (MPTF) and Students Interest Questionnaire (SIQ). The performance test consist of twenty (20) multiple choice item questions, with four options constructed by the researcher to measure students performance in fraction while students interest questionnaire was a 10-item questionnaire on likert-sale of 5-point rating i.e, Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD). The interest questionnaire had items such as:

1. I like attending fraction classes in mathematics because it is very interesting.
2. I always do my assignment when it comes to fraction.
3. Solving problems in fraction has assisted me in my activities at home.

The instruments were content validated by two experts in measurement and evaluation and two mathematics teachers. The instruments were trail tested by administering them to 20 basic 7 students who were not part of the main study. The internal consistency reliability coefficient of MAPF and SIQ were found using Kuder Richardson-21 formulae and the Cronbach Alpha respectively. The reliability of MATF was found to be 0.76 and SIQ was found to be 0.83.

The researchers used the permanent mathematics teacher as research assistant for the study. One of the teachers was taught on the use of practical approach and the other was left to use the conventional method. Before beginning the lesson, MAPF and SIQ were administered to both groups by the teachers. The teacher for the treatment group taught fraction topics using practical approach based on the lesson package prepared by the researchers. The control group was taught using conventional approach. Both instruments were administered after treatment. The instrument items were reshuffled and the paper color changed as to avoid students knowing they are same questions as that of the pretest. The data were collected from the two groups. The scripts were marked and scored. To further ascertain the equality of the two groups, the pretest scores and the pre-interest scores were analyzed using independent t-test. Non-significant difference was found to exist between the two groups (experimental and control) in both the pretest scores and pre-interest scores. The posttest score were analysed using mean, standard deviation and t-test.

1.1.5 Results

Hypothesis One

There is no significant effect of practical approach on students' mean performance score in fraction.

Table 1. t-test analysis of post-test scores of students taught using practical approach and conventional method

Groups	N	X	S.D	t-value	Sign @ p<.05
Experimental	83	69.40	14.06	8.56	*
Control	90	50.40	15.10		

Critical value = 1.97, Cal. Value = 8.56, df = 171

* = significant @ p<.05

As shown in table 1, the performance of experimental group with mean score of 69.4 is greater than that of the control group with mean score of 50.4. The table also shows t-calculated value of 8.56 which is greater than the t-critical value of 1.97 at 0.05 level of significance. Therefore, the null hypothesis one is rejected. Thus, there is a significant effect of practical approach on students' performance in fraction.

Hypothesis Two

There is no significant effect of practical approach on students' interest in learning fraction.

Table 2. t-test analysis of post-interest scores of students taught using practical approach and conventional method

Groups	N	X	S.D	t-value	Sign @ p<.05
Experimental	83	38.95	10.02	11.74	*
Control	90	24.18	6.35		

Critical value = 1.97, Cal. Value = 11.74, df = 171

* = significant @ p<.05

Table 2 showed mean interest of 24.18 and 38.95 for control and experimental groups respectively. This implies that the experimental group developed interest was greater than that of the control group. The result in table 2 also shows that the t-calculated value of 11.74 is greater than the critical t-value of 1.97 at 0.5 level of significance. Hence, the null hypothesis is rejected. This implies that there is a significant effect of practical approach on students' interest in learning fraction.

1.1.6 Discussion of Results

The first objective was to determine the effect of practical approach on students' performance in fraction. The results showed that students taught using practical approach performed significantly better than their counterparts taught using the conventional method. This could be attributed to the students' practical work which provided them with ease in imagination and abstraction of fraction as a concept. It enables them to think out the mathematical ideas which are contained within the various activities. This could be as a result of the procedure used as students proceeded from handling of objects to diagrams and finally to a symbolic stage which assisted them in establishing the relationship between what is taught in the classroom and the experiences outside the classroom. This is in line with Koko (2008), who stated that, practical approach helps the learner to find out information and understand concepts through appropriate activities and demonstrations, thereby encourage them discover patterns in mathematics leading to rule and formulae. Hence Emefo (2007) stated that students taught using practical approach will perform significantly better than those taught using conventional method.

The second objective was to ascertain the influence of practical approach on students' interest in learning fraction. The results indicated that students taught using practical approach developed greater interest than their counterparts taught using conventional method. The interest developed by those taught using practical approach was significantly better than those taught using conventional method. This supports Emefo (2007), who stated that practical approach enhances the development and sustenance of interest among learners. It enables learners to think out mathematical ideas which are contained within the various activities they undertake at the same time as they engage in mathematical activities. The study also agrees with Ukwu (2010), who observed that practical approach is the only way to make teaching and learning of mathematics effective, meaningful, interesting and pleasurable to the learners. It attracts learners' attention because it helps to develop the learners' interest in the lesson.

1.1.7 Recommendations

Based on the findings of this study, it is recommended that:

- Mathematics teachers should explore the use of practical approach in teaching fractions.
- Teachers' trainers should emphasize the use of practical approach among other teaching methods in teaching students.
- Seminars and workshops should be organized for serving teachers to keep abreast with the development of activities that can be used during practical approach teaching.
- Curriculum planners for upper basics should as a matter of priority incorporate the practical approach activities into students' activity column of fraction during curriculum development.
- Ministry of Education, State Universal Basic Education Board and Principals should ensure that the materials used in practical approach classes be made available for mathematics teachers in teaching fractions.

1.1.8 Conclusion

Practical approach, from the findings of this study, has the potential to enhance students' performance and interest in learning fraction. It stimulated, motivated and propelled students' mathematical learning thereby enhancing their understanding of the taught concept. It also assisted students in gaining experience of how concepts play out in practice. Using practical approach students found fun in the subject they considered very difficult and abstract.

References

- Beaty, A 2000, 'Action Learning: A guide for professional management and educational Development,' *Education Quarterly Review*, vol. 6, no 1, pp. 21 – 33.
- Cox, K 2007, *Fractions and decimals*. Georgia: Georgia Development of Education.
- Emefo, CN 2008, 'Practical approach for teaching area of plane shapes' *Journal of Issues on Mathematics*, vol. 10 no.1, pp. 30 – 36.
- Harbour-Peter, VFA 2001: *Unmasking some aversive aspect of school mathematics and strategies for averting them*. Enugu: Snap Press, Ltd Enugu.
- Koko, GM 2008, 'Teaching and learning of fractions in primary schools using practical approach,' *Journal of Issues on Mathematics (STAN)*, vol 11 no1, pp. 53 – 60.
- Nigel, M 2003, 'The effect of Different Practical Approach on Mathematics Students Achievement' Master's Thesis, University of Southampton.
- Nnadozie, O 2004, *The psychology of learning mathematics education*, Hnolulu, Hanai.
- Obodo, GC 2004, *Principles and practice of mathematics education in Nigeria*, Enugu, Academic Forum.
- Odili, GA 2006, *Teaching Mathematics in Secondary School*, Enugu Anacuma Educational Books.
- Salau, R 2001, 'Constructing and using representing context in teaching fraction,' *A Research Integration*, no. 2, pp. 433-456.
- Soyemi, BO 2003, *Students dictionary of mathematics*. Ife: Ade Publishers.
- Tzur, R 1999, 'An integrated study of children construction of improper fractions and the teacher's role in promoting that learning', *Journal for Research in Mathematics Education*, no 6, pp.14 – 22.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

