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The Impact of Field Trip on the Retention and Academic Performance in Ecology, Among Secondary School Students in Zaria Local Government Area, Kaduna State

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Abstract: *The study investigated "the impact of field trips on retention and academic performance in ecology among secondary school students in Zaria Local Government Area, Kaduna State, Nigeria. A Quasi experimental design which utilized a 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 a 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 the Ecology Performance Test (EPT) with a reliability value 0.83 and the Ecology Retention Test (ERT) with reliability value 0.83 aimed at determining the performance and retention of the students. One research question was stated what is the impact of field trip teaching strategy on students academic performance in ecology concept in Zaria Educational Zone? One corresponding hypotheses such as the one that addressed the absence of a significant difference between the mean scores of the students taught in items of an ecology concept (using field trip and those taught using the lecture method) was formulated and tested at 0.05 level of significance. After the data were collected; the research questions were tested using descriptive statistics such as mean and standard deviation while 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 the field trip teaching strategy favoured the urban experimental group, one of the major recommendations made is the government should make the use of the 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 concepts at senior secondary school level.*

Keywords: *Field Trip, Retention, Academic Performance and Ecology*

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1.0 Introduction

Science, from its linguistic origin derived from the Latin word "Scienta" 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. Science deals with nature, through observation and subsequent experimental investigation (Anaso, 2007; Kalu 2007). 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. In science students are exposed to teaching and learning strategies/methods including lecture method, demonstration, discovery, discussion, laboratory activities, co-operative learning etc, depending on the aspect one wants to teach.

Also biology is a branch of the general body of knowledge (science) is been defined differently by different scientists based on perception and understanding of the subject. Okwo and Tawtiyas, (2000) define biology as science which 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 one of the wisdely known subject (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 most science disciplines such as medicine, agriculture, pharmacy, microbiology, biochemistry and psychology among others (Bichi, 2003; Kalu and Ndokwo, 2006). Therefore knowledge and application of appropriate strategy that is useful in the establishment of sound academic foundation for students is basically essential.

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 biotechnology and ethics. Due to 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 biology Programme are:

(i) Adequate laboratory" and field skills in Biology;
(ii) Meaningful and relevant knowledge in biology
(iii) Ability to apply scientific knowledge to everyday life in matters of personal and community health and Agriculture.
(iv) Reasonable functional scientific attitudes and
(v) Emphasis of content and context of the syllabus is placed on: field studies, guided-discovery/Biology as inquiry (FME 2005).

Thus, from the above objectives, an outdoor strategy such as 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 field trip as a strategy for teaching biology,

many biology teachers in the various secondary schools have not accept the hybrid approaches (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 co-ordination, among others, much of which can be taught effectively by demonstration, discovery, lecture method, activity" based in the class room 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 organism or group 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 organisms with functional processes on land in the oceans and in 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; including the following,

(i) It is best to study organism in their natural environment,

(ii) It also enables teachers to teach for acquisition of scientific skills which is a major goal of science education.

Several studies on performance in biology concepts among Nigerian final year secondary school students revealed under achievement (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 can lead to 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 between period of 2011 to 2016 which indicated the poor performance of students in biology (Appendix.1). This poor performance in biology forms the basis for this study.

From the results shown in Appendix 1 the students' performance in biology examinations conducted by the West African Examination Council (WAEC) between 2010 and 2016 the percentage failure for three years is higher than 50% except in 2011 and 2016 where the percentage was higher than 50%. This high level of failure may not be unconnected with the poor performance in ecology concepts because WAEC biology questions shows that students cannot escape answering questions on ecology. Consequently, the present study seeks to investigate the impact of field trips on students' academic performance and retention in ecology concept at the senior secondary school level

1.1 Research questions

The following research questions are set to guide the study;

What is the effect of field-trip teaching strategy on students' academic performance in urban and rural experimental school in ecology concept in Zaria Educational zone?

1.2 Null hypothesis

This study has the following null hypotheses:

There is no significant difference between the mean scores of the urban and rural experimental schools' students taught ecology concept using field trip and those

taught using the lecture method.

2.0 Materials and Methods

2.1 Methodology

2.1.1 Research Design

The research design for this study was Quasi-Experimental design involving the pre and post tests. There are two groups namely: the control and experimental groups. 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 post test (to determine the effect of the treatment on students Academic performance), and Post-Posttest (to determine the treatments effect on retention ability) the researchers design illustration is presented in Fig. 1

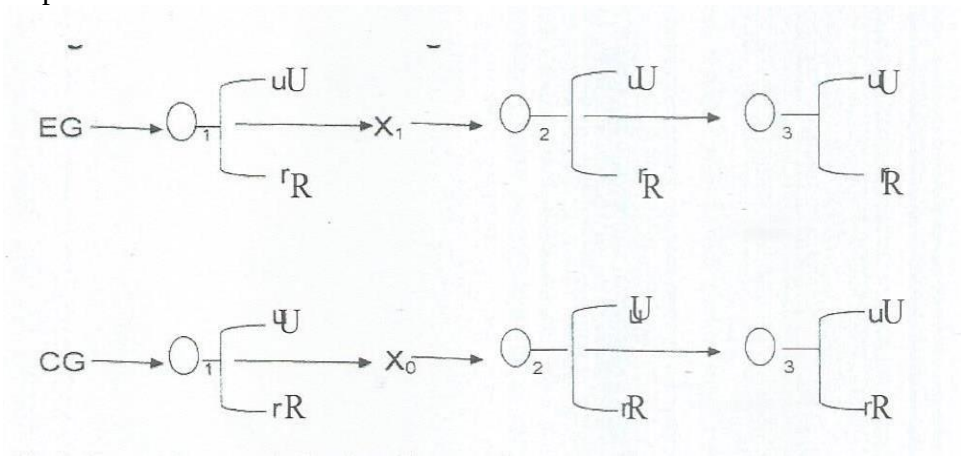

Fig 1: Illustration of research design

Key: EG - Experimental Group, CG - Control Group, 0_1 = pretest, X_1 = treatment, X_0 = no treatment, 0_2 = posttest, 0_3 = post-posttest, U = urban area and R = rural area

2.2 Population of the study

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. Although, 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 1.

Table 1: 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
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

2.3 Sample and sampling techniques

The study used a stratified random sampling technique due to location to obtain its sample size. This study considered 10% of the target population 200 SS I students in both rural and Urban as observed by Asika (2011). Two boys were asked to hand pick a piece of paper already folded with the names of the schools. As a result of the 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 an experimental group. In both schools, 25 males and 25 females were randomly selected through balloting method (ticked piece of paper). The sample sizes involved 200 students see Table 2.

Table 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**

2.4 Instrumentation

The instruments used for this study include:

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

2.5 Ecology performance test (EPT)

EPT was administered to determine the achievement of students. Before the Administration of the post test, a pretest was conducted using EPT to ascertain the students ability level, the ecology performance test was administered after the treatment. The EPT consisted 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.

3.0 Result and Discussion

The data collected from this study were analyzed based on the research question and hypothesis formulated as follows:

(i) Research Question 1: What is the effect of the field-trip teaching strategy on students’ academic performance in urban and rural experimental schools 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 3. Results shown in Table 3 revealed that the mean scores of the urban experimental group was 58.76 while the standard deviation was 13.27. The mean scores for the rural experimental were 51.10 with a standard deviation of 13.53. The mean

difference between the urban experimental and rural control group was 7.66 in favour of the urban experimental group. This suggests that the urban experimental group had mean scores more than the rural experiment group and that, the effect of the treatment had an effect on the urban experimental group.

Null Hypothesis 1: There is no significant difference between the mean scores of the urban and rural experimental schools 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 below presented the summary of the analysis.

Table 3: Means and Standard deviation of urban and rural students of the experimental group in EPT

Variable	N	Mean	SD	MD
Experimental group (urban)	50	58.76	13.27	7.66
Control group (rural)	50	51.10	13.53	

Table 4 Presents t-test of posttest means score of the Urban and Rural Students of Experimental groups in Ecology Performance Test (EPT)

Variable	N	Mean	SD	DF	SE	t-cal	t-crit	p-value	Remark
Experimental group	50	58.76	13.27						
Control group	50	51.10	51.10	98	2.68	2.76	1.96	0.01	Significant

The results presented in Table 4 indicated that the t_{cal} is 2.76 and the P-value = 0.01 at 98 degree of freedom (df). Since the P-value = $0.01 < \alpha = 0.05$ it is evident that there is a significant difference in the mean scores of the urban and rural experimental groups in the academic performance level of students. The significant difference is in favour of the urban experimental group exposed to field trip teaching strategy as indicated by the mean scores. Therefore, the Null hypothesis 2 is rejected.From the findings of the study, it is evident that the most important benefits of field trips is 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 explanation of results obtained from the hypothesis tested and acknowledged the published works of other authors in the study like Ajaja, (2010), Michie (2001) and Fred (2007).

Null Hypothesis: There is no significant difference between the mean scores of the rural experimental schools' students in ecology concept. The outcome demonstrated that the field trip teaching strategy has a more positive effect on the urban experimental group than the rural experimental group. This might be due to the following reasons:

1) Exposure: this is not surprising, because those in urban seem to be more exposed to those organisms on media like Television, the Internet e.t.c. and they might have known more about the organisms even before they saw them live. The rural group might be coming in contact with them but know very little about them hence the difference in performance.
2) Students in the urban areas used English language as a means of communication much more than those in the rural area. Therefore, they can to express themselves better than those in the rural areas. Moreso, WAEC/NECO

questions were sets and answered in English language.

4.0 Conclusion

This inference is drawn from the finding thus:
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 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.
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 SS level. This will enhance students gain firsthand information, and provide opportunity for them to see, possibly touch and feel what they have heard about certain organism and situations.
ii. Field trip experiences when used should be relevant to contents in the curriculum, if they are to make the necessary impact.

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Appendix .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)