

## Effects of Field-Trip and Inquiry-Based Instructions on Performance among Secondary School Biology Students in Lere Education Zone, Kaduna-Nigeria

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### ABSTRACT

This study sought to find out the “Effects of Field-Trip and Inquiry-Based Instructions on Performance among Secondary School Biology Students in Lere Education Zone, Kaduna-Nigeria”. The study adopted a pretest, posttest and post-posttest quasi-experimental and control group design. The population comprised all 1979 senior secondary school Biology students in Lere zone. A sample consisting of 163 students randomly selected from three coeducational schools in Lere Education Zone participated in the study. The experimental group A having 55 students and B having 56 students were taught Ecology concepts using Field-trip and Inquiry-based Instruction respectively while the control group having 52 students were taught using lecture method. A validated instrument called Ecology Performance Test (EPT) with  $r=0.87$ , was used to gather data. Two objectives, research Questions and Null Hypotheses guided the research. The hypotheses were tested at  $p \leq 0.05$  level of significance. Data collected were analyzed using t-test and Kruskal-wallis statistics. The results of the study revealed that differences existed on performance when students are taught using field-trip, inquiry-based instruction and lecture teaching methods in favour of experimental groups A and B. Based on the findings the following recommendations were made; the use of field-study and inquiry-based instruction should be encouraged among teachers of Biology to improve student’s performance; Field-trip and Inquiry-based Instruction should also be encouraged to promote the learning of Biology by both male and female students.

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### INTRODUCTION

The global aim of science is to enable learners to acquire knowledge and skills that would be relevant to their future livelihoods (Gali, 2018). Science, as a concept, is a process geared towards problem-solving to enhance the living standard of man. Shaibu (2014) defines science as a complex human activity that leads to the production of a body of universal statements called laws, theories or hypotheses, which serve to explain the observable behavior of the universe or part of it, which, in themselves, have predictive characteristics. Sanusi (2019) has observed that

the economic and political strength of a nation is always assessed in terms of achievements in science and technology. Usman (2021) posits that people live in a world where science and technology have become integral parts of human culture and any country that overlooks this significant truism does so at the risk of remaining backward in an advancing world. Hence, Omiko (2015) concluded that no nation can make appreciable progress in terms of development without a correct scientific base. This is why the National Policy on Education (FRN, 2013)

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emphasized on the provision of science education at all levels of education in Nigeria.

Biology is one of the science subjects that occupy a significant position in the senior secondary school curricula. Umoh (2020) defines Biology as a branch of science that is concerned with the characteristics and behavior of organisms how species and individuals come into existence, and the interaction they have with their environment. Biology plays a vital role in providing knowledge of relevant concepts about living things and developing scientific skills and attitudes. Ibrahim further stated that Biology is a subject specifically designed to provide students with skills and attitudes of caring about themselves, other organisms, and the environment. Ghumdia (2017) stipulates that when the knowledge of Biology is acquired and applied in any society, it can bring about rapid and sustainable national development. To further emphasize its significance, Flowers, (2018) and Abubakar (2017) have observed that Biology, as a discipline, has contributed tremendously to the financial, physical, and aesthetic benefits of humanity and to national building. The areas of contributions of Biology include but are not limited to, the followings: Medicine, Aquaculture, Crime detection, Forestry, Genetic Engineering, Parasitology, Biochemistry, Physiology, Ecology, Genetics, and Molecular Biology has made Biology subject to become central focus in most human activities including solutions to the problem of food security, environmental pollution, population explosion, radiation, disease, health, hygiene, family life, poverty eradication, management and conservation of natural resources as well as Biotechnology and ethics. The objectives of learning Biology at the senior secondary school level include learners having adequate laboratory and field skills in Biology in general and ecology in particular.

Danjuma (2017) stated that ecology is concerned with the biology of groups of organisms with functional processes on land in the oceans and in freshwater. Ecology deals with the interaction of organisms and their natural environment and needs to be taught with an appropriate method or strategy of teaching that

requires direct observation of organisms in natural habitats. These organisms may be within or far away from the school environment. Danjuma (2017) observed that teaching ecology at secondary schools in Nigeria has not been very impressive due to poor teaching instructional strategies used. Gali (2018) stated that the poor teaching strategies employed by several teachers affect the performance of the students in the subject. Dallatu (2019) observed that teaching Biology using teacher-centered strategies such as the lecture method does not encourage the learners to participate fully in the classroom activities and hence students perform poorly in Biology concepts. Despite the importance of ecology as a concept in Biology, the performance among secondary school students remains poor. The failure rate in Biology is even more alarming compared to Chemistry and Physics despite its popularity among science students. Dallatu (2019) noted that a review of student's enrolment in a science subject at the senior secondary schools' level in Nigeria shows that more students register for Biology than any other science subject but their academic performance in the subject is comparatively lower at SSCE when compared with other science subjects.

Poor performance in Biology among Nigerian secondary school students has been the major concern of parents, teachers, and the public. Jibrin and Nura (2017) have identified poor methods of teaching and improper use of instructional materials as some of the deficiencies of Biology teachers, which has led to low academic performance on the part of the students. Researchers such as Lawal (2009), Atadoga and Lakpini (2013) have found that the persistent low academic performance in Biology education was partly attributed to teachers' instructional strategies such as lecture methods in which the learner remains passive while the teacher does most of the talking. As such, instructional strategies used by teachers in the teaching and learning process have a significant influence on learners' academic performance. Ecology is one of the concepts in Biology which cannot be taught theoretically. According to Gyuse (2009), vital abstract contents in Biology (like the Ecology

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concept) can hardly be effectively communicated to the learners theoretically. One of the major purposes of the Biology program in Nigeria secondary schools is to enable students to apply it to everyday life activities. Unfortunately, this

purpose has not been achievable due to the poor performance of students as reported by the Chief examiners of WAEC as recorded in Table 1.

**Table 1.** Students' Performances in Biology Kaduna State WAEC May/June, 2016-2023

Year	Total Sat	No with A1-C6	% with A1-C6	No with D7-F9	% with D7-F9
2016	126,821	59657	47.04	67161	52.96
2017	134,852	56570	41.95	78282	58.05
2018	130,653	56155	42.98	74498	57.02
2019	150,925	72204	47.85	78722	52.17
2020	143,936	62008	43.08	81928	56.92
2021	149,162	61028	40.90	88134	59.10
2022	136,916	58284	42.60	78632	57.40
2023	178,932	88643	49.50	90289	50.50

**Source:** West African Examination Office, Kaduna Office (2023)

Table 1 is a clear indication of poor performance as 50% and above that register for the subject failed every year from 2016-2023. The performance in Biology between 2016 and 2023, more than 50% of the students that sat for the examination had below credit pass. This high failure rate at SSCE Biology according to Muoneme (2015) and Dallatu (2019) has continued to be a source of worry to curriculum planners, educationists, parents and the entire society. Reports from several studies like Nworgu, (2005). Johnson (2016) and Danjuma (2017) have indicated that a vast number of factors are responsible for this poor performance. Prominent among these factors include the difficult and abstract nature of some Biology concepts like Evolution, Genetics, Cell Physiology, and Ecology, inadequacy and poor use of instructional materials, teachers' prevalent use of traditional teaching methods lack of practical classes/ activities to foster the acquisition of social skills and lack of interest of students towards teaching for better retention, among others. All these have contributed directly or indirectly to the deplorable quality of Biology teaching and learning in Nigeria, especially in activity-based teaching strategies such as practical activity method, inquiry-based, and field-trip instructional methods.

Field-trip is a teaching method that involves taking students outside the classroom to

make relevant observations about living things in their natural habitat. It could be in a nearby school farm, national park, zoo, industry, forest or game reserve. Bajah (2002) sees field trips as an important component of science teaching. In addition, Bagiwa (2023) sees field trips as an outdoor type of laboratory activity or field work or learning exercise undertaken by teachers and students in certain aspects of a subject, to allow students to acquire relevant knowledge of the organism in the natural habitat. In addition, Aliyu (2018) observed that Field-trip is taking students out of the classroom to places where they can see concrete illustrations of classroom theories. It also offers direct observation and interpretation in their natural environment. In the field, the learners require the use of basic scientific skills that include participation in group activities, communicating with others, cooperation, problem-solving, and manipulation of substances and organisms in the natural surroundings. Another method that involves the learners in active learning is the Inquiry-based.

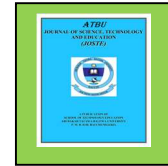
Reports of the National Research Council (NRC, 2015) identified Inquiry as a teaching and learning method that provides learners with motivation to learn and develop skills to be successful throughout life. They explained that students benefit by learning science through authentic investigations similar to those conducted by professional scientists. In theory, with the

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placement of science in a context through Inquiry-based instruction, teachers and students begin to develop their approach to science, and this investigative learning leads to better understanding. The inquiry method of teaching according to Danjuma (2017) is a teaching method where the learner, with minimum guidance from the teacher, seeks to discover and create answers to a recognized problem through the procedure of making a diligent search. Inquiry is a term used in science teaching that refers to a way of questioning, seeking knowledge or information or finding out about a phenomenon. Obeka (2010) however added that the use of this method aids the student to learn not only concepts and principles but also self-direction, responsibility, and social communication. He further stated that it is a highly interactive step-by-step approach that involves students at all levels of discussion. It is also the way people learn when they are left alone.

#### STATEMENT OF THE PROBLEM

Despite the popularity of Biology among Nigerian students, performance at the Senior Secondary School level has remained poor. A critical look at students' academic performance in Biology in the Secondary School Certificate Examination over the years showed consistently low academic performance as can be seen in Table 1.

The performance of Biology students is in Table 1. May/June 2016-2023 West African Examination S.S.C.E. is evidence of poor performance in Biology. Nwokolo, (2023), observed that part of the reasons for the failure of students in examinations is attributed to the methods of teaching adopted by teachers for teaching Biology, which is mostly lecture method. Johnson (2016) reported poor skills acquisition when the lecture method is used to teach Biology concepts and other science-related subjects. The need to find solutions to students' poor academic performance is therefore an obvious factor as Flowers (2018) opined that several factors have been responsible for low acquisition of social skills. This includes: Teaching methods, learning materials, teaching factors, societal factors, and strategies employed by teachers

among others. Muoneme (2015) reported that when the lecture method is used, the interest of learners is not always boosted and hence affects the performance of the students due to lack of interest. Maikano (2016) also reported poor retention ability when Biology concepts are taught using the lecture method. When the interest and retention ability of learners are not enhanced/boosted it directly affects the performance and acquisition of social skills among students. It is against all these backgrounds that this study investigates the Effects of field trips and Inquiry-based Instruction on Performance in Lere Education Zone, Kaduna-Nigeria.

#### Objectives of the Study

The study has the following objectives which are to:

1. determine the effect of field trip and Inquiry-based Instructions on Academic Performance in ecology.
2. find out the effects of field trips and Inquiry-based Instructions on Performance in ecology based on gender.

#### Research Questions

The following research questions are set to guide the study;

1. What is the difference between the mean Performance in ecology scores among students taught ecology using field trips and Inquiry-based Instructions and those taught using the Lecture Method?
2. What is the difference between the mean performance in ecology scores of male and female students taught ecology using field trips and Inquiry-based Instructions?

#### Null Hypotheses

This study has the following Null Hypotheses:

**Ho<sub>1</sub>:** There is no significant difference between the mean performance scores among students taught ecology using field trip and Inquiry-



based Instructions and those taught using Lecture Methods

**Ho<sub>2</sub>:** There is no significant difference between the mean performance scores of male and female students taught ecology using field trips and Inquiry-based Instructions.

### **Scope of the Study**

This study seeks to investigate the Effects of Field-trip and Inquiry-based Instructions on Performance among Biology secondary school students in Lere Education Zone. Senior Secondary II Students in three Secondary Schools in Lere Education Zone participated in the study. The reason for not using S.S I and S.S. III is because S.S I are just coming to the school and so they are not too familiar with the subject while S.S. III are busy preparing for their final year examinations; S.S. II students were selected to participate because they are more stable receiving their lessons without many distractions. Ecology concepts were taught because of the poor performance among secondary school students and they are activity oriented.

## **METHODOLOGY**

### **Research Design**

The research design employed for this study was a pretest, posttest, and post-posttest quasi-experimental control group design. A pretest was administered to the groups to determine their equivalence using the Ecology Performance Test (EPT). Experimental group I (EG<sub>1</sub>) was taught ecology using the field-trip method and experimental group II (EG<sub>2</sub>) was taught ecology using the inquiry-based method while the control group was taught using the lecture method. The three groups were of the same equivalence based on the pretest results. Both the experimental and control groups were taught for six weeks. Thereafter, a post-test (O<sub>2</sub>) was administered to determine the impact of field trip and inquiry-based instructional methods on students' academic performance in the concepts taught.

### **Population of the Study**

The population for this study consisted of all SS II Biology students in the coeducational Government Senior Secondary School Students in Lere Educational Zone. Their total number was 1979 students; 1269 male and 711 females; the schools involved had similar conditions in terms of recruitment, and quality of staff, provision of equipment/chemicals, instructional materials, students' enrollment, curriculum and academic calendar among others.

### **Sample and Sampling Technique**

From the twenty-two (22) public schools in the area of the study, six schools were randomly selected as the target population. The six schools were subjected to a pre-test and the results obtained were subjected to statistical analysis using ANOVA and Scheffe's test for homogeneity of mean. Three schools were chosen whose performance did not significantly differ, these schools were GSS Yarkasuwa (Snr), GSS Damakasuwa (Snr) and GSS Saminaka (Snr). Since the research requires two experimental groups and one control group, simple random technique of balloting was used to assign the three groups into experimental and control groups respectively.

Intact class was used in each of the three schools selected, GSS Yarkasuwa (Snr) comprising of fifty-five (55) participants were assigned the experimental group I, GSS Damakasuwa (Snr) comprising of fifty-six (56) subjects were assigned the experimental group 2 and GSS Saminaka (Snr) comprising of fifty-two (52) subjects were assigned to the control group. A sample size of one hundred and sixty-three (163) participants from the three intact classes was considered appropriate for experimental research of this nature in line with the recommendation of Sambo (2008) that a minimum of 30 subjects is viable for experimental study.

### **Instrumentation**

The instrument used for this study is Ecology Performance Test (EPT). The instrument was adapted by the researcher using WAEC 2014-2018 past questions. The Ecology

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Performance Test (EPT) comprised of forty choice objective test items each with four alternatives (A – D) from which the students selected the correct answer. Two marks were allocated for each question answered correctly.

The Instruments were given to experts who are Ph.D holders with the minimum rank of senior lecturers in the Department of Science Education; Department of Biological Sciences Ahmadu Bello University, Zaria and two experienced Secondary School Biology teachers to validate the test items. A pilot test was conducted involving students of Government Secondary School Ramin Kura which was part of the study population but not part of the sample schools. The forty (40) item instruments on the Ecology Performance Test were administered to the thirty (30) students with the assistance of the Biology teachers of the school. The reliability coefficient for the Ecology Performance Test (EPT) was obtained using the test-retest method. The scores were subjected to Pearson Product Moment Correlation Coefficient (PPMC) to obtain their reliability values. The reliability for EPT was found to be 0.87.

#### **Treatment Administration**

The two groups were taught the Ecology concept using different strategies; experimental group one was taught using field-trip instruction, and experimental group two was taught using Inquiry-based instruction. At the end of six (6) weeks of six periods, the researcher administers the posttest to the students in the experimental and control groups using the Ecology Performance Test (EPT), the EPT was marked and scored over 80, and each question carries two marks. After scoring, the data was subjected to inferential and descriptive statistical analysis using SPSS. The control group was taught the same concepts by the researcher using the lecture method alone. The lesson was presented by defining the concept then followed by the explanation and important points were written on the chalkboard.

#### **Procedure for Data Collection**

After teaching the experimental group 1 and 2 and the control group for six weeks, a post-test and Ecology Performance Test (EPT) was administered by the researcher. The EPT was marked and scored over 80 marks. After marking the scripts of the three schools, the scores were recorded accordingly based on their groups.

#### **Procedure for Data Analysis**

The null hypotheses are restated here along with the appropriate statistical tools to be used in testing them. The statistical tools include descriptive statistics mainly mean, standard deviation, and frequency used to answer the research questions, and inferential statistics was used to test the null hypotheses at  $P \leq 0.05$  level of significance. Hypothesis one was analyzed using ANOVA while hypothesis two was analyzed using ANCOVAR.

#### **Analysis and Results Presentation**

Inferential statistics of parametric test of Analysis of variance (ANOVA) and the Analysis of Covariance (ANCOVAR) for all hypotheses involving performance.

1. Pretest data generated via Ecology Performance Test (EPT) to establish group equivalence before the experiment
2. Posttest data generated via Ecology Performance Test (EPT)

## **RESULTS**

**Research Question One:** What is the difference between the mean Performance scores among students taught ecology using field trips and Inquiry-based Instructions and those taught using Lecture Method?

To answer this research question, a descriptive statistic of mean scores and standard deviation was used.



**Table 2a:** Summary of Posttest Mean Score for the Academic Performance for Experimental A, B and Control Group.

Groups	N	Mean	Std. Deviation	Mean Diff
Experimental A	55	54.81	7.20	15.62
Experimental B	56	52.89	5.74	13.70
Control Group	52	39.19	5.36	

Table 2a revealed that there is difference between the mean academic performance scores of the experimental A, B and control groups when exposed to Field-trip, Inquiry-based instructions and Lecture method respectively. The mean score of 54.81, 52.89 and standard deviation of 7.20, 5.74 respectively are higher than the mean score of 39.19 and standard deviation of 5.36 for the control group. The mean difference was 15.62 and 13.70 for experimental group A and B respectively in favor of experimental groups. In order to establish if the difference is statistically significant inferential statistics was used to test the null hypothesis.

**Hypothesis One:**

**Ho<sub>1</sub>:** There is no significant difference between the mean performance scores among students taught ecology using Field-trip and Inquiry-based Instructions and those taught using Lecture Method

To test this Null Hypothesis One, the Ecology Performance Test (EPT) post-post-test scores of students taught using Field-trip and Inquiry-based Instructions and those taught using Lecture method were subject to One-way Analysis of Variance (ANOVA) was used. A summary of the analysis are shown in Table 2b

**Table 2b:** Results of ANOVA Analysis of Differences in Mean Academic Performance for Experimental A, B and Control Group.

Groups	Sum of Squares (SS)	Df	Mean Square (MS)	F	p	R
Between Groups	7707.574	2	3853.787	101.322	0.01	S
Within Groups	6085.616	161	38.035			
<b>Total</b>		163	13793.190			

Significant at alpha  $P \leq 0.05$

From Table 2b, the result shows that the p-value 0.001 observed is less than the alpha p-value of 0.05 at df 2, 161. Since the p-value observed (0.001) is less than 0.05 the difference is significant. Therefore, the null hypothesis which says: There is no significant difference between the mean Academic Performance scores of students taught ecology using Field-trip, Inquiry-

based Instructions and those taught using Lecture Method is rejected. Since the observed p-value is less than  $P \leq 0.05$  level of significance, this suggests that there exists evidence to conclude that there is a significant difference among the teaching methods. To indicate the groups that show significant differences, a post hoc Scheffe's test was used and the result is presented in Table 2c

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**Table 2c:** Results of Scheffee's Multiple Comparisons of Posttest Academic Performance Scores of Experimental A, B and Control Group.

Groups (I)	Group (J)	Mean Differences(I-J)	Std Dev.	Sig.	Remark
1 Expl A	2 Expl B	1.92532	1.17079	.262	NS
	3 Ctrl	15.62587*	1.19289	.000	S
2 Expl B	1 Expl A	-1.92532	1.17079	.262	NS
	3 Ctrl	13.70055*	1.18770	.000	S
3 Ctrl	1 Expl A	-15.62587*	1.19289	.000	S
	2 Expl B	-13.70055*	1.18770	.000	S

Significant at alpha  $P \leq 0.05$

From Table 2c a Scheffe's multiple comparisons test was conducted and the mean differences were significant at the 0.05 level among the three groups. Therefore, the post-hoc test confirmed the ANOVA result of significant differences between the groups. That is, the significant difference exists between experimental group A and Control, and also between group B and Control, but no significant difference between group A and B. the result thus implies that teaching with Field-trip and Inquiry-based improved students' academic performance in

Ecology than lecture method. Therefore, the null hypothesis which says: There is no significant difference between the mean Academic Performance scores of students taught ecology using Field-trip, Inquiry-based Instructions and those taught using Lecture Method is rejected. Since the observed p-value is less than  $P \leq 0.05$  level of significance.

**Question Two:** What is the difference between the mean performance scores of male and female students taught ecology using field trips and Inquiry-based Instructions?

**Table 3a:** Summary of Posttest Mean Score for the Academic Performance of Male and Female Students in Experimental Group A and B.

Groups	Gender	N	Mean	Std. Deviation	Mean D.
Experimental A	Male	34	54.79	6.67	0.06
	Female	21	54.85	8.15	
Experimental B	Male	31	52.70	6.19	0.41
	Female	25	53.12	5.25	

The results in Table 3a revealed that there is a mean difference in the academic performance of male and female in experimental group A and B. The mean performance scores of 54.79, 54.85 and a standard deviation of 6.67, 8.15 for male and female respectively in experimental group A while the mean scores of 52.70, 53.12 and standard deviation of 6.19, 5.25 for male and female in the experimental group B respectively. The mean difference was 0.06 and 0.41 for the experimental group A and B respectively. To check for significant differences,

a null hypothesis was tested and presented in Table 3b.

**Hypothesis Two:**

**Ho<sub>1</sub>:** There is no significant difference between the mean performance scores of male and female students taught ecology using field trips and Inquiry-based Instructions.

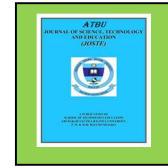
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**Table 3b:** Analysis of Covariance (ANCOVAR) Statistics on Difference Between the Mean Performance Scores of Male and Female Students Taught Ecology using Field-Trip and Inquiry-Based Instruction

Sources of variation	Sum of Squares (SS)	Df	Mean Square (MS)	F	P	R
Corrected Model	105.239 <sup>a</sup>	3	35.080	.814	.489	NS
Intercept	311021.394	1	311021.394	7213.994	.001	S
Groups	97.827	1	97.827	2.269	.135	NS
Sex	1.501	1	1.501	.035	.852	NS
Groups vis Sex	.808	1	.808	.019	.891	NS
Error	4613.157	107	43.114			
Total	326561.000	111				
Corrected Total	4718.396	110				

Significant at alpha  $P \leq 0.05$

From the result in Table 3b, it is clear that the observed p-value under sex (gender) is 0.891. This value is greater than the alpha  $p \leq 0.05$ , which means that there is no significant difference between the mean performance scores of male and female students exposed to ecology concepts using field trips and Inquiry-based Instructions. Therefore, the null hypothesis eight which predicted no significant difference between the mean performance scores of male and female students taught ecology using Field-trip and Inquiry-based Instructions, is hereby retained.

### DISCUSSION OF RESULTS

The main objective of this study is on the Effects of Field-trip and Inquiry-based Instructions on Performance among Secondary School Biology Students in Lere Education Zone. The findings of the study are discussed as follows:

Hypothesis one showed that there was a significant difference between the mean Academic Performance scores of students taught ecology using Field-Trip, Inquiry-Based Instructions and those taught using Lecture Method in favour of the experimental groups. The experimental group A and B performed significantly better than the control group. This means that the experiment had a greater impact on field trip and Inquiry-based instructions than the control group that was exposed to lecture method in understanding of biology concepts. These findings conform with that of Chukwuemeka (2018), Iwuju, (2011), Maikano (2016), Yakubu (2016), Danjuma (2017), Ibrahim; Hamza; Bello

and Adamu, (2018) and Adanyi (2019) independently carry out their research using activity-based instruction and both find out that the learners under experimental group performed significantly better than the students in the control group.

Results of testing Hypothesis five showed that there was no significant difference between the social skills acquisition level of students taught ecology using Field-trip and Inquiry-based Instructions and those taught using Lecture Methods in favour of the experimental groups. hence both male and female students acquired social skills equally thus the skills are gender friendly. This is not in agreement with the findings of Omer and Gokmen (2017) investigated Gender and Acquisition of Social Skills among Junior Secondary School (JSS) 3 students in Cyprus Municipality and the results revealed that male and female students acquire social skills differently in favour of female students. The findings is in line with the research of Reetu (2016) and Amosa, (2018), who worked differently using the inquiry method and Field-trip instructions respectively and came up with results in favour of both male and female students thus gender friendly.

Results of testing Hypothesis two showed that there was no significant difference between the mean Performance scores of male and female students taught ecology using Field-Trip and Inquiry-Based Instructions hence the academic performance of both male and female students was enhanced thus the instructional methods are gender friendly. The findings agree

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with studies carried out by Maikano, (2016), Muoneme (2015), Wada (2016), Danjuma (2017), Sanusi, (2019) and Adanyi (2019) reported that field-study and inquiry-based instructions was more effective in enhancing academic performance than the lecture method. This may be that social skills acquired by students were induced by the fact that they were able to interact with the teaching materials by Field-trip and Inquiry-based instructions. Their findings show no significant difference in academic performance between male and female students taught using either Field-trip or Inquiry-based instructions. Therefore, with the empirical evidence in this study, it is shown that the use of Field-trip and Inquiry-based instructions are gender friendly in learning Biology.

### CONCLUSION

On the basis of the findings from this study, the following general conclusions could be deduced:

1. Field-trip and Inquiry-based Instructions has the potential of enhancing academic performance of ecology concepts by learners.
2. Field-trip and Inquiry-based Instructions enhanced academic performance among Male and female students in ecology.

### RECOMMENDATIONS

Based on the findings of the study the following recommendations were made:

1. Both male and female senior secondary school students should be taught Biology with field-trip and Inquiry-based instructions as both enhance performance when used.
2. Field-trip and Inquiry-based instructions should be encouraged by the Science Teachers Association of Nigeria in the teaching and learning of Biology at Senior Secondary Schools as it is found to improve students' academic performance.

### REFERENCES

- Abubakar, S. A. (2017) Effect of Cooperative Learning Strategy on the Attitude and Academic Performance of Biology Students of Different Cognitive Styles in Kaduna state, Nigeria. *Unpublished Ph.D Thesis. Faculty of Education. ABU Zaria.*
- Adanyi, C. (2019). Impact of Process-based Instruction on Acquisition of Science Process Skills, Performance and Retention among Basic Science Students in Zaria Educational Zone *Unpublished Ph.D Thesis. Faculty of Education. ABU Zaria.*
- Aliyu M. M (2018). Educational excursions and student's achievements in business studies. *Journal of Educational Research and Development. p, 111-124*
- Amosa, A. (2018). Effects of Field Trip on Students' Academic Performance in Basic Technology in Ilorin Metropolis, Nigeria. *Malasian Online Journal of Educational Technology. Vol.3, Issue 2 (www.mojet.net).*
- Atadoga, M.M Lapkini, M.A. (2013). A Comparison of Numeracy Achievement of primary school Pupils Taught Using whole class and Varied Classroom Organization Instructions. *Proceedings of Multicultural African Confluence, Held at Faculty of Education, Ahmadu Bello University, Zaria Between 11<sup>th</sup> - 15<sup>th</sup> June, 2013.*
- Chuckwuemeka, P.I. (2018). Students' Pre-practical Experiences and Academic Achievement in Senior School Biology Theory Lesson. *Journal of Resourcefulness and Distinction; 5(1):1-8*
- Dallatu, R. Y. (2019) Effects of Indoor and Outdoor Laboratory Activity Methods on Anxiety, Retention and Performance among Secondary School Biology Students in Kaduna, Nigeria. *Unpublished M.Ed. Thesis, Department*

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- of Science Education, Ahmadu Bello University, Zaria, Nigeria.
- Danjuma, S. (2017). Effects of Inquiry-based instruction in Acquisition of Process-skills, interest and Performance in Ecology concepts. *Unpublished M.Ed. Thesis, Department of Science Education, Ahmadu Bello University, Zaria, Nigeria.*
- Federal Ministry of Education, (2013). National Policy on Education, Federal Government Press Lagos Nigeria.
- Flowers, A. (2018), *Social Skills Improvement System (SSiS)*, Pearson Education, inc., [anise.flowers@pearson.com](mailto:anise.flowers@pearson.com)
- Gali, M. (2018). Impact of Linear Programmed Instructional Strategy on Academic Performance among Secondary School Biology Students in Tarauni, Kano State, Nigeria. *Unpublished M.Ed. Thesis, Department of Science Education, Ahmadu Bello University, Zaria, Nigeria.*
- Ghumdia, A. A. (2017). Effects of Inquiry-Based Teaching Strategy on Students Science Process Skills Acquisition in Some Selected Biology Concepts in secondary Schools in Borno State. *International Journal of Scientific Research 1(2), 96-106*
- Gyuse E.Y (2009). *Moving Teaching and Science Education Forward*. Diagnosing Science Teacher's Problem. Science Teachers Association of Nigeria (STAN) Minna Niger State.
- Ibrahim, M. S; Hamza, M. Y; Bello M and Adamu, M. (2018). effects of inquiry and lecture methods of teaching on students' academic achievement and retention ability among N.C.E 1 Chemistry students of Federal College of Education, Zaria. *Open Access Journal of Chemistry*
- Jibrin, A.G. and Nura, R.A. (2017). The Role of ICT in Teaching Science Technology and Mathematics Education (SMTE) in Nigeria Institutions. A paper presented at the National
- Johnson, J. L. (2016). *School-Wide Social Skills Instruction*. Retrieved from <https://vkc.vanderbilt.edu/assets/file/resources/psisocialskills.pdf>. 13/03/2019.
- Lawal, F.K. (2009). Developing Enterpreneurial Skills through Biology Education and the Role of the Biology Teacher. Science Teachers Association of Nigeria 50<sup>th</sup> Annual Conference 134 – 137. *Leadership*, Sept.
- Maikano, S. (2016) Impact of Computer-Assisted and Science Process Instruction in Biology among Varied Abilities Secondary School Students in Kaduna, Nigeria. *Unpublished Ph.D Thesis A.B.U. Zaria.*
- Muoneme, J. O. H. (2015) Impact of Enrich-Lecture Method with Interactive Multimedia Board on Academic Achievement and Interest of Students in Ecology Concepts. *Unpublished M. Ed Thesis. Faculty of Education, ABU Zaria.*
- National Research Council, (2015). *Inquiry and the national science Education standards*. Washington, DC: Nation Academy Press
- Nworgu, L.N. (2005). *Fundamental Principles and Methods of Teaching Biology*. Enugu: Global Publisher (Nig.) Ltd.
- Obeka, S. S (2010). *Current Trend in Geographical and Environmental / Education*. Ahmadu Bello University Press, Ltd.
- Omiko, A. (2015). Levels of Possession of Science Process Skills by Final Year Students of Colleges of Education in South-Eastern States of Nigeria. *Journal of Education and Practice*, 6(27) 094-101
- Sanusi, B. R. (2019). Effects of Improvised and Standard Instructional Materials on Performance and Retention in Digestive System Among Secondary School Students in Sokoto, Nigeria.
- Shaibu, A.A.M. (2014) Navigating the maze of students' under-achievement in science: Does Science Education

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- Research Provide a Road map?  
*Inaugural Lecture in Department of Science Education A.B.U. Zaria.*
- Umoh, C.G. (2020). A theoretical analysis of the effects of gender and family education on human resources development. *Journal of Curriculum Organization of Nigeria*, 10(1), 1-4.
- Usman, S. (2021). Impact of 5Es Problem-Solving Model on Science Process-Skills Acquisition, Performance and Retention in Cell Physiology among Secondary School Biology Students, Zaria, Nigeria. *Unpublished M.Ed Thesis faculty of Education, ABU, Zaria.*
- Wada, N.S. (2016). Impact of Field Trip on Motivation, Retention and Performance in Plant Adaptation among Secondary School Students in Gumel, Jigawa State Nigeria. *Unpublished Thesis, Faculty of Education, A.B.U. Zaria.*

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