

Effects Of Outdoor Teaching Strategy On Students' Academic Achievement In Basic Science In Secondary School In Ekiti State, Nigeria

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Abstract: *The study investigated the effects of Outdoor Activities teaching strategy on students' academic achievement in secondary school Basic Science in secondary schools in Ikere Local government Area, Ekiti State, Nigeria. The study was a pretest, posttest, control group quasi-experimental design. Purposive and stratified random sampling techniques was used to select a total sample of 140 public JSS I Basic science students (this sample was divided into the experimental and control groups in ratio 1:1 meaning that, 70 students from each group) from four Junior secondary schools in Ikere Local Government Area, Ekiti State. Two schools each for experimental and control groups. Two null hypotheses were formulated and tested at 0.05 level of significance. The instrument for this study was Basic Science Achievement Test (BSAT) and the treatment package used for the study was tagged: Outdoor Instructional Package (OIP). The data collected were analysed using t-test and ANCOVA statistical analysis packages. The results of the analyses showed that no significant difference existed between the achievements of students in experimental and control groups involved in the study at pretest (this indicated initial academic homogeneity of the groups). However, students' achievement in the experimental group at post-test level was found to be significantly better than that of the control group. This showed that Outdoor teaching strategy significantly influenced students' achievement in Basic Science in Junior Secondary School. The implications of the results on students' achievement in Basic science are discussed. Based on the findings of the study, conclusion and appropriate recommendations were made.*

Keywords: *Outdoor activities, Teaching Strategies, Academic Achievement and Basic Science.*

I. INTRODUCTION

Basic science formerly known as Integrated Science is the first form of science a child comes across at the secondary school level. Basic Science is considered the bedrock of all science subjects at the Senior Secondary School (SSS) level. The subject prepares students at the upper basic level for the study of core science subjects (biology, chemistry and physics) at the Senior Secondary School (SSS) level (Oludipe, 2012). According to Trustee of Princeton University cited in Oyeniyi (2019), Basic Science is a revolutionary new introductory science curriculum developed at Princeton intended for students considering a career in science. Basic Science emphasizes scientific literacy and research oriented

learning (Gunseli & Guzin, 2017). The subject encourages exploration of student's immediate environment. As a result, Basic Science teachers continue to learn along with their students.

The teaching of Basic Science is therefore, based on the philosophy of active learner participation in the process whereby, students are encouraged to learn by constructing their own knowledge based on what they already understand as they make connection between new information and old information, guided or facilitated by the teacher (Piaget) as quoted by (Anna, 2015).

Under this philosophy, students are encouraged and let to discover concepts and generalizations based on their experiments. In the study of Akomolafe as quoted by Anna

(2015), rightly pointed out that, when children learn science using the process of activity approaches, they improve their ability to apply intellectual skills to solve problems, improve their language development, become more creative, master science content better and develop positive attitude towards Science and Scientists.

There are various objectives of Basic Science as identified by Bilesanmi-Awoderu & Oludipe (2012). The reasons for which Nigeria government started Basic Science teaching in Nigerian upper basic level include:

- ✓ Provides of students at the upper basic level, a sound basis for continuing science education in single science subject.
- ✓ Enhancement of scientific literacy of the citizenry.
- ✓ It allows students to understanding of students' environment in its totality rather than in fragments.
- ✓ Having a general view of the world of science.
- ✓ The processes of science serve as unifying factors for the various science subjects.

The importance of Basic Science in everyday life can never be over emphasized. It serves as the bedrock which provides the required training in scientific skills to meet the growing needs of the society. It is the fundamental knowledge acquired through Basic Science at the upper basic level that leads to the transformation of the world through dramatic advances in almost all fields including Medicine, Engineering, Electronics and Aeronautics among others (Guyana, 2018).

The application of scientific knowledge acquired through Basic Science, as reported by Guyana (2018) has helped many countries like China and India to transform from poor feudal type economies to become economic and industrial power houses and in several ways compete effectively with developed countries. Basic Science is of great importance because early experiences in science help students to develop problem-solving skills that empower students to participate in an increasingly scientific and technological world (Guyana, 2018).

Basic Science is the type of science which provides unique training of students in observation, reasoning and experiment in the different branches of science; it also helps students to develop a logical mind (Prakash, 2012). Basic Science enables students to be systematic and enables them to form an objective judgment. Basic Science, if taught according to its philosophy, equips students with the necessary introductory scientific and technological knowledge and skills necessary to build a progressive society. This forms the bedrock on which scientific and technological studies rest (Ochu & Haruna, 2014).

Oyeniya (2019) affirmed that the term "teaching approach" refers to the general pedagogy and management style used for classroom instruction. A teacher's choice of teaching approach should not only be based on what fits/suits him or her but also putting into consideration the subject area, schools mission statement, class demography, etc. The choice of teaching approach according to Wikipedia may also depend largely on the information that the teacher or instructor intends to pass across to the students in his/her class, the skill that is to be taught, and it may be influenced by the attitude and level of enthusiasm of the students. Science lessons that are not interesting will not be able to motivate pupils to learn and

subsequently will affect their scientific thinking skills and curiosity (Elvis, 2013).

The primary purpose of teaching at any level of education is to bring a fundamental change in the learner. To facilitate the process of knowledge transmission, teachers should apply appropriate teaching methods that best suit specific objectives and level exit outcomes. In the traditional epoch, many teaching practitioner widely applied teacher-centered method to impart knowledge to learners comparative to student-centered methods. Until today, questions about the effectiveness of teaching methods on students learning have consistently raised considerable interest in the thematic field of educational research. Moreover, research on teaching and learning constantly endeavor to examine the extent to which different teaching methods enhance growth in student learning (Elvis, 2013). Safdar (2010) stated that "how to learn is equally important with what to learn but how to teach (teaching strategy) is more important than what to teach". Teachers make a difference. Some teachers reliably elicit greater gains than others because of differences in how they teach (Tennyson & Volk, 2015).

Teaching methods involve different activities of the teacher and the learners such as questioning, explanation, demonstration or direction. The activities can be referred to as skills or techniques. Thus, teaching methods involve different techniques and methods among which are lectures, cooperative learning, inquiry-oriented learning or inquiry-based methods with mobile devices for learning, self-directed study, computer-assisted testing/assessment (Sung, Chang & Liu, 2015). The use of these techniques vary with different teaching methods and also on many factors such as type of learning objectives, nature of the subject, age of students, number of students in a class among others (Aniaku, 2012). Quite remarkably, regular poor academic performance by the majority students is fundamentally linked to application of ineffective teaching methods by teachers to impact knowledge to learners (Elvis, 2013). Substantial research on the effectiveness of teaching methods indicates that the quality of teaching is often reflected by the achievements of the learners.

Teaching and learning need not to take place exclusively within classroom buildings. The outdoor environment has massive potential for learning. The outdoor environment offers motivating, exciting, different, relevant and easily accessible activities from pre-school years to college. Outdoor learning experiences are often remembered for a lifetime. Integrating learning and outdoor experiences whether through play in the immediate grounds or adventures further provides relevance and depth to the curriculum in ways that are difficult to achieve indoors.

Teaching Basic Science through outdoor activities may reduce the perceived abstract nature to a vivid reality by exposing the students to the practicality of Basic Science. In the outdoor Basic Science activities, learning objects are real material objects in the surrounding. The students will be exposed to the original/actual materials instead of bringing the dummy to the classroom to demonstrate.

Outdoor teaching activities could allow better acquisition of knowledge by students, as the activity could be experienced with different senses as a result of their physical interaction with nature within their environs, this would make them to

form their personal opinion about events. The Outdoor activity strategy of teaching science encourages group interactions among pupils and if properly used, the spirit of teamwork, exchange of ideas and respect for each other's point of view will be enhanced at early stages of learning. Another feature of Outdoor activity-based teaching strategy is that local resources can be effectively utilized in the teaching process. In typical students' activity, costly scientific equipment is often substituted with locally available teaching aids (Iwuji, 2012).

Science, as a subject, is fundamentally fascinating to students and involves them in an adventurous exploration individually or in groups. Such a learning process calls for students to learn science through an open-ended process approach to better understand scientific concepts and grasp essential skills. First-hand experiences should be one of the essentials in teaching (Farmery) as quoted by (Saroja, 2013). Ideas relating to the importance of children learning outside are not new and have a provenance that includes writers such as Rousseau, Montessori and Kolb among many others. Indeed, in 2013 the Ofsted Report into Science Education found that: 'invariably, achievement was highest where pupils were involved in planning, carrying out and evaluating investigations that, in some parts, they had suggested themselves (Ofsted, 2013). The results of Ting & Siew (2014) showed a significant difference in post-test mean score between students in outdoor group and control group in both students' science process skills and scientific curiosity.

Oyeniya (2019) opines that research has been carried out to evaluate the impact of outdoor learning in improving students' performance in understanding science. Commonly, it is reasoned that outdoor learning is the better platform of active and engaging learning that benefits students the most especially in understanding science rather than learning in the indoors (Fagerstam, 2012). Evidence taken by House of Common Select Committee findings strongly indicated that education outside the classroom is of significant benefit to pupils. Academic fieldwork clearly enhances the teaching of Science and Geography, but other subjects such as History, Art and Design and Citizenship can also be brought to life by high quality educational visits. Group activities, which may include adventurous expeditions, can develop social skills and give self-confidence.

A Curriculum for Excellence, Scottish Executive as quoted by Association for science education outdoor working group (2011) said outdoor learning improves: the challenge and enjoyment of learning; the breadth, depth and coherence of learning-drawing on different experiences; relevance of learning-by contextualizing experiences; expression and creativity-responding imaginatively to stimulating settings. Buntod, Suksringan & Singseevo (2010) claimed that students develop better in their critical thinking skills and science process skills after undergoing an environment-based education.

In addition, National Foundation for Education Research (2004) cited in Oyeniya (2019) also indicated that outdoor school group project shows positive impact on students' science process skills. Curiosity has often been highlighted as an important attribute and influencing factor with respect to students' learning. Literature studies showed that higher curious students probably achieve better than lower curious

students because of their exploration of events and objects for longer periods of time and their use of many more senses. Curious youngsters will recall experiences longer, comprehend better and achieve a more complete learning. In short, curiosity motivates students on their learning (Ting & Siew, 2014).

Studies on Field work which is an academic or other investigative studies undertaken in a natural setting, rather than in laboratories, classrooms, or other structured environment show that students learn science content or concepts via observations, (structured or unstructured) discussion as well as through analysis of other forms of collected data. The collected data could be in the form of specimens, video and or audio recorded objects and phenomenon (Nurshamshida, Nabilal & Nurlatifah, 2013). Field study does not only allow students' active engagement with each other but also helps develop an understanding of the experience and process of learning in natural setting. Nurshamshida et al (2013), who used field study as an approach to teaching found his students accurately describing plants and animals they had observed in different habitats during field trip.

Awodun (2016) while looking at the effects of outdoor activities on students' academic performance in Physics in Senior secondary schools in Ekiti State, Nigeria found out that outdoor teaching approach is more potent in improving students academic achievement in Physics in secondary schools than the conventional teaching method. The study also revealed that effects of teaching approach on secondary school Physics was not vary with gender of students.

Moreover, Oyeniya (2019) while looking at the effects of outdoor activities and Advance organizer teaching strategies on students' learning outcomes in secondary school Basic Science in Ekiti State found out that there is significant difference between pre-test and post-test mean score of students exposed to outdoor activities: that outdoor activities teaching was most effective of teaching Basic Science in Ekiti State, Nigeria.

Gender issues are currently the main focus of discussion and research all over the world, Nigeria inclusive. The question of gender is a matter of grave concern especially among academics and policy formulators. Intellectuals are worried about the role of male and female in the psychological, political, social, economic, religious, scientific and technological development of nations (Ujiro, 2015). Meanwhile concerns about academic achievement with respect to males and females have generated a considerable interest in the field of educational testing over the years. Differences in academic achievement of the two genders are likely to contribute disparities in the allocation of cognitive roles in the world of work.

Oludipe (2012) quoted Erinoshio that what has remained the main focus of great concern in the field of science education are the biases and misconceptions about women and science, i.e. science is a male enterprise. Many researches according to Oludipe (2012) had been carried out on gender issues in science education. Abdullahi, Mlozi & Nzalayaimisi (2015) quoted Bilesanmi-Awoderu that many researchers have provided reports that there are no longer distinguishing

differences in the cognitive, affective and psychomotor skill achievements of students in respect of gender.

The research carried out by Corina (2013) on the effects of outdoor activities on the enrolment of students by gender shows, more than half of those who attempted questions related to outdoor activities in the examination papers of teacher education during the last eight years were female and outdoor courses have higher enrolment of female students as well. However, research by Gunzeli (2017) on the effect of outdoor activities on the enrolment of students by gender shows that teenage girls have less positive expectation from outdoor activities than boys.

In Nigeria, in spite of the enormous role that Basic Science plays in providing a solid foundation for the mastering of basic concepts in science and technology for national development, and the efforts of government and other stakeholders in improving science education, results in Basic Science in most certified examination bodies like the results of examination conducted by National Examinations Council (NECO) and Ekiti State Ministry of Education, Science and Technology have not been satisfactory. The broad aim and expectations of any teaching and learning programme is productivity and positive-evaluated end-product (achievement).

Hence the need for Outdoor Activities teaching strategy as it will enhance their performances because they encourage interaction among them, allows students to observe, think, reason, investigate and make conclusion on their own about what they see themselves.

RESEARCH HYPOTHESES

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

- ✓ There is no significant difference in the achievement mean scores of students taught using outdoor teaching strategy and conventional teaching method after the treatment.
- ✓ There is no significant difference in the achievement mean scores of male and female students taught in each of outdoor teaching strategy and conventional methods.

II. METHODOLOGY

The research design adopted in the study was a pretest, posttest, control group quasi-experimental. Purposive and stratified random sampling techniques was used to select a total sample of 140 public junior secondary one (JSS I) Basic science students (this sample was divided into the experimental and control groups in ratio 1:1; meaning 70 students from each group) from four Junior secondary schools in Ikere Local Government Area, Ekiti State, Nigeria. Two schools each for experimental and control groups respectively.

The treatment package used for the study was tagged: Outdoor Instructional Package (OIP). The instrument used to collect relevant data from the subjects was Basic Science Achievement Test (BSAT). The reliability of the instrument was determined through the split-half method with the reliability coefficient of 0.78.

The administration of the instrument was in three stages: the pre-treatment stage (two weeks), the treatment stage (four weeks) and the post-treatment stage (two weeks). Eight weeks altogether were used for the whole study. The experimental group was taught using guided outdoor teaching strategy while the control group was taught using the conventional method of teaching.

Two null hypotheses were tested at 0.05 level of significance. The data collected were analysed using t-test and ANCOVA statistical analysis packages.

III. RESULTS AND DISCUSSION

HYPOTHESIS 1

There is no significant difference in the achievement mean scores of students taught using outdoor teaching strategy and conventional teaching method.

GROUP	N	\bar{X}	SD	df	t_{cal}	t_{tab}	Result
outdoor teaching strategy	70	24.63	7.58	138	8.14	1.98	*
Conventional teaching Method	70	15.28	5.93				

$P < 0.05$ (Result Significant at 0.05 level). * = Significant.

Table 1: t-test analysis of achievement mean scores of students taught using outdoor teaching strategy and students taught using conventional method

As shown in table 1, when the mean scores (posttest) of students taught using outdoor teaching strategy and students taught using conventional method were statistically compared, a *t-value* ($t_{cal} = 8.14$) with $P < 0.05$ alpha level was obtained, which was significant at 0.05 level. This implies that there exists significant difference between the outdoor teaching strategy and conventional method of teaching achievement mean scores after the treatment in favour of students taught using outdoor teaching strategy. Consequently, the null hypothesis which states that there is no significant difference in the achievement mean scores of students taught using outdoor teaching strategy and conventional teaching method was rejected. As such, the conventional method of instruction can be said to be less effective compared with outdoor teaching strategy.

HYPOTHESIS 2

There is no significant difference in the achievement mean scores of male and female students taught in each of outdoor teaching strategy and conventional method.

In order to test the hypothesis, scores relating to Basic science achievement scores of male and female students taught using outdoor teaching strategy and conventional methods were computed and analyzed using Analysis of Covariance (ANCOVA) statistics at 0.05 level of significance. The result is presented in Table 2.

Source	SS	Df	MS	F _{cal}	F _{tab}
Corrected Model	967.818	4	156.221	31.172	2.98
pretest Achievement	2.225	1	2.223	.263	3.86
Sex	.342	1	.342	.036	3.86
Group	734.162	1	734.162	163.682	3.86
Sex * Group	2.431	1	2.431	.268	3.86
Error	664.234	135	5.316		
Corrected Total	1967.356	139			
Total	73161.000	140			

$P > 0.05$ (Result Significant at 0.05 level). * = Significant.

Table 2: ANCOVA showing Basic science achievement scores of outdoor teaching strategy and conventional methods by gender

Table 2 showed that the computed F-value ($F_{cal} = 0.268 < F_{tab} = 3.86$) with a P-value ($P > 0.05$ alpha level) obtained from the analysis of the difference in Basic science achievement mean scores of male and female students taught using outdoor teaching strategy and conventional methods. The null hypothesis, therefore, was not rejected. This implies that there is no significant difference in Basic science achievement mean scores of male and female students taught using outdoor teaching strategy and conventional methods.

IV. DISCUSSION

Research Hypothesis one seek to find out the effects of outdoor teaching strategy and conventional method of teaching on the performance of Basic science students in junior secondary schools in Ekiti State. It was discovered that students' taught using outdoor teaching strategy had significantly higher academic achievement than their counterpart taught using conventional method. This result is not entirely surprising as it confirms the assumptions that students' taught using outdoor teaching strategy (experimental) performed significantly better than those taught using the conventional teaching method. This was confirmed by their calculated mean academic performance in Basic science which was 24.63 and 15.28 by experimental and control group students' respectively. This outcome agreed with findings of Oyeniyi (2019) while looking at the effects of outdoor activities and Advance organizer teaching strategies on students' learning outcomes in secondary school Basic Science in Ekiti State found out that there is significant difference between pre-test and post-test mean score of students exposed to outdoor activities: that outdoor activities teaching was most effective of teaching Basic Science in Ekiti State, Nigeria.

Research Hypothesis two seek to find out the difference in the achievement mean scores of male and female students taught in each of outdoor teaching strategy and conventional method. The findings revealed that: there was no significant difference in the academic achievement of male and female students in Basic science in each of the experimental and control groups before and after the treatment. In other words, the achievement of male and female students exposed to outdoor teaching strategy did not differ significantly as female

students were found to have similar achievement in Basic science as their male counterparts in the outdoor teaching strategy and conventional methods of teaching in this study. The implication of this result is that gender was not a significant predictor of students' achievement in Basic science. This finding agreed with the findings of Abdullahi, Mlozi & Nzalayaimisi (2015) quoted Bilesanmi-Awoderu that many researchers have provided reports that there are no longer distinguishing differences in the cognitive, affective and psychomotor skill achievements of students in respect of gender.

V. CONCLUSION

This study focused on the effects of outdoor teaching strategy on Students' academic Achievement in Basic Science in Junior Secondary Schools, Ekiti State, Nigeria.

Based on the findings of this study, it can be concluded that outdoor teaching strategy is more potent in stimulating students' achievement in Basic science in secondary schools than the conventional method. It can also be concluded that the effect of teaching method on junior secondary school Basic science was also found not to vary with gender of students. This simply implies that performance of students taught using different teaching methods is not in any manner affected by their gender.

VI. RECOMMENDATIONS

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

- ✓ Since the commonly used conventional method of instruction has been empirically discovered in this study to be less effective than outdoor teaching strategy in improving junior secondary school students' academic performance in basic science, the conventional method presently in use by Basic science teachers should be improved upon or modified or replaced (as the case may be) with outdoor teaching strategy and other activity-based teaching method.
- ✓ Basic science teachers should be encouraged to adopt outdoor teaching strategy as this will expose the students to doing by themselves which is the foundation for tomorrow's scientists thereby leading to the development of our dear country, Nigeria since the needed man-power would have know the developmental rudiments right from their secondary school days.
- ✓ State and Federal Government should equip all schools with necessary facilities for the application of outdoor teaching strategy.

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