

# GLOBAL CHALLENGES ON THE EFFECT OF FIELD TRIP AND CONVENTIONAL TEACHING STRATEGIES ON STUDENTS INTEREST AND ACHIEVEMENT IN SCIENCE EDUCATION IN OJU AND OBI LOCAL GOVERNMENT AREAS OF BENUE STATE

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## **Abstract**

*This study investigated the effect of the use of Field Trip and Conventional teaching strategies on students' interest and achievement in secondary school (SS 2) Ecology in Oju and Obi Local Government Areas of Zone "C" Benue State. Four research questions and six null hypotheses guided the study. The hypotheses formulated were tested at  $P < 0.05$ . The research instruments developed by the researcher for this study were Ecology Achievement Test (EAT) and Students' Interest in Ecology (SIE). The reliability coefficient for EAT was 0.86 while that of SIE was 0.75. A sample of 411 (264 male and 147 female) students participated in the study. From the result obtained it was revealed that students in the experimental group (where Field Trip was used) performed better than those in the control group (where Conventional Teaching strategies was used) to teach same topic in ecology ( $F_{1,410} = 133.611$ ,  $P < 0.05$ ). The interest of both male and female students were higher in studying ecology whenever Field Trip strategy was used compared with when conventional teaching strategies was used in teaching the same topic in ecology. Similarly, it was revealed from the findings that gender was not a factor in the achievement of students in ecological test. Rather, teaching strategies (methods) used in teaching ecology contributed immensely to students' achievement in ecological test. Based on the findings, it was recommended that ecology teachers should be encouraged to use field trip strategy for effective learning of ecological concepts at the secondary schools level in Africa.*

Globally, science education is the bedrock in which current challenges on energy, climate change, environmental degradation, economic crisis, political challenges, food and technological development hinge. Effective teaching and learning of science globally depend on sound scientific education. Since science as a

body of knowledge comprising ideas, skills and information about the world, nature and man, has great influence on our life and living.

There is peculiarity in usage of different strategies to communicate science concepts to students particularly at the secondary level all over the globe. The efficacy of such teaching strategies such as fieldtrip and conventional teaching methods used globally can be determine by the interest and achievement of science students in their various fields of studies. Agbi (2004) defined field trip as one of the methods of teaching science (ecology) by taking students out to the field to have firsthand experience of happenings in natural and technological setting. Such experience cannot be possible in the classroom.

In line with the above, Brian and Jones (2004) alluded that an educational field trip can be an integral part of instructional programme. Good field trip provides participants (Student) with firsthand experience related to the topic on concepts been discussed in that programme. That is, the first hand experience on ecological concepts, such as, ecosystem, ecological niche, components of the ecosystem can easily be understood using field trip to the understanding of the students.

Ndioho (2008) looked at field trip as a method of teaching ecology, which entails leaving the classroom and observing the organisms in their natural homes or habitats. This is linked up with excursion taken outside the classroom. According to him, in the field you will see how the organisms, live, interact with one another and the way in which they are affected by their environment.

In the same vein, Okebukola (2002) asserted that this method of teaching ecology promotes scientific thinking. The field trip experiences crystallize learning experience and facilitate retention and transfer of knowledge (Gbamanja, 2000). Conventional teaching strategies are methods of teaching ecology, which include: lecture, demonstration and discussion methods of teaching ecology. These teaching methods fall into any of the four teaching modes, which are identified by Gbamanja (2002).

**i. Didactic Mode:** It is the telling mode of teaching. It is a way of dispensing facts to the learner. A teacher who effectively uses this mode is good at narrating or reporting facts.

**ii. Heuristic Mode:** This mode of teaching ecology involves inquiry and discovery methods. The teacher here is an arranger, organizing inquiry / discovery activities to facilitate meaningful learning.

**iii. Philetic Mode:** This is the effective way of teaching ecology where students' feeling or opinions are aroused. A philetic teacher is a friend, a counsellor and a "parent".

**iv. Guristic Mode:** This is the mode of instruction where the teacher tries to explain his experience or feelings, there is no motive to the teacher per se.

Effective teaching of science education develop students' conceptual understanding and analytical abilities through doing authentic science-based, guided inquiry hands on activities which enhances students' self worth and confidence (Balasubramaian, Wilson, and Cios, 2007). Science teachers are required to use highly structured instructional strategies. This required teachers to be knowledgeable in scientific content and pedagogy. Bransford, Brown, and Coking (2000) asserted that effective teaching strategies in science education globally involve:

*Using appropriate just-in-time learning stimuli; Engaging students preconceptions prior to teaching them new concepts; Providing deep fundamental knowledge; Organizing knowledge in ways that facilitates information retrieval and application and Allowing students more opportunities to define learning goals and monitor their progress in achieving them.*

Teachers' inability to identify teaching strategies which will facilitate students' interest and achievement in science will have grievous implications on students understanding trend in global challenges on climate, energy, food, industrialization, and environmental degradation which could serve as a threat to human existence.

Over the years, performance in science examination have not been very impressive as evidence from the school certificate examination results of the West African Examination Council (WAEC) and National Examination Council (NECO) Chief examiner's report, (2014 and 2015). Ugbaja (2008) confirmed that there is sharp fall in students' performance in science (Biology). The reason for this sharp fall was advanced by Ugbaja (2008) who believes that the fall of students' in the science (Biology) SSCE examination is due to inability of teachers to teach effectively certain topics in the sciences (Biology). Syllabus especially genetics and ecology. Nzewi (2008) also noted that students' performance in ecology an aspect of Biology is poor. Reasons were advanced for this; among them is the teaching style. Teachers know that the manner of presentation of a concept goes a long way to affect the extent of comprehension by the learner.

This poor performance in science education particularly Biology at the Senior School Certificate Examination (SSCE) is a nationwide problem and of course global in nature. Thus, it is evidenced that teaching of Biology especially ecology aspect in senior secondary school in Nigeria and elsewhere in Africa has not attained achievement level towards sustainable development globally and especially in Nigeria.

Since adoption of suitable teaching methods will stimulate students' interest and enhance achievement in ecology examinations, Biology teachers should be helped to identify teaching strategies which will enable them teach ecological

concepts effectively to their students so as to achieve desired learning outcomes for sustainable development.

### **Purpose of Study**

The main purpose of this study is to find out the effects of using field-trip and conventional teaching strategies on students' interest and achievement in ecology at the senior secondary school level. Specifically the study sought to:

- i. Determine whether using field-trips or conventional teaching methods may be more facilitative in stimulating students' interest and achievement in ecology.
- ii. Determine if there is gender difference in students' interest and achievement when they are taught using the field-trip teaching strategy.
- iii. Determine if method interact with gender to influence students' interest and achievement in ecology.

### **Research Questions**

The following research questions guided the study:

- i. To what extent do the effects of using field-trip and conventional teaching strategies on students' achievement in ecology differ?
- ii. What is the effect of using field-trip and conventional teaching strategies on students' interest in ecology?
- iii. To what extent do the achievement of students taught using field-trips and conventional teaching methods in ecology differ based on gender?
- iv. To what extent is the difference in the interest of boys and girls taught ecology using field trip and those taught using conventional teaching strategies in ecology?

### **Research Hypotheses**

The following research hypotheses were formulated to guide the study and were tested at .05 level of significance:

- i. There is no significant difference between the mean achievement scores of students taught ecology using field trip and those taught using conventional methods.
- ii. There is no significant difference between the mean interest of students taught ecology using field-trip and those taught using conventional teaching method.
- iii. There is no significant difference in the mean interest of male and female students taught ecology using field-trip method.
- iv. There is no significant difference in the mean achievement between male and female students taught ecology using field-trip.
- v. There is no significant interaction effect of methods and gender on students' achievement in ecology.

**Design of the Study**

The research design for this study is the quasi-experimental type. The study was aimed at determining the effect of the use of field trip and conventional teaching strategies on students’ interest and achievement in ecology. Experimental design hinges on establishing cause-effect relationship of a given treatment. In which case, the study adopted the non-equivalent control group, pretest and post-test design as indicated in Table 1.

<b>Group</b>	<b>Pre-test</b>	<b>Treatment</b>	<b>Post-test</b>
E	0 <sub>1</sub>	FTF	0 <sub>2</sub>
C	0 <sub>1</sub>	TCM	0 <sub>2</sub>

**Where:**

- E = Experimental group
- C = Control group
- TFT = Treatment with Field-trip
- TCM = Treatment with Conventional teaching

**Methods:**

- 0<sub>1</sub> = Pre-test
- 0<sub>2</sub> = Post-test

**Instrument for Data Collection**

Two instruments were used for this study namely; Ecology Achievement Test (EAT) and Students’ Interest in Ecology (SIE) as pre-test and post-test for both control and experimental groups. EAT comprises of twenty objectives test items with options a – d for each question drawn from the National Biology Curriculum and WAEC syllabus for SS 2.

EAT questions were patterned after WAEC standard to meet the requirement at SS 2 ecology from the following units: Ecosystem – Component and Size, component of ecosystem, local biotic community, ecological factors, simple measurement of ecological factors, food webs and tropic levels. Each question carries 4 marks giving a total of 100 marks. Similarly, SIE is a Likert scale type questionnaire which comprises of 20 items. SIE items were constructed by the researcher for students in both control and experimental groups. This is aimed at ascertaining level of students’ interest in ecological study before and after teaching of the concept. SIE was scored using SA, A, D, SD, as 4, 3, 2, and 1 for positive statements, and 1, 2, 3, and 4, in the reverse order, for negative statements. Any decision mean of 2.50 and below as negative. Likewise, any decision mean above 2.50 was regarded as positive or accepted.

### Experimental Procedure

This deals with presentation of the data obtained for the study. Analyses of data are arranged using inferential statistics to test the hypotheses formulated for the study. The findings are also discussed showing details of the data from where the means and standard deviations of the different tests for the experimental and control groups were computed. The results of the tests of hypotheses helped in testing for statistical significance of means compared. The findings from the study were interpreted and discussed.

### Data Presentation, Analysis and Interpretation

The results of the data analyzed and interpretation are presented here according to the research questions and hypotheses posed for the study. Data related to Research Questions were presented in such a way that Research Questions 1 & 3 followed each other, while Research Question 2 & 4 followed to aid comprehension of the analyses and interpretation of results. Tables 1, 2 and 3 show means and standard deviation of the effect of using field trip and conventional teaching strategies on students' interest and achievements in ecology. ANCOVA test for disparity in interest and achievement were also analyzed and reported in Tables 2 and 3 respectively.

**Table 2: Mean and Standard Deviation of Post EAT Analysis of Ecological Achievement Test**

Sex	Strategy	Mean	Standard Deviation	N
Male	Field Trip	58.23	9.56	135
	Conventional	39.23	8.64	133
	<b>Total</b>	<b>48.81</b>	<b>13.17</b>	<b>268</b>
Female	Field Trip	58.92	9.12	75
	Conventional	39.77	8.85	72
	<b>Total</b>	<b>49.54</b>	<b>13.13</b>	<b>147</b>
Total	Field Trip	58.49	9.39	201
	Conventional	39.42	8.69	205
	<b>Total</b>	<b>49.07</b>	<b>13.15</b>	<b>415</b>

Table 2 accommodates means and standard deviations for achievement of students taught using field trip and conventional teaching strategies as well as for males and females taught using the same strategies. Information in Table 2 were used to answer research questions 1 and 3.

**Table 3: Means and Standard Deviation of Post SIE Analysis of Students' Interest in Ecology**

Sex	Strategy	Mean	Standard Deviation	N
Male	Field Trip	3.69	.60	135
	Conventional	3.73	.60	133
	<b>Total</b>	<b>3.71</b>	<b>.60</b>	<b>268</b>
Female	Field Trip	3.87	.54	75
	Conventional	3.84	.56	72
	<b>Total</b>	<b>3.85</b>	<b>.55</b>	<b>147</b>
Total	Field Trip	4.76	.59	201
	Conventional	2.77	.59	205
	<b>Total</b>	<b>3.76</b>	<b>.59</b>	<b>415</b>

Table 3 reveals information on the respondent mean score and standard deviation on their students' interest in ecology for the students in field trip and conventional teaching strategies as well as for male and female students taught using the 2 strategies. Data in Table 3 are used to answer research questions 2 and 4.

### **Finding**

**Research Question 1:** What is the effect of using field trip and conventional teaching strategies on students' achievement in ecology?

From the result in Table 2, the effect of using field trip and conventional teaching strategies on students' achievement in ecology where compared. While students that were taken on field trip formed the experimental group, the students in a normal classroom where conventional teaching strategy was used in teaching the same topic in ecology formed the control group. From the comparison, the mean scores of those students who went on field trip (Experimental Group) was 58.26 and standard deviation of 9.56 while the mean scores of students taught using conventional teaching strategy was 39.23 and standard deviation of 8.64. This shows a mean difference of 19.07. The result indicated that the achievement of students taught ecology using field trip is higher compared to those students taught using conventional teaching strategy. This answered the first research question.

**Research Question 2:** To what extent do the achievement of students taught ecology using field trip and conventional teaching strategies differ based on gender?

The result in Table 2 shows that the mean achievement scores of male students taught ecology using field trip was 58.26, while that of the female students was 58.92. This shows that the difference in the mean achievement score between male and female students taught using field trip was 0.66. This implies that both male and female students' achievements in ecology test was relatively high and close, although their

female counterpart performed slightly higher by 0.7 mean difference. Whereas, the mean achievement scores of male and female students taught ecology using conventional teaching strategies was 39.23 and 39.78 respectively. This also shows that the difference in the mean achievement scores was 0.54. Both male female students performed poorly, below average where conventional teaching strategy was used. Here again, the female students performed slightly better than the male counterparts, although still below average by 0.5 mean difference. The answer to the third research questions is that there is no sharp difference in achievement between male and female students taught ecology using field trip. They both performed poorly when taught ecology using conventional teaching strategies.

**Research Question 3:** What is the effect of using field trip and conventional teaching strategies on students' interest in ecology?

The statistical analysis of students' interest for both field trip and conventional teaching strategy groups are indicated in Table 3. This shows a mean interest difference of 1.98, which implies that students who went on field trip show more interest toward ecology learning than those taught using conventional teaching strategy. The answer to the research question 4 is that, students showed positive interest in learning ecological concepts when field trip is used as teaching strategy. On the other hand, students showed less interest on learning ecological concept when conventional teaching strategies are used for teaching ecological concepts.

**Research Question 4:** To what extent is the difference in the interest of male and female students taught ecology using field trip and those taught using conventional teaching strategy?

The results in Table 3 shows that the mean interest of male and female students taught ecology using field trip teaching strategy was 3.69 and 3.87. Here the difference in the mean interest between the males and females was 0.17. The female shows a statistical difference in mean interest higher than the male counterpart by 0.20. This implies that both males and females have comparable interest in ecology taught using field trip. Statistically, the interest of females was slightly higher toward ecology when field trip was used as a teaching strategy. The high performance of male and female students in the ecology achievement test (EAT) using field trip as a teaching strategy in ecology.

Similarly, the mean interest of males and females taught ecology using conventional teaching strategies was 3.73 and 3.85. This shows that the difference in the mean interest between the males and females is 0.12. This then implies that both males and females have about the same interest in ecology when conventional teaching strategies are used.



### **Discussion of Findings**

In this study, five null hypotheses were formulated and tested statistically. In the first test, a significant difference was found to exist between the mean score of students who went on field trip (experimental group) and those students who were taught ecology in the ordinary class with conventional teaching strategies (control group). Students who went on field trip performed significantly better than those taught using conventional strategy. Therefore teaching method was a significant factor on students' achievement in ecology. This finding is in line with the view of some scholars that teaching method should be carefully selected to enhance students' effective learning of concepts.

For instance, the finding of Hauwau and Takur (2008) in which ecology students involved in field trip showed a remarkably higher achievement compared with those students taught using conventional teaching strategy. A similar result was obtained by Nwagbo and Obiekwe (2010) who carried out a work on effects of constructivist approach on students' achievement in ecological concepts in biology. The findings show that students taught using field trip performed significantly higher than those taught using conventional teaching strategies.

Reasons for this significantly higher achievement of students in ecology is due to the opportunity provided for the students to investigate living animals and plants which were interacting with each other and the world around them understanding that field work is a career. Field work provides some basic natural history and investigatory experience and skills which are lacking from conventional teaching strategies used in the classroom. Natural understanding between teachers and students using field trip enhances the effectiveness of learning and can provide motivation which transfers and remains after the field work experience.

Above notwithstanding, the findings of this study contradicts those of John and Rosalind (2002), who established that students' experience from field trip can influence their thinking negatively especially with regards to ecological phenomena. Students see for themselves nesting birds, grazing cattle, decaying fruits and the like which affect their thinking and expectations about natural phenomena.

The test of null hypothesis 2 had also shown that the mean interest of students in the use of field trip in teaching ecology was significantly higher than those taught ecology using conventional strategy. Students were enthusiastic toward the use of field trip as a strategy for teaching ecology. The findings of this study support that of Asoegwu (2008) who confirmed that students show high interest in the use of field trip as a teaching strategy that often arouse students' interest in learning.

This study also found that both male and female students are of near equal interest in ecology when field trip is used as a strategy for teaching. This was revealed by the statistical analysis of data showing mean interest of male and female to be 3.69 and 3.87. From these findings there was no statistically significant difference in

interest. It can therefore be established that all students are similarly interested in learning ecology effectively through the use of field trip as a teaching strategy.

Null hypothesis 4 involves testing for statistical difference in the mean achievement scores of male and female students taught Ecology using field trip. From the findings it was revealed that both male and female students performed better in ecology test resulting from the use of field trip and that the difference in their means is insignificant. One appreciates that the more any teaching strategy involves student active participation, the more it is likely to enhance achievement.

The study further revealed that by using field trip as a teaching strategy students interest in ecological study will be aroused toward better performance. This explains why the students in the experimental group (field trip) did better than those in the control group (conventional teaching strategy).

Issues relating to gender have attracted much attention that scholars are interested in finding out the human attributes that are gender dependent. One of the purposes of this study is to found out whether there is significant interaction between methods and gender on students achievement in ecology. However, the study has shown that no significance interaction exists between method and gender on students' achievement in ecology. Since gender is not a factor for poor performance of students in ecology but rather teaching method used in ecology, significant interaction was not expected. The finding of this study supports that of Stefanie (2005) who studied memory recall between men and women and found no significant effect of gender on memory recall.

In the five hypotheses no significant interaction was found between the method and gender on students' interest in ecology. This implies that gender is not a factor for lack of students' interest in studying ecology but the use of methods that cannot effectively guarantee participation of student in ecology class make them to lose interest in ecological class leading to students poor performance. This is in line with the view of Nzewi (2008) that teaching methods used that are teacher – centered make students to lose interest in studying a course. Both male and female students were interested in studying ecology but are usually discouraged by the manner and method in which the course is taught.

In conducting this study, efforts were made to control likely contaminating factors in studies like this. One of such factors is small sample size. A total of 411 students comprising male and female students were involved in this study.

The experimental group (field trip) has 209 students. While the control group (conventional teaching strategy) has 202 students. A total number of 147 female students and 264 male students participated in this study. The sample size is large enough to take care of the problem of small size.

### **Conclusion**

The statistical analysis of data collected have shown that students taught ecology using field trip who took Ecological Achievement Test (EAT) performed better than their counterparts taught ecology using conventional teaching strategies who also wrote the same test. Similarly, students who were taught ecology using field trip as a teaching strategy showed high level of interest when compared with those taught ecology using conventional teaching strategies.

This study has revealed that male and female students exhibited similar levels of interest in the use of field trip as a teaching strategy for ecology course. This delineated the importance of teaching strategies as a cardinal factor for achievements of students in ecology test. It also shows that male and female students could compete with themselves favourably when field trip is used as a teaching strategy for ecology lesson.

It then holds that students' achievement in ecology does not depend on gender, but on teaching strategies. Ecology teachers and other stakeholders should take advantages of this to encourage the use of field trip as a teaching strategy.

### **Recommendations**

On the basis of the findings of this study, the following recommendations are made:

1. The authors of Ecology textbooks should emphasize on the use of field trip as a teaching strategy for ecology in their textbooks.
2. Stakeholders in education should organize workshops, conferences and seminars to expose teachers on how best to use field trip as a teaching strategy. This can be done by proper arrangement made through adequately funding of these workshops and seminars.
3. Field trip strategy should be used in ecology teaching to enhance students' interest and participation in ecology class.
4. Field trip should be used in ecology teaching to eliminate gender differences.
5. Teachers should be willing to carefully plan an ecological field trip. For the effective use of field trip, teachers can strictly adhere to the three stages of executing a successful field trip in this study.

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