Effects of Over-head Projector on Senior Secondary School Students' Achievement and Retention in Geography in Bosso Local Government Area of Niger State

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Abstract
The study investigated the effects of overhead projector on senior secondary school students' achievement and retention in geography in Bosso Local Government Area, Niger State. Pretest-posttest experimental –control group design was adopted for the study. The population of the study made up of six hundred and fifty (650) senior secondary school (SS1) students in public senior secondary schools within Bosso Local Government Area. The sample size for the study is eighty- eight (88). Two research questions and two hypotheses guided the study. Two public senior secondary schools were purposively chosen for the study while two intact classes from these schools were randomly assigned to experimental and control group. Geography Achievement Test (GAT) and Geography Retention Test (GRT) was used as instrument for data collection. The instruments were validated by two experts from Educational Technology Department and two experts from Geography Department, Federal University of Technology Minna. The instruments for data collection (GAT) was trial tested using test-retest method at an interval of two weeks, the reliability of the GAT was determined using Pearson-Product Moment Correlation (PPMC) Coefficient statistics. The result obtained was 0.78. Mean, standard deviation and t-test statistics were used to analyze the data collected. The result of the study revealed that the utilization of overhead projector did not enhance students' academic achievement hence control group had mean (13.07) while experimental group that was taught with over-head projector had mean(9.52). Gender also revealed that female students retained higher than male students when taught using overhead projector. Based on these findings, it was recommended that secondary school teachers should be trained in appropriate and effective utilization of overhead projector and encouraged to incorporate its use in teaching and learning of geography in Senior Secondary Schools in Niger State.

Keyword: Achievement, Effects, Geography, Over-head Projector, Retention.

Introduction
Geography can be defined as the scientific study of the earth's surface, physical features, divisions and population. The earth as the focus of geographical study is known as "theatre" where virtually all human activities are carried out. Therefore, it is only plausible and imperative that man knows about the nature and characteristics of the earth and the consequences of the interactions between man and his environment (Egunjobi, 2002).Geography as a field of study integrates diverse concepts and skills, and is dynamic in nature, it demands availability of a variety of resources such as technologies for effective teaching and learning (Atere, 2006).

The use of technologies for classroom teaching and learning cannot be over emphasized in terms of effective performance and productivity.Lazar (2015) defined Educational Technology as thesystematic and organized process of applying modern technologies,analyzing and evaluating to improve the quality of teaching and learning. The use of educational technology in instruction enable learner to comprehend material taught, move at his own pace, repeat the material not sufficiently clear, get results of the performance and also track down the student progress.

Instructional material refers to human and non-human materials and facilities that can be used to ease, encourage, improve and promote teaching and learning activities. These include any kind of materials used in the process of instruction. Instructional materials are defined as resources that are organized to support instruction. Instructional materials are made up of printed materials, audio visuals, projectors, television, computers and multimedia which serve as aids in the successful delivery of instructions in the classroom (Oriade, 2000).

There are different kinds of educational technology

materials that are used for instruction in education. These include overhead projector, Opaque projector, internet, interactive digital television, video, radio, cameras, computers/computer assisted instruction, and multimedia facilities. In this study over-head projector will be employed to determine its effects on achievement and retention of geography students.

Overhead projector can be described as the most effective, simple and cost effective projecting instrument in the educational process. The overhead projecting system consist of the projector and the transparencies, the projector is the media and the transparencies is the material. The overhead projector is a box shaped and has a large aperture, light from a powerful lamp inside the box is always condensed by a special type of lens (Fresnel lens) and passes through a transparency of about 25 by 25cm, placed on the aperture. A lens and a mirror system mounted on a bracket above the box turn the light beam 90° and project the image back over the shoulder of the presenter or instructor into the screen or wall. It can be used effectively in classroom instruction and it works well for large group of learners than individualized instruction (Tukura, 2001).Perlberg (2015) stated that although overhead projector is fast fading but still remain relevant as one of the earliest classroom teaching device. Generally, many teachers find chalkboard to be a thing of the past with the advent of projectors in the classroom. Rather than writing notes across board, consequently teachers and students alike find projectors to be useful classroom devices in the 21st century because students can ask teachers to repeat or playback information not clear or understood. According to Ndak (2003) overhead projector enables the teacher to face learners from the front of an illuminated room and project on the screen above and behind him, the teacher can write, sketch and erase when presenting lectures. Transparencies can be prepared in advance and used at the discretion of the teacher and progressive disclosure can be easily achieved by simply covering that portion of the transparency on the instructional material.

The instructional techniques or strategy employed in teaching of geography in most Nigerian secondary schools is the lecture method. Ezenwa (1999) observed that this method leads to poor performance of secondary school students in public Examination. According to Oriade (2000) Instructional materials have the characteristics of holding attention of students because they reinforce verbal messages by providing a multi-media approach. Oriade (2000) pointed out that no matter how good a curriculum maybe, absence of the use of instructional materials can jeopardize its effective implementation. Instructional materials are seen as an improvement and great relief for teachers in impacting knowledge and making the message clearer, more interesting and easier for the learners to assimilate thereby enhance achievement (Oriade, 2000).

Achievement, simply mean accomplishing whatever goal set out for a programme. Achievement is doing what you want to do within the bounds of the law, it is the pursuit of dreams. It is the realization of a dream fulfilled. However, it is important to know that accomplishing goals is done through the fire of your Will (Riccards, 2007). Academic achievement is the extent to which a student, teacher or institution has achieved the educational goals, the outcome of education. Individual differences in academic performance have been linked to differences in intelligence and personality. Students with higher mental ability as demonstrated by intelligent quotient(IQ) test and those who are higher in conscientiousness tend to achieve and retain higher in academic settings.

According to Bichi (2002) retention is the ability to later remember information or knowledge gained after learning. Retention involves the ability to recall the content that has been given within a specific period of time. It is the ability to demonstrate what the learner has learnt and being able to demonstrate cognitive skills in the subject (Wushishi, Danjuma& Usman, 2013).However, pupils' ability to reproduce the learnt material could be through the use of appropriate instructional methods like innovative teaching strategies in teaching. Learning could be made more effective, lasting and enjoyable and topics that are abstract to students could be made clearer, easier and meaningful for better achievement of concept learnt. Hornby (2001) stated that using overhead projector both high and low ability learners would be able to collaborate in terms of understanding, explaining and retaining the concepts learnt in geographyirrespective of gender.

The concept of gender is used to describe those characteristics of men and women that are societal determined in contrast to those which are scientifically determined which affect the use of computer in teaching and learning of science concepts (Victoria, 2005). Gender difference is one of the factors affecting learning and many researchers such as Gambari, (2004) and Dantala, (2005) have focused attention on studies relating to effect on students' academic achievement. Studies on the influence of gender on achievement have not

produced conclusive results. Some findings indicated that significant differences existed between the achievement of male and female students. Other findings showed that gender factor had no influence on students' achievement (Yusuf, 2004). The author noted that gender has no impact on students' academic achievement. This evidence in academic achievement due to gender had resulted in the need to verify the effects of over- head projector on secondary school students' achievement and retention in geography.

Statement of the Problem

Over the years, the teaching and learning of Geography in schools has not received the desired attention. Geography is perceived to be a very difficult subject to comprehend due to limited inventory, for instance teachers always teach with the aid of chalk boards, text books and lecture method, this method has been found to be inadequate for effective teaching and learning. According to WAEC Chief Examiners reports, 2009, 2010, and 2011, indicated declining achievement of students in Geography examinations. The results revealed that secondary schools students achievement in geography examinations were highly declining, very poor and worrisome.

It is against these background that these research examine the effects of overhead projector as an instructional aid ons tudent's achievement and retention in Geography in Senior Secondary Schools in Bosso Local Government Area of Minna, Niger State.

The objectives of the study are:

1. To determine the effects of over-head projector on students achievement and retention in geography.
2. To determine gender effect of over-head projector on male and female student achievement and retention in geography.

Research Questions

The study attempt to find answers to the following questions:

1. What is the difference in mean scores of the experimental group taught geography with over-head projector and control group taught with lecture method?

2. Will the use of overhead projector enhance male and female studentachievement and retention when taught geography?

Research Hypotheses

$H0_1$: There is no significant difference between the meanachievement scores of the experimental group taught geography with over-head projector and those taught with lecture method.

$H0_2$: There is no significant gender difference in geography achievement scores when taught with over-head projector.

Research Methodology

The research design adopted for this study ispretest posttestexperimental and control group design. This is to measure the degree of change occurring as a result of treatment and to address some of the issues arising with assignment bias and the allocation of participant to groups.

The population of the study comprised all senior secondary school one (SS1) students, who offer geography in public secondary schools within Bosso Local Government Area of Niger State. The sample for the study was selected from two co-educational schools in Bosso Local Government Area of Niger State.

The sample size for this study was eighty-eight(88) students drawn from two public co-educational schools. The sampling technique used is multi-stage sampling technique. Purposive sampling technique was first used to select two schools with similar characteristics (in terms of facilities, staffing, and location). Secondly, random sampling was used to select one intact class from each school.

Two instruments were used for data collection in this study. They are the GeographyAchievement Test (GAT) and Geography Retention Test (GRT). Specifically, the questions were drawn from relief and vegetation unit of geography content. The GAT was used for both pre-test and post-test. It consist of 30 items of multiple choice objective test items. Each objective question has 4 options A-D, one mark was allocated to each question.The test is designed to measure students' cognitive achievement in the relief and vegetation system concepts. The GRT was used to determine the extent to which the experimental group differed in remembering the contents taught and it was administered two weeks after the achievement test. The retention test is the same as the achievement test, except that, the items in the achievement test were re-organized.

The research instruments was subjected to face and content validity by two experts, one from Department of Science Education and the other one from Department of Educational Technology, Federal University of Technology, Minna. The instruments were validated in terms of clarity of items, linguistic accuracy and appropriateness of the instruments for the purpose of the study. The test items where corrected on the bases of criticism, suggestion and recommendations of the validators before the final version of the instruments was used. Government Day Secondary School, Bosso was used for the reliability of the instruments because it was not among the sampled schools used for the study. Trial testing was done in order to determine the reliability of the instrument. Test-retest method was used in the administration. The scores were collated and analyzed using Pearson-Product Moment Correction (PPMC) Formula and r=0.78 was obtained indicating that the instruments are reliable for the study.

The researcher went with an introductory letter from the Department of Science Education, Federal University of Technology Minna to the authorities of the selected schools under study, to enable the researcher carry out the research work in the schools. The structured geography achievement test (GAT) was administered to both the experimental and control group as pre-test with the help of trained research assistants before the commencement of teaching. The students' performance on the GAT was recorded and stored for reference. The experimental group was taught the relief and vegetation system of Nigeria using the overhead projector and the control group was thought the same topic using lecture method.

The researcher administer the GAT as posttest to the two groups after been thought for four weeks. The students' scores from the posttest were collected and subjected to data analysis. The retention test was administered to the students two weeks after the experiment. Retention test was employed to determine how the two groups differ in remembering the content learnt.

The mean (X), standard deviation (S.D), and t-test statistics were used to analyze the data collected. The level of significance adopted for the study was 0.05. This level of significance form the basis for accepting or rejecting each of the hypothesis.

Results

Two null hypotheses were formulated and tested in this study. The main aim was to determine if there are significant differences in terms of achievement and retention scores.The summary of data analyzed and results are presented below.

Table 1: Summary of Independent t-test of the Pretest Mean Achievement Score of the Experimental and Control group.

Variable	*N*	*df*	*Mean*	*SD*	*t-cal (calculated)*	*p-value*	*Remark*
Experimental Group	44	43	9.35	3.215	1.242	1.573	NS
Control Group	44		9.17	2.981			

NS: not significant at ≤0.05

Table 1 shows that the calculated t-value of 1.242 is lower than the p - value of 1.573. This shows that there is no significant difference at 0.05 level of significance in the pretest scores of the experimental and control groups. This implies that the subjects in both groups were at the same entry level with regard to their previous knowledge of the subject before the geography topics were presented to them. The mean scores were statistically at the same level(9.35 and 9.17).

HO_1: There is no significant difference in the performance scores of the students taught geography with overhead projector and those taught with lecture method.

Table 2: Summary of Independent t-test analysis of the Posttest Mean Achievement Scores of Experimental and control group.

Variable	*N*	*df*	*Mean*	*SD*	*t-cal (calculated)*	*p-value*	*Remark*
Experimental Group	44	43	9.52	3.265	3.421	0.152	NS
Control Group	44		13.07	5.026			

*NS at p≤ 0.05

The posttest statistical analysis on table 2 shows that there is no significant difference in the scores of experimental and control groups. The t-value (calculated) at 3.421 is greater than the p-value of 0.152, it means that there was no significant difference in the performance of the experimental group taught with the overhead projector and the control group taught without the overhead projector. The null hypothesis was therefore retained.

HO_2: There is no significant difference in the mean scores of male and female students taught geography with the overhead projector.

Table 3: Summary of Independent t-test of the Posttest Mean Achievement and Retention Scores of Male and Female Geography Student in the Experimental group.

Variable	*N*	*df*	*Mean*	*SD*	*t-cal (calculated)*	*p-value*	*Remark*
Male	24	43	7.45	3.931	4.36	0.46	S
Female	20		13.41	0.886			

***Significant at p≤ 0.05**

Table 3showsthe mean, standard deviation and t-value of the geography achievement test for male and female students. The analysis shows that there was difference in the scores of the two groups. The t-value (calculated) of 4.36 is greater than the p-value of 0.46, female performed better than male. The null hypothesis was therefore rejected.

Discussion of Findings

The result of the data analyzed shows that there was no difference in the pre-test academic achievement of students in the experiment group with mean achievement (9.35) and those in control group (9.17). This implies that there was no difference in the mean achievement of students in terms of their previous knowledge, this mean that the subjects in both groups were at the same entry level with regard to the subject before the commencement of study. This finding is inline with the study byTukura (2001) who stated that a pretest may increase the likelihood that an individual will do better on the subsequent posttest when it is identical to the pretest.

The result of the data analyzed in table 2 shows that the experimental group taught with overhead projector had mean achievement of (9.52) which was lower than the control group taught with lecture method with mean achievement of (13.07). This implies that there was no significant difference in the mean achievement of students taught using overhead projector and those taught with lecture method. The corresponding hypothesis onewas retained, since the t–value (calculated) at (3.421) is greater than the p-value of (0.152). This means that the overhead projector did not enhance the teaching and learning of geography when compared with lecture method. The finding from the study agree with findings of Julia (2002) and Bob(2002) that the use of instructional technology facilities in the teaching and learning process could stimulate students` interest in learning and consequently enhance performance in respective subjects.

Table 3 shows that the mean achievement of the male (7.45) is lower than the female students with mean achievement of (13.41).It implies that there was a difference in the male and female student taught using overhead projector. Thus, the null hypothesis two was rejected, since the t-value (calculated) at (4.36) is greater than the p-value of (0.46). This means that female performed better than their male counterpart. The result is in agreement with the findings of Karthigeyan and Nirmala (2012) who conducted a study on student in English language analyzed and assess gender difference in academic achievement of 10th class students in Salen and Sankari educational district of Tamil Nadu foundthat female students performed better than their male counterpart.

Conclusion

The study investigated the effects on the use of overhead projectors in teaching geography in secondary schools. The result of the study revealed that student taught with overhead projector scored lower in the geography achievement test (GAT) than those taught with lecture method. The overhead projector also had a significant effect on the performance of females' students than on the male students as female performed better than the males' students.

Recommendations

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

1. Teachers in the secondary schools should be encouraged to use overhead projector in teaching geography. This will make the teaching and learning of geographyto be more effective, meaningful and interesting.

2. Government at all level should provide adequate funds for purchase of relevant instructional materials for schools.
3. Stake holders in education from primary to tertiary levels should organize seminars, workshops, and conferences for teachers particularly on the appropriate methodology of teaching.

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