

EFFECT OF FIELD TRIP INSTRUCTIONAL STRATEGY ON SCIENCE STUDENTS' ACHIEVEMENT AND RETENTION IN ECOLOGY IN SOKOTO STATE, NIGERIA

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Abstract

This study investigated the effect of field trip instructional strategy on science students' achievement and retention in ecology in Sokoto State, Nigeria. Quasi-experimental design of non-equivalent pretest and post-test control group was employed for the study. Two research questions and two null hypotheses guided the study. The population of the study comprised 5,207 SS1 students in public coeducational schools. The sample of the study comprised 125 SS 1 students from two intact classes randomly selected from public coeducational secondary schools in South Senatorial District, Sokoto State, Nigeria. Ecology Achievement Test (EAT) was used as instrument for data collection. The reliability of EAT was determined using Kuder-Richardson formula 21 (KR₂₁) and this yielded a coefficient of 0.79. Mean and Standard Deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance. The findings of the study revealed that a significant difference existed in the achievement of students taught Ecology concept using field trip instructional strategy and conventional method in favour of the field trip instructional strategy. Based on the findings of this study, it was recommended that teachers should be encouraged to use field trip instructional strategy in the teaching of Ecological concepts.

Keywords: Achievement, Ecology, Field trip, Instructional strategy, Retention.

Introduction

Biology is a science of life concerned with the characteristics of living things, their forms, functions and relationship with one another and with their environment among others. Biology is a prerequisite for studying a number of disciplines such as medicine, agriculture, pharmacy, microbiology, biochemistry and psychology among others (Nnorom, 2015). Biology plays a vital role in the economic development of a nation. This is because recent feats recorded in the field of biochemistry, physiology, ecology, genetics and molecular biology, have made the subject a central focus in most human activities including solutions to the problem of food scarcity, pollution, population explosion, radiation, disease, health, hygiene, family life, poverty eradication, management and conservation of natural resources as well as biotechnology and ethics. Due to immense benefits of the subject (Biology) to both individual and societal development, the Federal Government of Nigeria, in the National policy on education (FRN, 2014), made biology a core science subject at the senior secondary school (SSS). There are

different branches or concept of biology and there are different ways of dealing with them effectively such as ecology which requires students to be taken out to see living organisms in their natural habitats (Etobro & Fabinu, 2017). Ecology is defined as the study of the relationship of organism or group of organisms and their environment; or the science of the interrelationship among living organisms and their environment. Ecology is concerned with the biology of groups of organism with functional process on land, in the oceans and in fresh water (Emmadiole & Okafor, 2014). The ecology concepts include the following: habitat, population, ecosystem, succession, adaptation, conservation, pollution, cycling material, biological control, community, biotic interaction, soil studies erosion, ecology and disease, sewage disposal, ecological study, feeding relationship, energy, environment to mention just a few.

Field trip according to Cirfat (2014) is an excursion taken outside the classroom for the purpose of making relevant observations and also for obtaining some specific information. Field trip is a teaching strategy in biology which is done by taking students out to the field to provide firsthand experience of organisms in their natural environment (Zumyil, 2016; Amosa, Ogunlade & Atobalete, 2015). Amosa, Ogunlade and Atobatele (2015), state that the use of field trip in teaching and learning helps to bring about effective and efficient learning. Zumyil (2016) agreed that if properly planned, field trips afford the students opportunity to become actively engaged in observing, collecting, classifying, studying relationship and manipulating objects and also have better understanding of certain concepts and phenomena. It is one of the most enjoyable and exciting experience for students studying science especially Biology (Zumyil, 2016). According to Prem (2012), the purpose of field trip is to enhance the curriculum, give students experiential learning experiences,

concrete skills such as note-taking, involvement in a real world experience which makes learning more meaningful and memorable. Prem (2012) further states that field trips can add variety to the regular instructional program and help students appreciate the relevance and importance of what they learn in the classroom.

Nwachukwu (2013) viewed achievement basically as the competence a person has in an area of content. This competence is the result of many intellectual and non-intellectual variables. Researchers (Akanbi & Kolawale, 2014) have come out with constructive results on the causes of poor academic achievement in Secondary School Science, instructional strategies ranked very high amongst other causes identified. This indicates that the depreciation of instructional strategies, by not encouraging, promoting and improving learners' understanding of Science concepts, this has made the desired achievement unattainable.

Retention is the ability to hold, keep or recall past experience and reproduce a learnt concept when the need arises (Bukunola & Idowu, 2012). It is an important variable in learning because only a learnt experience is recalled, learning cannot be said to have taken place if there is no proper retention. For so long, researchers have been keen on knowing what could be done by teachers to enhance maximum retention of knowledge or skills long after they have been acquired whether in the classroom or outside the classroom (Eriba & Samuel, 2018; Agu & Samuel, 2018).

The poor achievement of students in Biology especially ecological concepts in Senior Secondary Schools has been a concern to science educators. This emerging concern in the poor achievement of students and its resultant consequence on the production and development of future environmental scientist had led to the search for instructional strategies that promote effective and improved

the learning of Biology. There are many alternative methods and strategies that could help students achieve better in science. This study seeks to try one such strategy – Field Trip Instructional Strategy to see its effect on students’ achievement and retention in ecological concepts in Sokoto State, Nigeria.

Objectives of the Study

The purpose of this study was to investigate the effect of field trip instructional strategy on science students’ achievement and retention in ecology in Sokoto State, Nigeria. Specifically, the study sought to:

1. determine the effect of field trip on students’ achievement in Ecology.
2. determine the effect of field trip on students’ achievement in Ecology.

Research Questions

1. What are the mean achievement scores of science students taught ecology using field trip and conventional method?
2. What are the mean retention scores of science students taught ecology using field trip and conventional method?

Hypotheses

H₀₁: There is no significance difference between the mean achievement scores of science students taught ecology using field trip with those taught using conventional method.

H₀₂: There is no significance difference between the mean retention scores of science students taught ecology using field trip with those taught using conventional method.

Methodology

Quasi-experimental design of non-equivalent pretest and post-test control group was employed for the study. The population of the study comprised 5,207 SS1 students in public coeducational schools in South Senatorial District, Sokoto State, Nigeria. The sample of the study comprised 125 SS 1 students from two intact classes randomly

selected from public coeducational science secondary schools in South Senatorial District, Sokoto State, Nigeria. The experimental group I (n=60) and control group (n=65) were taught using field trip instructional strategy and conventional method respectively for six weeks. Ecology Achievement Test (EAT) was used as instrument for data collection. EAT consisted of 30 multiple choice achievement test items with 4-options A-D designed to measure students’ achievement. The instrument was subjected to content and face validity by two experts in Usman Fodio University, Sokoto and one from Nasarawa State University, Keffi. The reliability of EAT was determined using Kuder-Richardson formula 21 (KR₂₁) and this yielded a reliability coefficient of 0.79.

During the first week of the experiment, a pretest was administered. The treatment lasted for six weeks. During this period, students were taught six selected concepts in Ecology using a double period lasting for 80 minutes. The experimental group was taught using field trip instructional strategy. In this group, students were divided into six groups (five students in each group) to carry everybody along. Group leaders were appointed to each group to co-ordinate the activities of the group. Each member of the team was given work sheet that contained specific questions to answer. During the trips the students worked in groups, asked questions and collected samples where possible. They observed, and recorded all that was required strictly under the guidance of the questions designed. They were encouraged to use their field guide sheets and discuss with each other what they saw, touched and heard during the trip.

The students were encouraged not to pick sample flowers or vegetation and not to disturb animals in their specific habitat except instructed to do so. They used cameras, small tape recorders or mandated to record specific information. Each group was given

40 minutes only. They were asked to collect some samples according to the lesson plan designed. After each trip students returned from their group investigation, they were allowed to discuss and put together their experiences creatively. Each team was asked to present their experiences to the rest of the groups on what they had observed and recorded in the field. The control group was taught using the conventional method. Posttest was administered immediately after the experiment. The last one week was used for the administration of post-posttest after treatment using EAT. This makes a total of eight weeks.

Mean and Standard Deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the research hypotheses at 0.05 alpha level of significance.

Results

Research Question One

What are the mean achievement scores of science students taught ecology using field trip and conventional method?

Table 1: Mean Achievement Scores and Standard Deviations of Science Students taught Ecology using Field Trip Strategy and Conventional Method

Methods	Pretest	Post-test
Mean	52.60	63.94
FT N	60	60
Std. Deviation	5.085	6.166
Mean	51.05	54.45
CM N	65	65
Std. Deviation	5.310	5.446

Table 1 reveals that for the science students taught ecology using the field trip, the mean score for the pre-test is 52.60 and SD of 5.085 and for the post-test is 63.94 and SD of 6.166

and for those taught ecology in the conventional method, the mean score for the pre-test is 51.05 and SD of 5.310 and for the post-test is 54.45 and SD of 5.446.

Hypothesis One

There is no significance difference between the mean achievement scores of science students taught ecology using field trip with those taught using conventional method.

The result of analysis to test this hypothesis is presented in Table 2.

Table 2: Result of ANCOVA of Science Students taught Ecology using Field Trip Strategy and Conventional Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2797.536 ^a	2	1398.768	48.303	.000
Intercept	1397.715	1	1397.715	48.267	.000
Pretest	492.625	1	492.625	17.012	.000
Methods	1952.587	1	1952.587	67.428	.000
Error	2895.824	120	241.319		
Total	362704.000	125			
Corrected Total	5693.359	124			

Table 2 reveals a significant difference in the mean achievement scores of science students taught ecology using field trip strategy and conventional method. F = ratio of 67.428 was obtained with associated exact probability value of 0.000. Since the associated probability (0.000) is less than 0.05 set as level of significance, the null hypothesis was rejected. The result implies that the field trip strategy group produced a significant effect on the post-test achievement scores of students when covariate effect (pre-test) was controlled. This indicates that there was a significant difference in the mean achievement scores of science students taught ecology using field trip strategy and

conventional method in favour of the field trip strategy group.

Research Question Two

What are the mean retention scores of science students taught ecology using field trip and conventional method?

Table 3: Mean Retention Scores and Standard Deviations of Science Students taught Ecology using Field Trip Strategy and Conventional Method

Methods		Post-test	Retention
FT	Mean	63.93	75.85
	N	60	60
	Std. Deviation	5.434	6.649
CM	Mean	54.45	61.05
	N	65	65
	Std. Deviation	4.729	5.643

Table 3 reveals that for the science students taught ecology using the field trip, the mean score for the post-test is 63.93 and SD of 5.434 and for the retention is 75.85 and SD of 6.649 and those taught ecology using the conventional method, the mean score for the post-test is 54.45 and SD of 4.729 and for the retention test is 61.05 and SD of 5.643.

Hypothesis Two

There is no significance difference between the mean retention scores of science students taught ecology using field trip with those taught using conventional method.

The data to test this hypothesis is presented in Table 4.

Table 4: ANCOVA Result on Retention of Science Students taught Ecology using Field Trip Strategy and Conventional Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1618.352 ^a	2	809.176	139.713	.000
Intercept	34.255	1	34.255	5.914	.019
Posttest Method	894.992	1	894.992	154.530	.000
Error	23.679	1	23.679	4.088	.049
Total	260.627	120	5.792		
Corrected Total	31929.000	125			
	1878.979	124			

Table 4 reveals a significant difference in the mean retention scores of science students taught ecology using field trip strategy and conventional method. F = ratio of 4.088 was obtained with associated exact probability value of 0.049. Since the associated probability (0.049) is less than 0.05 set as level of significance, the null hypothesis was rejected. The result implies that the field trip strategy produced a significant effect on the retention scores of students when covariate effect (post-test) was controlled. This indicates that there was a significant difference in the mean retention scores of science students taught ecology using field trip strategy and conventional method in favour of the field trip strategy group.

Discussion of Findings

The findings of this study reveals a significant difference in the mean achievement and retention scores of science students taught ecology using field trip strategy and conventional method in favour of the field trip strategy group. The finding is also in agreement with the findings of Prem (2012), Ahmad (2014), Denen and Isah (2015), Amosa, Ogunlade and Atobatele (2015),

Suwopoleme (2016), Zumyil (2019) Oka and Samuel (2020) who in their various researches found out that field trip enhances students' achievement and retention in science concepts. But it is in contrast with the findings of Abdul-Amosa and Adunni (2018) who found out that field trip has no significant effect on students' achievement.

The reason for the enhanced achievement could be because students had the opportunity to actively engaged in an out of the classroom teaching where they were involved in observing, collecting, classifying, studying relationship and manipulating real objects and situations, also they had a better understanding of certain concepts and phenomena. Another reason for better achievement experienced by the treatment group could be because the students were captivated, more focused, attentive and interested in what they were doing. This no doubt offered slow learners opportunity to catch up with the fast learners. Biology students' achievement and retention could greatly improve if they are allowed to take charge of their learning. Interaction among the students provides a better opportunity to develop cognition.

Conclusion

The findings of this study have shown that Field Trip Strategy is more effective than Conventional Method.

Recommendations

Based on the findings of this study, it was recommended that,

1. Teachers should be encouraged to use field trip instructional strategy in the teaching of Ecological concepts.
2. Seminars and workshops should be organized by stakeholders in Biology to train teachers on the use of field trip instructional strategy to help enhance and improve the achievement of students in ecology.

References

- Agboghoroma, T. E. (2015). Interaction effects of cognitive style and instructional mode on students' knowledge of Integrated Science. *European Journal of Research and Refection in Educational Sciences*, 3(1), 47-54.
- Agu, P. A. & Samuel, R. I (2018). Effect of reversed jigsaw, tai cooperative and guided discovery learning strategies on basic science and technology students' interest and achievement. *International Journal of Innovative Education Research*, 6(2), 19-26.
- Ahmad, Y. (2014). Effects of field- trip on retention and academic achievement in ecology among secondary school students in Zaria, Nigeria. A thesis submitted to the school of postgraduate studies Ahmadu Bello University, Zaria, Kaduna State.
- Ajaja, P. O. (2013). Which strategy best suits biology teaching? Lecturing, concept mapping, cooperative learning or learning cycle? *Electronic Journal of Science Education*, 7 (1), 102 – 108.
- Amosa, A. G.; Ogunlade, O. & Atobatele, A. S. (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.
- Anungwo, M. N. (2014). Enhancing the academic performance of Nigerian students through creative teaching and assessment procedures. *Proceedings of the 55th Annual Conference of Science Teachers Association of Nigeria*. 90 – 97.
- Akanbi, A. A. & Kolawole, C. B. (2014). Effects of guided discovery and self-learning strategies on senior secondary

- school students' achievement in Biology. *Journal of Educational and Leadership Development*, 6(1), 19-42.
- Bukunola, B. A. J. & Idowu, O. D. (2012). Effectiveness of cooperative learning strategies on Nigerian junior secondary students' academic achievement in Basic Science. *British Journal of Education, Society and Behavioural Science*, 2(3), 307-325.
- Cirfat, A. B. (2014). Effects of experimental learning strategy on secondary school students' self-esteem and achievement in practical skills. An unpublished Ph.D thesis in the department of Curriculum and Teaching, Faculty of Education, Benue State University Makurdi.
- Denen, D. U. & Isah, S. A. (2015). Effect of field-trip instructional strategy on SS1 students' Interest and achievement in ecological concepts. *International Journal of Research in Science, Technology and Mathematics Education*, 3(1), 1-11.
- Emmadiole, N. B. & Okafor, C. U. (2014). Strategies teachers can use to inspire creativity in senior Secondary Biology Students. *Proceedings of the 55th Annual Conference of Science Teachers Association of Nigeria*, 200 - 206.
- Eriba, J. O. & Samuel, R. I. (2018). Effect of stad and jigsaw iv cooperative learning strategies on students' interest and achievement in basic science. *Case Study International Journal*, 7(4), 6-14.
- Etobro A. B., & Fabinu, O. E. (2017). Students' Perceptions of Difficult Concepts in Biology in Senior Secondary Schools in Lagos State. *Global Journal of Educational Research*, 16, 139-147.
- Ezenduka, C. U. & Achufusi, J. N (2014). Enhancing creativity in senior secondary school biology teaching through creative learning model approach. *Proceedings of the 55th Annual Conference of Science Teachers Association of Nigeria*, 207 - 214.
- Federal Republic of Nigeria (2014). *National policy on education*. NERDC Press Lagos.
- Nnorom, N. R. (2015). Effect of Cooperative Learning Instructional Strategy on Senior Secondary School Students Achievement in Biology in Anambra State, Nigeria. *International Journal for Cross-Disciplinary Subjects in Education*, 5(1), 2424-2427.
- Nwachukwu, C.O. (2013). Achievement and interest of Chemistry students exposed to cooperative and competitive learning. *Unpublished Ph.D thesis. Nnamdi Azikiwe university, Nigeria*.
- Owenvbiugie, R. O., & Iyoha, D. O. (2017). Effect of Instructional Scaffolding on Academic Performance of Students in Financial Accounting in Secondary Schools in Delta State, Nigeria. *Journal of Education Research and Behavioral Sciences*, 6(2), 021-028.
- Prem, L. (2012). Field trip strategy. Retrieved from 202/06/field-tripstrategy.htm/?m=/eprogressiveportfolio.b Press Paris.
- Zumyil, C. F. (2019). Effects of computer simulation and field trip instructional strategies on students' achievement and interest in ecology in Plateau Central Education Zone, Nigeria. A thesis submitted to the postgraduate school, Benue State University, Makurdi, Benue State.