EFFECTS OF INTERACTIVE MULTIMEDIA INSTRUCTION ON SOCIAL STUDIES STUDENTS' ACADEMIC ACHIEVEMENT AND RETENTION IN JUNIOR SECONDARY SCHOOLS IN ZARIA EDUCATION ZONE

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Abstract

The study examined the effects of interactive multimedia instruction on social studies students' academic achievement and retention in junior secondary schools in Zaria Education Zone, Kaduna State, Nigeria.Two research questions and their corresponding null hypotheses were stated. The design of the study was the non-equivalent pre-test post-test control group type of quasi experiment. The population of the study consisted of JSSIII Social Studies students in Zaria Education Zone, Kaduna State. There is a total number of 26322 JSSIII students consisting of 14178 male and 12144 female students in the study area. Purposive sampling technique was used and the sample size of 120 was purposively utilized. The study used two instructional packages called Social Studies Interactive Multimedia Package (SOSIMP) to assist in the teaching of experimental group and Social Studies Conventional Lecture Method (SOSCOLM) for the control group. Social Studies Achievement Test (SSAT) was the data collection instrument. The content and construct validity of the instrument was determined by experts in social studies and test and measurement. The reliability coefficient index of the instrument was 0.786. Arithmetic means and standard deviations were used to answer the questions posed while One Way Analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 alpha. The study found that the use of interactive multimedia instruction (IMI) in teaching Social Studies enhances students' academic achievement and retention ability in junior secondary schools in Zaria Education Zone, Kaduna State, Nigeria. Some recommendation were proffered which include the need for changing teaching methods to empower students by embracing technology in Social Studies lesson in junior secondary schools.

Key Words: Academic Achievement,Effects, Interactive Multimedia, Retention, Social Studi.

Introduction

The quality of education depends on the availability of resources in the school, and the academic achievement of students depends greatly on the teachers' knowledge, skill and attitude towards technology integration in teaching and learning. Schools that have qualified teachers, interactive teaching and learning materials, conducive learning environment can provide qualitative and quantitative education for its learners.The choice of effective, adequate and relevant teaching technique by a qualified Social Studies teacher putting into consideration the topic to be taught and the students' level and ability is the starting point and a foundation for attaining effective transaction and communication between teacher and students in social studies classroom (Salihu, 2015).

Adoke (2015) opined that any established school curriculum calls for means of its effective implementation in order to achieve the desired objectives for which it is' intended. Teaching strategies are very vital in the teaching-learning process. The method adopted by the teacher may promote or hinder learning. According to Yerima (2007), effective methods stimulate students' interest in a topic, which is the bases for achieving desired objectives or it may discourage their initiatives and curiosity.

The purpose of teaching and learning resources is to provide a source of learning experiences for students. They should be able to facilitate interaction among students and teachers during the teaching/learning process, as well as to help students to learn, broaden students' learning experiences and meet different learning needs. If used effectively, teaching and learning resources can help students to construct knowledge for themselves and develop effective learning strategies, generic skills, values and attitudes, thus laying a solid foundation for life-long learning.

There are techniques that encourage the development of creativity, ability or provide experience not easily secured in any other way. Application of Information and Communication Technology (ICT) in teaching and learning has been widespread and popular with students and teachers. It

promotes learning and teaching skills. One of the interesting aspects of ICT application is Interactive Multimedia Instruction (IMI).Similarly, Augustyn (2019) sees it as any computer-delivered electronic system that allows the user to control, combine, and manipulate different types of media, such as text, sound, video, computer graphics, and animation. It is used to describe a scientific and creative research field within "multimedia" that supports expression or communication through multiple media with the ability to influence and alter their content and context (Deliyannis, 2012).

By Interactive multimedia, educators usually refer to the use of multimedia and Information Communication Technology (ICT) equipment to offer an effective dialogue between the resource materials- indirectly with the instructor and the students in comparison with traditional methods of teaching which may lack such interactivity (Nusir, Alsmadi, Al-Kabi&Shardqah, 2011). Moreover, multimedia has the potential to create high quality learning environments especially for students, with the capability of creating a more pragmatic learning context through its different medias- text, graphics, sound, animation and so on which will enhance students' academic achievement and retention in Social Studies.

Academic achievement entails students learning outcome over a given period of time. Academic performance by Scortt (2012) refers to how well a students are attaining their tasks and studies. Also Okorie (2014) academic achievement is the ability to study and remember fact and being able to communicate one's knowledge verbally or written on paper. Grades is one of indicators of students' academic achievement. On the other hand, retention entails recollection of the learned contents. It is the ability to possess, use or keep information and ability to reproduce past experiences or previously familiar materials. Retention according to Ngwoke and Eze (2010) is the process by which a child stores information in his memory for use at a later period. Retention occurs when facts or experiences are stored in the long term memory. A student may be able to memorize facts in the short term, but may not retain those facts over the long term memory. Ngwoke and Eze (2010) believed that knowledge and skills are meant to be used not to be stored in the memory, much of the experiences one thinks are not retained were never stored in the long term memory system.

Various studies have indicated that interactive multimedia instruction enhances students' academic achievement and retention compared to traditional/conventional expository methods. Some of these studies include Owolabi and Oginni (2013); Salihu, Abdullahi, Alfa and Muhammed (2015); Cyril (2016); Sani (2019); Algerioy (1999); Losike-Sedimo (2006); Reis (2007); Umar, Idris, Audu, Arah, Yusuf and Beji (2016); Ijhedo (1995), Maurice (2000); Brashears, Akers and Smith (2005), Wickens (2008) and Nkweke (2010).

Despite the fact that studies have proven that interactive multimedia instruction enhances students' academic achievement and retention, very few teachers of Social Studies try to utilize it for the benefit of promoting students learning especially in this 21st century where teaching and learning is undergoing massive restructuring, remodelling and revitalization to suit the current demands and also to stand the test of time. Many teachers of Social Studies are still accustomed to traditional methods of teaching especially the lecture and didactic techniques despite the availability of learner-centered and activity-based teaching strategies that were proven by research findings to be effective in enhancing students' academic achievement and retention. This has contributed to poor academic performances among students in Social Studies as a subject especially at Junior School Certificate Examinations (JSCE). In the light of the foregoing, this study examines theeffects of interactive multimedia instruction (IMI) on Social Studies students' academic achievement and retention in junior secondary schools in Zaria Education Zone, Kaduna State, Nigeria.

Objectives of the Study

The major objective of this study was to examine theeffects of interactive multimedia instruction (IMI) on Social Studies students' academic achievement and retention in junior secondary schools in Zaria Education Zone, Kaduna State, Nigeria. The study was guided by the following specific objectives:

i. to find out the mean academic achievementscores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method;
ii. to determine the mean retention scores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method.

Research Questions

The study answered the following questions:

i. What is the difference in the mean academic achievement scores of students taught Social Studies using interactive multimedia Instruction and those taught using conventional lecture method?

ii. What is the difference in the mean retention scores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method?

Null Hypotheses

The study tested the following null hypotheses at 0.05 alpha level of significance:

$H0_{1:}$ There is no significant difference in the mean academic achievementscores of students taught using interactive multimedia instruction and those taught using conventional lecture method;

$H0_{2:}$ There is no significant difference in the mean retention scores of students taught using interactive multimedia instructionand those taught using conventional lecture method.

Methodology

This study employed Quasi-experimental research design. Precisely, the non-equivalent pre-posttests comparison design was adopted. According to Salihu (2015) the design requires a pretest and post-test for a treated and comparison group. It is a design in which the effects of a treated or intervention are estimated by comparing outcomes of a treatment group and a comparison group but without the benefit of random assignment (Salihu, 2015). The design is presented below.

$EG \rightarrow O_1 \rightarrow X_1 \rightarrow X_0 \rightarrow O_2 \rightarrow O_3$
$CG \rightarrow O_1 \rightarrow X_1 \rightarrow X_0 \rightarrow O_2$

Key

EG- Experimental Group
CG- Control Group
O_1- Pre-Test
X_1- Treatment
X_0- Teaching Method
O_2- Post-Test
O_{3-} Post-Post Test

The population of the study consisted of JSSIII Social Studies students in Zaria Education Zone, Kaduna State. There is a total number of 26,322 JSSIII students consisting of 14,178 male and 12,144 female students respectively based on the official data obtained from Zaria Education Zone office 2017. Two schools were purposively selected in the study area because of the availability of computer laboratory and internet connectivity needed to expose the students in the experimental group to Social Studies instructional multimedia package. The schools were Alhudahuda and Barewa Colleges, Zaria.

The study purposively used 120 participants of which 60 of them were used as experimental group and the other 60 were controlled. The student participants were randomly selected from other members of the class. The decision of picking sample size was based on the opinion of Olayiwola (2010) who suggested 15-30 participants for this kind of study.

The study used an instructional package called Social Studies Interactive Multimedia Package (SOSIMP) to assist in the teaching of experimental group. The package consisted of hypertext, animation, pictures and sound to assist the students in learning natural and artificial environment of man and their features. On the other hand, conventional lecture method was followed to teach students considered as control group. Printed instructional materials were used as complement. The instructional package was named Social Studies Conventional Lecture Method (SOSCOLM).

The students were pretested before being exposed to the packages. The teacher-made test used to evaluate the students learning was named Social Studies Achievement Test (SSAT). The pre and post tests were marked and scored over 100.The content and construct validity of the instrument was determined by experts in Social Studies and test and measurement. The reliability coefficient index of the instrument was 0.786 which was obtained through Guttmann slit halves procedure. The post-post test was conducted at the interval of two weeks from the post-test to determine the retention ability of the students.

The data for the study were the scores of the teacher made-test (SSAT) obtained from the pre-test and post-test administered to the control and experimental groups. The study's research questions were answered using means and standard deviation. Analysis of Covariance (ANCOVA) was used in testing the null hypotheses at 0.05 alpha level of significance.

Results

Research Questions

Research Question One: What is the difference in the mean academic achievementscores of students Social Studies taught using interactive multimedia instruction and those taught using conventional lecture method?

Table 1: Descriptive Statistics on the Difference in the Mean Academic AchievementScores of JSS III Social Studies Students in Experimental and Control Groups

Group	N	Pre-test		Post-test		Mean Difference
		Mean	SDev	Mean	SDev	
Experimental	60	48.95	13.89	68.17	8.08	19.22
Control	60	50.04	12.48	51.76	11.54	1.72
Mean Difference		1.09		16.41		17.50

Result in Table 1 shows the difference in pre-test and post-test mean academic achievement scores of JSSIII Social Studies students taught using interactive multimedia instruction (IMI) and those taught using conventional lecture method. It indicates that the pre-test mean scores difference of the two groups was 1.09, which suggests that the groups were almost at the same level in terms of mean academic achievement prior to the treatment. The gained mean academic achievement scores of experimental group after treatment stood at 19.22, while the gained mean academic achievement scores of the control group was 1.72. The post-test mean difference between the two groups was 16.41 in favour of the experimental group.

Research Question Two: What is the difference in the mean retention scores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method?

Table 2: Descriptive Statistics on the Difference in the Mean Retention Scores of JSS III Social Studies Students in Experimental and Control Groups

Group	N	Post-test		Post-post test		Mean Difference
		Mean	SDev	Mean	SDev	
Experimental	60	29.27	8.83	57.64	13.02	28.37
Control	60	29.23	8.94	36.89	8.89	7.71
Mean Difference		0.04		20.75		20.66

Result in Table 2 reveals the mean retention scores (post-post-test) of 57.64 for students in the experimental group with standard deviation of 13.02, while the control group has a mean retention (post-post-test) score of 36.89 standard deviation of 8.89. Students in the experimental group gained by mean retention difference of 28.37, while those in the control group gained by mean difference of 7.71. The difference in the post-post-test mean retention scores of the two groups stood at 20.75 in favour of experimental group.

Null Hypotheses

$H0_1$: There is no significant difference in the mean academic achievementscores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method.

Table 3: One Way Analysis of Covariance on the Difference in the Mean Academic AchievementScores of experimental and Control Groups

Source of Variation	Sum Squares	Df	Mean Squares	F	Sig	Eta Squared
Corrected Model	33432.995[a]	2	16716.497	328.682	.000*	.698
Intercept	21222.617	1	21222.617	417.282	.000*	.595
Treatment	14132.577	1	14132.577	277.877	.000*	.495
Method	20660.154	1	20660.154	406.223	.000*	.598
Error	14444.002	117				
Total	**1071141.000**	**120**				

* Significant at P< .05

The results of Table 3 shows that there is significant difference in the mean academic achievement scores of students taught using interactive multimedia instruction and those taught using conventional lecture method. The calculated F-value 406.223 indicated that method is a significant factor on students' academic achievement in Social Studies at P<0.05. The effect size (eta squared = .598) suggests that 59.8% of the difference in academic achievement scores is due to method of teaching. Thus, the hypothesis which stated that there is no significant difference in the mean academic achievement scores of students taught using interactive multimedia instruction and those taught using conventional lecture methodis therefore rejected.

The implication of these results is that interactive multimedia instruction employed for the experimental group enhanced the students' academic achievement in the learning of social studies than did the control group.Hence, it is inferred that the use of interactive multimedia instruction enhanced students' academic achievement in Social Studies in junior secondary schools in Zaria Education Zone, Kaduna State, Nigeria.

$H0_2$: There is no significant difference in the mean retention scores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method.

Table 4: One Way Analysis of Covariance on the Difference in the Mean Retention Scores of Experimental and Control Groups

Source of Variation	Sum Squares	Df	Mean Squares	F	Sig.	Eta Squared
Corrected Model	44698.275[a]	2	22349.138	299.653	.000*	.678
Intercept	14263.732	1	14263.732	191.245	.000*	.402
Post-post test	13840.567	1	13840.567	185.571	.000*	.395
Method	30772.596	1	30772.596	412.592	.000*	.592
Error	21181.718	117	74.584			
Total	698266.000	120				
Corrected Total	**65879.993**	**120**				

* Significant at P< .05

Results of Table 4 shows that there is significant difference in the mean retention scores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method. It indicates that method is a significant factor on students' retention in Social Studies at P<0.05, with F-value of 412.592. The effect size (eta squared = .592) suggests that 59.2% of the difference in retention scores is due to method of teaching. Thus, the hypothesis which stated that there is no significant difference in the mean retention scores of students taught Social Studies using interactive multimedia instruction and those taught using conventional lecture method is therefore rejected. Hence, the use of interactive multimedia instruction enhanced retention in Social Studies among junior secondary school students in Zaria Education Zone, Kaduna State, Nigeria.

Findings of the Study

In the light of the foregoing, it was found that:

i. the use of interactive multimedia instruction (IMI) in teaching Social Studies enhances students' academic achievement in junior secondary schools in Zaria Education Zone, Kaduna State, Nigeria;

ii. interactive multimedia instruction (IMI) enhances the retention ability of junior secondary school students in Social Studies in Zaria Education Zone, Kaduna State, Nigeria.

Discussion of Findings

The findings of the study indicated that the use of interactive multimedia instruction (IMI) in teaching Social Studies enhances students' academic achievement and retention ability in junior secondary schools in Zaria Education Zone, Kaduna State, Nigeria.

In line with current finding, Owolabi and Oginni (2013) study shows that there was a significant different in the achievement of students exposed to cartoon style multimedia teaching and those that are conventionally taught. In the same vein, Salihu, Abdullahi, Alfa and Muhammed (2015) corroborates the current findings as it discovered that; upper Basic Level students who were taught by way of interactive multimedia instruction (IMI) outperformed their counterparts who were taught through conventional lecture method (CLM).Similarly, Yahaya (2015) study as lend credence to the current study as it foundthat students taught using lecture method supplemented by multimedia resources out-performed their counterparts taught with lecture method only.Cyril (2016) findings indicated that students in the experimental group performed better in mechanical craft practice and in retention test than those in the control group. Hence, he concluded that multimedia instructions have more effect on learning achievement and retention of skills in craft practice.

Corroborating the current finding Sani (2019) discovered that and that significant difference was found in the mean academic performance and retention level of pupils taught social studies using multimedia resources than pupils taught using traditional method.Similarly, Umar, Idris, Audu, Arah, Yusuf and Beji (2016) findings shows that multimedia instruction is more effective in improving student's achievement and retention in auto-mechanics than conventional method. There was significant difference in the student's achievement and retention mean scores in favouring students in the experimental group.

Contrasting the current findings, Algerioy (1999) study found out no statistically-significant differences, between the average achievement of the experimental group students and those belonging to the control group, in remembrance, understanding and application level. Similarly, Losike-Sedimo (2006) study show that there are numerous benefits for engaging multimedia in teaching. Reis (2007) study indicate that the standard video player was the most effective overall, which suggests that media designs able to control the focus of a learner's attention to one specific stream of information, a single-stream focused approach, may be the most effective way to present media-based content.

Conclusion

Interactive Multimedia Instruction (IMI) is a new way of assisting students to learn at their own phase. It is an effective way of appealing to the senses of the learners; sight, hearing. By and large, it enhances active involvement of the students in all the learning taxonomies, thus, promoting effective transaction and communication between the teacher, the learner and the learning materials.

Recommendations

In the light of the above, the study made the following recommendations:

i. There is the need for Kaduna State government to build and equipped computer laboratories in each secondary school in the state. This will assist in effective utilization of IMI as viable instructional strategy for the 21st century teaching and learning;

ii. There should be training and retraining of teachers on computer applications especially on interactive multimedia instruction (IMI).

iii. The study concludes that there is a need for changing teaching methods to empower students by embracing technology.

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