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Effect of Video Based Instruction for Teaching Mathematics in Primary Schools in Ifelodun Local Government Area, Lagos State

O.O OBIELODAN, M. A. FAKOMOGBON, A. A. AMOSA, R. N. NJOAGWU
University of Ilorin, Nigeria

Abstract. Mathematics is a core subject, which is confronted with inadequacy in quality and quantity of instructional materials. Video based instruction enhances meaningful and productive learning. Thus, the video instructional package is a possible solution to the problem of inadequacy of instructional materials. Therefore, the main purpose of this study was to investigate the effects of video based instruction in teaching mathematics in primary schools, Lagos State. Specifically, the study investigated the difference between pupils' performance taught using video based instruction and their counterparts taught using expository method. A pre-test, post-test quasi-experimental design was adopted for the study. The two sampled schools comprised 40 pupils who were randomly assigned to treatment (20 pupils) and control (20 pupils). The research hypotheses were tested using Analysis of Co-variance (ANCOVA). The findings revealed that at significant level, the value produced F (1, 39) = 17.917, the significance of F, alpha = .000 < 0.05 alpha level of significance. Therefore, hypothesis was rejected. This implies that the significance difference exists between the performance of pupils taught with video based instruction and their counterparts taught using expository method. Also, at 0.05 significant level, the value produced F (1, 39) = 0.280, the significance F, alpha = 0.600 > 0.05. Therefore, hypothesis two was accepted. This implies that the performance of male and female pupils showed no significant difference when taught using video based instruction. Based on the findings of the study, it was recommended that teachers should teach using video based instruction so as to encourage individualized learning. Also, teacher should put more efforts on equal distribution of attention to both male and female pupils.

Keywords: Mathematics, video based instruction, pupils and gender

1. Introduction

Education remains an instrument of change and national development. It is a social process and the medium for the acquisition of relevant knowledge, skills and attitudes for survival in a changing world. In the Nigeria education continuum, basic education as the foundation requires a sound knowledge of science and technology. The National Policy on Education (FRN, 2013) maintains that primary education is one given in institutions for which children of age range 6 to 11 plus are enrolled. It indicates a nine-year basic education for pupils in segments of 6 years of primary education and 3 years of junior secondary education. Curriculum planners would have to acquire some satisfactory means for deciding and selecting which objectives would need to be achieved by an educational program. As a result, curriculum workers would have to work with criteria that are understood and used the same way by everyone involved in structuring mathematics curriculum with the use relevant instructional materials such as video based instruction. Therefore, instructional materials for teaching mathematics can provide

the teacher with means of extending the students perspective of knowledge.

2. Literature Reviewed

The objectives of primary education are all embracing. They reveal an all-round up bringing that makes a child good citizen of Nigeria. The objectives as outlined in NPE (FRN, 2013) among others include:

(a) Inculcation of permanent literacy, numeracy and the ability to communicate effectively.
(b) Laying a sound basis for scientific, critical and reflective thinking.
(c) Instilling morals and values in the child.
(d) Providing opportunities for Nigerian child to develop life manipulative skills that will enable the child function effectively in the society within the limits of the child's capacity.

In order to actualize the overall objectives of primary education as stated above, the primary mathematics curriculum was developed. Thus, the primary school mathematics curriculum has its objectives tailored in line with those overall objectives. For simplicity there are separate curricula for two levels of primary (1-3 and primary 4-6) education. The objectives of learning mathematics are documented in the 9-year basic education mathematics curriculum for primary 1-3 and 4-6 respectively (NERDC, 2007).

According to National Policy on Education (FRN, 2013), a nation cannot achieve greatness unless she directs her efforts in technology to develop the resources in the country. Because of its importance, many nations of the world introduce media tools early to children in developing countries such as Nigeria. Science and technology is taught in schools for general literacy and as preparation for future activities in related fields. Technology is the application of knowledge to the practical aims of human life or to changing and manipulating the human environment. Technologies in teaching and learning mathematics include the use of instructional materials, tools, techniques, and sources of power to achieve meaningful and productive learning.

Amosa (2013) pointed out that instructional material helps in arresting the attention and motivation of learners if it is judiciously used in the course teaching and learning processes. Thus, teaching and learning of mathematics with instructional resources help the teacher and students to achieve meaningful and productive learning. Onasanya and Adegbija (2007) opined that communication media (also referred to as instructional materials) have made specific as well as broad contributions to learning activities, if it is not an exaggeration to say that successful teaching and learning depend largely on the instructional resources. Most of the instructional resources are set of tools ranging from home-made device like bamboo, microscopes to sophisticated machines like film projectors, each assisting the teacher in disseminating knowledge.

Abolade (2009) defined instructional material as careers of information that that the teacher needs to encourage effective learning. Moreover, instructional materials are materials and equipment that serve as vehicles with which instructions are channeled with ease to their destination. Generally, instructional materials are classified into three broad areas; audio; visual and audio-visual materials. Thus, this is in line with the report of Amosa (2013) that the three categories are all suitable for achieving meaningful and productive teaching and learning. In view of this, video based instruction constitutes a very important audio-visual material and could be used for effective teaching and learning of mathematics in the classroom.

Mathematics as a subject is one of the key predictors of a nation's long term economic determinant. It was further argued that to continue to improve in mathematics performance, there must be improvement in the quality of mathematics instruction received by the students of all levels of education (Friedman, 2005). The quality of mathematics instructions can be improved through video based instruction. Thus, there is a need to properly cater for effective and efficient meaningful learning materials for teaching pupils. This topic is premised on the current world trend and research emphasis on students' achievement in

mathematics which gender cannot be left out. Therefore, teaching and learning of mathematics should not be gender bias.

Several studies have reported poor pupils' academic performance in mathematics despite the importance attached to the subject in the National Policy on Education. The leaners' performances continue to deteriorate year after year. This has become a source of concern to all stakeholders in education in Lagos State. Those who teach subjects requiring the application of mathematics complained of the challenges they face, such as lack of interest in the subject, poorly equipped mathematics laboratory, non-availability of facilities to aid teaching of the subject and relevant resources.

Furthermore, mathematics teaching in some schools in Lagos State today still follows the traditional pattern such as lecture method which has been identified as being ineffective method in ensuring students participation in the lesson. Non-utilization of necessary techniques in teaching mathematics is another contributing factor. Video based instruction could be used as a means to provide additional support for learners who are otherwise completely reliant on asynchronous delivery (Amosa, 2016). In situations where a student needs continual feedback to acquire the refinement of a physical task, video is far superior to text or graphics. Also, video based instruction provides the opportunity for clearer communication between pupils and instructor and/or between pupils and pupils.

The factors influencing pupils' performance in the teaching and learning of mathematics are inappropriate method of teach a particular topic, non-availability of facilities to aid teaching of mathematics, lack of orientation by teachers, insufficient qualified teachers teach mathematics, teachers are not technically oriented and due to this, they will not be able to teach the subject technologically so as to impact the skills of technology to pupils. A critical look at the National Policy on Education (FGN, 2013) showed that the Federal Republic of Nigeria intend that the basic school curriculum in Nigeria provides adequate skill on numeracy. The subject designed to provide such skill is mathematics.

A versatile teacher of mathematics must have adequate knowledge of basic essential facilities and needed methods or strategies to provide adequate numeracy skills in the teaching and learning of mathematics (Kolawole, 2007). It was stressed further that teacher should be skillful in the utilization of instructional materials for teaching mathematics. Video based instruction enables teachers and pupils to explore the practical knowledge of the subject matter. Mathematics education requires highly motivated students because it requires reasoning, making interpretations, and solving problems, mathematical issues, and concepts. The challenge of mathematics learning for today's education is that it requires disciplined study, concentration and motivation.

Teaching and learning process becomes boring when learners are taught with conventional method, but students might become excited to create meaningful attitudes towards learning when they are taught using interactive video-based instruction. Clothier (2013) reported that in teaching and learning, learners have unique opportunities to interact with varieties of interactive media to acquire learning experiences. Video based instruction is one of the interesting inducements, which bring about formation of positive attitudes of students towards learning. Therefore, teachers' adoption and use of innovative technologies in teaching and learning process might become imperative. Irrespective of gender, pupils' attitude toward learning mathematics relies on the use of stimulating learning materials such as video based instruction, which is one of the prominent learning packages that encourage individualized learning.

In the beginning of one's life, the interaction between the parents and the child determines his or her position in all facets of life. This can also be noticed when the child is at the point of getting toy to play with, noticeably, the inferiority will be there for the kind made available for female child. Therefore, educational imbalance between male and female

in Nigeria is also due to societal traditions and myths, which relegate females' education to the background.

Amosa (2013) reported that female students are as brilliant as male students are, thus, they only require being given equal chance and in case of practical oriented courses, preferential treatment should be disallowed. Bello (2003) noted that female characterizes gender differences in school sciences by under representation and underachievement in science. Evidence abounds in science education literature that female enrolment in science subjects is very low. In addition, some parents do not show any positive attitude towards their female children education, believing that it is a waste of resources. Some even doubts the ability of their girl child when compared to the boy child in education matters.

3. Purpose of the Study

The study sought to examine the effect of video based instruction for teaching mathematics in primary schools in Ifelodun Local Government Area, Lagos State. Specifically, the study found out:

(i) The difference between pupils' performance taught using video based instruction and their counterparts taught with expository method.
(ii) The difference between male and female pupils' performance taught using video based instruction in teaching mathematics.

4. Research Questions

The following research questions were answered in this study:

(i) What is the difference between pupils' performance taught using video based instruction and their counterparts taught with expository method?
(ii) Is there any difference between male and female pupils' performance taught using video based instruction in mathematics?

5. Research Hypotheses

Bases on the research questions, the following hypotheses were tested in this study:

Ho_1: There is no significant difference in the academic performance of pupils taught using video based instruction and those taught with expository teaching method.
Ho_2: There is no significant difference in the performance of males and females pupils taught mathematics using video based instruction.

6. Methodology

All primary schools in Lagos State constituted the population of the study while the target population was pupils from two primary schools in Ifelodun Local Government of Lagos State. Twenty (20) pupils from each of the two intact classes constituted male and female were purposively selected from the sampled schools. These schools are; Ekum Nursery and Primary Schools, Amukoko, Lagos (control group) and Resourceful Schools, Iganmu, Lagos (experimental group). The two sampled schools were randomly assigned to experimental (20 - male and female pupils) and control groups (20 – male and female pupils). Two instruments were used to gather the relevant data for this study: video instructional package (treatment) and Mathematics Achievement Test. The quasi-experimental, non-equivalent, non-randomized, pre-test, post-test control group design was adopted for the study.

In the design, pre-test served as a measure of students' background knowledge for the two groups. The experimental group received the treatment using the video based instruction (treatment) alongside expository method while the control group was taught using expository method only. After the treatment, all the groups were post-tested using mathematics achievement test. All research questions were answered using mean and standard deviation while all the hypotheses were tested through analysis of co-

variance (ANCOVA) to ascertain whether any significant difference exists at 0.05 significant levels.

Table 1: Experimental Designs

Group	Pre-Test	Treatment	Post-Test
Experimental	0_1	X	0_2
Control	0_3		0_4

Where: 0_1 = Pre-test scores of the experimental group.
02 = Post-test scores of the experimental group.
03 = Pre-test scores of the control group.
04 = Post-test scores of the control group.
X= the treatment for the experimental group.

7. Results

This section presents the analysis and interpretation of data collected for this study. Data obtained in respect to research questions were analyzed using mean and standard deviation and ANCOVA was used for the hypotheses.

Research Question 1: What is the difference between pupils' performance taught using video based instruction and their counterparts taught with expository method?

Table 2: Mean and Standard Deviation on Research Question One

Group	N	Mean	Std. Deviation
Control	20	4.80	1.281
Experimental	20	7.65	1.226

As shown in table 2, teaching of mathematics using video based instruction has a positive influence on performance of pupils. As the mean score (7.65) of the pupils taught using video based instruction was higher than the mean score (4.80) of the pupils taught using expository method. It can be deduced that the teaching of mathematics using video based instruction enhances pupils' academic performance in mathematics.

Table 3: Analysis of Co-variance (ANCOVA) on the performance of both experimental and control groups

Hypothesis One: There is no significant difference in the academic performance of pupils taught using video based instruction and those taught with expository teaching method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	117.345[a]	2	58.672	91.869	.000
Intercept	68.938	1	68.938	107.943	.000
Pretest	36.120	1	36.120	56.556	.000
Group	11.443	1	11.443	17.917	.000
Error	23.630	37	.639		
Total	1691.000	40			
Corrected Total	140.975	39			

denotes F is significant at 0.05 alpha level

Table 3 shows that an F (1, 39) = 17.917, and the alpha = .000 for the group was significant at 0.05 alpha level. This is because the significance of F, alpha = .000 is less than 0.05 alpha level of significance. This result showed that video based instruction method and the expository method of instruction produced significant difference on the post-test performance of pupils when the covariate (pretest) was statistically controlled. The result showed that significance difference exists between the performance of pupils taught with video based instruction and their counterparts taught using expository method of instruction in favour of experimental group.

Research Question 2: Is there any difference between male and female pupils' performance taught using video based instruction in mathematics?

Table 4: Mean and Standard Deviation on Research Question Two

GENDER	N	Mean	Std. Deviation
Male	8	7.65	1.512
Female	12	7.75	1.055

As shown in table 4. The performance of male and female pupils when taught using video based instruction proved a minor difference. The table reveals that male and female pupils had a close range of (7.65) and (7.75) respectively.

Hypothesis 2: There is no significant difference in the performance of males and females pupils taught mathematics using video based instruction.

Table 5: Analysis of Co-variance (ANCOVA) on the Performance of both Males and Females Pupils taught using Video Based Instruction.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	117.805[a]	4	29.451	44.488	.000
Intercept	67.400	1	67.400	101.811	.000
PRETEST	35.989	1	35.989	54.363	.000
GENDER	.185	1	.185	.280	.600
Error	23.170	35	.662		
Total	1691.000	40			
Corrected Total	140.975	39			

F is not significant at 0.05 alpha level

Table 5 shows that an F (1, 39) = .280, and the alpha = .600 for the influence of gender was not statistically significant at 0.05 alpha level. This is because the significance of F, alpha = .600 is greater than 0.05 alpha level of significance. This study therefore accepts the hypothesis 2. The result shows that the gender did affect the performance of the group of pupils taught with video based instruction as the performance of male pupils showed no significant difference from their female counterparts when both were taught using video based instruction

8. Summary of Major Findings

The following are the summary of major findings:

(i) The pupils taught using video based instruction performed significantly better than those taught using expository method.

(ii) There was not a significant difference in the performance of male and female pupils taught using video based instruction in teaching mathematics.

9. Discussion

The use of video based instruction in teaching has great effect on the performance of primary school mathematics pupils in Ifelodun local government area of Lagos State. It was found

that pupils are more fascinated and prepared to learn when they are taught with video. Their performance greatly improved, assimilation and reminiscence of concepts becomes easier as they learn by exercising various senses.

The findings indicated that the pupils using video based instruction performed better than their counterparts taught using expository method. This finding corroborated with the findings of Amosa (2016), which states that students taught using interactive video based instruction performed better than their counterparts taught using expository method. Also, Amosa (2013) affirmed that the gender of the learners is not a factor in teaching and learning of basic technology, male students taught using community resources did not perform better than female students that were also exposed to the community resources.

10. Recommendations

The following recommendations were made based on the findings of the study:

(i) Video based instruction should be integrated into the teaching and learning of pupils. Thus, teachers should teach using video based instruction so as to encourage individualized learning.

(ii) Video based instruction should be incorporated into the teaching-learning process in order to solve the problem of gender learning imbalance. Also, teacher should put more efforts on equal distribution of attention to both male and female pupils.

(iii) Government and private school administrators should ensure that equipment for video based instruction are made available for all teachers in their respective schools for the benefit of teaching and learning.

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