

EFFECT OF PHOTOGRAPHIC MEDIA INSTRUCTIONAL PACKAGE ON SECONDARY SCHOOL STUDENTS' INTEREST AND ACHIEVEMENT IN BIOLOGY IN OBIO-AKPOR IN RIVERS STATE

Chukundah, U. Doris & Odibo Aghogho
Department of Science Education, Federal University Otuoke.

Email: chukundahud@fuotuoike.edu.ng & odiboaa@fuotuoike.edu.ng

ABSTRACT

This study centered on effect of photographic media instructional package on secondary school students' interest and achievement in Biology in Obio-Akpor Local Government Area of Rivers State. In course of the study, involving the pre-test post-test non-equivalent, three research questions and three null hypotheses guided the study. The study was conducted using Senior Secondary II Science students. The study population was made up of one thousand two hundred (1,200) Senior Secondary School Biology students in the thirty-six (36) Public Secondary Schools, out of which a sample of one hundred and eighty one (181) was drawn from four schools, through a purposive sampling technique. In each school, one intact class was used and the students were randomly assigned by balloting into experimental and control groups respectively. The experimental group was taught ecology a topic in Biology using photographic media instructional package, while the control group was taught using the conventional (lecture) method. Achievement test on Biology (ATB) and Interest Inventory on Biology (IIB) were used for data collection. Mean and standard deviation were used to answer the three research questions while t-test and analysis of variance (ANOVA) were used to test the three null hypotheses at 0.05 level of significance. The result revealed among others that there was statistical significant improvement in students' achievement in Biology after exposure to photographic media instruction. Consequently, the study held that there was a statistical significant difference in Biology interest between students exposed to photographic media instruction and lecture methods in Biology in the study area. Based on the findings and the conclusion the study recommended that the use of photographic media approach in instructional delivery in Biology should be encouraged, since it stimulates and sustains student interest in learning; training should be organized for Biology teachers to equip them with knowledge and skill in using photographic media instructional method.

Keywords: Photographic media, Instructional package, Secondary school, Students' interest, and Achievement

INTRODUCTION

Biology as a subject is one of the core science subjects taught at Senior Secondary school level in Nigeria. Biology as a subject occupies a unique position in the school curriculum, introduced to students at the Senior Secondary school level as a preparatory ground for human development where career abilities are groomed, FRN (2004). Biology is prerequisite for pursuing a number of careers in sciences which include medicine, pharmacy, biochemistry, botany, nursing, and zoology among others.

Effective teaching and learning of biology therefore becomes imperative to facilitate its function in the society as engendered in the laudable goals of education outlined by the Federal Republic of Nigeria on its National Policy in the 4th Educational National Research and Development Council Published in 2004 cited in Nwogu (2012).

Interestingly, effect of photographic media on biology is the focus of this study. The science of biology deals with the interrelationship among plants, animals and their non-living environment. According to Ige (2001), ecology provides knowledge and understanding of the mechanism of changes brought about by the interaction of the living things and the effect of the interaction between the living things and their external environment. For instance ecology as aspect of biology

gives the students an opportunity to meet with some of the most important ecological issues affecting the environment. These include the influence of human activity in altering human ecological relationship that is, creating new habitats or downgrade and destroy old ones, the biological consequence of pollution, waste disposal, pesticides use and misuse and the medical and behavioural difficulties arising from the stresses of modern day life.

Ricklef, (2005) is of the view that we study ecology for two reasons; to gain the intellectual gratification that comes from understanding natural patterns and processes and to apply that understanding to environmental problem that confront mankind. This ecological concept occupy a central position in biology as well as school curriculum and play very important role in scientific advancement that affects the lives of mankind. So, it is appreciated that one of the most fundamental and universal aspect of biology is ecology. The national curriculum for senior secondary schools indicates that great emphasis is placed on ecological concept. The West African Senior Certificate examination syllabus shows that the basic ecological concepts include: components of an ecosystem, local biotic community in Nigeria community in Nigeria, major biomes of the world etc.

A close analysis of the past senior certificate examination questions revealed that ecology questions has dominated in the past years and the students achievement were very poor. The West African Examination Council (WAEC) chief examiners report further revealed that the errors students commit in ecological concepts had contributed immensely to the poor achievement of students in senior school certificate biology examination 2014-2018. However, many teachers adopt only one method of teaching specifically, the conventional (lecture) method to teaching. Chukundah and Naade, (2020) explained that poor presentation of teaching and learning of biology by teachers may lead to poor understanding on the part of the students. Hence, lecture method does not promote meaningful learning of ecological concepts, since students are not actively involved in the learning process. This method is not very good for teaching certain concepts in biology specifically ecological concepts that may require attitudes and feeling of students, which is not child-centered (Vikoo, 2003).

The importance of innovation science education encourages teachers and students to explore research and use the entire tool to uncover something new (Chukundah & Omeodu, 2022). This pre-supposes that a good measure of scientific literacy through basic education is necessary for man's comfort in his environment. Thus the relevance of technology makes it imperative that the ability of technology to achieve this role is derived from the ability of technologist to apply the knowledge acquired to solve problem. Ezeliara (2008), however, opined that the technological illiteracy inherent in the Nigerian citizenry has been attributed to poor academic achievement and interest of students in science subjects, particularly biological science. This brings in the question of what photographic media instructional approach is all about, in terms of set inducing the science students generally and biological science in particular. Photographic media makes teaching and learning easier, faster and far more interesting, it has a tremendous role in the teaching and learning process. Photographic media has great potential and play vital roles in education.

Photographic media include print, contact sheet, negatives, Polaroid print, slide and transparencies. Photographic is also used to improve the learning process and increase the interaction between students and teachers (Singh, 2007). This has greatly influenced the science education in ways; it helps teachers to prepare study materials for students in a more clearly and comprehensive ways such as demonstrate and visualize (Milkova, 2012). To Veughan (2010) teachers discover the ways to boost student's interest and motivate them by using educational photographic media applications, and students can also be actively involved in the learning process by using photographic application, which increases the learning effectiveness and are more attractive than traditional-based learning methods.

Interest to Cambridge Dictionary is the feeling of wanting to give your attention to something or of wanting to be involved with and to discover more about something. Interest is also regarded as a

psychological conduct that indicates the behavioral disposition such as attention, or focus of an individual towards an even, activity, object or subject. The use of multimedia and interest of the student will enhance a better academic achievement (Nwogu, 2012). In any learning situation, sustaining the interest of a learner is of great importance. It is time to rethink how skills and competences can become the basis of producing worthwhile citizens with intrinsic patriotic desire to serve the nation, by giving adequate attention to science education in particular in its capacity to drive needed change (Omeodu & Chukundah, 2019). Although Achor (2003) emphasized that student-related factor appear to be more persistent and demanding to address, among the many classroom-climate variables, Ajewole & Okebukola, (2000) agreed that poor instructional strategies seem to be at the fore. This is not totally surprising since it is well known that many classroom teachers still make use of the conventional lecture method which is teacher centered and has received so much criticism over the years, especially in the teaching of science subjects.

The advocacy here is that the present and the on-going reform in education be directed towards improving instructional strategies in teaching and learning science. Thus, there is no gain saying that effective teaching and learning of science requires teachers adopting the different methodologies and pedagogies to meet the demands of today's generation of science students, imperative is the demands of new technologies and the demands of a constantly evolving educational environment in order to improve the academic achievement and interest of students in science. There is a loud and prevailing outcry from many quarters about failure rate of students in science subject (Biology). In spite of the diverse and varied methods of lesson delivery in classrooms learning today, there is poor academic achievement and interest in science which is on the increase. This may be due to poor presentation of teaching and learning of science subject by teachers leading to poor understanding and lack of interest on the parts of the students. The poor academic achievement in science subjects calls for an urgent review of the current instructional strategies in use in classrooms. Other factors are: examination malpractice, lack of reading culture, by the students, lack of instructional materials and poor teaching method, high failure rate of science subjects in WAEC/SSCE especially in biology that kept worrying stakeholders.

It is taught in order to expose students to the basic working of scientific enterprise and to also provide the learner with the necessary foundation upon which to build subsequent science learning in the senior secondary school (Chukundah & Jermiah, 2018). This point is particularly crucial since different learners respond to information differently, depending on their interests, prior knowledge or mode of presentation of the instruction. Without doubt, stimulating, capturing and sustaining the interest of a learner is of great importance during a teaching-learning episode and without it learning outcomes are hardly ever achieved. The situation appears different in many Nigerian classrooms where the conventional lecture method, a teacher-centered approach which emphasizes content is usually employed in such a classroom, student's interests are not stimulated rather, boredom, distraction, restlessness, cat-napping among others becomes and are very evident (Chukundah & Telima, 2020). In very concise terms, the results of the traditional chalk and talk (lecture) method are observed as student's lack of motivation, disinterest, seen in lack of participation, absenteeism, drop-outs and biases along gender lines.

Under such prevailing conditions optimal academic achievement and interest in science are still far away but the situation can be turned around. The emergence and development of new resources for teaching and learning science using new technologies hold out hope for many. Among these new technologies the photographic media approach to learning science stands out. Through its interesting method of using audio and visual effects to arouse and sustain student's interest, achieving this by inclusion of moving pictures, eye-catching graphics, and animation. To handle poor academic achievement of students in various science subjects especially in biology being the most offered science subjects by Nigerian students in the Senior School Certificate Examination and West

African Examination Council, photographic instruction need to be introduced in the teaching of science generally and Biology in particular.

Statement of the Problem

Effective teaching of biology in such a way that encourages active participation of students for better understanding is an ever abiding and challenging task in many developing countries, including Nigeria. Kearsley, (2000) opined that it is a natural subject which requires the use of appropriate and effective instructional strategy to understand nature. Though very challenging, one of the ways to bring about a change of emphasis in teaching from the teachers' directed approach to a facilitated approach is to change the medium of instruction (Kiili, 2005).

It has been rightly observed that teachers have employed different instructional strategies to assist students during teaching and learning process, the poor academic achievement of students in Biology has attracted much concern to stakeholders, parents, government and even the students, being the most offered science subjects by Nigerian students in the (SSCE/WAEC Examination). More so, there is a loud and prevailing outcry on failure rate of students in science subjects especially biology. The poor achievement may be traced to lack of students' interest in ecology that formed the major content in biology content (Agogo & Naakaa, 2014). For instance Chief Examiners Reports on WAEC/SSCE (2018) shows poor academic achievement/failure rate in biology for the period of 2014 to 2018. Even so, is misconception of ecological concepts, students finding understanding ecology difficult as well as difficulty in integrating ecological concepts (Cimer, 2012; Zeidan, 2010). These need to be investigated, getting the right instructional method to overcome it.

Interestingly, findings of studies on teaching and learning approaches consistently show a positive correlation between the application of modern technology and positive learning outcome. However, most of these studies were conducted in many developed countries in Europe and America, (Souga, Richteril & Nelin, 2017; Lihen & Orue, 2016; Yamauchi, 2008) with little attention to the Nigerian public secondary school context. Furthermore, there is limited knowledge in existing literature as to whether the use of photographic media package can aid the reduction of failure rate in students' academic interest and achievements in biology. Thus, a gap exists in the literature that needs to be bridged. It is against this background of poor academic achievement that informed this study focused on effects of photographic media instructional package on secondary schools students' interest and achievement in biology in Obio-Akpor, Rivers state.

Purpose of the Study

The purpose of this study is to establish the relative effect of photographic media instructional package on secondary school students' interest and achievement in ecology in Obio-Akpor, Rivers state. In specific terms, the objectives specifically sought to:

1. Find out whether there is difference in students' academic achievement in biology before and after they have been exposed to photographic media.
2. Determine whether there is difference in academic achievement between students taught with photographic media and those taught with lecture method in biology based on gender.
3. Determine whether there is difference in interest in biology between students taught with photographic media and those taught with lecture method.

Research Questions

The following research questions guided the study:

1. What is the academic achievement of students in biology before and after they have been exposed to photographic media?
2. What is the difference in academic achievement of the male and female students in biology when exposed to photographic media and those taught with lecture method?
3. What is the difference in interest in biology between students taught with photographic media and those taught with lecture methods?

Hypotheses

The following null hypotheses weretested at 0.05 level of significance, acceptance or rejection of which helped in re-enforcing findings of the study.

Ho₁: There is no significant difference between students' academic achievements in biologybefore and after they have been exposed to photographic media.

Ho₂: There is no significant difference in the academic achievement of males and females in biology when exposed to photographic media and those taught with lecture method.

Ho₃: There is no significant difference in interest in biology between students taught with photographic media and those taught with lecture methods.

Significance of the Study

The study revealed the effect of photographic media on students' academic achievement in ecology. It also unveiled the effects of photographic media on students' interest in ecology. This study would be of immense benefit to Biology teachers, as they are encouraged to teach the subject effectively with the support of photographicmedia in order to stimulate and sustain student's interest in Biology. The study would equally encourage principals of secondary schools to give adequate support (financial and material) to teachers of Biology in the planning and production of photographic media in the teaching of the subject Biology. The study would also serve as a source of information to the ministry of education to ensure the availability of photographic media for the entrancement of Biology teaching. It would also help teachers, students' and parents to understand the importance and use of photographic production. It would benefit other scholars serving as a source of information for other researchers interested in some aspects related to this work, being rich in literature of knowledge, to serve as reference point.

METHODOLOGY

The research design adopted was quasi-experimental design specifically, a pre-test, post-test experimental and control group design was used to determine the effect of photographic media instructional package on secondary schools students interest and achievement in Biology.

The population for the study made up of all the one thousand, two hundred (1,200) senior secondary school Biology student in the twenty one (21) public secondary schools in Obio-Akpor, Rivers State, Nigeria.

Purposive sampling was used to select four (4) schools, from the twenty one public secondary schools in the Local Government Area that formed the target population, which include:

- a. School that have multimedia and computer facilities;

Four intact classes were used and the students were randomly assigned by balloting, to two experimental and control groups, respectively. In all, 181 SS2 science students out of one thousand two hundred (1,200) were recruited for the study from the four schools.

Two instruments for data collection were used: The Achievement Test on Biology (ATB) which was designed by drawing 30 multiple choice questions from four topics in biology and include; ecological concepts, ecosystem, local biotic communities and major biomes. Each question attractedone mark for each correct answer. A total of 30 marks were allocated to the instrument.

The second instrument adopted in this study was Interest Inventory on biology (IIB) which was designed to evaluate the interest level of the students in ecological concept in biology. It was structured on Likert 4-point rating scale of Strongly Agree (SA) = 4 point, Agree (A) = 3 points, Disagree (D) = 2 points and Strongly Disagree (SD) = 1 point with 26 measurable items. Average score were calculated for each item for the male and female students. The data generated from these instruments were used to answer the research questions and analyze the hypotheses for the study. The data analysis was done using descriptive statistics (mean) and standard deviation to answer the research questions. Inferential statistics of t-test, independent t-test Factorial ANOVA were used to test the hypotheses at the 0.05 alpha level of significance.

RESULTS

Research Question 1: What is the achievement of students in biology before and after they have been exposed to photographic media?

Table .1: Mean Scores of Students' before and after Exposure to photographic media.

Groups	Pre-test (M_1)	Post-Test (M_2)	Pre-test Mean (M_1)	S.D ₁	Post-Test Mean (M_2)	S.D ₂
Experimental group	89	89	7.33	2.43	17.35	3.20

Field Data, 2024

Result from Table .1 shows that mean score (M_1) on Achievement Test on biology of students before exposure to photographic media instruction was 7.33 while their score after the exposure was 17.35. These values indicate that students performed better on the test after being exposed to photographic media instruction in ecology. Again, a standard deviation ($S.D_1$) of 2.43 for the scores of students before the exposure as against a standard deviation ($S.D_1$) of 3.20 after the exposure, shows that there was higher variance in the scores of students after the exposure more than before the exposure.

Hypothesis 1: There is no significant difference between student's achievements in biology before and after they have been exposed to photographic media. Based on the mean scores for the pretest and the posttest and the p-value being less than significant level of 0.05, it was concluded that there was a statistical significant improvement in students' achievement in Biology after exposure to photographic media instruction.

Research Question 2: What is the difference in academic achievement of the boys and girls in biology when exposed to photographic media and those taught with lecture method?

Table 2: Difference in Scores Based on Teaching Method and Gender.

Groups	Boys			Girls		
	N	Mean (M_1)	S.D	N	Mean (M_2)	S.D.
Multimedia	51	17.86	3.18	38	16.66	3.15
Lecture	42	14.50	3.17	50	13.84	3.03
Difference		3.36			2.82	

Field Data, 2024

Result from Table 2: shows that mean score (M_1) on Achievement Test on biology of the experimental and control groups were respectively 17.86 and 14.50 for the boys. For the girls the mean scores were 16.66 for experimental group and 13.84 for the control group. A mean difference of 3.36 for the boys shows that boys in the experimental group performed slightly higher than the boys in the control group. Again, a mean difference of 2.82 for the girls shows that the girls in the experimental group also performed slightly better than the girls in the control group.

Hypothesis 2: There is no significant difference in the achievement of boys and girls students in biology when exposed to photographic media instruction and those taught with lecture method. The result indicates that there was a statistical significant difference in achievement of boys and girls. $F(1,177) = 0.338$, $p > 0.05$ for interaction between teaching method and gender This shows that for gender there was no statistical significant difference in achievement between boys and girls exposed to photographic media instruction and those exposed to lecture method.

Research Question 3: What is the difference in interest in biology between students taught with photographic media instruction and those taught with lecture methods?

Table 3: Difference in Interest for Students Exposed to photographic media instruction and Lecture method

Groups	N	Mean (M)	S.D
Multimedia	89	18.71	2.97
Lecture	92	13.17	2.18
Difference		5.53	

Field Data, 2024

Result from Table 3: shows that mean score (*M*) on Biology Interest Inventory of the experimental and control groups were respectively 18.71 and 13.17. A mean difference of 5.53 shows that students exposed to photographic media had higher level of interest in Biology than the students exposed to lecture method.

Hypothesis 3: There is no significant difference in interest in biology between students taught with photographic media instruction and those taught with lecture methods. . Based on the mean scores for the Biology Interest for students exposed to photographic media instruction and Lecture methods, and the p-value being less than significant level of 0.05, it was concluded that there was a significant difference in Interest between students exposed to photographic media instruction and lecture methods in ecology in the study area.

Discussion of Findings

Research question one sought to find out the achievement of students in biology before and after they have been exposed to photographic media instruction. The result shows that there was improvement in the Biology achievement of students exposed to instruction in biology using photographic instructional approach. This was evident from a difference in the achievement of students before and after their exposure with achievement after exposure being higher than that before the exposure. The result of hypothesis one which sought to ascertain a significance difference in the achievement of students before and after exposure to photographic media instruction shows that there was a statistical significant difference in the achievement of students exposed to photographic media instructional approach. This implies that the mean scores of students in biology after exposure to photographic media instruction were higher than their mean score before the exposure. This result agrees with the result obtained by Ilhan, and Oruç (2016) that carried out study on effect of the use of multimedia on students' performance. They found that students exposed to multimedia had their academic performance increased in social studies lesson compared to the traditional classroom. The result agrees with the result obtained by Akinoso (2018) who carried out study on effect of the use of multimedia on students' performance in secondary school mathematics. Akinoso (2018) found that use of multimedia positively influenced the academic performance of students in mathematics.

Research question two sought to ascertain the difference in academic achievement of the boys and girls students in biology when exposed to photographic media and those taught with lecture method. The result shows that male students exposed to photographic media instruction in ecology performed slightly higher than those exposed to lecture method. Similarly, female students exposed to photographic media instruction in biology performed slightly higher than female students exposed to lecture method.

Research question three sought to ascertain the difference in interest in biology between students taught with photographic media instruction and those taught with lecture methods. The result shows that students exposed to photographic media had higher level of interest in biology than the students exposed to lecture method. The test of hypothesis seven showed that there was a statistical significant difference in interest between students exposed to photographic media instruction and lecture methods in biology in the study area. This result agrees with the result obtained by Chukundah and Telima (2020) examined the effect of video graphics multimedia instructional package on students' interest and achievement in biology. The study by Chukundah and Telima

(2020) concluded that video-graphic instruction presentation significantly boosts students' interest, involvement, in biology than traditional classroom instructional method.

CONCLUSIONS

Based on the findings of this study, it was concluded that students exposed to photographic media instruction performed significantly better than students exposed to biology instruction through lecture teaching method. In addition, male and female students exposed to biology instruction through photographic media approach performed significantly better than students exposed to lecture method. Furthermore, rural and urban students exposed to biology instruction through photographic media approach had higher level of interest in biology than students exposed to lecture method.

RECOMMENDATIONS

The following recommendations are made based on findings and conclusions drawn from this study:

1. The use of photographic media approach in instructional delivery in Biology should be encouraged, since it stimulates and sustains student interest in learning.
2. Training should be organized for Biology teachers to equip them with knowledge and skill in using photographic media instructional method.
3. Instructional aids needed for effective instructional delivery using photographic media instructional approach should be provided in schools for effective teaching delivery.
4. Professional bodies like Science Teachers Association of Nigeria (STAN) and other stakeholders in education should organize workshops, seminars and conferences to update their members with the use of photographic media instruction.
5. Curriculum designers and publishers should have the use of photographic media built into the curriculum of Biology and text books, to ensure that the biology teachers adopt the instructional package.

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