

Effect of Multimedia Instructional Approach on Mid Basic II Pupils' Interest and Retention in Basic Science

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Abstract

This study investigated the effect of multimedia instructional approach on the interest and retention of mid basic II pupils in Basic Science. The sample for study comprised Eighty-five mid basic II Basic Science pupils from two intact classes purposively selected from two private co-education schools in Federal Capital Territory, Abuja, Nigeria. Two research questions guided the study and two null hypotheses were tested at 0.05 level of significance. Two instruments were used for data collection namely; Pupils' Interest in Basic Science rating scale (PIBS) and Basic Science Retention Test (BSRET). The reliability of PIBS was determined using Cronbach Alpha and the coefficient obtained was 0.79 while Kuder-Richardson formula 21 ($K-R_{21}$) was used to determine the reliability of BSRET and the reliability coefficient was found to be 0.80 implying that the instruments were reliable enough for the study. Descriptive statistics were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the research hypotheses at 0.05 alpha level of significance. The findings of this study revealed significant differences in the interest and retention of male and female mid basic II pupils taught Basic Science concept using Multimedia Instructional Approach. Based on the findings, it was recommended that; Basic Science teachers should incorporate multimedia instructional approach which has been found to increase pupils interest and enhance retention.

Keywords: Basic Science, Instructional Approach, Interest, Multimedia and Retention.

INTRODUCTION

The success of any educational enterprise in this modern age of advanced technology is in terms of technologies and or media employed to ensure maximum cognitive development or advancement of learners. Multimedia aids in education could be define as the various electronic and technological devices employed by the teacher/ learner to enhance the interest, acquisition and retention of knowledge. These include print media like newspapers, magazines, journals and books. Electronic media include; Television, Radio, Slide, CD Rom, Projectors, CDs, DVDs and interactive media like cell phones and the internet. Multimedia combines five basic types of media into the learning environment: text, video, sounds, graphics and animation, thus providing a powerful new tool for education (Nwanekezi & Kalu, 2012).

Researches have shown that the quality of learning can be significantly enhanced when ICT is used as an intellectual multi-tool adaptable to learner's needs (Furo, 2015; Nwafor & Okoi, 2016; Gambari & Yusuf, 2017). Gyang (2008) referred to this as: critical thinking, information skill, higher level conceptualization and problem solving. It has been observed that average school age child spends much time watching television; playing video games and exploring other electronic media devices, including the cell phones. These exploration and manipulation have been found to stimulate interest and create enabling environments for learning to take place both inside and outside the classroom, it is also makes learning easier and knowledge more easily retained (Nwanekezi & Kalu, 2012).

Moreover, Akbiyik and Akbiyik (2010) are of the view that critical thinking, decision making, reflective thinking and creative thinking are various forms of cognitive learning outcomes of multimedia aids.

The basic school stage is the formative stage of an individual. At this stage, audio and visual impressions made on a child in the process of teaching and learning leaves a long-lasting effect on the educational development of the child. Children are naturally curious and inquisitive about their environment. They are observant, persistent and enjoy entertaining learning experiences (Nwanekezi & Kalu, 2012).

Basic Science education's purpose is to train pupils to acquire proper understanding of basic principles as well as application. It is also aimed at developing appropriate scientific skills and attitudes as a prerequisite for future scientific activities. To achieve these objectives, active participation and collaborative learning activities become imperative and these need functioning instructional media to make Basic Science instruction effective (Osokoya, 2013; Oni, 2014; Samuel, 2017).

Interest is considered to be the feeling of an individual towards a particular object or an activity. It means that a child will develop interest in any object or activity that is found to be attractive or stimulating. Therefore, in a classroom situation, the learner will be attentive during a lesson only if the instruction is appealing to the learner (Nwachukwu, 2013; Danjuma, 2015).

Retention is the ability to hold, keep or recall past experience and reproduce a learnt concept when the need arises (Bukunola & Idowu, 2012). It is an important variable in learning because only a learnt experience is recalled, learning cannot be said to have taken place if there is no proper retention. The ability of students to recall past learnt Basic Science concepts as an objective of the Basic Science teaching and learning process may likely enhance achievement in the subject. For so long, researchers have been keen on knowing what could be done by teachers to enhance maximum retention of knowledge or skills long after they have been acquired whether in the classroom or outside the classroom (Azuka, 2012).

The use of multimedia instructional approach in teaching Basic Science at the basic school level helps to expose them to have a better understanding of the concepts taught. It therefore has become pertinent to find out how the application of multimedia affects the interest and retention of mid basic pupils in Basic Science.

Purpose of the Study

The purpose of this study is to investigate the effect of multimedia instructional approach on the interest and retention of mid basic II pupils in Basic Science. Specifically, the study sought to:

1. determine the effect of multimedia instructional approach on the interest of mid basic II pupils in Basic Science.
2. determine the effect of multimedia instructional approach on the retention of mid basic II pupils in Basic Science.

Research Questions

The following research questions guided the study:

1. What is the mean interest scores of male and female pupils taught Basic Science using multimedia instructional approach?
2. What is the mean retention scores of male and female pupils taught Basic Science using multimedia instructional approach?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean interest scores of male and female pupils taught Basic Science using multimedia instructional approach.
2. There is no significant difference in the mean retention scores of male and female pupils taught Basic Science using multimedia instructional approach.

Scope of the Study

The study focused on the effect of multimedia instructional approach on teaching mid basic II Basic Science pupils in Abuja, Nigeria. The content scope was; Reproductive system in mammals.

METHODOLOGY

Quasi experimental research design was employed for the study. The sample for study comprised Eighty-five mid basic II Basic Science pupils from two intact classes purposively selected from two private co-education schools in Federal Capital Territory, Abuja, Nigeria. The schools were purposively sampled based on equivalence in laboratories, ICT facilities and manpower. The schools were randomly assigned to experimental groups (taught using Multimedia Instructional Approach (n = 40)), and the control group (taught using Guided Discovery (n = 45)).

Two instruments were used for data collection namely; Pupils’ Interest in Basic Science rating scale (PIBS) and Basic Science Retention Test (BSRET). PIBS contained 10 items designed to determine students’ interest in Basic Science. PIBS was rated using a four-point rating scale. The options were; Strongly agreed (SA) = 4 points, Agree (A) = 3 points, Disagree (D) = 2 points and Strongly Disagreed (SD) = 1 point. Basic Science Retention Test (BSRET) was a 15-item instrument with options A – D in reproductive system in mammals. The test was validated by experts in Science and Technology Education and were trial tested. The reliability of PIBS was determined using Cronbach Alpha and the coefficient obtained was 0.79 while Kuder-Richardson formula 21 (K-R₂₁) was used to determine the reliability of BSRET and the reliability coefficient was found to be 0.80 implying that the instruments were reliable enough for the study.

RESULT

Descriptive statistics of mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the research hypotheses at 0.05 alpha level of significance.

Research Question One

What is the mean interest score of male and female pupils taught Basic Science using multimedia instructional approach?

The data used to answer this research question is presented in Table 1.

Table 1

Means and Standard Deviation of Male and Female Pupils’ Interest Using Multimedia Instructional Approach

Group	Type of Test	Male			Female		
		X	SD	N	X	SD	N
Multimedia	Pretest	17.12	3.10	21	15.55	2.76	19

	Posttest	30.42	2.30	21	27.98	3.01	19
Guided Discovery	Pretest	12.01	3.00	25	11.07	3.23	20
	Posttest	21.15	2.87	25	17.52	2.76	20

Table 1 reveals that male pupils had a higher mean interest score than their female counterparts.

Research Question Two

What is the mean retention score of male and female pupils taught Basic Science using multimedia instructional approach?

The data used to answer this research question is presented in Table 2.

Table 2

Means and Standard Deviation of Male and Female Pupils' Retention Using Multimedia Instructional Approach

Group	Type of Test	Male			Female		
		X	SD	N	X	SD	N
Multimedia	Pretest	19.50	2.95	21	17.75	2.76	19
	Posttest	32.26	3.30	21	28.43	2.01	19
Guided Discovery	Pretest	15.10	2.10	25	13.17	2.23	20
	Posttest	25.25	2.57	25	22.52	2.43	20

Table 2 shows that male pupils had a higher mean retention score than their female counterparts.

Hypothesis One

There is no significant difference in the mean interest score of male and female pupils taught Basic Science using multimedia instructional approach.

Table 3

Result of Analysis of Covariance of Male and Female Pupils' Interest Taught Basic Science Using Multimedia Instructional Approach

Source of Variation	Sum of Square	Df	Mean Square	F-calculated	F-critical
Covariance Pre-interest	1543.02	1	39.62		
Mean Effects	2535.22	2	2421.72	15.04	
Multimedia*Gender	25975.84	3	25975.84	10.03	1.89
Residual	54016.55	79		11.06	1.30

Total	84070.63	85
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Table 3 revealed a significant difference in the interest of male and female pupils taught Basic Science concept using multimedia instructional approach. The calculated F-value was 10.03 as against the critical F-value of 1.89 at 0.05 level of significance. Therefore, the hypothesis was rejected, since the calculate F-value was greater than the critical F-value.

Hypothesis Two

There is no significant difference in the mean retention score of male and female pupils taught Basic Science using multimedia instructional approach.

Table 4

Result of Analysis of Covariance of Male and Female Pupils’ Retention Taught Basic Science Using Multimedia Instructional Approach

Source of Variation	Sum of Square	Df	Mean Square	F-calculated	F-critical
Covariance Pre-test	597.02	1	532.09		
Mean Effects	11535.22	2	31.72	41.22	
Multimedia*Gender	295.64	3	295.64	19.73	1.89
Residual	433.07	79		19.06	1.30
Total	84070.63	85			

Table 4 revealed a significant difference in the retention of male and female pupils taught Basic Science concept using multimedia instructional approach. The calculated F-value was 19.73 as against the critical F-value of 1.89 at 0.05 level of significance. Therefore, the hypothesis was rejected, since the calculate F-value was greater than the critical F-value.

Discussion

The findings of this study revealed that the use of Multimedia Instructional Approach had significant effect on pupils’ interest in Basic Science. The pupils taught using Multimedia Instructional Approach had significant interest than those taught using the Guided Discovery Method. This result is in agreement with the findings of (Furo, 2015; Nwafor & Okoi, 2016; Gambari & Yusuf, 2017) who reported that students taught science using audio and visual assisted instruction develop significant interest than those taught without.

In relation to retention, the findings of this study revealed that the use of Multimedia Instructional Approach had significant effect on pupils’ retention in Basic Science. This result is in agreement with the findings of (Nwanekezi & Kalu; 2012 and Akbiyik & Akbiyik; 2010) who reported that pupils taught Basic Science using multimedia assisted instruction retain higher than those taught without.

Conclusion

The findings of this study revealed significant differences in the interest and retention of male and female mid basic II pupils taught Basic Science concept using Multimedia Instructional Approach.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Basic Science teachers should incorporate multimedia instructional approach which has been found to increase pupils interest and enhance retention.
2. Government should ensure adequate provision of media aided instructional materials for the effective teaching and learning of Basic Science.

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