

# FIELDTRIP AND DEMONSTRATION INSTRUCTIONAL STRATEGIES ON STUDENTS' PERFORMANCE IN BIOLOGY IN CALABAR SOUTH LOCAL GOVERNMENT AREA OF CROSS RIVER STATE

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**Abstract:** The study examined Field Trip and Demonstration Instructional Strategies on Students Performance in Biology in Calabar South Local Area of Cross River State. Three specific objectives, three research questions and three research hypotheses were postulated to guide the study. The study adopted quasi-experimental research design specifically pre-test post-test design. The population of the study comprises all the 610 SS1 Biology Students in all the nine (9) Public Secondary Schools in Calabar South Local Government Area of Cross River State. Simple Random Sampling was adopted to select two schools in Calabar South Local Government Area of Cross River State. One school was assigned field trip method while the other school was assigned demonstration method using intact class settings. A sample size of 90 Senior Secondary One Biology Students drawn from four intact classes was used in the study. Two public secondary schools in Calabar South were randomly sampled using cap and draw method and all the two schools participated in the study. In the two schools, 48 were exposed to field trip teaching method while 42 were exposed to demonstration teaching method. Instructional (treatment) package on Pollution and Biology Performance Test (BPT) were used as instruments for the study. The instrument validity and reliability were determined. Kuder Richardson Formula-21 was used to determine the internal consistency for Biology Performance Test (BPT) which yielded a reliability coefficient index of 0.84. Mean and standard deviation were used in answering the research questions while analysis of co-variance (ANCOVA) was used for testing hypotheses at .05 level of significance. The study revealed no significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration method. There is no significant difference in the mean achievement scores of male and female students taught Biology using Field trip. There is no significant difference in the mean achievement scores of male and female students taught Biology using Demonstration method. The researcher recommends among other things that teachers should be encouraged in adopting diverse teaching strategies that will help improve the achievement of students in biology.

**Keywords:** Fieldtrip, Demonstration, Instructional Strategy, Students' performance.

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## 1. INTRODUCTION

Biology is a unique branch of natural sciences, however, like other natural sciences; it is concerned with the search for in-depth understanding of natural phenomena and events. It is composed of two major fields, functional biology and historical biology, which is also, known as evolutionary biology (Bello, Bello and Abimbola, 2016). More generally, engagement with biology is likely to mean not only that students are more likely to choose to continue their studies in biology, but also that they are more likely to believe that they have a framework for understanding reality, to feel that the natural world is worth preserving and even that an understanding and appreciation of biology can help give them meaning in their lives.

It is well established that biology can facilitate human development, in particular, development towards greater student autonomy. Biology offers learners the opportunity to engage with the diversity of living organisms, and their local and wider environment. Biology demonstrates to student that they are part of the diversity of living things. It develops students' personal values and sense of responsibility with regard to living organisms and their environment.

Njoku, Nwagbo and Ugwuanyi, (2020) assert that Biology will continue to hold a distinctive place in the school curriculum. This is because the basic understanding of biology is required for study in a variety of disciplines such as Medicine, Agriculture, Pharmacy, Micro-Biology, Biochemistry, and Psychology, among others. It goes without saying that no student planning to pursue these courses of study can do without Biology.

For learners to perform maximally in biology, teachers can employ proper teaching strategies. Teaching strategies comprises the principles and methods used for instruction to be implemented by teachers to achieve the desired learning goals in students. These strategies are determined partly by the nature of the learner. For a particular teaching strategy to be appropriate and efficient it has to be in relation with the characteristics of the learner and the type of learning it is supposed to bring about.

The design and selection of teaching strategies must put into consideration not only the nature of the subject matter but also how the students learn. The teaching of the contents of biology curriculum demands making instruction relevant to real-world experience. Several types of teaching methods can be employed in the classrooms by the teachers such as field trip/excursion, demonstrations, discovery, discussion, laboratory activities, and cooperative learning among others which are among the most potent adaptive practice a teacher can use to improve student learning as against the conventional instructional method (Amalu, 2015). However, certain concepts in Biology cannot be effectively taught without taking the students on a field trip or bringing the object to the students for proper observation by demonstration.

A fieldtrip is taking students outside the classroom for the purpose of making 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. Field trip is an outdoor type of laboratory activity or field work or learning exercise undertaken by teachers and students in certain aspects of a subject, to give students the opportunity to acquire knowledge. Stephen (2019) concluded by defining a field trip "as a journey taken by a group of people to a place away from their usual environment."

Fieldtrip is done in three (3) steps which are: preparation, activities and follow-up activities. Preparation is done by both the teachers and students. Teachers take time to learn about the destination and the subjects or topics before the trip. Activities is mostly done by the students which include lecture, tours, video and demonstration while follow-up activities are general discussions that occur in the classroom once fieldtrip is completed.

Demonstration strategy is the process of teaching through examples in class or through experiments in laboratory. For example, a science teacher may teach the students a concept by performing an experiment for students. A demonstration can be used to prove a fact through combination of visual evidence and associated learning. Demonstrations help evaluate the students' interest and reinforce memory retention because they provide connections between facts and real-world application of those facts.

Wilson (2011) views a field trip to be a class trip with an educational intent, in which students interact with the setting, displays, and exhibits to gain an experiential connection to the ideas, concepts, and subject matter. Salihu (2015) described field trips as student experiences outside of the classroom at interactive locations designed for educational purposes. Ajaja (2010), on the other hand, studied the effects of field experiences on students' knowledge of scientific processes and biology

success. The study found a significant difference in process of science test scores and in biology achievement between students exposed to field trip experiences and those who were not. The study also reported strong correlation between process of science scores and biology achievement scores and concluded that field trip experiences enhanced students understanding of process of science, improved students' attitude towards Biology and significantly influenced their biology achievement. Igwebuikwe and Atomatofa (2013) investigated the Effects of Field Trip and Discovery Methods on Senior Secondary School Students' Retention in Biology in Benue State, Nigeria. The result showed that the Field Trip and Discovery methods enhanced students' retention in Biology. There was no significant difference between male and female students' retention in Biology.

Ogbulujah (2014) evaluated the effects of agricultural field visits on students' agricultural science performance in selected secondary schools in Rivers State. The study's findings suggested that agricultural field excursions learning experiences aided in broadening students' knowledge and exposure to modern farming technologies. A field excursion improves knowledge of agricultural processing procedures, increases farm product usage, and aids in species improvement and genetics. The performance level of students in senior secondary school III examination and students' overall performance in O' Level examination certificate in agricultural science in secondary schools in Rivers State improved significantly ( $p < 0.05$ ) due to exposure to field trips. Also, Oka and Samuel (2020) admitted that field trip strategy is found to be more effective in improving the academic achievement of basic science students than classroom lesson.

Demonstrations are usually carried out when the resources are limited or when the activity is prone to accidents; otherwise, students are expected to carry out their own experiment after the demonstration. The method can be used in the teaching and learning of some concepts in Biology but it does not require the students 'observing things in their natural environment. A study conducted by Tamari, Bonney and Polizzotto (2015) revealed that students learn more effectively and perform better on questions that relate to demonstration teaching method than on questions related to lessons that do not have a demonstration component. Thus, the authors concluded that demonstration teaching method is a valuable tool to promote active and interdisciplinary learning as well as promote academic achievement in biology.

Demonstration teaching method is an approach which involves showing a particular procedure or skills to the students who after careful teaching and learning and interaction repeat and practice the same process shown to them, this can be used when the available resources or equipment cannot go around for each individual in the class. The approach teaches certain techniques or skills, theory, practice. Demonstration teaching method is a teaching method which involves experimentation (Igboegwu, 2012).

Daluba (2013) investigated the effect of demonstration method of teaching on student's achievement in Agriculture in secondary schools in Kogi east education zone of Kogi state. Two research questions and one hypothesis guided the study. The result of the study reveals that demonstration methods have significant effect on students' achievement in Agriculture and Agriculture is largely applied to Biology. The study recommended that efforts should be made by teachers to thoroughly integrate demonstration method in teaching Agriculture at the secondary school level.

Omotayo and Adedeji (2015) investigated the effects of demonstration teaching method on senior secondary school students' academic performance in Biology in Ekiti State, Nigeria. The findings of the study revealed that there was a significant difference in the post - test mean scores of students taught with demonstration teaching method and conventional method. Based on the findings, it was recommended that during Biology lessons, teachers should adopt the use of demonstration teaching method to enhance student's academic performance.

Gender sensitive is also a moderating variable to look into. Firstly, boys always seem to perform better than girl's counterpart in biology. Also, studies show gender disparity in students' interest, indicating higher interest in female than their male counterpart in biology. It is also important to find out if the result of demonstration and fieldtrip is truly gender sensitive. There is a 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 biology, being that the females outperformed the males.

Njoku, Nwagbo and Ugwuanyi (2020), in a study on effects of peer tutoring and peer-led team learning on secondary school students' achievement in Biology, found out that the interaction effect of learning strategy and gender was statistically insignificant for students' achievement in Biology. Also, Ukor and Abdulbajar, (2019) in the study on effects of field trip and demonstration instructional strategy (FIS) on students' interest and achievement in biology concepts, specifically found out that there is no significant influence of gender on students' achievement in Biology.

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Hence in most cases, male students performed academically well compared with their female counterparts. Contrarily, Salihu (2015) examined the effect of gender achievement of students in Biology using field trip and demonstration method amongst students in secondary schools, Kaduna. The study revealed that there was significance difference between the mean scores in favour of the girls. This showed that the females gained more from field trip and demonstration method compared to their male counterparts.

The importance of biology cannot be undermined. However, to enhance the performance of students in biology, there is need for teachers to utilize innovative teaching strategies to help learners understand difficult concepts in Biology. Such strategies include field trip and demonstration in the teaching and learning of biology. Field trip and demonstration learning strategies makes learning experiences interesting, aids interaction, prompts discussion, satisfies students' natural curiosity, and eliminates boredom.

**Statement of the problem**

Field trip and demonstration learning strategies makes learning experiences interesting, aids interaction, prompts discussion, satisfies students' natural curiosity, and eliminates boredom.

The researcher wonders whether these strategies when utilized by the teacher can improve the academic performance of students in biology as students' poor performance can be attributed to insufficient teaching and instructional methods employed by science teachers. Lack of qualified teachers, lack of teaching materials and poor state of funding education by stakeholders in education.

It is against this backdrop that this research explores the effect of fieldtrip and demonstration instructional strategies among students for effective teaching and learning of biology in Calabar South Local Government Area of Cross River State, Nigeria.

**Objectives of the study**

The study is to determine the effect of fieldtrip and demonstration instructional strategies on students' performance on the concept of pollution in biology:

- i. To determine the difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration Instructional Strategies.
- ii. To ascertain the difference in the mean achievement scores of male and female students taught Biology using Field trip Instructional Strategy.
- iii. To determine the difference in the mean achievement scores of male and female students taught Biology using Demonstration Instructional Strategy.

**Research Questions**

The following research questions are stated to guide the study:

- i. What is the difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration Instructional Strategies?
- ii. What is the difference in the mean achievement scores of male and female students taught Biology using Field trip Instructional Strategy?
- iii. What is the difference in the mean achievement scores of male and female students taught Biology using Demonstration Instructional Strategy?

**Hypotheses**

The following null hypotheses were postulated and used for the study.

- i. There is no significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration Instructional Strategies.
- ii. There is no significant difference in the mean achievement scores of male and female students taught Biology using Field trip Instructional Strategy.
- iii. There is no significant difference in the mean achievement scores of male and female students taught Biology using Demonstration Instructional Strategy.

## 2. METHOD

This study adopted quasi-experimental research design specifically pre-test post-test design. The population of the study comprises all the 610 SS1 Biology Students in all the nine (9) Public Secondary Schools in Calabar South Local Government Area of Cross River State, Nigeria. A sample size of 90 Senior Secondary One Biology Students drawn from four intact classes was used in the study. Two public secondary schools in Calabar South were randomly sampled using cap and draw method and all the two schools participated in the study. In the two schools, 48 were exposed to field trip instructional strategy while 42 were exposed to demonstration instructional strategy. Simple Random Sampling was adopted to select two schools in Calabar South Local Government Area of Cross River State. One school was assigned field trip method while the other school was assigned demonstration method using intact class settings.

Instructional (treatment) package on Pollution and Biology Performance Test (BPT) were used as instruments for the study. The instrument titled Biology Performance Test was subject to Face validity with a 20 item questions submitted to two lecturers, one biology expert and one expert from test and measurement department, university of Cross River State, Calabar. Kuder Richardson Formula-21 was used to determine the internal consistency for Biology Performance Test (BPT) which yielded a reliability coefficient index of 0.84. Mean and standard deviation were used in answering the research questions while analysis of co-variance (ANCOVA) was used for testing hypotheses at .05 level of significance.

## 3. RESULTS

### Research Question 1

What is the difference in the mean achievement scores of students taught biology using field trip and those taught using demonstration Instructional Strategies?

**Table 1: Mean, Standard Deviation and Mean difference scores of students taught biology using field trip and those taught using demonstration Instructional Strategies**

Treatment Group	n	Pretest		Posttest		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Field trip	48	11.25	2.96	27.79	6.01	16.54
Demonstration Strategy	42	12.52	3.56	28.28	4.89	15.76

The result in Table 1 shows the difference in the mean achievement scores of students taught biology using field trip and those taught using demonstration strategy. The result shows that the pretest of students taught biology using field trip was 11.25 with a standard deviation of 2.96 and a posttest mean of 27.79 with a standard deviation of 6.01 with a mean difference of 16.54. Whereas, the pretest of students taught biology using demonstration strategy was 12.52 with a standard deviation of 3.56 and a posttest mean of 28.28 with a standard deviation of 4.89. The mean difference for students taught biology using demonstration strategy was 15.76. The result indicate that the mean difference of field trip is slightly higher than the demonstration strategy. The result implies that both field trip and demonstration strategies appear more effective in improving academic achievement of students in Biology.

### Research Question 2

What is the difference in the mean achievement scores of male and female students taught Biology using Field trip Instructional Strategy?

**Table 2: Mean, Standard Deviation and Mean difference in the mean achievement scores of male and female students taught Biology using Field trip Instructional Strategy?**

Gender	n	Pretest		Posttest		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	24	12.91	2.88	27.33	6.11	14.42
Female	24	11.58	3.06	28.25	5.99	16.67



Result in Table 2 shows the difference in the mean achievement scores of male and female students taught Biology using Field trip strategy. The result showed that male students had a pretest mean of 12.91 with a standard deviation of 2.88 and a posttest mean of 27.33 with a standard deviation of 6.11. The difference between the pretest and posttest means for male students was 14.42. Whereas, female students had a pretest mean of 11.58 with a standard deviation of 3.06 and a posttest mean of 28.25 with a standard deviation of 5.99. The difference between the pretest and posttest means for female students was 16.67. For both male and female taught using field trip, the posttest means were greater than the pretest means with female having a slightly higher mean increase than the male students. This implies that taught using field trip appears more effective in increasing students' academic achievement in Biology irrespective of gender.

**Research Question 3**

**What is the difference in the mean achievement scores of male and female students taught Biology using Demonstration Instructional Strategy?**

**Table 3: Mean, Standard Deviation and Mean difference in the mean achievement scores of male and female students taught Biology using Demonstration Instructional Strategy**

Gender	n	Pretest		Posttest		Mean Difference
		$\bar{X}$	SD	$\bar{X}$	SD	
Male	15	12.93	3.45	29.60	5.40	16.67
Female	27	12.29	3.66	27.55	4.51	15.26

Result in Table 3 shows the difference in the mean achievement scores of male and female students taught Biology using Demonstration strategy. The result showed that male students had a pretest mean of 12.93 with a standard deviation of 3.45 and a posttest mean of 29.60 with a standard deviation of 540. The difference between the pretest and posttest means for male students was 16.67. Whereas, female students had a pretest mean of 12.29 with a standard deviation of 3.66 and a posttest mean of 27.55 with a standard deviation of 4.51. The difference between the pretest and posttest means for female students was 15.26 For both male and female taught using field trip, the posttest means were greater than the pretest means with female having a slightly higher mean increase than the male students. This implies that Demonstration strategy appears more effective in increasing students' academic achievement in Biology regardless of gender.

**Hypothesis 1**

**There is no significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration Instructional Strategies.**

**Table 4: Result of Analysis of Covariance (ANCOVA) of the significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration Instructional Strategies**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	222.605 <sup>a</sup>	2	111.303	3.934	.023
Intercept	3061.255	1	3061.255	108.205	.000
Pretest	217.138	1	217.138	7.675	.007
Methods of Teaching	.312	1	.312	.011	.917
Error	2461.350	87	28.291		
Total	73356.000	90			
Corrected Total	2683.956	89			

a. R Squared = .083 (Adjusted R Squared = .062)

The result in Table 4 shows that an F-ratio of 0.011 with an associated probability value of 0.917 was obtained with regards to the difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration strategies. Since the associated probability of 0.917 was greater than 0.05, the null hypothesis one which states that there is no significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration strategies were retained. This implies that there is no significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration strategies.

**Hypothesis 2**

**There is no significant difference in the mean achievement scores of male and female students taught Biology using Field trip Instructional Strategy.**

**Table 5: Result of Analysis of Covariance (ANCOVA) of the significant difference in the mean achievement scores of male and female students taught Biology using Field trip Instructional Strategy**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	148.059 <sup>a</sup>	2	74.029	2.149	.128
Intercept	1362.636	1	1362.636	39.564	.000
Pretest	137.976	1	137.976	4.006	.051
Gender	3.313	1	3.313	.096	.758
Error	1549.858	45	34.441		
Total	38772.000	48			
Corrected Total	1697.917	47			

a. R Squared = .087 (Adjusted R Squared = .047)

The result in Table 5 shows that an F-ratio of 0.096 with an associated probability value of 0.758 was obtained with regards to the difference in the mean achievement scores of male and female students taught Biology using Field trip strategy. Since the associated probability of 0.758 was greater than 0.05, the null hypothesis two which states that there is no significant difference in the mean achievement scores of male and female students taught Biology using Field trip was retained. This implies that there is no significant difference in the mean achievement scores of male and female students taught Biology using Field trip strategy.

**Hypothesis 3**

**There is no significant difference in the mean achievement scores of male and female students taught Biology using Demonstration Strategy.**

**Table 6: Result of Analysis of Covariance (ANCOVA) of the significant difference in the mean achievement scores of male and female students taught Biology using Demonstration Strategy**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	112.530 <sup>a</sup>	2	56.265	2.528	.093
Intercept	1704.663	1	1704.663	76.588	.000
Pretest	72.226	1	72.226	3.245	.079
Gender	31.223	1	31.223	1.403	.243
Error	868.041	39	22.257		
Total	34584.000	42			
Corrected Total	980.571	41			

a. R Squared = .115 (Adjusted R Squared = .069)

Data presented in Table 6 shows that an F-ratio of 1.403 with an associated probability value of 0.243 was obtained with regards to the difference in the mean achievement scores of male and female students taught Biology using Demonstration strategy. Since the associated probability of 0.243 was greater than 0.05, the null hypothesis three which states that there is no significant difference in the mean achievement scores of male and female students taught Biology using Demonstration strategy was retained. This implies that there is no significant difference in the mean achievement scores of male and female students taught Biology using Demonstration strategy.

**4. DISCUSSION**

**Instructional Strategies and Students' Academic Performance in Biology**

Hypothesis one states that there is no significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration strategies. Result in table 1 and 4 indicate no significant difference in the mean achievement scores of students taught Biology using Field trip and those taught with Demonstration strategies. Both

field trip and demonstration method appear more effective in improving academic achievement of students in Biology. This was so because both methods exposed the students to real life situations during lesson delivery. Also, both methods captured the learners' attention and was a powerful motivator in classroom delivery. This finding is in line with the study of Oka and Samuel (2020) who admitted that field trip strategy is found to be more effective in improving the academic achievement of basic science students than classroom lesson. In the same vein, the finding of this study agrees with Omotayo and Adedeji (2020) who found that demonstration teaching method is effective in laboratory experiment in science.

#### **Gender and Students' Academic Achievement in Biology taught using Field Trip Instructional Strategy**

Hypothesis two states that there is no significant difference in the mean achievement scores of male and female students taught Biology using Field trip instructional strategy. Results in table 2 and 5 indicates no significant difference in the mean achievement scores of male and female students taught Biology using Field trip. This was so because a slight mean difference in the achievement scores of male and female students was observed. Also, this could be hinged on the fact that both male and female believed that field trip and demonstration strategies are appealing, regardless of gender. The finding is in line with the study of Igwebuikwe and Atomatofa (2013) who investigated the Effects of Field Trip and Discovery Methods on Senior Secondary School Students' Retention in Biology in Benue State, Nigeria. The result showed that that Field Trip and Discovery methods enhanced students' retention in Biology. There was no significant difference between male and female students' retention in Biology.

#### **Gender and Students' Academic Achievement in Biology taught using Demonstration Instructional Strategy**

Hypothesis three states that there is no significant difference in the mean achievement scores of male and female students taught Biology using Demonstration Instructional Strategy. Results in table 3 and 6 indicates no significant difference in the mean achievement scores of male and female students taught Biology using demonstration instructional strategy. This finding is in line with Ukor and Abdulbajar, (2019) in the study on effects of field trip and demonstration instructional strategy on students' interest and achievement in biology concepts, specifically found out that there is no significant influence of gender on students' achievement in Biology. The findings is also in line with Tamari, Bonney and Polizzotto (2015) who revealed that students learn more effectively and perform better on questions that relate to demonstration teaching method than on questions related to lessons that do not have a demonstration component.

### **5. CONCLUSION**

Based on the findings and conclusion of the study, the following recommendations were made:

1. Curriculum experts should include easy curriculum contents such as field trip and demonstration teaching strategies for effective teaching delivery by teachers so as to make the teaching and learning of biology interesting and captivating for the learners.
2. Government in conjunction with other professional bodies should sponsor further research on the use of field trip and demonstration teaching strategies in the learning of biology and other science related subjects.

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