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EFFECTS OF FIELD TRIP INSTRUCTIONAL STRATEGY ON STUDENTS' INTEREST AND ACHIEVEMENT IN ECOLOGY IN ABUJA, NIGERIA

[1]Yusuf, A. T., [2]Uzoechi, B. C., [3]Agu, P. A. and [4]Adeyemo, O.

[1'2'3'4]Department of Science, Technology and Mathematics Education, Faculty of Education

Nasarawa State University, Keffi, Nigeria

Corresponding author: yusaat1432@gmail.com

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Abstract

This study investigated the "effects of field trip instructional strategy on students' interest and achievement in ecology in Abuja, Nigeria". The study adopted quasi-experimental research of pre-test, post-test, non-equivalent, non-randomized, control groups design. The population for the study consists of 35,155 (15,767 males and females) SS students. Simple random sampling techniques was used in the three stages to sample 175 students (84 males and 91 females); students were selected for the study. Two instruments, namely Ecology Interest Rating Scale (EIRS) and Ecology Achievement Test (EAT), were validated and found reliable for the study. Four research questions were raised, and four null hypotheses were formulated for the study. Descriptive statistics of mean and standard deviation were used to answer research questions, while inferential statistics of ANCOVA was used to test the null hypotheses at 0.05 level of significance. The findings revealed that there is a significant difference on the interest and achievement of students exposed to the field trip instructional strategy and their counterparts exposed to the conventional method in favour of the experimental group. Also, the findings revealed that there is no significant difference of male and female students' achievement in ecology using the field trip instructional strategy. Hence the researcher recommended that the use of the field trip instructional strategy should be adopted for teaching Ecology concepts in the secondary schools and in-service training program for Biology Teachers in the form of workshops, seminars, and conferences should be organized to focus more on how to use the field trip instructional strategy in teaching ecology concepts, among others.

Keywords: Field Trip Instructional Strategy, Ecology, Achievement and Conventional Method

Introduction

Nations all over the world thrive to improve the standard of living of their citizens through the instrumentality of formal education at all levels of education. The teaching of sciences at the secondary level of provides the foundation for scientific knowledge which avail the students the opportunities to study in various field of endeavour that shape their lives and enhance the advancement of science and technology of the nation. Man's impact on the environment is not only alarming but vicious. This impact, understandably raises some worry for the earth's capacity to sustain life in the long run. This impact has attracted the attention of both national and international environmentalists and conservationists. It is reported that over the past 50 years, human beings have changed ecosystems more rapidly and extensively than in any comparable period in human history, to a substantial and largely irreversible loss in biodiversity (Millennium Ecosystem Assessment).

The possible causes for ecosystem degradation are identified by conservationists to include illiteracy of citizens, mismanagement of ecosystem services, poor policy and negative institutional response. As a panacea to annul the effect of the ecosystem disequilibrium, environmental education is recommended for integration into subjects' curricula at all levels of education in Nigeria. In the biology curriculum, environmental education is integrated under ecology (Moemeka, 2016). The importance of ecology to biodiversity and sustainable development cannot be downplayed. According to Nwagbo and Obiekwe (2016), ecology creates the opportunity for students to explore the natural environment, ecosystem dynamics, and ecological issues affecting the environment. The knowledge of ecology can help learners to solve problems such as poor attitude to the environment, over-population, resource depletion, pollution and other forms of technological impact on the environment (Muhammed & Jongur, 2018). For this reason, the curriculum planners taught it wise in making ecology to have a sizeable content of the learning experiences in the secondary school biology curriculum (Moemeka, 2003).

Despite the fact that, the use of field trip instructional strategy combined with other instructional strategies to teach biology was emphasized in the biology curriculum, it is reported that teachers hardly use it, but instead rely on traditional method of lecture method and demonstration methods (Tete, 2017). According to Muhammed and Jongur (2018), the dominance of lecture method in teaching results to the less effective teaching of biology and thus, promotes rote learning.

Field trip instructional strategy, sometimes called excursion method, is an important instructional strategy which involves taking

learners out of the classroom for the purpose of learning science concepts and principles (Tete, 2017. Field trip extends the teaching-learning processes outside the classroom and brings the students to a direct contact with real-life objects, phenomenon and events under a natural setting.

The argument for use of field trip draws its strength from constructivist school of educational thought who maintains that, for a meaningful learning to take place, learners have to build their own learning and knowledge from personal experience. This means that, self-constructed knowledge and sense-making cannot take place if the teacher assumes the role of a custodian of the subject matter. Rather, effective learning takes place better in such an interactive forum like field trip (Igwebuike, 2016). Apart from the fact that field trip promotes students' interest in a subject, the strategy aids interaction, prompts discussion, satisfies students' natural curiosity, and eliminates boredom that characterize chalk and talk method.

Over the years, reports from West Africa Examination Council (WAEC, 2019-2024) on senior secondary school students' achievement reveals low performance of students in biology at the Senior School Certificate Examination (SSCE). According to WAEC, this low achievement is due to the students' inability to use experience of basic principles to explain common trends, phenomena and concepts. In WAEC (2024), many of the students were reported of not being able to answer questions on ecology. Even the few ones who attempted the questions were not able to perform well. To overcome the challenges that students are facing in tackling questions on ecology, the WAEC chief examiner recommended the use of field trip for teaching of ecological concepts so as to enable the students to gain meaningful understanding.

Apart from achievement, another important variable in this study is interest. Interest according to Aggarwal (2010), is the feeling that stimulates an individual to activity without any external influence. The amount of interest an individual has on a particular activity determines the level of success in that activity (Mangal, 2017). Both the instructors and the learners can make the teaching-learning process a thing of joy or fun when the instructor is interested in and able to secure the attention of the learners (Okigbo & Okeke, 2017 & Aggarwal, 2010) to his/her instructions. Despite this importance of students' interest for their learning processes, there have been reports of declines of students' interest in science (Ozcan, 2023). This decline occurs in all science subjects, including biology. Also, studies show gender disparity in students' interest, indicating higher interest in female than their male counterpart in biology (Yong, 2019, & Ozcan, 2023).

There is an ongoing debate on the influence of gender factor on achievement in science. For instance, Abu-Hola (2015) established a significant difference between male and female achievement in science, being that the females outperformed the males. Nwagbo and Obiekwe (2016) revealed that, gender factor has no significant influence on students' achievement in ecological concepts. Oludipe (2015) compared male and female achievement in basic science and found no significant difference. Olasehinde and Olatoye (2016) in their study established that there is no significant difference between male and female students' achievement in science. Kauru (2015) compared students' performance in mathematics and other science subjects and reported that females performed better than their males' counterpart in biology while the males performed better than the females in mathematics, physics and chemistry. While Baram, Sethi, Bry and Yarden (2015) reported that some topics in biology are gender biased, Ozcan (2023) added that females are more interested in biology than the males. Since the gender debate and achievement in biology is inconclusive this study considered gender as an important variable. This study, therefore, seeks to investigate the effects of field trip instructional strategy on students' interest, achievement and retention in ecology in Abuja, Nigeria.

Statement of the Problem

The performance of students in biology at the senior secondary school level of education in Nigeria has been persistently low over the years (West Africa Examination Council WAEC, 2019 to 2024). The problem has been linked to poor teaching strategies (Abiodun, 2015; Nwagbo, 2017). The poor teaching strategies employed by educators may have caused students to lose interest in the subject (Ogonna & Odike, 2016). If this problem persists, students' interest in biology will deteriorate further and the country's standard in science education as well as the economy will painfully meltdown. This is because biology is a pre-requisite subject for many fields of development including medicine, surgery, pharmacy, forestry, biochemistry, among others. The country will therefore not be able to produce sufficient number of doctors, dentists, pharmacists, and other scientists to meet the demand of the country's skilled manpower needed for scientific and technological development.

Whereas, the search for more effective approach for the teaching and learning of biology that will enhance students' interest and improve their performance has been on for some time now, that search is yet to end. Needful to say that for a nation to advance, appropriate measures have to be put in place to improve students' level of interest and achievement in science subjects, especially

biology. The problem of this study put in question form, therefore is, what is the effect of FIS on students' interest and achievement in ecological concepts.

Objective of the Study

This Study investigated the effect of field trip instructional strategy on students' interest and achievement in ecology in Abuja, Nigeria. The specific objectives were to:

1. Find out the interest on students taught Ecology using field trip instructional strategy and Conventional method.
2. Find out the effect of field trip instructional strategy on the interest of male and female students in Ecology.
3. Investigate the achievement of students taught Ecology using field trip instructional strategy and Conventional method.
4. Determine the effect of field trip instructional strategy on the achievement of male and female students in Ecology.

Research Questions

The following research questions were asked to guide the study:

1. What are the mean interest ratings of students taught Ecology using field trip instructional strategy and those taught using Conventional Method?
2. What are the mean interest ratings of Male and female students taught Ecology using field trip instructional strategy?
3. What are the mean achievement scores of students taught Ecology using field trip instructional strategy and those taught using Conventional Method?
4. What are the mean achievement scores of male and female students taught Ecology using field trip instructional strategy?

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance

Ho_1: There is no significant difference in the mean interest ratings of students taught ecology using field trip instructional strategy and those exposed to Conventional Method.

Ho_2: There is no significant difference in the mean interest ratings of male and female students taught ecology using field trip instructional strategy.

Ho_3: There is no significant difference in the mean achievement scores of students taught ecology using field trip instructional strategy and those exposed to Conventional Method.

Ho_4: There is no significant difference in the mean achievement scores of male and female students taught ecology using field trip instructional strategy.

Methodology

This study adopted quasi-experimental research design of pre-test, post-test and nonrandomized control group. The population for this study comprised all senior secondary school one biology students (SS 1) of 2024/2025 academic session in Abuja, Nigeria. Simple random sampling techniques was use for selection of the 175 SS 1 students of which 110 for experimental group (49 male and 61 female) and 65 control group (35 male and 30 female) as sample for the study.

Ecology Interest Ratings Scale (EIRS) and Ecology Achievement Test (EAT) were the instrument for the study. EIRS items consist 20 items covering students' interest in ecology developed by the researcher using four-point Likert scale and EAT items consist of 30 multiple choice questions. The two instrument were validated by three expert and found reliable for the study with the reliability index of 0.94 (EIRS) and 0.98 (EAT) respectively. Research assistant was trained on how to use video clip instructional strategy in teaching ecology, while the control group used the normal lecture method in teaching ecology. Pre-test was conducted and treatment lasted for 4 weeks for experimental and control groups simultaneously. Experimental group were taught ecology using video clip instructional strategy while control group were taught using conventional method. Post-test was administered and the data generated were subjected to descriptive statistics of mean and standard deviation to answer research questions while inferential statistics of ANCOVA was used to test the null hypotheses at 0.05 level of significance.

Results

Research Question One: What are the mean interest ratings of students taught Ecology using field trip instructional strategy and those taught using Conventional Method?

Table 1: Mean and Standard Deviation of Interest Ratings of Students' Taught Ecology Using Field Trip Instructional Strategies and those Taught Using Conventional Method

Teaching Method	Types of Tests	N	Mean	Std. Div.
Field Trip	Pre-test	110	13.19	2.76
	Post-test	110	30.19	4.90
Conventional	Pre-test	65	12.74	2.84
	Post-test	65	15.06	3.96

Table 1 shows that, the pre-test and post-test mean and standard deviation of interest ratings of students taught ecology using Field Trip instructional strategy are the pre-test and post-test mean and standard deviation of students interest ratings taught ecology using Field Trip instructional strategy are (N= 110, M= 13.19, SD = 2.76) and (N= 110, M= 30.19, SD = 4.90) and pre-test and post-test mean and standard deviation of interest ratings of students' taught ecology using Conventional method are (N= 65, M= 12.74, SD = 2.84) and (N= 65, M= 25.06, SD = 3.96) respectively.

Research Hypothesis One: There is no significant difference in the mean interest ratings of students taught ecology using field trip instructional strategy and those exposed to Conventional Method.

Table 2: Results of ANCOVA on Interest Ratings of Students' Taught Ecology Using Field Trip Instructional Strategy and those Taught Using Conventional Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9495.280[a]	3	3165.093	150.704	0.000	0.643
Intercept	7215.677	1	7215.677	343.569	0.000	0.578
Preinterest	1.351	1	1.351	0.064	0.800	0.000
Method	**9490.700**	**1**	**4745.350**	**221.546**	**0.000**	**0.643**
Error	5271.527	172	21.002			
Total	166096.000	175				
Corrected Total	14766.808	174				

a. R Squared = 0.643 (Adjusted R Squared = 0.639)

Table 2 reveals that, there is a significant difference in the mean interest ratings of students exposed to field trip Instructional Strategy and Conventional Method. The value of $F_{(2, 251)} = 221.546$ is obtained with associated exact probability value of 0.000. Since the associated probability value was 0.000 is less than 0.05 level of significance, the null hypothesis one is rejected. The results implied that, the field trip Instructional Strategy produce a significant effect on the post-test interest ratings of students when covariate effect (pre-test) is controlled. Hence, there is a significance difference among the two groups.

Research Question Two: What are the mean interest ratings of Male and female students taught Ecology using field trip instructional strategy?

Table 3: Mean and Standard Deviation of Interest Ratings of Male and Female Students Taught Ecology Using Field Trip Instructional Strategy

Gender	Types of Tests	N	Mean	Std. Dev.
Male	**Pre-test**	**49**	**13.19**	**2.96**
	Post-test	**49**	**29.47**	**5.19**
Female	**Pre-test**	**61**	**13.85**	**3.35**
	Post-test	**61**	**27.92**	**5.40**

Table 3 shows the results of pre-test and post-test mean interest ratings and standard deviation of male students' taught Ecology using Field Trip Instructional Strategy are (N = 49, M = 13.19, SD = 2.96) and (N = 49, M = 29.47, SD = 5.19), while pre-test and post-test mean interest ratings and standard deviation of female students' taught Ecology using Field Trip Instructional Strategy are (N = 61, M = 13.85, SD = 3.35) and (N = 61, M = 27.92, SD = 5.40) respectively. From the result presented, female students had higher interest in ecology than female students when taught using field trip instructional strategy. The data were further analyzed using ANCOVA.

Null Hypothesis Two: There is no significant difference in the mean interest ratings of male and female students taught Ecology using field trip instructional strategy.

The testing was carried out using ANCOVA as shown in Table 4.

Table 4: Results of ANCOVA on Interest Ratings of Male and Female Students Taught Ecology Using Field Trip Instructional Strategy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	76.860[a]	2	38.430	1.343	0.265	0.025
Intercept	5056.730	1	5056.730	176.730	0.000	0.625
Pretestinterest2	9.634	1	9.634	0.337	0.563	0.003
Genderfieldtrip	**61.335**	**1**	**61.335**	**2.144**	**0.146**	**0.020**
Error	3032.956	106	28.613			
Total	92359.000	109				
Corrected Total	3109.817	108				

a. R Squared = 0.025 (Adjusted R Squared =0.006)

Table 4 reveals that, there is no significant difference in the mean interest ratings of male and female students exposed to Field Trip Instructional Strategy. The value of $F_{(1, 106)} = 2.144$ was obtained with associated exact probability value of 0.146. Since the associated probability 0.146 is greater than 0.05 level of significance, the null hypothesis three is therefore not rejected. The results indicated that, there is no significant difference in the mean interest ratings of male and female students exposed to Field Trip Instructional Strategy. The results implied that, there is no gender difference in interest ratings of students in Ecology when they are taught using Field Trip Instructional Strategy.

Research Question Three: What are the mean achievement scores of students taught Ecology using field trip instructional strategy and those taught using Conventional Method?

Table 5: Mean and Standard Deviation of Achievement Scores of Students Taught Ecology Using Field Trip Instructional Strategies and Conventional Method

Teaching Method	Types of Tests	N	Mean	Std. Div.
Field Trip	Pre-Test	110	13.19	2.76
	Post-Test	110	30.19	4.90
Conventional	Pre-test	65	12.74	2.84
	Post-Test	65	15.06	3.96

Table 5 shows the pre-test and post-test mean achievement scores and standard deviation of students taught ecology using Field Trip instructional strategy are (N= 110, M= 13.19, SD = 2.76) and (N= 110, M= 30.19, SD = 4.90) and pre-test and post-test mean achievement scores and standard deviation of students taught ecology using Conventional method are (N= 65, M= 12.74, SD = 2.84) and (N = 65, M= 15.06, SD = 3.96) respectively. From the result presented, students show more mean achievement scores in ecology when taught with field trip instructional strategy. The data were further analyzed using ANCOVA

Null Hypothesis Three: There is no significant difference in the mean achievement scores of students taught Ecology using field trip instructional strategy and those exposed to conventional method. The test for this hypothesis is presented in Table 6.

Table 6: Results of ANCOVA on Achievement Scores of Students' Taught Ecology Using Field Trip Instructional Strategies and those Taught Using Conventional Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	**9372.088[a]**	**3**	**3124.029**	**195.418**	**0.000**	**0.700**
Intercept	**5012.362**	**1**	**5012.362**	**313.540**	**0.000**	**0.555**
Preachiev	**14.916**	**1**	**14.916**	**0.933**	**0.335**	**0.004**
Methods	**9275.180**	**2**	**4637.590**	**290.097**	**0.000**	**0.698**
Error	**4012.578**	**172**	**15.986**			
Total	**168538.000**	**175**				
Corrected Total	**13384.667**	**174**				

a. R Squared = 0.700 (Adjusted R Squared = 0.697)

Table 6 shows a significant difference in the mean achievement scores of students exposed to Field Trip Instructional Strategies and Conventional Groups. The value of $F_{(2,251)} = 290.097$ was obtained with associated exact probability value of 0.000. Since the associated probability 0.000 is less than 0.05 level of significance, the null hypothesis four is hereby rejected. The results implied that, the Field Trip Instructional Strategies produced a significant effect on the post-test achievement scores of students' when covariate effect (pre-test) is controlled. Hence, there is a significant difference among the two groups of Field Trip Instructional Strategies and Conventional Method.

Research Question Four: What are the mean achievement scores of male and female students taught Ecology using field trip instructional strategy.

Table 7: Mean and Standard Deviation of Achievement Scores of Male and Female Students Taught Ecology Using Field Trip Instructional Strategy

Gender	Type of Test	N	Mean	Std. Dev.
Male	**Pre-test**	**49**	**14.43**	**2.97**
	Post-test	**49**	**30.29**	**5.14**
Female	**Pre-test**	**61**	**12.20**	**2.14**
	Post-test	**61**	**30.11**	**4.73**

Table 7 shows the results of pre-test and post-test mean and standard deviation of achievement scores of male students' taught Ecology using Field Trip Instructional Strategy are (N = 49, M = 14.43, SD = 2.97) and (N = 49, M = 30.29, SD = 5.14), while pre-test and post-test mean and standard deviation of achievement scores of female students' taught Ecology using Field Trip Instructional Strategy are (N = 61, M = 12.20, SD = 2.14) and (N = 61, M = 30.11, SD = 4.73) respectively. From the result presented,

male students had higher achievement scores in ecology than female students when taught ecology using field trip instructional strategy. The data were further analyzed using ANCOVA.

Null Hypothesis Four: There is no significant difference in the mean achievement scores of male and female students taught Ecology using field trip instructional strategy.

The test for the hypothesis is presented in Table 8.

Table 8: Results of ANCOVA on Achievement Scores of Male and Female Students Taught Ecology Using Field Trip Instructional Strategy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	18.975[a]	2	9.488	0.391	0.677	0.007
Intercept	2989.179	1	2989.179	123.300	0.000	0.535
Pretestacheiv2	18.181	1	18.181	0.750	0.388	0.007
Genderfieldtrip2	**0.816**	**1**	**0.816**	**0.034**	**0.855**	**0.000**
Error	2594.016	107	24.243			
Total	102877.000	110				
Corrected Total	2612.991	109				

a. R Squared =0.007 (Adjusted R Squared = -0.011)

Table 8 reveals that, there is no significance in the mean achievement scores of male and female students exposed to Field Trip Instructional Strategy. The value of $F_{(1, 107)} = 0.034$ was obtained with associated exact probability value of 0.855. Since the associated probability value of 0.855 is greater than 0.05 level of significance, the null hypothesis six is therefore not rejected. The results indicated that, there is no significant difference in the mean achievement scores of male and female students exposed to Field Trip Instructional Strategy. The result implied that, male and female students achieved equally when taught Ecology using Field Trip Instructional Strategy.

Discussion of Findings

The findings of this study revealed the effects of field trip instructional Strategy in enhancing teaching and learning of Ecology concepts in Biology.

The results revealed a significant difference between the interest of students exposed to field trip instructional Strategy and Conventional Method. The findings on

students' interest in field trip instructional Strategy compared to those using

Conventional method. This result is in agreement with the earlier findings of Adedayo (2024); Abdullahi and Ibrahim (2023); Nwachukwu and Otuakhena (2022); Zumiyil and Antip (2022) and Ado, Essien and Job (2018) who jointly found out that, students taught biology concepts and other science subject using experimental strategies had better interest than those taught biology concepts using Conventional Methods. This also agrees with the findings of Okebukola and Akinwumi (2022) who reported that, students taught ecology topics using video clip instructional strategy has significant effects in biology thinking than those taught using Conventional Method.

The result also indicated that, there is no significant difference between male and female students' interest in ecology when exposed to field trip instructional strategy, which indicates that, this strategy is gender friendly and thereby help in reducing the gap between male and female student's interest. This finding is in agreement with the work of Adedayo (2024); Ogunniyi and Adebayo (2024).

The results revealed a significant difference between the achievement of students in Field trip Instructional Strategy and Conventional Method in Favor of Field trip Instructional Strategy. The findings on students' achievement in Field trip Instructional Strategy compared to those using conventional method group are in agreement with the earlier findings of Tukura (2022); Ekpo and Ehi (2022); Egwu and Okigbo (2021); Awosa, Ogunlada and Atobatele (2023) who found out that, students taught ecology and other science subjects using Field trip Instructional Strategy achieved higher than those taught using Conventional Methods.

The results also revealed that, there is no significant difference in achievement of male and female students taught ecology using field trip in the experimental group. This finding is in agreement with the findings of Akinwumi and Okebukola (2023); and Okebukola and Akinwumi (2022), who jointly opined that, gender has no significant in the achievement of students in ecology but in disagreement with the findings of Nwankwo and Okoro (2024); Ajayi and Okoye (2023); Okoro and Eze (2022), who reported that gender has significant effects on students' achievement. Male students' achievement did not differ from their female counterparts when exposed to Field Trip Instructional Strategy probably because the male students did not explore their learning environment more than their female students.

Conclusion

On the whole, this study has shown that the use of field trip has significant effect on students' interest and achievement in ecology. The adoption of this method by biology teacher will go a long way in solving the problem of poor performance in ecology.

Recommendations

The following recommendations are made based on the findings of the study:

1. Teachers of Biology should make conscious effort to identify ecological sites for use in field trip and excursions in teaching such aspects of Biology like ecology so as to enhance interest and achievement. When combined with discussion and guided discovery, field trip will make promote achievement in ecology.
2. Deliberate efforts should be made at ensuring gender equity in the science classroom by the science teacher.
3. School principals should provide incentives for biology teachers to motivate them to embark on field trips.
4. Seminars, Conferences, and workshops be organized for Biology teachers to update their knowledge on the use field trip Instructional Strategies by FCDA Abuja.

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