

Effect of Audio-visual Materials on Students' Achievement in Biological Concepts in College of Education, Oyo

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ABSTRACT

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Students' achievement in Biological Concept is not encouraging over the years in Nigeria Colleges of Education. This may be due to Biology lecturers' failure to make use of audio-visual materials in their classes, which could be due to lack of audio-visual materials and lack of knowledge of how to use the materials where they are available, lack of enthusiasm and inventiveness on the part of lecturers. This study was conducted on the "Effect of Audio-visual Materials on Students Achievement in Biological Concepts in College of Education in Oyo. A quasi-experimental design which involves pre-test, post-test and non-equivalent intact group was used for the study. One hundred and ninety-six (196) 200 Level NCE students' were randomly selected from the College of Education in Oyo. Two (2) research questions were asked and answered using mean and standard deviation while ANCOVA was used to test the formulated hypotheses at 0.05 level of significance. The Biological Concept Achievement Test (BCAT) was the tool used for data collection. A reliability index of 0.80 using Kuder-Richardson formular (Kr 20). The findings revealed that students taught with audio-visual material have a higher achievement score of 2.03 and 2.15 in Biological Concept than their counterpart while $p=0.000$. It was recommended that lecturers of colleges of education should practice the use of Audio-visual materials in teaching Biological concept for better achievement.

Keywords:

Audio-visual, ANCOVA

INTRODUCTION

Today all over the world especially the developing countries like Nigeria are struggling hard to develop technologically and scientifically. The world is turning scientific and all proper functioning of life depend greatly on science. Science is focused with gaining a better knowledge of the workings of our environment in order to assist man in learning more about the universe (Oladejo & Gbolagade, 2011). It would have been impossible for man to explore the planets of the cosmos if it hadn't been for the application of science. Biology, chemistry, physics, and mathematics are some of the fundamental subjects that make up science. Numerous studies have shown that students' interest in science is waning among high school students.

Biology is a fundamental topic in Nigeria, and it is taught from senior secondary schools forward. Biology is the scientific study of all living things, including plants and animals. A thorough understanding of Biology is required for the study of many courses that are important to mankind. These courses include cell, microbiology, genetics, medicine, zoology, botany, physiology and evolution, among many others. Biology is essential in many aspects of life and plays a significant part in the creation of educational opportunities (Abudu, & Gbadamosi, 2014).

Poor achievement in Biological concepts may be linked to a variety of reasons, with teaching methods being considered to be one of the most significant. Because of this, it is possible that understanding of Biology ideas may not be completely accomplished without the assistance of audio-visual material. Biology teaching and learning that does not include audio-visual elements is likely to result in students doing poorly.

Ojetade & Aregbesola (2020) supported this statement with their findings that reviewed that audio-visual materials has significant effect on student's achievement in science. Ebere

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& Joy (2019) also revealed that students that was expose to lesson with audio-visual technological contents integrated achieve higher in test scores than the group not expose to audio visual materials. Ten percent (10%) of what individuals hear and read is remembered, twenty percent (20%) of what they see remembered, and eighty percent (80%) of what they see and do is remembered, according to research (Doosuur & Mwuese, 2013). Audio-visual material is referred to as a multi-sensory interactive application or presentation that uses a variety of digital media types to communicate messages or information to an audience, including text, pictures, sound, and video (Eraikhuemen & Enogie 2017). As a result, when words are supplemented by pictures and animations, ideas are simpler to convey and understand, giving the learning experience a whole new level (Agada, 2021).

Technological development adds new aspects to learning, allowing it to transcend beyond the traditional classroom setting and chalk and talk methodology. Audio-visual educational materials that are presented in both audio and visual formats enhance understanding and retention, which helps to assist teaching and learning (Tairu, Muhammed, Adamu, & Aminu, 2018). Audio-visual access to knowledge is one of the possibilities offered by information and communication technology, which has now had a significant influence and may also be used as a tool for successful education as well as learning. Due to the widespread acknowledgement that the traditional chalk and speak approach cannot satisfy the evolving requirements of the teaching and learning process, audio-visual instructional resources are increasingly being used to supplement traditional classroom education.

The Nigeria Certificate of Education Biology program is to motivate and assist learners become intellectually informed in Biology and produce a competent and effective Biology lecturers with good mastery of content and methods, to develop the understanding of the students'. The Programme states that learners are expected to offer Biology in combination with other subjects and also with Education and General studies as a course of study. Biology/chemistry, Biology/physics, Biology/computer and Biology/ISC. Subject combination is the group of subjects students choose at the beginning of the academic session to study in the course duration. According to Farounbi (2014) stated that chemistry should be made a prerequisite for biology at higher institution. If students make wrong combinations while choosing area of specialization, such students might have problem in performing well. Abioye (2011) states that area of specialization does have tremendous influence on academic of students in our educational institution. Methods lecturer used for teaching of Biological Concepts are very important. students subject combination did not influence academic achievement of Biological concept while some studies revealed that subject

combination have effect in academic achievement of students (Farounbi, 2014).

This set of educational resources creates a self-directed, learner-controlled, and personalized learning environment for the student (Ashaver & M.S. Igyuve, 2013). The study is motivated by the fact that students did not assimilate for longer period, which makes learning outcome low in their academic achievement. The inappropriate use of audio visual materials in colleges of education lead to the present study of Effect of Audio-Visual Materials on Students Achievement in Biological Concept in Colleges of Education.

The study aim is to examine the effect of audio-visual materials on students' achievement in Biological concepts in Colleges of education, Oyo metropolis.

Specifically the study is to examine:

1. The application of audio-visual materials have impact on students' achievement in Biological concepts in Colleges of Education Oyo metropolis.
2. The effect of audio-visual materials on students' achievement in Biological concepts in Colleges of education based on subject combinations?

Research Questions

The following research questions are raised to guide the study

1. What is the effect of audio-visual material on students' achievement in Biological concepts in Colleges of education?
2. What is the effect of audio-visual materials on students' achievement in Biological concepts in Colleges of education based on subject combinations?

Hypothesis

Ho₁. There will be no significant difference between the students' achievements in Biological Concepts in Colleges of Education taught using Audio-visual materials.

Ho₂. There will be no significant main interaction effect of treatment on achievement scores of treated groups in Biological Concepts in Colleges of Education using Subject Combinations.

METHODOLOGY

The research design study was quasi-experimental. Using pre-test and post-test approach. The sample was drawn from two colleges of education. Simple randomly sampling was used for both experimental and control groups respectively. They were ninety-six students in experimental groups and ninety-six students in control groups.

The research instruments used for this study were Biological Concept Achievement Test (BCAT), Computer laptop and overhead projector. Also, a lesson plan format was made to guide the teaching of fertilization as the core of the study. The Biological Concept Achievement Test (BCAT)

consisted of 20 multiple choice objectives questions with five (5) options on each questions. The research instrument was validated by the researcher's supervisor and three (3) lecturers in the Department of Science Education at Lead City University in Ibadan, Nigeria. A reliability index value of 0.80 was obtained using Kuder Richardson formular (Kr 20).

Lesson note was prepared for both experimental group and control group to teach the biological concepts. Students in the experimental group were taught using audio visual materials while the control groups were taught using the conventional method. The teaching was carried out for

four (4) weeks while the post test was administered at the end of teaching.

The research questions raised for the study were answered using frequency count, mean, standard deviation. While the hypotheses formulated for the study were tested using analysis of covariance (ANCOVA) at 0.05 level of significance.

Research Question One

What is the effect of audio-visual material on Biology students' achievement in Biological concepts in Colleges of education?

Mean and Standard Deviation of Student's Achievement Scores in Biology

Group	N	Pre-test Mean	SD	Post-test Mean	SD	Mean Gain
Treatment	98	2.03	0.783	10.45	1.061	8.42
Control	98	2.15	0.800	4.85	1.848	2.70

Table 1: It revealed that students in biology taught with audiovisual materials had a pretest mean achievement scores of 2.03 and posttest mean achievement scores of 10.45 with a mean gain of 8.42. While the control group had a pretest mean achievement scores of 2.15 and posttest mean achievement scores of 4.85 with a mean gain of 2.70. The treatment group and the control group pretest mean score of 2.03 and 2.15 pointed out that they are on the same page with both treatment and control group without the use of audiovisual materials

while the posttest means shows that students taught with audiovisual materials perform better than those biology students taught without audiovisual materials using conventional methods.

Research Question Two: What is the effect of audiovisual materials on Biology students' achievement in Biological concepts in Colleges of education using subject combinations?

Table 1 Mean and Standard Deviation of Student's Achievement Scores using Subject Combinations

Control group	N	Pre Test Mean	SD	Posttest Mean	SD	Mean Gain
Biology/Chemistry	13	2.38	0.870	5.23	1.691	2.85
Biology/Physics	11	2.27	0.905	3.55	1.508	1.28
Biology/Mathematics	14	2.29	0.825	5.21	1.369	2.29
Biology/Computer	12	2.00	0.739	5.25	2.379	3.25

Table 2: Mean and Standard Deviation of Student's Achievement Scores using Subject Combinations

Treatment group	N	Pre Test Mean	SD	Posttest Mean	SD	Mean Gain
Biology/Chemistry	14	1.79	0.893	11.21	2.155	9.42
Biology/Physics	11	2.00	0.775	11.00	1.095	9.00
Biology/Mathematics	12	2.17	0.835	10.42	0.793	8.25
Biology/Computer	11	2.09	0.701	10.18	0.405	8.09

Table 2: pointed out that pre-test and post-test mean achievement scores based on subject combinations for treatment group was 1.79 and 11.21 for Biology/Chemistry with mean gain of 9.42.while their counterpart in the control group had pretest and post achievement scores of 2.38 and 5.23 with mean gain 2.85. Biology/Physics had pre-test and post-test mean of 2.00 and 10.57 with a mean gain of 9.00.while the control group had 2.27 and 3.55 for pretest and posttest achievement test with a mean gain of 1.28. Biology/Mathematics had a pre-test mean achievement

scores of 2.17and post-test mean achievement scores 10.42 with a mean gain of 8.25 while control group had a pretest and posttest achievement scores of 2.29 and 5.21 with mean gain 3.29. Biology/ Computer had a pre-test and post-test mean of 2.09 and 10.18 with a mean gain of 8.09. While the control group had a pretest and posttest achievement scores of 2.00 and 5.25 with a mean gain 3.25. The pretest mean scores for both control and treatment group are on the same starter before the introduction of audiovisual materials.

Table 3: ANCOVA Analysis showing the Difference between the Biology Students' Achievements in Biological Concepts in Colleges of Education using Audio-visual Materials and Students taught without Audio-visual Materials

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Squared	Eta
Corrected Model	1540.663 ^a	2	770.332	336.825	.000	.777	
Intercept	1344.275	1	1344.275	587.780	.000	.753	
Pretest	1.371	1	1.371	.599	.440	.003	
Group	1537.327	1	1537.327	672.192	.000	.777	
Error	441.398	193	2.287				
Total	13370.000	196					
Corrected Total	1982.061	195					

Table 3 indicates that there is a significant difference between the mean achievement scores of students in treatment group and those in control group F-ratio is 672.192, with associated probability ($p=0.000$). Meanwhile the Probability value of 0.000 is less than 0.05 level of significant. The partial Eta squared (0.777) shows that the group has an effect on the academic achievement of Biology (0.777) accounting for 77.7% of the respondents. Hence, it

could be concluded that audio-visual materials has a great impact on the academic achievement of Biology students in colleges of Education. The null hypothesis that there will be no significant difference between the Biology students' achievements in Biological concepts in Colleges of education taught using audio-visual materials and students taught using conventional method of teaching is therefore rejected.

Table 4. ANCOVA Table Showing the Difference between Biology Students' Achievements in Biological Concepts in Colleges of Education using Audio-visual Materials using Subject Combinations.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Eta
Corrected Model	38.444 ^a	8	4.806	.462	.881	.019	
Intercept	1525.857	1	1525.857	146.806	.000	.440	
Pretest	4.569	1	4.569	.440	.508	.002	
Comb	35.108	7	5.015	.483	.847	.018	
Error	1943.617	187	10.394				
Total	13370.000	196					
Corrected Total	1982.061	195					

a. R Squared = .019 (Adjusted R Squared = -.023)

Source: Fieldwork 2021

In table 4 revealed that there is no significant difference between Biology students' achievements in Biological concepts in Colleges of education using audio-visual materials based on subject combinations at F-ratio (0.483) with probability of 0.847 was obtained therefore since the probability value of 0.847 is greater than 0.05 level of significant. While Partial Eta Squared 0.018 accounting for 1.8%. The null hypothesis of no significance difference is therefore accepted using subject combinations.

The findings also reviewed that subject combination have influence on academic achievement of students which supported the view of Abioye (2011) that area of specialization does have tremendous influence on academic of students in our educational institution. And also Farounbi (2014) stated that chemistry should be made a prerequisite for biology at higher institution. If students make wrong combinations while choosing area of specialization, such students might have problem in performing well.

DISCUSSIONS OF FINDINGS

The findings of this study supported the view of Ojetade & Aregbesola (2020) that audio-visual materials has significant effect on student's achievement in science. Ebere & Joy (2019) also revealed that students that was expose to lesson with audio-visual technological contents integrated achieve higher in test scores than the group not expose to audio visual materials.

CONCLUSION

The results of this research the finding, use of audiovisual materials in teaching of Biology concepts in the study has helped to improve students' achievements. Audiovisual materials is not to usurp the role of the lecturers in colleges of education, but their main purpose is to make it possible for the lecturers in colleges of education to teach more effectively especially Biology concepts like fertilization and many other

in order to make it more interesting. It is equally important that audiovisual materials should help the students learn more easily and more rapidly hence, the importance and positive effect of audiovisual materials on learners' achievement in Biological concepts in colleges of education should not be underestimated.

RECOMMENDATIONS

Based on the results from this finding, the following are the recommendations suggested;

1. Lecturers in Colleges of education should always download a video of Biological concepts like fertilization connect it with either laptop or computer and place it at the front of the students for them to watch and listen.
2. Lecturer and Students can also download some topic in Biology on their phone to learn with it.
3. Lecturers of colleges of education should put into practice on the use of audio-visual resources to assist teaching and learning process.

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