



Impact of Field Trip on Academic Performance of Secondary School Students in Ecology Concepts in Kaduna State

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ABSTRACT

The study investigated the impact of field trips on the academic performance of secondary school students in ecology concepts in Zaria Local Government Area, Kaduna State, Nigeria. An experimental design that utilized pre-test control group design was adopted. The population of the study consisted of 2834 SSI students from (19) public secondary schools in Zaria Educational Zone of Kaduna State. Four (4) out of nineteen schools were randomly selected from both urban and rural areas where two schools each were used as experimental and control groups respectively. The experimental group was taught using field trip teaching strategy while the control group was taught by lecture method. A stratified random sampling technique was employed to select the sample from the four schools and a total of 200 students were selected as a sample size from both urban and rural areas. The instruments used for this study were ecology, performance test (EPT) with reliability value 0.83 and Ecology Retention Test (ERT) with a reliability value of 0.85 aimed at determining the performance and retention of the students. One research question with a corresponding hypothesis was formulated, answered and tested at 0.05 level of significance respectively. After the data were collected, the research questions were tested with descriptive statistics such as mean and standard deviation and the hypotheses were tested using inferential statistics i.e. independent sample test (t-test). The findings of the study showed that the field-trip teaching strategy favoured the experimental group in the ecology concept. The study further confirmed that field trip teaching strategy favoured urban experimental groups, one of the major recommendations made is that government should make the use of field trip teaching strategy compulsory made is that government should make the use of field trip teaching strategy compulsory particularly in the teaching and learning of ecology concept at senior secondary school level.

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INTRODUCTION

Science, from its linguistic origin derived from the Latin word "Scientia" which means "Knowledge" (Eneh 2000). Science as a branch of knowledge is the systematic study of things around us. The totality of Knowledge obtained from such studies constitutes scientific knowledge. In addition, science deals with nature, by observing it and later to an experimental

investigation (Anaso, 2007 and Kalu 2007). In science education, students are exposed to several methods/ strategies of teaching and learning science. These include lecture method, demonstration, discovery, discussion, laboratory activities, cooperative learning etc, depending on the aspect one wants to teach. Usman, (2008), defines science as consisting of a specific branch of a general body of knowledge such as Biology,



Chemistry, Physics, Geology or Astronomy to mention but a few.

Biology as a branch of the general body of knowledge (science) has been defined by different scientists according to perception and understanding of the subject. Okwo and Tawtiyas, (2000) define biology as a science that involves the systematic study of living things and interaction with each other and their environment. Kalu, (2007) simply defines biology as the science of life.

Biology as a science of life is concerned with the characteristics of living things, their forms, functions and relationship with one another and with their environment among others. However, for effective biology teaching, the use of method/strategy which would make the use of the environment would achieve much and bring home the actual meaning of the concepts. Among science subjects (chemistry, physics and biology), biology is the most popular (Ibrahim, 2008). It is a core (compulsory) subject for almost all Senior Secondary Schools Students in Nigeria. Also, the basic knowledge of biology is a prerequisite for studying several disciplines such as medicine, agriculture, pharmacy, microbiology, biochemistry and psychology among others (Bichi, 2003, Kalu and Ndokwo, 2006). So, the use of a strategy that will ground the students in the biology concept should be used. The present study investigates the impact of field trips on students' academic performance and retention in ecology concept at senior secondary school level.

Biology plays a vital role in the economic development of a nation. This is because Ajaja, (2008) said that recent advances recorded in the field of biochemistry, physiology, ecology, genetics and molecular biology, have made the subject a central focus in most human activities including solutions to the problem of food scarcity, pollution, population explosion, radiation, disease, health, hygiene, family life, poverty eradication, management and conservation of natural resources as well as for biotechnology and ethics. Due to the immense benefits of Biology to both individual and societal development the Federal Government of Nigeria, in the National policy on education, (FME 2005), made biology a core science subject at the senior secondary school (SSS). The objectives of the biology Programme

are:

- a. Adequate laboratory" and field skills in Biology;
- b. Meaningful and relevant knowledge in biology
- c. Ability to apply scientific knowledge to everyday life in matters of personal and community health and Agriculture.
- d. Reasonable functional scientific attitudes and
- e. The emphasis of content and context of the syllabus is placed on: field studies, guided-discovery/Biology as inquiry (FME 2005).

From the above objectives, an outdoor strategy such as a field trip has been recommended by FME (2013) for its implementation for the accomplishment of biology objectives in the secondary schools in Nigeria. However, despite the recommendation on a field trip as a strategy for teaching biology, many biology teachers in the various secondary schools still teach biology concepts using the only traditional method that is the lecture method (Usman, 2000).

There are different branches or concepts of biology and there are different ways of dealing with them effectively. For instance, there is anatomy and physiology, genetics, evolution, nervous coordination, among others, much of which can be taught effectively by demonstration, discovery, lecture method, activity" based in the classroom and/or indoor laboratory. There is an aspect in biology that is referred to as ecology that requires students to be taken out to see living organisms in their natural habitats.

Ecology is defined as the study of the relationship of organisms or groups of organisms and their environment, or the science of the interrelationship among living organisms and their environment. Also, ecology is concerned with the biology of groups of an organism with the functional processes on land in the oceans and freshwater (Odum, 1971 and Obeka, 2010). The ecology concepts include the following: habitat, population, ecosystem, succession, adaptation, conservation, pollution, cycling material, biological control, community, biotic interaction, soil studies erosion, ecology and disease, sewage disposal,



ecological study, feeding relationship, energy, environment to mention just a few. An outdoor strategy seems to have advantages in the teaching and learning of ecology in many ways; some of these are;

- i. It is best to study organisms in their natural environment,
- ii. It also enables teachers to teach for the acquisition of scientific skills which is a major goal of science education.

Ecology deal with the interaction of organisms and the environment need to be taught with an appropriate method or strategy of teaching that requires direct observation of organisms in natural habitat. These organisms may be within or far away from the school. One of the most effective strategies to teach this aspect maybe by taking the students to the natural habitat of the organisms. This strategy is called field trips.

A field trip is taking students outside the classroom to make relevant observations and also obtaining some specific information. It could be in a nearby school farm, national park, zoo, industry, forest or game reserve. It is an important component of science teaching (Bajah, 2002).- According to Obeka, (2010) Field trip is an outdoor type of laboratory activity or fieldwork or learning exercise undertaken by teachers and students in certain aspects of a subject, to allow students to acquire knowledge. In addition, Aliyu, (2008) observes that field trips is taking students out of

the classroom to places where they can see concrete illustrations of classroom theories. It also offers direct observation and interpretation of the substance in their natural surroundings. It is on the spot that requires the use of basic scientific skills that is observation, identification, classification and manipulation of substance in the natural surroundings.

Several studies on performance in biology concepts among Nigerian final year secondary school students revealed underachievement (Adeniyi, 2004, Okafor, 2002, Uzoechi, 2007, Usman, 2008, Ibrahim, 2008 and Ajaja, 2010). The poor performance has been attributed to the attitudinal problems of students (Okafor, 2002). cognitive and socio-economic problems of teachers (Adeniyi, 2004), administrative problems of policymakers (Okafor, 2002), method of teaching (i.e using lecture method, discussion, indoor laboratory) across all concepts in biology (Okafor, 2002 and Usman 2000) and also teacher factor may be due to poor mastery of subject matter which results in skipping of topics, (Shuaibu and Usman. 2002, Okoli, 2006. and Okeke, (2007). These poor performances are evident in the statistics of WAEC results for science subjects from 2011 -2016 which indicated the poor performance of students in biology (Table 1.1). This poor performance in biology forms the basis for this study.

Table 1.1: Biology WAEC/SSCE Results for Biology from 2011-2016

Year	Total No. that sat for the exam	Total % with A1-C4	Total % with D7-F9
2011	126,821	47.04	57.96
2012	134,852	41.95	58.05
2013	130,653	42.98	57.02
2014	150,896	47.85	52.17
2015	143,936	43.08	56.92
2016	168,793	46.02	53.08

SOURCES: WAEC Kaduna State Office, (2016)

Table 1.1 shows the students' performance from 2010 - 2016 in Biology all over the federation. The percentage of students that passed at credit level and above and the percentage that failed in biology were clearly shown. The table shows that for 3 years, the percentage of failure is higher than 50% and only in 2011 and 2016 percentage pass is higher than

50%. This high level of failure may not be unconnected with the poor performance in ecology concepts because WAEC biology questions show that students cannot escape answering questions on ecology.

The objective of the Study

The study has the following objectives:

- i. Investigate the impacts of field trip teaching strategy on the academic performance of students' taught ecology concept at the SSS level.

ecology concept using field trips and those taught using the lecture method.

Research Question

The following research questions are set to guide the study;

1. What is the impact of field-trip teaching strategy on students' academic performance in ecology concept in Zaria Educational zone?

Null Hypotheses

This study has the following null hypotheses:

- i. There is no significant difference between the mean scores of the students taught

METHODOLOGY

The research design for this study was an Experimental design involving the pre and post-tests. There were two groups: the control and experimental, all sampled students were pre-tested to determine the level of equivalence academically. The experimental groups received treatment (field trip), while the control groups received no treatment (lecture). Also, all the groups were subjected to posttest (to determine the effect of the treatment on students' Academic performance), and Post- Post-test (to determine treatment effect on retention ability, the researcher design illustration is presented in figure 3.1

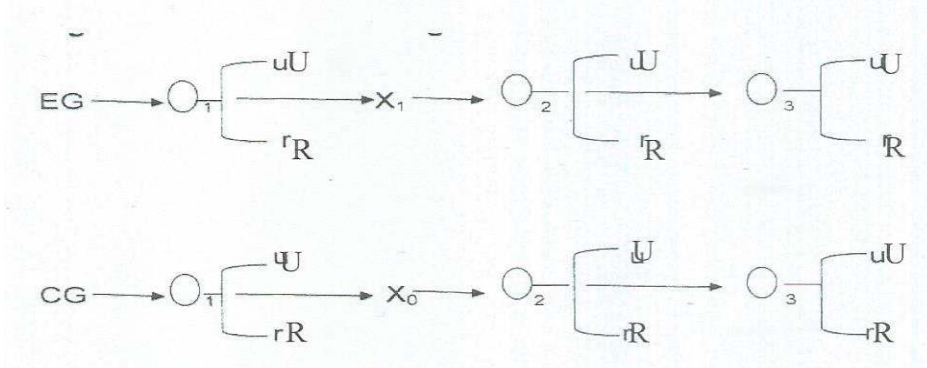


Fig 3.1: Research Design Illustration

Key: EG - Experimental Group, CG - Control Group,

- O₁ = pretest
- X₁ = treatment,
- X₀ = no treatment,
- O₂ = posttest,
- O₃ = post-posttest
- U = urban area,
- R = rural area

The population of the study consisted of 2934 SSI students from nineteen (19) schools admitted in, 2016/2017 session in Zaria Educational Zone of Kaduna State. Though these schools are physically different in terms of location, they are the same in terms of administration, staffing, infrastructure and students were admitted on merit. See Table 3.2

Table 3.2: Population of the Study

S/No	Name of School	Location	Number of Students		Total
			Male	Female	
1.	Alhudahuda College	Urban Areas	339	-	339
2.	Barewa College	""	274	-	274
3.	GSS Zaria	""	262	-	262
4.	GSS Dakace	""	70	30	100
5.	GGSS Zaria	""	-	142	142

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S/No	Name of School	Location	Number of Students		Total
			Male	Female	
6.	GGSS D/Bauchi	****	-	225	225
7.	GSS Magajiya	****	100	50	150
8.	GGSS Pada	****	-	70	70
9.	GGSS K/Gayan	****	-	155	155
10.	GSS Muchiya	****	84	18	102
11.	GSS Chindit	****	-	70	70
12.	GSS Chindit	****	118	-	118
13.	Aminu GSS	****	229	80	309
14.	GSS T/Jukun	****	119	85	204
15.	GCC Zaria	****	60	46	106
16.	GSS Dinya	Rural Areas	35	28	63
17.	GSS T/Saibu	****	129	22	151
18.	GSS Yakasai	****	29	5	34
19.	GSS Likoro	****	54	6	60
Grand-Total			1902	1032	2934

Source: Ministry of Education Kaduna (MOEK), 2016

The study used a stratified Random Sampling technique due to location to obtain its sample size. This study considered 10% of the target population of 200 SS I students in both rural and Urban as observed by Asika (2011). Two boys were asked to handpick a piece of paper already folded with the names of the schools. As a result of this, two schools were randomly selected from

urban and rural areas respectively. These schools are GSS Magajiya Zaria City and GSS Dinya as the control group while GSS T/Saibu as the experimental group. In both schools, 25 males and 25 females were randomly selected through the balloting method (a ticked piece of paper). The sample sizes involved 200 students see Table 3.2.

Table 3.2: Sample of the Study

S/No	Location	Schools	Male	Female	Total
1.	Urban	Alhudahuda College	25	25	100
2.	Rural	GSS Dinya	25	25	100
3.	Urban	Barewa College	25	25	100
4.	Rural	Tudun Saibu	25	25	100
Grand-Total			100	100	200

The instruments used for this study include:

- i. Ecology Performance Test (EPT) and
- ii. Ecology Retention Test (ERT).

Ecology Performance Test (EPT) was administered in determining the achievement of students. Before the Administration of Posttest, a pretest was administered using EPT to ascertain the student's ability level, was confirmed the same see appendix "A". The Ecology Performance Test was administered after the treatment. EPT was made up of 25 multiple choice questions with four options each to choose the correct options. The questions were collected from past WAEC/NECO

question papers for 5 years 2010-2014. See Appendix "E"

RESULT

The data collected for this study were analyzed based on the research questions and hypotheses formulated.

Research Question 1: What is the impact of field trip strategy on students' academic performance in ecology concept in Zaria educational zone?

The descriptive statistics of mean and standard deviation were used to answer this



research question and the summary of the results is presented in Table 4.1.

Table 4.1: Mean and Standard Deviation of the Experimental and Control groups in Ecology Performance Test (EPT)

Variable	N	Mean	SD	MD
Experimental group	100	51.73	12.68	6.97
Control group	100	44.76	14.43	

Results in Table 4.1, shows the mean score of the experimental group was 51.73 and a standard deviation of 12.68 while the mean scores for the control group were 44.76 and a standard deviation of 14.43. The mean difference between the experimental and control group was 6.97 in favour of the experimental group. This shows that the experimental group had mean scores more than the control group. This implied that the effect of the treatment had an impact on the experimental group.

Null Hypothesis 1: There is no significant difference between the mean scores of the students taught ecology concept, using field trip and those taught using lecture method. The Hoi was analyzed using t-test statistics.

The inferential statistic t-test was used to test this hypothesis, and Table 4.5 below presented the summary of the analysis.

Table 4.2: t-test of posttest mean score of the control and Experimental groups in Ecology Performance Test (EPT)

Variable	N	Mean	SD	DF	SE	t-cal	t-crit	p-value	Remark
Experimental group	100	51.73	12.68	198	1.92	3.63	1.98	0.00	Significant
Control group	100	44.76	14.43						

The results in Table 4.2 shows that the t-cal is 3.63 and the P-value = 0.00 at the degree of freedom (df) = 198. Since the P-value = 0.00 < α = 0.05. It means that there is a significant difference in the mean scores of the experimental and control groups. The significant difference is in favour of the experimental group exposed to field trip teaching strategy as indicated by the mean scores. With this result, the Null hypothesis 1 was therefore rejected.

DISCUSSION OF FINDINGS

This study is very significant in the sense that it has been able to demonstrate the usefulness of field trips in the learning of biology, particularly ecology concepts. The most important use of field trips lies in the basic fact that they provided the most realistic means of meeting organisms in their actual environment. This makes topics or concepts and principles taught more vivid and retention better. This Unit presented an explanation of results obtained from the hypothesis tested and

acknowledged the published works of other authors in the study like Ajaja, (2010), Michie (2001) & Fred (2007).

Null Hypothesis 1: There is no significant difference between the mean scores of the students taught ecology concepts using field trips and those taught using the lecture method. Table 4.5 proved that there was a significant difference between the mean scores of the experimental and control groups in the ecology concept. This suggested that the field trip teaching strategy has favoured the experimental groups. This confirmed the findings of David (2006), Ajaja (2010) and Michie (2007) which stated that knowledge gains were found to be significant with the experimental group using field trip teaching strategy more than their counterpart that was strictly taught in the class using lecture method in ecology concept?

CONCLUSION

Generally, it was confirmed that there was a high significant difference between the mean



performance of the experimental and control groups in the ecology concept. And there was also a high significant difference between the mean performance of the experimental and control groups in ecology concept on retention ability. This further confirmed that the field trip teaching strategy has gained more than the traditional method of teaching. However, it was statistically, shown that field trip teaching strategy favoured students in the urban experimental groups in teaching ecology concept. This might be that, the students in urban are more curious i.e want to know when taken to the natural surroundings, the urban students used English as a means of communication so they have an advantage in NECO/WAEC examination and also the availability of electric light in the urban help in the used of internet. Field trip teaching strategy favored the experimental groups was because the pre-requisite steps of activities in the teaching of ecology concept were followed. This has stimulated students' attention and interest, which led to good performance in the ecology concept. The students in the experimental group were taught the strategy that required the use of basic science process skills i.e. observation, identification, classification and manipulation of substances in the natural surroundings. The students in this group became more active and creative since they can see and manipulate organisms in their natural surroundings.

RECOMMENDATIONS

Based on the findings; the paper made the following recommendations:

- i. Although field trip is integrated into the teaching programme, it is not being used. Therefore, the government should make the use of field trip teaching strategy compulsory particularly in the teaching and learning of the ecology concept at the SS level. This will enhance students gain firsthand information, and provide an opportunity for them to see, possibly touch and feel what they have heard about certain organisms and situations.
- ii. Field trip experiences when used should be relevant to contents in the curriculum if they are to make the necessary impact.
- iii. Field trip experiences should emphasize real practical experiences with the students collecting, analyzing data,

interpreting data and using them to explain previous knowledge.

- iv. Field trips when used should be such that can serve as an integrated learning i.e. field trip cannot teach one idea, but many, A field trip to a vegetable farm, for example, can bring disparate topics together such as photosynthesis, the scientific method, how to collect data, plant, insect, part of flowers, soil erosion etc.

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