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Field Trip Teaching Approach and Senior Secondary School Students' Achievement, Motivation and Attitude in Ecology: Evidence from Niger State, Nigeria

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ABSTRACT

This study examined how a field trip teaching approach affects senior secondary school students' academic achievement, motivation and attitude in ecology in Niger State, Nigeria. A quasi-experimental pre-test/post-test design was adopted, with intact classes serving as experimental and control groups. The target population was 2,935 Senior Secondary School One (SS1) students in public co-educational schools across the six educational zones of the state. Using the Taro Yamane formula, a sample of 352 students was drawn by stratified random sampling from six schools (three experimental and three control, one per educational zone), and 22 Biology teachers acted as research assistants. Data were gathered with the Ecology Achievement Test (EAT), the Student Motivation Questionnaire (SMQ) and the Student Attitude Questionnaire (SAQ). Test-retest reliability coefficients of 0.80 and 0.85 were obtained for the SMQ and SAQ respectively. Following a six-week treatment, the data were analysed using means and standard deviations for the research questions and the independent samples t-test for the null hypotheses at the 0.05 level of significance. The results showed that students taught through field trips obtained higher post-test achievement scores (M = 75.90) than those taught by the lecture method (M = 72.43), a difference significant at p = 0.05. Motivation (M = 4.19 versus 2.96) and attitude (M = 3.39 versus 2.44) were also significantly higher in the field trip group (p = 0.00). It was concluded that field trips significantly improve students' achievement, motivation and attitude in ecology. It was recommended that Biology teachers adopt field trips regularly, that teachers be trained to organise them, and that field trips be made a compulsory part of the ecology curriculum.

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INTRODUCTION

The word "science" comes from the Latin "scientia", meaning knowledge (Eneh, 2020). Science is a branch of knowledge concerned with the systematic study of the world around us, and the sum of what is learned from such study is called scientific knowledge. Science also deals with nature, starting from observation and proceeding to experimental investigation (Anaso & Kalu, 2017). Usman (2018) describes science as made up of particular divisions of the general body of knowledge, for example Biology, Chemistry, Physics, Geography and Agriculture.

Biology, as one division of science, has been defined by scholars in different ways depending on their understanding of the subject. Okwo and Tawtiyas (2020) see it as the systematic study of living things, how they relate to one another and to their surroundings. Kalu (2017) puts it more simply as the science of life. As the science of life, Biology is concerned with the features of living organisms, their structures

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and functions, and their relationships with each other and with the environment.

Because of its great value to both individual and national development, the Federal Government of Nigeria, through the National Policy on Education, made Biology a core science subject at the senior secondary school (SSS) level (FME, 2015). The aims of the biology programme are summarised as follows: to equip learners with adequate laboratory and field skills together with meaningful and relevant knowledge, so that scientific knowledge can be applied to daily life, particularly in matters of personal and community health and agriculture, supported by sound scientific attitudes, with emphasis on field studies and guided discovery within the Biology syllabus (FME, 2015). In view of these aims, the FME recommends outdoor strategies such as the field trip for achieving Biology objectives in Nigerian secondary schools. Even so, many Biology teachers still rely only on the traditional lecture method (Usman, 2020).

Biology has many branches, and each can be handled in different ways. Topics such as anatomy and physiology, genetics, evolution and nervous coordination can be taught well through demonstration, discovery, lectures, or activity-based work in the classroom or indoor laboratory. Ecology, however, is an area that requires students to be taken outside to see living organisms in their natural habitats. Ecology is the study of the relationships between organisms, or groups of organisms, and their environment; it is also the science of the interrelationships among living things and their surroundings. It further deals with the biology of groups of organisms and the functional processes taking place on land, in the oceans and in fresh water (Odum, 2011; Obeka, 2010).

Ecological concepts include habitat, population, ecosystem, succession, adaptation, conservation, pollution, cycling of materials, biological control, community, biotic interaction, soil erosion, ecology and disease, sewage disposal, ecological study, feeding relationships, energy and environment, among others. An outdoor strategy offers several advantages in teaching and learning ecology. Organisms are best studied in their natural setting, and such a strategy also helps teachers develop scientific skills in learners, which is a central goal of science education (Obeka, 2019). Because ecology deals with how organisms interact with their environment, it needs a teaching method that allows direct observation of organisms in their natural habitats, whether these are near the school or far from it. One of the most effective ways to teach this area is to take students to those habitats. This strategy is known as the field trip.

A field trip involves taking students out of the classroom to make relevant observations and collect specific information (Aliyu, 2018). The destination may be a school farm, national park, zoo, industry, forest or game reserve, and the activity is an important part of science teaching (Bajah, 2012). Obeka (2010) describes it as an outdoor form of laboratory activity, fieldwork or learning exercise carried out by teachers and students on certain aspects of a subject so that students can gain knowledge.

Aliyu (2018) adds that students are taken to places where they can see concrete illustrations of what they learned in class. It allows direct observation and interpretation of materials in their natural setting, takes place on the spot, and calls for basic scientific skills such as observing, identifying, classifying and handling materials. It also gives real-life context to what is being learned, so that content makes more sense and is better remembered when students see where and how things happen in reality. This agrees with the Chinese proverb cited by Ukairo (2018): what I hear, I forget; what I see, I remember; and what I do, I understand.

The field trip is not, however, the only strategy for effective teaching of Biology concepts through child-centred learning for the benefit of the individual and society. Others include problem solving, inquiry, questioning, the discovery approach and concept mapping, all of which can make learning more effective, meaningful and relevant. Yet these approaches cannot be used effectively for ecology concepts (Ajaja, 2010). This study therefore investigated students' achievement and motivation in ecology using the field trip approach. Okafor (2012) notes that some

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Biology teachers do not choose their methods carefully and teach every aspect of the subject by lecture, which may partly explain students' poor performance in Biology. It is time for science teachers to vary their methods according to the aspect being taught, so that students learn more, are highly motivated and apply what they learn through meaningful activities. Aiming to improve students' learning in Biology, this study focuses on the field trip approach to ecology, which may help students take full part in learning activities.

Motivation (interest) is another variable that can influence students' achievement. It can be defined as arousing the student's mind to take in instruction (Cava, 2011). Viau (2015) proposed that motivation arises from students' perceptions of themselves and their surroundings, and drives them to undertake and complete academic tasks. Many studies also suggest that motivation is the most important factor shaping students' achievement and learning (Tanbo, 2012). Researchers have likewise reported that students who lack academic success tend to have low motivation toward the lessons concerned (Parare et al., 2014), and Barlia (2019) found that students need to be motivated toward science lessons in order to progress in them.

Attitude is a further concern. Orunaboka (2011) observed that the attitudes people hold often influence how they behave, individually and in wider situations, which is why administrators, psychologists and sociologists are interested in how attitudes develop, how they affect behaviour and how they can be changed. Attitude is a predisposition to classify objects and events and to react to them consistently; a person with a certain attitude responds to his idea of a thing rather than its actual state. Attitudes are formed through learning experiences: a favourable experience produces a positive attitude and an unfavourable one the opposite (Khalid, 2015). Attitude includes not only negative elements such as prejudice, bias and dislike but also positive ones, sometimes called sentiments, such as attachment and loyalty to people, objects and ideas (Khan & Ali, 2012). It is thus a system of ideas with an emotional core.

People are not born with attitudes; they acquire them, some from their own experience, knowledge and skills and some from other sources. Attitudes are also not fixed and change gradually over time (Olasheinde & Olatoye, 2014). Fasakin (2012) regarded attitude as a major factor in choosing a subject, and described it as a mental and natural state of readiness, organised through experience, that directs an individual's responses to all objects and situations related to it. Yusuf and Bhutta (2012) described it as the tendency of individuals to organise thoughts, emotions and behaviour toward a psychological object. There is concern about how to improve students' academic achievement and retention in science, particularly Biology (Okafor, 2012; Kalu, 2017). The present study therefore investigates the effects of the field trip teaching approach on students' academic achievement, motivation and attitude in ecology.

STATEMENT OF THE PROBLEM

The main aim of any teaching and learning process is that learners should be able to perform tasks and, where possible, transfer what they have learned to solve problems in new situations. One aim of teaching ecology in secondary schools is to promote understanding of ecological concepts so that the knowledge can be used to solve real-life problems. Over the years, this aim has hardly been met. Poor performance in internal and external Biology examinations in Niger State in recent times is worrying and many have attributed it to a weak foundation in Biology. It may also be linked to the teaching methods used by Biology teachers, since good learning results from a good method of teaching (Eneh, 2020). Ecology has been reported as one area of the senior secondary Biology curriculum in which students struggle, performing poorly on questions about ecological concepts (NECO Chief Examiner's Reports, 2019, 2020, 2021, 2022, 2023).

This persistent weakness in ecological concepts points to the ineffectiveness of the method Biology teachers use. Students may regard ecology as abstract and meaningless, understanding neither the basic concepts nor the processes behind them. This could be because

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teachers use teacher-centred methods that do not involve students, which hinders concept formation and lowers interest in ecology. Instruction that emphasises passing information from teacher and textbook to students encourages memorisation, leading to continued poor performance. It is against this background that the study set out to investigate the effects of field trips on senior secondary school students' achievement, motivation and attitude in ecology in Niger State, Nigeria.

Objectives of the Study

The study sought to:

1. determine the effect of the field trip teaching approach on students' academic achievement in ecology in Niger State;
2. determine the effect of the field trip teaching approach on students' motivation in ecology in Niger State; and
3. explore the effect of the field trip teaching approach on students' attitude in ecology in Niger State.

Research Questions

The following questions guided the study:

1. What is the effect of the field trip teaching approach on students' academic achievement in ecology?
2. What is the effect of the field trip teaching approach on students' motivation in ecology?
3. What is the effect of the field trip teaching approach on students' attitude in ecology?

Null Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

Ho_1: The field trip teaching approach has no significant effect on students' academic achievement.

Ho_2: The field trip teaching approach has no significant effect on students' motivation.

Ho_3: The field trip teaching approach has no significant effect on students' attitude.

METHODOLOGY

The study used a quasi-experimental pre-test/post-test design with intact classes, without full random assignment of students to experimental and control groups. This design was suitable because secondary school students are already organised into natural class groups of similar characteristics, and random assignment could disrupt normal school activities. The study was carried out in Niger State, in the North Central geopolitical zone of Nigeria, whose capital is Minna. The state covers about 76,363 square kilometres and has three geopolitical zones and six educational zones: Bida, Lapai, Minna, Suleja, Kontagora and Borgu. The target population was 2,935 Senior Secondary School One (SS1) students in public co-educational secondary schools across the six educational zones. SS1 students were chosen because their curriculum includes several ecology topics and offers a foundation for learning ecology. Twenty-two (22) Biology teachers also took part as research assistants.

Six secondary schools, one from each educational zone, were conveniently selected, giving three experimental and three control schools. A sample of 352 students was determined with the Taro Yamane formula at the 0.05 significance level. Stratified random sampling ensured that students from the selected schools were proportionally represented, and all twenty-two Biology teachers participated.

Three instruments were used: the Ecology Achievement Test (EAT), the Student Motivation Questionnaire (SMQ) and the Student Attitude Questionnaire (SAQ). The EAT had 25 multiple-choice questions drawn from the SS1 WAEC and NECO Biology curriculum, while the SMQ and SAQ had 20 items each, on five-point and four-point Likert scales respectively. Experts in measurement and evaluation, Biology education, and the research supervisors validated the instruments for face, content and construct validity. Reliability was established through a pilot study at Bosso Secondary School, Minna, using the test-retest method; the Pearson Product Moment Correlation gave coefficients of 0.80 for the SMQ and 0.85 for the SAQ.

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Before the treatment, the biology teachers were briefed and trained on the research procedures, including lesson delivery and use of the instructional plans. Data collection began after approval from the relevant school authorities. Pre-tests were given to both groups, followed by a six-week treatment, after which post-tests were administered. The questionnaires were also administered under the researcher's supervision. Means and standard deviations were used to answer the research questions, and the independent samples t-test was used to test the null hypotheses, with analysis done in SPSS Version 20 and Microsoft Excel.

RESULTS

Research Question 1:
What is the effect of the field trip teaching approach on students' academic achievement in ecology?

The descriptive analysis in Table 1 shows that the field trip teaching approach had a positive effect on students' academic achievement in ecology in Niger State.

Table 1: Academic Achievement of Senior Secondary School Students in Ecology

Group	N	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Gain Mean	Gain SD
Control	144	24.71	14.68	72.43	16.80	47.72	2.12
Experimental	208	26.73	15.44	75.90	15.70	49.17	0.26
Mean Difference		2.02		3.47		1.45	

Table 1 compares the ecology scores of the two groups before and after instruction. Students taught by the conventional lecture method (control group) had a pre-test mean of 24.71 (SD = 14.68) and a post-test mean of 72.43 (SD = 16.80), giving an achievement gain of 47.72 (SD = 2.12). Students taught through field trips (experimental group) had a pre-test mean of 26.73 (SD = 15.44) and a post-test mean of 75.90 (SD = 15.70), giving a gain of 49.17 (SD = 0.26). The gain difference of 1.45 favours the experimental group, indicating better achievement than the control group.

Research Question 2:
What is the effect of the field trip teaching approach on students' motivation in ecology?

The descriptive analysis in Table 2 shows that the field trip approach had a very strong positive effect on students' motivation to learn ecology concepts in Niger State.

Table 2: Motivation of Senior Secondary School Students in Ecology

Group	N	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Gain Mean	Gain SD
Control	20	2.12	0.44	2.96	0.74	0.84	0.3
Experimental	20	1.95	0.46	4.19	0.25	2.24	-0.21
Mean Difference		-0.17		1.23		1.4	

Table 2 gives the motivation scores of the two groups. The control group had a pre-test mean of 2.12 (SD = 0.44) and a post-test mean of 2.96 (SD = 0.74), a motivation gain of 0.84 (SD = 0.3). The experimental group began with a markedly lower pre-test mean of 1.95 (SD = 0.46) but reached a post-test mean of 4.19 (SD = 0.25), far above the control group. This represents a very high motivation gain for the field trip group (M = 2.24) compared with the control group (M = 0.84, SD = 0.3), a difference of 1.4.

Research Question 3:
What is the effect of the field trip teaching approach on students' attitude in ecology?

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The descriptive analysis in Table 3 shows that the field trip approach had a more positive effect on students' attitude toward learning ecology concepts in Niger State.

Table 3: Attitude of Senior Secondary School Students in Ecology

Group	N	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Gain Mean	Gain SD
Control	20	1.66	0.26	2.44	0.52	0.78	0.26
Experimental	20	1.60	0.25	3.39	0.34	1.79	0.09
Mean Difference		-0.06		0.95		1.01	

Table 3 presents the attitude scores. The control group moved from a pre-test mean of 1.66 (SD = 0.26) to a post-test mean of 2.44 (SD = 0.52). The experimental group moved from a pre-test mean of 1.60 (SD = 0.25), which was much lower, to a post-test mean of 3.39 (SD = 0.34). Both groups improved (control gain = 0.78; experimental gain = 1.79), but the gain difference of 1.01 favours the group taught through field trips.

Hypothesis 1 (Ho1):
The field trip teaching approach has no significant effect on students' academic achievement.

Table 4: Effect of the Field Trip Approach on Students' Academic Achievement in Ecology

Group	N	Mean	Std. Dev.	df	t-test	p-value (2-tailed)	Remark
Control	144	72.43	16.80	350	-1.98	0.05	Significant
Experimental	208	75.90	15.70				

An independent samples t-test compared the post-test achievement of the control and experimental groups. As Table 4 shows, the control group's mean (M = 72.43, SD = 16.80) was lower than the experimental group's (M = 75.90, SD = 15.70), suggesting that students taught through field trips performed better than those taught conventionally.

To test whether this difference was statistically significant, the t-test gave t = -1.98, p = 0.05, df = 350, indicating a significant difference between the two groups' mean achievement. Since the p-value equals 0.05, the null hypothesis (Ho1) was rejected, and it was concluded that the field trip approach had a significant positive effect on students' academic achievement in ecology. In summary, students taught through field trips (M = 75.90) achieved more than those taught by conventional methods (M = 72.43).

Hypothesis 2 (Ho2):
The field trip teaching approach has no significant effect on students' motivation.

Table 5: Effect of the Field Trip Approach on Students' Motivation in Ecology

Group	N*	Mean	Std. Dev.	df	t-test	p-value (2-tailed)	Remark
Control	20	2.96	0.74	38	-7.08	0.00	Significant
Experimental	20	4.19	0.25				

*N = number of items on the instrument.

Table 5 reports an independent samples t-test comparing the post-test motivation of the two groups. The control group's mean (M = 2.96, SD = 0.74) was lower than the experimental group's (M = 4.19, SD = 0.25), suggesting that students taught through field trips were more motivated than those taught conventionally. The t-test (t = -7.08, p = 0.00, df = 38) showed a significant difference between the groups' mean motivation scores. As the p-value (0.00) is below 0.05, the null hypothesis (Ho2) was rejected, and it was concluded that the field trip approach had a significant positive effect on students' motivation

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to learn ecology. In summary, the field trip group (M = 4.19) was more motivated than the control group (M = 2.96), showing that the approach effectively raised students' motivation.

Hypothesis 3 (Ho3):
The field trip teaching approach has no significant effect on students' attitude.

Table 6: Effect of the Field Trip Approach on Students' Attitude in Ecology

Group	N*	Mean	Std. Dev.	df	t-test	p-value (2-tailed)	Remark
Control	20	2.44	0.52	38	-6.89	0.00	Significant
Experimental	20	3.39	0.34				

*N = number of items on the instrument.

Table 6 reports an independent samples t-test comparing the post-test attitude of the two groups. The control group's mean (M = 2.44, SD = 0.52) was lower than the experimental group's (M = 3.39, SD = 0.34), suggesting that students taught through field trips had a better attitude toward learning ecology than those taught conventionally. The t-test (t = -6.89, p = 0.00, df = 38) showed a significant difference between the groups' mean attitude scores. As the p-value (0.00) is below 0.05, the null hypothesis (Ho3) was rejected, and it was concluded that the field trip approach had a significant positive effect on students' attitude toward learning ecology. In summary, the field trip group (M = 3.39) showed a better attitude than the control group (M = 2.44), showing that the approach effectively improved students' attitude toward ecology.

DISCUSSION OF FINDINGS

The study set out to establish the effects of field trips on senior secondary school students' academic achievement, motivation and attitude in ecology in Niger State, Nigeria. Students were placed in experimental and control groups and tested before and after instruction on the three variables. Both descriptive and inferential statistics were applied, and several important findings emerged.

The first major finding was that students taught through field trips performed significantly better in ecology than those taught by the conventional lecture method (p = 0.05). This suggests that experiential learning gives a deeper grasp of ecological concepts, since students can observe and interact with real ecological settings. The improvement agrees with literature stressing that active learning strategies strengthen students' retention and understanding of scientific concepts (Obeka, 2019). Seeing, touching and engaging with real environments reinforces classroom knowledge and makes abstract ideas more concrete and memorable (Samuel et al., 2020). Involvement in field trips also lowers the level of abstraction, helps students stay focused and participate actively, builds practical skills, and lets them gain first-hand knowledge and solve real-world problems. By giving authentic, interactive experiences, field trips improve achievement, which implies that they work better than the conventional method.

This result is consistent with Egwu and Okigu (2021), who found a significant difference in ecology achievement in favour of students taught by field study rather than lecture in Anambra State, Nigeria, and who also reported improved attitudes toward ecology. Similarly, Dasun, Ariya and Kazi (2023) found the field trip approach significantly improved the achievement of Upper Basic School students in Social Studies in Plateau State, Nigeria. It also matches Ajaja (2010), who studied the effect of field studies on Biology learning outcomes and found significant differences in process-of-science scores between the pre-test and post-test of field trip students, and between those who had field trip experiences and those who had not.

The finding further agrees with Abdul, Oyeronke and Adunni (2015), Ogbuluijah (2014), Adanyi (2019), Abubakar and Mohammed (2023), Sunday and Theresa (2024) and Uwah and Amadioha (2025), who each used activity-based instruction and found that experimental groups significantly outperformed control groups in

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various subjects. It disagrees, however, with Ogar and Effiong (2022), who found no significant difference between the achievement of students taught environmental hazards through field trips and through the expository method, and with Eze and Asogwa (2016), who reported that students taught through field trips scored slightly lower than those taught with video instruction.

Another key finding was that students exposed to field trips were more motivated than those taught by the traditional lecture method. Motivation is central to learning because it drives students' interest, engagement and readiness to take part in academic activities (Njoku & Mgbomo, 2021). The result supports earlier work showing that students are more enthusiastic and proactive when taught through interactive, engaging methods. For example, Ainsworth and Burch (2019) found that field trips arouse curiosity and excitement by breaking the monotony of classroom learning and letting students explore new settings. In their study, hands-on activities allowed students to apply theory to real situations, strengthening their intrinsic motivation to learn.

These results agree with John (2021), who found that NCE Social Studies students taught by field trips in North-west Nigeria were more motivated than those taught conventionally, with a statistically significant difference ($p = 0.001$). They are also in line with Wada (2016), who reported that field trips greatly improved learners' motivation in a plant adaptation class compared with lecture. They disagree, however, with Uwah and Amadioha (2025) and Dimkpa and Okoro (2017), who both reported no significant difference in students' motivation between field trips and other methods in various subjects.

The study also found that students who took part in field trips had a more positive attitude toward ecology than those taught by lecture. This suggests that field trips not only improve knowledge but also shape students' perceptions of, and enthusiasm for, Biology as a subject. A positive attitude toward a subject increases students' willingness to engage with it and to pursue further study. The findings are consistent with Gresens and McCarthy (2020), who found that students in field-based learning developed a deeper appreciation for science and were more likely to consider scientific careers. Abubakar and Mohammed (2023) and Dasun, Ariya and Kazi (2023) likewise reported improved attitudes to learning through field trips, which in turn improved achievement in various subjects. Shabbir, Nasrin and Muhammad (2019), in a study in Pakistan, showed that field trips improved students' interest in science and also raised their understanding of their subjects more than regular teaching.

CONCLUSION

This section brings together the main insights of the study and considers their wider implications. The findings confirm that the field trip approach significantly improves students' achievement, motivation and attitude in ecology. Given this effectiveness, the strategy should be widely adopted to strengthen science education in secondary schools. The results are in line with constructivist learning theories, which hold that students learn best when they engage actively with their environment and build knowledge from experience (Piaget, 1980; Dewey, 1938). By bringing real-world experiences into Biology lessons, field trips help close the gap between theory and practice. The study therefore reaffirms the need to include experiential learning strategies in the science curriculum to improve students' understanding, interest and long-term retention of biological concepts.

RECOMMENDATIONS

Based on the findings, the following recommendations are made:

1. Biology teachers should make field trips a regular instructional strategy for ecology and related topics, since they give students first-hand experience that deepens understanding and engagement. Schools should set aside resources and time for planning and carrying out meaningful field trips so that their educational benefits are maximised.
2. Workshops and training programmes should be organised to give teachers the skills to conduct field trip-based

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learning effectively. Many teachers rely only on lectures because they lack exposure to other strategies and training them in experiential techniques will improve classroom practice and students' learning experiences.

3. The biology curriculum should include field trips as a compulsory part of ecology education, so that students benefit from hands-on experience rather than being restricted to theoretical classroom instruction.

REFERENCES

Abdul, G.A.A., Oyeronke O.O. and Adunni A. (2015). Effect of field trip on students' academic performance in basic technology in Ilorin metropolis, Nigeria. *Malaysian Online Journal of Educational Technology*, 3(2): 1- 6.

Abubakar, M. and Mohammed, A.D. (2023). Impact of Fieldtrip and Guided-Discovery Strategies on Secondary School Geography Students' attitude and Performance in Landform Concepts, Dutsin-Ma, Katsina Nigeria. *Journal of Science Technology and Education*, 11(3): 26 – 35.

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 PhD Thesis, Ahmadu Bello University Zaria, Nigeria.

Adeniyi, E. O (2014). *Science as a way of knowing the NSSSP Experience*. Annual Conference Proceedings, 26th of the Science Teachers Association of Nigeria, 101-111.

Ainsworth, R. and Burch, K. (2019). Enhancement of interest and engagement through field trips: A case study in secondary education. *Journal of Science Education,* 12(3): 45-60.

Ajagun, G.A (2021). A Study of the Performance of Science Students in the Senior School Certificate Examination in Selected Schools in Kaduna State. *Tambari Kano Journal of Education,* 6(2), 11-126.

Ajaja, O.P, (2010). Effects of Field trip studies on learning outcome in Biology. *Journal of Human Ecology, Department of Science Education, Delta State University, Abraka, Nigeria,* 31(3),171 – 177

Aliyu M. M (2018). Educational excursions and students achievements in business studies. *Journal of Educational Research and Development,* 7(2), 111-124.

Anaso J.M (2017). Investigation into the causes of students' poor academic achievement in chemistry in Senior Secondary School Certificate Examination. *Nigerian Journal of Science and Educational Research, (9), 98-119*

Asika, N. (2015). *Research Methodology in Behavioural Sciences.* Ikeja, Longman Nigeria PLC.

Bajah S. T. (2012). *Teaching Science for Scientific Development.* A Key note address to the NCE Conference at Federal College of Education, Zaria.

Baliv, G. M (2020). *Education Psychology*, New York, Macmillan.

Bello, G. (2016). *Comparative Effective of Two Forms of Concepts/ Mapping Instructional Strategies on Senior Secondary School Students Achievement in Biology.* Unpublished Ph.D Thesis, University of Ilorin, Nigeria.

Danmole, B.T. (2018). Gender, Location and Type of School as Prediators of Science Knowledge Among Fresh Entrants in Junior Secondary Schools in Nigeria. *Journal of Research in Education.* 2(2), 44 – 51

Dasun, P.P., Ariya D.A. and Kazi, N.P. (2023). Effects of field trip technique on attitude and academic achievement of upper basic students in social studies in Pankshin, Plateau State, Nigeria.

Corresponding author: Shaba Umar Badoko
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Kebbi State University of Science and Technology, Aliero.
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Sapientia Foundation Journal of Education, Sciences and Gender Studies (SFJESGS), 5(1): 51 – 58.

David, L.R (2016). *Indoor And Outdoor Laboratory Experience on Secondary School Students Academic Achievement And Retention in Ecology* FSC Occasion at Publication 72 British Ecology Sociology Fraser.U. (1939).

Edeudu, S. A &Agwagah (2016). Primary School Social Studies Project Work. *A Workshop Paper presented to Primary School Teachers, Nsukka.*2nd March, pp. 2-9.

Egwu, S.O. and Okigbo, E.C. (2021). Effect of field trip on secondary school students' academic achievement in ecology in Anambra State. *South Eastern Journal of Research and Sustainable Development (SEJRSD)*, 4(1): 140 – 156.

Eneh, J. O (2020). *History and Philosophy of Science:* An Outline, Magnet Business Enterprise, Publishing Division. Enugu, 2010.

Eze, S. C. and Asogwa, D. U. (2016). Effects of Actual Field Trip for Environmental Influence and Video Instruction methods on Undergraduate Students' Achievement in Agricultural Sciences Nsukka. *International Journal of Science, Environment and Technology*, 5(1):279 – 286.

Ezendu, S. A (2012). *Development and Validation of Some Projects and Instrument for evaluating Students Learning Outcome in SSS.* Unpublished; PhD Thesis. Nsukka Department of Education. University of Nigeria.

Ezendu; S. A (2011). *Development and Validation of some Projects and Instrument for evaluating students learning outcome in SSS. Geography.* Unpublished PhD. Thesis Nsukka. Department of Education, University of Nigeria.

Ezeudu S. A and Agwagah (2016). Primary School Social Studies Project Work. *A Workshop Paper presented to Primary School Teachers*, Nsukka.

Fred, M. (2017). The field trip in Biology. New York, *Journal of School Science and Mathematics,* 28(22), 31-40.

Gayford, I (2020), *Field trips: A guide for conducting and planning Educational Experience,* Washington, Godfary publishers.

Gresens, J. and McCarthy, L. (2020). Experiential learning and student attitudes: The role of field trips in fostering scientific curiosity. *International Journal of Education Research*, 27(2), 78-92.

Kalu, I.U. U. & Ndokwo K. J. (2016). Review of the methodologies for effective practical Biology Instruction in secondary schools in Nigeria. *Journal Education Research and Development*, 4 (11), 52-70.

Kalu I. U. U (2017). Review of Factors which influencing the attitudes of students towards effective study of biology in senior secondary schools in Nigeria. *Unpublished thesis,* submitted to the Department of Science Education, Nigerian University, Nsukka.

Lawal, F.K (2015). Error Analysis in Practical Biology of Senior Secondary School Students in Zaria and Sabon Gari Local Government Areas of Kaduna State. *Unpublished M. Ed Thesis, Ahmadu Bello University, Zaria.*

Maikano, S. (2010). Comparism between Outdoor and Indoor Laboratory Teaching Strategies on Secondary School Students Academic Achievement and retention in Ecology. *Paper Presented in the Seminar at Department of Science Education A.B.U Zaria*

Maikano, S. (2017). *Effects of Outdoor and Indoor Laboratory Experiences on Secondary School Students Academic Achievement and Retention in Ecology*

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in Kaduna State. An Unpublished M.Ed Education Thesis. Faculty of Education, A.B.U, Zaria.

Mari, J. S (2014). *The Understanding of Science Process and its Relation to Achievement Integrated Science,* Unpublished M.Ed Thesis of Faculty of Education, ABU, Zaria.

Meckenzie, A.A., A& White, R.T (2020). Fieldwork In Geography And Long-Term Memory Structures Comparison of Two Planetarium Programs. *Journal of Research In Science Teaching, 19(1), 53-61.*

Michie, M. (2017). Field Trip Aren't Worth The Effort... Or are They? *Science Teachers Association Of The Northern Territory Journa*l, 7(17): 56-79.

Michie, M. (2021). Writing Reports From Excursion. *Science Teachers Association Of The Northern Territory Journal, 2(15*): 82-92.

National Examinations Council (NECO) (2019). *Chief Examiner's Report. Senior Secondary School Certificate Examination (*May/June.)

National Examinations Council (NECO) (2020). *Chief Examiner's Report. Senior secondary School Certificate Examination (*May/June.)

National Examinations Council (NECO) (2021). *Chief Examiner's Report. Senior secondary School Certificate Examination (*May/June.).

National Examinations Council (NECO) (2022). *Chief Examiner's Report. Senior secondary School Certificate Examination (*May/June.).

National Examinations Council (NECO) (2023). *Chief Examiner's Report. Senior secondary School Certificate Examination (*May/June.).

Okafor, P.N (2002). Laboratory resources and utilization as correlated of chemistry students learning outcomes *41st Annual Conference proceeding of the Science Teachers Association of NIGERIA (STAN)* 169-173.

Okeke E. A. c (2017). Remedies for Students Poor in Science *27th STAN Annual Conference Proceeding,* 118 - 136.

Okeke, E. A. C (2016). Remedies for Students' Performance in Science.1-*27th STAN Annual Conference Proceeding, 118-136.*

Okoli, J. N. (2016). Effect of Investigative Laboratory Approach and Expository Method on Acquisition, Different Levels of Scientific Literacy. *Journal of the Science Teachers Association of Nigeria* 41 (1 &2), 79-88

Okpala, J. I. N (2016). Project Work in Primary School from Theory into Practice. *A Seminar Paper Presented to Primary School Teachers,* Nsukka; University of Nigeria.

Okwo, F. A and Tawtiyas, (2020). Effect of position of diagrams and cognitive style on biology Achievement of pre-national Diploma students. *Journal of the Science Teachers Association of Nigeria*, 3 (12), 89-93.

Oriafor, S. O (2016). An evaluation of female students achievement in Secondary School Science. Implication for National Development. *27th STAN Annual Conference Proceeding* 161.

Oriaifor, S. O (2016). An Evaluation of Female Students' Achievement in Secondary Schools Science: Implications for National Development. *Journal for Science Teachers' Association of Nigeria, 9(13), 161 – 169.*

Oriaifor, S.O (2016). An Evaluation of Female Students Achievement in Secondary School Science; Implications for National Development. *Journal of Science Teachers Association of Nigeria*, 6(13), 161 -169.

Orion, N (2013). A Model For The Development And Implementation Of Field Trips As An Integral Part Of The Science Education, *Journal of Science Teachers Association of Nigeria*, 6(13), 161 -169.

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Orion, N., &Hofstein, A. (2014). Factors That Influence Learning During A Scientific Field Trip In A Natural Environment. *Journal Of Research In Science Teaching, 31(10,) 1097-1119.*

Orulor, T. T (2020). *Effect of Field Trip on Performance in Business Studies in Two Secondary School in Lagos.* Unpublished Thesis, Department of Vocational and Technical Education Ahmadu Bello University Zaria Pp. 12-25.

Oyedokun, M. R (2002). Identification of Difficult Topics in the Senior Secondary School Certificate Biology Syllabus as perceived by Students. *The Nigerian Teacher Today,* 10(91), 110-120.

Patric, H, (2010), Effect of Field Trip studies on Learning outcome in Biology Achievement, *Journal of Human Ecology, Department of Science Education, Delta State*, University, Abraka Nigeria, 31 (3), pp 188-191

Phicker, P. (2016). Women Participation in Science, Technical and Vocational Education: Relevance Constraints and Enhancement for Technology Advancement in Nigeria. *Journal of Education,* 1(4), 67 -74.

Price, S., & Hein, G.E (2021). More Than Field Trip: Science Programmes For Elementary School Groups At Museuns. International *Journal of Science Education,* 13(5), 505-519.

Tomaseosk, K. (2013). *Women and Human Rights.* New Jersey, USA 2ed Books Ltd. 202.

Turton, P (2017). "System Generated Failure at the Senior Secondary School Level. *A Paper Presented at the Postgraduate Research Seminar.* Faculty of Education, ABU. Zaria.

Usman, I. (2018). *The Relationship between Students' Performance in Practical Activities and their Academic Achievement! Integrated Science Using NISTEP Mode of Teaching.* Unpublished Ph.D Thesis faculty of Education, ABU, Zaria.

Usman, L. A (2018). Using a Selected method of Teaching in Enhancing Slow Learner's Academic performance Among *Junior Secondary School Integrated Science Students. 115.*

Uzoechi B. C (2017). Increasing teaching capacity on preservation techniques for Effective conduct of biology practical. *Paper presented in the conference at Nasarawa State University,* Keffi.

Uwah I. V. and Amadioha, A. (2025). Effects of Field Trip on Secondary School Students' Motivation and Achievement in Civic Education in Uyo Educational Zone, Nigeria. *Global Journal of Arts, Humanities and Social Sciences*, 13(1): 38 – 48.

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 MSc. Ed. Dissertation, Ahmadu Bello University, Zaria, Nigeria. Pp. 58 – 60.

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