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EFFECTS OF FIELD TRIP ON ACADEMIC PERFORMANCE AND RETENTION IN ECOLOGY CONCEPT AMONG SENIOR SECONDARY SCHOOL STUDENTS IN AKKO LGA, GOMBE STATE, NIGERIA

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Abstract
The study investigated the effects of field-trip on academic performance and retention in ecology concept among senior secondary school students in Akko Local Government Area, Gombe State. The objectives of the study were to examine the effects of field trip on Biology students' academic performance and retention in senior secondary schools. Two research questions and two corresponding hypotheses were formulated and tested at 0.05 level of significance. A quasi-experimental design which utilized pre-test post-test non-control group design was adopted. The population of the study consisted of all the 2,487 SS2 students from twenty-six (26) public schools in Akko Local Government Area Gombe State. A simple random sampling technique was employed to select a sample of 205 students from two intact classes drawn from two schools out of the 26 secondary schools in the study area. One school served as experimental group and the other school as control group. One instrument titled "Biology Achievement Test (BAT)" was used for data collection. The BAT was validated by experts after which the split half method was used to establish the reliability of the instrument using Pearson Product Moment Coefficient and a reliability of 0.847 was obtained Research questions were answered using descriptive statistics of mean and standard deviation, while the hypotheses were tested using inferential statistic of independent sample t-test. The findings of study revealed that field trip teaching strategy has significant positive effects on students' performance as it enhanced the performance of students in Ecology. It also concluded that field trip teaching strategy enhances students' retention of ecological concepts. The study recommended among others that Biology teachers should employ field trip strategy and activities to augment the conventional lecture method being used by many teachers in Nigeria. Also, the Ministries of Education should impress on school principals to ensure that teachers employ the use of field trip teaching strategy particularly in the teaching and learning of ecology concept at senior secondary school level.

Keywords: Biology, Ecology, Academic performance, Field Trip, and Retention.

Introduction

Learning is the process by which one acquires, ingests and stores or accepts information. Our experiences with learned information compose our bodies of knowledge. Learning is a process unique to each individual (Griffin, 2023). He further emphasizes that learning is influenced by personal experiences and social contexts. It involves integrating new knowledge with existing cognitive frameworks, resulting in meaningful behavioural changes. According to Hu (2017), learning can be understood as a shift in cognitive capabilities that allows individuals to apply knowledge effectively in various contexts. This conceptualization underscores the importance of interactive and engaging teaching methods that cater to diverse learning styles. In school sitting learning is a process by which students acquired knowledge, skills, attitude in order to relate well with their environment. In science subjects like Chemistry, Physics including Biology can help students to be able to know, observe things and have experience about things in the natural environment and how to adapt to changes in their environment. Learning entails acquiring scientific knowledge, skills, attitude that will enable students to be productive in d society.

Biology is a field of natural science that is concerned with study of living things. Biology is the scientific study of living organisms and their interactions with each other and their environment, encompassing their structure, function, growth, evolution, distribution, and taxonomy (Campbell & Reece, 2017). As pointed by Umar, Fugu and Aliyu (2018), Biology is the science that deals with the study of living things, since it is the study of living things there are certain recognizable characteristics by which living things have which includes; movement, death, respiration, growth, excretion, irritability, reproduction, and nutrition. Ong'amo, Ondigi and Omariba (2017) described Biology as a branch of science that has interconnected series of concepts and conceptual schemes that have developed as a result of experimentation and observation. Biology also is one of the core science subjects taught in Nigerian secondary schools. It is the backbone of science as it is the study of life and therefore plays an essential role in harnessing interaction between livings and its environment. Biology gives students opportunity to relate with some of the most important ecological issues affecting the environment. Ecology is the science dealing with the structure, dynamics and functions of nature including the distribution and abundance of organisms, the cycling of matter and energy, interaction between organisms and their environment, and evolutionary processes that shape ecosystems (Urban, Sabo & Plesnik 2021). Ecology examines how organisms individually and collectively interact with each other and with abiotic components of their environment, shaping communities, populations, and ecosystems (Huntley 2023).

Ecology also studies the interrelationships between organism and their natural environment both living and non-living. It donates that no organism can live in isolation instead it must interact with its environment. That is to say, no plant or animal is independent of its environment. Knowledge of ecology helps the students and society at large to handle some of the environmental issues like climate change, global warming, flooding, drought, loss of biodiversity etc. by creating awareness on the effects of man's activities on the ecosystem, precautionary measures and solutions to environmental issues. Despite the importance of Ecology, several research findings like Etobro and Fabinu (2017) revealed that many students find Ecology difficult to understand. This is an indication

of loophole in the teaching-learning process. Moreover, the level of understanding an individual has on a particular topic or subject greatly influences his/her success and could only be ascertained using academic performance in form of test or examination.

Academic performance is the sum total scores of students exposed to a particular task or series of tasks in order to check the level of accomplishment of the stated objectives of the tasks. Academic performance according to Ricarda, Anja, Anne and Linda (2017) refers to performance results that show the level of goal accomplishment of an individual in educational environments, particularly in schools, colleges and universities. Arokoyu and Chukwu (2017) maintained that performance is a measure of output and the main changes in knowledge, skills, and attitude of individuals as a result of experiences acquired from the school. Agboghoroma and Oyovwi (2017) stated that academic performance is commonly measured with examinations that assess important procedural knowledge such as skills and declarative knowledge such as facts which student have learnt. Students' academic performance is ascertained by testing which has and will continue to play significant role in any educational system world-over. Academic performance is generally used to determine how well an individual is able to assimilate, retain, recall and communicate his knowledge of what has been learnt. Students' academic performance is a feature in every education enterprise and is considered to be the centre which the whole education system revolves round about. It is believed that academic performance is the knowledge gained which is assessed by marks by a teacher. Academic performance can determine the success or failure of any academic institution, serves as bedrock for knowledge acquisition and the development of skills. It can also have a direct impact on the socio-economic development of a country.

All stakeholders in education such as the government, school, principals and teachers have been making concerted efforts to achieve a 100% performance of students in Biology because of the importance of the subject. In spite of the efforts being made by these stakeholders and the importance of Biology to national development in the fields of Biotechnology, Agriculture, Medical sciences Nursing, Pharmacy among others, studies have shown that many secondary school students do perform below minimum requirements in Biology in external examinations like West African Senior School Examination (WASSCE) and NECO SSCE and the failure rate has remained very high (Chibabi, Umoru, Onah & Itodo, 2018). Also, the yearly reports of chief examiner of West African Examination Council (WAEC) confirm poor performance of candidates in Biology. The WAEC Chief Examiners' reports (2019-2023) also revealed persistent students' unsatisfactory achievement in the West African Senior School Certificate Examination. The WAEC Chief Examiners' reports attributed the unsatisfactory achievement to weaknesses observed in the candidates such as lack of in-depth knowledge of some basic topics like genetics, nervous systems, evolution; describe biological processes and also compare some social life patterns of different organisms in their ecosystems. This difficulty has been attributed to the seeming abstract nature of some phenomena and processes of Biology concepts which students find difficult to visualize (Etobro & Fabinu, 2017). The students who failed may not get admission to study any Biology related course in institutions of higher learning which will invariably lead to shortage of manpower in critical sectors that require trained

personnel in Biology related fields. There is therefore a need to try out other student centred teaching strategies that facilitate better understanding and retention like field trip. Field trip could afford students the opportunity to watch and or experience life patterns of organisms in their habitats. This may concretize abstract biological concepts and processes such interrelationship between organisms in their different habitats and ecological zones which could lead to acquisition of hands-on and minds-on learning experiences.

The use of fieldtrip in teaching the ecology concept could enhance academic performance since the students would have to observe organism in their natural habitats. Field trip is defined as a method of teaching which include excursions carried outside the school environment to enable learners observe a phenomenon, process or event, interact with some personalities in order to obtain some information relevant to a particular subject area or school experience, Kasumu and Kasumu (2023). According to Sutherland and Jelen-Sanchez (2021) Field Trip are structured educational experiences outside the class room that are designed to provide students with direct exposure to subject matter, thereby enhancing their understanding through hands- on interaction and observations. The authors further stress that it allows students to see the practical application of what they learn in the classroom. This real – world connection can make learning more relevant and engaging, helping students understand the importance and utility of their studies. This real world experience could enhance students' performance. Studies have revealed that field trip has positive impacts on students' performance in Biology concepts. For example, Okeke (2022) carried out a study on the Effect of field- trip on academic achievement in Biology among Secondary School Students in Ikwuano, Nigeria revealed that the field trip teaching strategy favoured the experimental group in Biology concept as the students in experimental group performed better than those in control group.

Field trips foster engagement and motivation, critical factors in retention. Research revealed that students who participated in field trips reported increased interest and motivation in the subject matter (Sullivan 2018). This increased motivation translates to improved retention, as students are more likely to recall information that resonates with them. Since field trip provides students with opportunities to have first-hand information as they observe living things interact with each other in their natural environment, this teaching strategy might enhance students' retention as they observe courtship behaviour, territorial behaviour among organism in their natural environment. Retention, according to Wilcox, Pollock and Bolton (2025) refers to the learner's ability to store knowledge over time and retrieve it later. Retention is to have information stored in long term memory in such a way that, it can be readily retrieved despite the interval of time between the learnt materials. Thus, retention interval is the time that elapses between achievement tests of initial test and another subsequent test. Emerald (2023) stated that, good retention strategies are strongly linked with instructional strategy that encourages active and independent learning. Field trip provides opportunity for active learning as learners interact with the organisms in the natural habitats which could have meaningful impact on student's retention. When students are taken out for field trip, they observe things by themselves and they are able to retain and recall it whenever they are being asked upon.

Unlike in lecture method which according to Liu et al (2024) is a teacher –centred

mode of instruction in which the teacher churns out information to students through oral presentation allowing the teacher to cover a lot of content over a limited time with students as passive learners without getting involve in the learning process, field trip provides learners opportunities to participate actively in the learning process. This have a tendency to enhance students' retention. Studies about the impact of field trip teaching strategy on students' retention have revealed some findings. Henry (2024) reported in a research on the effects of field trip on students' retention in Biology concepts in senior secondary schools in Balanga LGA of Gombe state that student' taught using field trip teaching strategy had better retention mean scores than students taught using lecture method.

Similarly, Ekpo and Ehi (2022) investigated the effects of field trip method on students' academic achievement and retention in Basic science and Technology among junior secondary school students in Yala, Cross River, Nigeria and found that students taught environmental hazard using field trip retained higher than those taught using other methods. The findings of the aforementioned studies show that field trip has shown to be effective in enhancing students' performance and retention in other locations. However, the present study investigated the effects of field trip on academic performance and retention in ecology concepts among senior secondary school students in Akko Local Government Area Gombe state.

Statement of the Problem

The main objective of any teaching and learning process in secondary schools is to achieve a 100% performance of students in Senior School Certificate Examination, which will enable them to pursue careers in in related disciplines. However, students' performance in Biology at SSCE in Gombe state has continued to fluctuate and remained below the optimal expected target. Data collated on WAEC SSCE from Gombe state Education Management Information System (EMIS), revealed unsatisfactory performance. This position is further supported by the Chief Examiners' reports on West African Senior School Certificate Examinations (2020-2024) which also revealed a persistent low performance in Biology.

The WAEC Chief Examiners' reports attributed the unsatisfactory performance to weaknesses observed in the candidates such as lack of in-depth knowledge of some basic topics like genetics, nervous systems, evolution; describe biological processes and also compare some social life patterns of different organisms in their ecosystems. The consistent low performance could also be informed by the teaching strategies most often adopted by the teachers in senior secondary schools in Nigeria such as the conventional lecture method because such method seems to allow them to cover much course content within a limited time with less engagement of students. If the unimpressive performance is not mitigated, students who failed may not get admission to study any Biology related course in institutions of higher learning which may invariably lead to shortage of manpower in critical sectors that require trained personnel in Biology related fields. There is therefore a need to try out other student centred teaching strategies that facilitate better understanding and retention like field trip. Field trip could afford students the opportunity to observe life patterns of organisms in their habitats, thereby making the learning meaningful.

Objectives of the Study

The objective of the study was to examine the effects of field trip on Biology students' academic performance and retention in senior secondary schools. The specific objectives of the study include to:

1. To determine the effect of field trip on academic performance in ecology concept among senior secondary school students in Akko L.G.A, Gombe state.
2. To determine the effect of field trip on retention in ecology concept among senior secondary school students in Akko L.G.A, Gombe state.

Research Questions

The following research questions were raised to guide the study.

1. What is the effect of field trip on academic performance in ecology concept among senior secondary school students in Akko L.G.A, Gombe state?
2. What is the effect of field trip on retention in ecology concept among senior secondary school students in Akko L.G.A, Gombe state?

Hypotheses

The following hypotheses are formulated to guide the study.

1. There is no significant effect of teaching method on student's academic performance in ecology concept when taught using Field Trip and lecture methods.
2. There is no significant effect of teaching method on student's retention in ecology concept when taught using Field Trip and lecture methods

Methodology

This study adopted a quasi-experimental design, specifically the pre-test, post-test, non-equivalent control group design where intact groups were assigned to the experimental and control groups. The population of the study consisted of all the 2,487 SS2 (1,397 male students and 1,090 Female students) who were offering Biology from 26 Government senior secondary schools in Akko Local Government Area, Gombe State**.** The sample of the study comprised of 205 students (114 Male students and 91 Female students) from two intact classes drawn from two schools selected using simple random sampling. One school was randomly assigned to experimental group and one assigned to control group respectively. The instrument that was used for data collection in this study was Biology Achievement Test (BAT). The items on the BAT and marking scheme were reshuffled and used as Biology Retention Test (BRT). The instrument consisted of 20 multiple choice questions with options lettered A-D. The scoring of BAT and BRT were based on the student's response on the test items. Each correct option attracted five (5) marks, while incorrect option attracted zero (0) scores. The students' scores were categorized into: Excellence Achievement (70-100), Very Good Achievement (60-69), Good Achievement (50-59), Poor Achievement (40-49), Very Poor Achievement (0-39). The scripts were marked by the researcher and all the scores were recorded for each respondent accordingly. Each correct answers carried 5 marks, while wrong answers attracted 0 marks. The maximum obtainable score for the test was 100 marks. The students' scores were categorized into: Very High Retention (70-100), High Retention (60-69), Good Retention (50-59), Low Retention (40-49), Very Low Retention (0-39) accordingly. Biology Achievement Test (BAT) was validated by two lecturers from the Department of Science Education, Federal University of Kashere. The experts checked the clarity of the items, comprehensiveness, suitability of the items and appropriateness of the language. The observations and comment of the experts were effected before the final modification of the items in the instrument for the study. The half split method was used to establish the reliability of the instrument and a

reliability of 0.847was obtained. The BRT was administered two weeks after the post-test to determine students' level of retention. The research questions were answered using descriptive statistics such as mean and standard deviation, while the hypotheses were tested using independent samples t-test at 0.05 level of significance.

Results

Research Question One

What is the effect of field trip on academic performance in ecology concept among senior secondary school students in Akko L.G.A, Gombe State?

Table 1: Performance Mean Scores of Students in the Experimental and Control Groups

Group	No	Mean	Std. Deviation	Mean Difference
Control	90	31.17	22.524	8.364
Experimental	115	39.53	25.691	

Table 1revealed that the control group had a mean score of 31.17 and standard deviation of 22.524, while the experimental group have a mean score of 39.53 and standard deviation of 25.691. The two groups have a mean difference of 8.364 in favour of the students in the experimental group. The higher mean difference by students in the experimental group implies that field trip teaching strategy has high positive impact of secondary students' performance in ecological concepts.

Hypothesis one

There is no significant effect of teaching method on student's academic performance in ecology concept when taught using field trip and lecture method.

Table 2: Independent Samples t- test on Student Academic Performance in the Experimental and Control Groups

Group	**No**	**Mean**	**Df**	**T**	**P**
Control	90	31.17			
Experimental	115	39.53	203	2.440	0.038

***Significant at P< 0.05 level**

Table 2 revealed a p value of 0.038 which is less than 0.05. The null hypothesis which states that there is no significant effect of teaching method on student's academic performance in ecology concept when taught using field trip and lecture method was rejected. This revealed that a significant difference existed between the mean academic performance of the students taught with field trip method and those taught with lecture method. Students taught with field trip method had a higher mean score of 39.53 which implied they performed better than those taught with lecture method with mean score of 31.17.

This presupposes that field trip teaching method improved students' performance in ecological concepts significantly.

Research Question Two

What is the effect of field trip on retention in ecology concept among senior secondary school students in Akko L.G.A, Gombe State?

Table 3: Retention Mean Scores of Students in the Experimental and Control Groups

Group	No	Mean	Std. Deviation	Mean Difference
Control	90	38.11	25.50	
Experimental	114	49.75	24.35	11.643

Based on the data presented in table 3, students in the control group had a mean score of 38.11 and standard deviation of 25.50, while the students from the experimental group had a mean score of 49.75 and standard deviation of 24.35. There was also a mean difference of 11.643 in favour of students in the experimental group. The students in the experimental group retain better than the students from the control group, implying that field trip teaching strategy has significant positive effects on students' retention in Ecological concepts.

Hypothesis two

There is no significant effect of teaching method on student's retention in ecology concept when taught using field trip and lecture method.

Table 4: **Independent Sample t-test on Student Retention in Biology in The Control and Experimental Groups**

Group	No	Mean	Df	T	P
Control	90	38.11			
			2.02	3.320	0.044
Experimental	114	49.75			

*** Significant at P< 0.05 level**

From Table 4, t-test result revealed that t-calculated value of 3.32 and p value of 0.044. The P< 0.05 showed that the null hypothesis which states that there is no significant effect of teaching method on student's retention in ecology concept when taught using field trip and lecture method was rejected. Students in the control group had a mean score of 38.11, while the students in the experimental group had a retention mean score of 49.75. Students in the experimental group does had higher retention mean score than of the students in the control group. This presupposes that the field trip teaching strategy can improve students' retention in Ecology.

Discussion

Research question one in table 1 showed that students who were taught Biology using field trip method performed better than those taught using lecture method of teaching. This is in line with Okeke (2022) who carried out a study on the Effect of field- trip on Academic Achievement in Biology among Secondary School Students in Ikwuano, Nigeria, his finding of the study showed that the field trip teaching strategy favoured the experimental group in Biology concept. This is also in line with Ijok and Mgbomo (2021) who in their study

on the effects of field Trip and demonstration method of teaching on students' achievement in Biology revealed that field trip teaching method better enhanced students' achievement in Biology than demonstration method.

From research question two table 2, it was found out that students who were taught using field trip method retained better than those who were taught using lecture method of teaching. This is in agreement with Henry (2024) who reported in a research on the effects of field trip on students' retention in Biology concepts in senior secondary schools in Balanga LGA of Gombe state that student' taught using field trip teaching strategy had better retention mean scores than students taught using lecture method. This is also in line with Ekpo and Ehi (2022) who investigated the effects of field trip method on students' academic achievement and retention in Basic science and Technology among junior secondary school students in Yala, Cross River, Nigeria and found that students taught environmental hazard using field trip retained higher than those taught using other methods.

Conclusion

Students who were taught using field trip method performed and retained ecological concepts better than those taught using lecture method. The study therefore concluded that field trip teaching strategy has significant positive effects on students' academic performance in Ecology. It further concluded that field trip teaching strategy has significant positive effects on students' retention as it enhanced students' retention of ecological concepts.

Recommendations

Based on the findings of the study, the following recommendations were made.

1 Biology teachers should employ field trip strategy and activities as a method of teaching to enable the students to learn in their own pace and have wider experience of their natural environment.

2 Biology teachers should be trained on how best to involve students into field trip activities during teaching of Biology concept so as to facilitate students' academic performance and retention in the lesson. This could be achieved through seminars and workshops for teachers in secondary schools.

3 Also, the Ministries of Education should impress on school principals to ensure that field trips are supported and made a routine for students and also encourage the teachers to employ the use of field trip teaching strategy particularly in the teaching and learning of ecology concept at senior secondary school level.

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