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Science Tourism Strategy for Teaching the Concept of Freshwater Conservation in Biology in Onna Local Government Area

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ABSTRACT

The study investigated the effect of science tourism on freshwater conservation for addressing climate issues and food scarcity using community resources in Onna Local Government Area. The study adopted a quasi -experimental design. Two schools were sampled for the control and experimental group. The two schools comprised of 110 Biology students drawn from the population of one thousand eight hundred using simple random sampling technique. Instrument for data collection was Biology Achievement Test with twenty items. The instrument was validated by two expert in Biology. The reliability of the test instrument calculated using Pearson product moment coefficient and the figure was 0.76 . The experimental group was exposed to the use of science tourism by visiting the freshwater bodies while the control group was not exposed to the community resources. After the treatment, the multiple choice item test was administered to the two groups. Data collected was analysed using mean, standard deviation and independent t-test statistical to. The result of the findings showed that the use of community resources in the teaching of freshwater conservation promote students' academic performance in Biology. It was concluded that tourism to community resources enriched students' academic performance in the concept of freshwater conservation in Biology. With this, it is recommended that community resource like freshwater bodies should be used in the teaching of freshwater conservation to address climate issues and food scarcity in Nigeria.

Keywords: Science tourism, freshwater conservation and community resources

Introduction

Education is the process or art of imparting knowledge, skill and judgment to students. During this process of knowledge impartation, facts, skills and ideas are learned either formally or informally by the students .In order to embrace a global best practice in education, tutors/ teachers should be conscious in that, what is imparted to the students today will help the nation as a whole from being threatened ;academically, physically, psychologically, emotionally, or financially in the nearest future. In a situation whereby the level of knowledge, skills and facts imparted to the students is not enough to address the global issues, there is need to rethink about the better instructional strategies to be adopted amidst the global best practice in teaching science subject like Biology .

Biology is a natural science that concerned with the study of life and living organisms including their morphological structures, physiological functioning, growth, evolution, distribution, identification and scientific naming of organisms (Urry and Moon, 2018). Being a science of life, Biology occupies a very important position in the secondary school curriculum. In Nigeria, the Secondary School Biology Curriculum is designed to prepare students to acquire adequate laboratory and field skills, meaningful and relevant knowledge in Biology and also to enable students apply scientific knowledge to everyday life in matters of personal, community, health, environmental conservation and agriculture (Federal Ministry of Education, 2013).

In all spheres of human endeavors, Biology plays a vital role. It is indispensable in the fields of medicine, pharmacy, agriculture, environmental conservation, brewery, geology and nursing among others (Institute of Biology, 2013). Biology helps to Inculcate in the individual , scientific skills and attitudes in its approach to personal and societal problem. It also impart factual knowledge and stimulate scientific reflective thinking so as to produce a better informed individual. Because of the importance of Biology, much emphasis has been placed on instructional strategies especially at the secondary school level.

The study of Biology in senior secondary schools is expected to equip students with useful concepts, principles and theories that will enable them face the challenges before and after graduation (King, 2014). It aims at equipping the learner with knowledge, skills and attitudes that are necessary for controlling and preserving the environment; enabling the learner to appreciate humans as the broader community of living organisms (Karen, 2015).

One of the major Biological concepts twithhat relate to climate change and food scarcity is freshwater environment. For better productivity, Freshwater bodies should be conserved. Freshwater conservation is a term that describes the act of protecting, preserving and management of freshwater resources

(Carleton, 2018) .Various environmental issues are taking heavy tolls on human lives ranging from overpopulation, hydrological issues, ozone layer depletion , global warming , deforestation, desertification , pollution, habitat loss, over exploitations , heating, pollution, acidification, oxygen loss, threatened extinct , endemic and endangered species of plant and animals in the freshwater ecosystem and destruction of freshwater resources , all these issues pose severe threat to the existence of humankind.

Freshwater conservation is considered as determinant for food availability and climate management strategy. According to United Nations Conference on Trade and Development (2022), benefits of freshwater conservation include :

- conservation regulating and providing us better breath.
- feeding us with both plant and animal products as food .
- providing various jobs fishing and research work to graduates.
- Provision of tools for economic development.
- Freshwater conservation conserves energy.
- It assuring us of future survival in term of climate change.
- helping to protect the environment by reducing runoff and keeping lakes and rivers clean.

With persistent poor performance of students in Biology school examinations even with much attention given to academic performance of students in this aspect of Biology. It has become a source of concern to researchers . Egbule (2014) noted that regardless of the laudable values attached to students academic performance in West African Examination Council and National Examination Council are still poor. Available statistics from West African Examination Council and National Examination Council show that students continue to perform poorly in Biology in the May/June examinations and the course of this poor performance is traced to teaching strategies and resources adopted by the teachers.

Rethinking about a better instructional strategy to promote critical thinking, collaborating learning and better academic performance toward students better academic performance in Biology , this study aim at: science tourism strategy for teaching the concept of freshwater conservation in Biology in Onna Local Government Area.

In order to protect the environment from climate issues and food scarcity, teaching of Biological concepts like conservation of freshwater at any level of education should be taught using science tourism which involves visit to freshwater bodies such as streams and rivers. The introduction of this content to students at different levels of education further spread the importance of freshwater conservation (Carleton, 2018).

Community resources are materials , places and human resources that are found within a given community. (Fred, 2017). Community resources are those resources coming from nature such as soil, minerals, water and climate. According to Olabode (2013), there are basically two ways in which the teacher may make use of community resources. One method is to take the school to the community. The other method is to bring some portion of the community to the classroom. The use of community resources in the teaching of Biology aims at enabling the child to understand and appreciate the living and non-living things found around his environment. This state of affair necessitates a departure from the conventional mode of organizing the teaching-learning process (Thoothukudi, 2014) . Olabode (2013) reported that education from the community resources is not only different in nature but also a valuable supplement to formal school experiences. Out of classroom experience promote learning, enhances the units taught in the classroom and provide learning experiences not gained in the classroom.

The use of resources within a community can greatly enhance the accomplishment of the aims and goals of school curriculum. Community resources can help teachers teach more effectively by providing motivation to students, helping students achieve learning objectives and exposing students to positive role models and real life situations. Community resources can provide the motivation students need to see the connection between the classroom and the real

It has been reported that involving students in the community visit gives them exposure to a stimulating learning environment and to different people and perspective and provides students a greater sense of purpose. Often, community-based activities can help students fulfill desired learning outcomes in a manner that is more engaging than traditional textbook assignment. The use of community resources can further the goals of science education by preparing students for the real world and helping students to become scientifically literate citizens. Poole (2014) advocated for the use of community personnel facilities and institutions by teachers as a means of making academic subjects more relevant to the students' everyday experiences. She claimed that community resources are necessary to provide students with the skills and knowledge required for self-sufficiency and independence in an adult world.

Furthermore, Alasela (2013) investigated the differences in the performance of students taught using expository and those taught without community resources. The findings indicated that the students taught using community resources performed significantly better than their counterparts taught using expository strategy. Moreso, Adesoji (2022) investigated the effects of Community Resources on Pupils Academic Performance in social studies education in Model Primary Schools Kaduna State . The findings showed that the use of community resources favoured the experimental group in terms of performance than the control group. It was on this notion that the researcher tent to fill the research gap in the sense that similar research was not conducted in Onna L.G.A to find out if science tourism to community resources could promote students academic performance in Biology .

Statement of Problem

Despite the role of science in the development of any nation, Biology students' academic achievement has been fluctuating . Researchers have identified some possible causes of students poor academic performance in Biology to include lack of learning facilities ,students home background , poor motivation strategies and lack of use of community resource among others . It was on this notion that the researcher investigate if students' academic performance in the concept of freshwater conservation could be improve with the use of science tourism to community resources like streams and river.

Purpose of the Study

The purpose of the study is to examine science tourism on freshwater conservation for addressing climate issues and food scarcity using Community resources in Biology in Onna Local Government Area.

Specifically, the study sought to;

1. examine the mean difference in students' academic performance in the concept of fresh water conservation when taught with community resources and those taught without .

2. examine the mean difference in male and female students' academic performance in the concept of freshwater conservation in Biology when taught using community resources.

Research Questions

1.What is mean score difference of students' academic performance in the concept of freshwater conservation when taught using community resources and those taught without .

2.What is the mean score difference of male and female students' academic performance in the concept of freshwater conservation in Biology when taught using of community resources in Biology?

Research Hypotheses

The following research hypotheses were formulated to guide the researcher;

1.There is no significant difference in the mean score of Biology taught using community resources and those taught without.

2. There is no significant mean score difference in male and female Biology students' academic performance in the concept of fteshwater conservation taught using community resources in Biology .

Research Method

Design

The design adopted for the study was Quasi-experimental design. This design was suitable as the researchers' treatment influences the student academic performance .

Area of the Study

The study was conducted in Onna Local Government Area, Akwa Ibom State.

Population of the Study

Population of the study comprised of all public secondary schools students in 2023/2024 academic session in Onna Local Government Area, Akwa Ibom State. The population of the Study consisted of two thousand and seventeen Biology students .

Sample and Sampling Technique

A sample of 110 Biology students were drawn from two intact classes in public secondary schools in the study area. The sample was obtained using simple random sampling technique. The reason for adopting simple random sampling techniques was that the population size was large .

Instrumentation

The instrument for data collection was Biology Achievement Test (BAT) .The instrument had twenty multiple item tests with options lettered A-D.

Validation

Face validation of the achievement test items were done by two experts from the department of test and measurement, University of Uyo, Uyo. Meanwhile, the content validation was achieved .

Reliability of the instrument

The reliability of the Biology achievement test (BAT) was 0.76 . The reliability value was found acceptable for use.

Method of Data Analysis

Data collected were subjected to mean, standard deviation and independent-test.

RESULT

Hypothesis 1.

There is no significant difference in the mean score of Biology taught using community resources and those taught without.

Mean, standard deviation and independent t-test were used in testing null hypothesis 1. The result is presented in Table 1.

Table 1: Summary of independent t-test of student's scores taught the concept of freshwater conservation using community resources and those taught without.

Results	N	$\bar{X}$	SD	df	t-cal	t-crit	Decision
Students taught using community resources	60	18.10	4.68	108	26.511	1.96	significant
Students taught without community resources	50	11.12	2.00				

The summary of the result in table 1 shows that the calculated t-value of 26.511 is greater that the critical value 1.96 at 0.05 level of significance . Therefore, the null no significant difference in the mean score of Biology students taught concept of freshwater conservation using community resources and those taught without is rejected. Hence, there is a significant mean score difference in students' academic performance taught the concept of fresh water conservation using community resources and those taught without.

Hypothesis 2.

There is no significant mean score difference in male and female Biology students' academic performance in the concept of freshwater conservation taught using community resources in Biology .

Mean, standard deviation and Independent t-test was used in testing null hypothesis 2. The result is presented in Table 2.

Table 2: Summary of independent t-test Mean scores of male and female students taught the concept of freshwater conservation using community resources .

Results	N	$\bar{X}$	SD	df	t-cal	t-crit	Decision
Male students taught using community resources	41	17.01	1.63	58	1.80	1.96	significant
Female students taught using community resources	19	18.31	1.04				

The results in table 2 indicates that the calculated t-value of 1.80 is less than the critical value of 1.96 at 0.05 level of significance . Therefore, the null hypothesis of no significant mean score difference in male and female Biology students' academic performance in the concept of freshwater conservation taught using community resources in Biology is retained .

Discussion of Findings

Effects of Community Resources on Students Academic Performance in Biology.

The summary of result in Table 1 shows that there is significant difference between the academic performance of Biology students taught the concepts of freshwater conservation using community resources and those taught without. This could be as a result of community resources espoused the students to the real life situation which was the stream and rivers. This probably made the students interact more with the concept when using community resources than the conventional strategy. The findings of this study aligns with the findings of Alasela (2013) Adesogi and (2018)who investigated community resources on students academic performance taught using community resources and those taught without . The significant in students academic performance could be due to community resources utilisation capable of improving improving students academic performance .

Effect of Community Resources on Male and Female Students taught the Concept of Freshwater Conservation .

The summary of results in Table 2 shows that there is no significant difference between the academic performance of male and female biology students taught the concept of freshwater conservation using scientific tourism to community resources. This could be as a result of the equal learning opportunities given to both male and female students during the tourism to the community resources. This fall in line with the findings of Alasela (2013) and Drek (2017) who conducted a study on the effects of community resources on performance of male and female students taught using community resources and his result had it that community resources is gender friendly .

Conclusion

Based on the findings of the study, it is concluded that tourism to community resources enhances students' academic performance in the teaching of freshwater conservation in Biology . Gender is not a significant determinant of students' academic performance in biology when taught with community resources .

Recommendations

Based on the findings of the study and the conclusion reached, it is recommended that:

1.Students should learn the concept of freshwater conservation using community resources.

2.Teachers should embrace science tourism to community resources to fresh water bodies like lakes and springs in the teaching of freshwater conservation to enhance students' academic performance in biology.

3. School principals should encourage teachers to attend to seminars and workshops to update knowledge on the science tourism to community resources.

4.The government should encourage the use of science tourism to community resources through organization of relevant seminars, workshops and conferences for biology teachers to boost their capacity.

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