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EFFECTS OF OUTDOOR ACTIVITIES AND ADVANCE ORGANIZER TEACHING STRATEGIES ON STUDENTS' ACADEMIC PERFORMANCE IN SECONDARY SCHOOL BASIC SCIENCE IN EKITI STATE

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ABSTRACT

The study investigated the effects of Outdoor Activities and Advance Organizer teaching strategies on students' academic performance in secondary school Basic Science in Ekiti State, Nigeria. Specifically, the study was designed to ascertain the difference in the performance of students exposed to Outdoor Activities, Advance Organizer and Conventional teaching strategies. The study also investigated the difference in the performance of students exposed to those strategies based on gender. The study adopted non-equivalent pre-test post-test design. The population consisted of 12, 033 Basic Science students in Ekiti State while the sample consisted of 138 J.S.1 students (intact class size) drawn from three public secondary schools in the three Senatorial Districts of Ekiti State. The sample was selected using multistage sampling procedure. The research instrument 'Basic Science Performance Test (BSPT)' was used to collect relevant data for this study. The face and content validity of the instrument was ensured while the reliability of the instrument was determined using split-half which yielded reliability co-efficient of 0.7872. The data were analyzed using inferential statistics of t-test, Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA) and Multiple Classification Analysis (MCA), all at 0.05 level of significance. The findings of the study showed that the three groups (Outdoor Activities, Advance Organizer and Conventional) were homogenous at the commencement of the experiment. The use of Outdoor Activities and Advance Organizer teaching enhanced performance of students in Basic Science than the Conventional strategy. However, Outdoor Activities and Advance Organizer are not gender biased. Based on the findings of the study, it was recommended among others that the use of Outdoor Activities and Advance Organizer teaching strategies should be encouraged in Basic Science class in Junior Secondary Schools so as to enhance academic performance of students in Basic Science. It was also recommended that Basic Science teachers should update their knowledge so as to accommodate the use of Outdoor Activities and Advance Organizer teaching strategies.

KEYWORDS: Outdoor activities, Advance Organizer, Teaching Strategies and Academic Performance

INTRODUCTION

The importance of science and technology on the overall development of any nation is acknowledged worldwide. Science and technology education form the foundation for sustainable national development by protecting human societies from ignorance, illiteracy, disease and poverty (Onyegegbu, 2006). The teaching of science starts from nursery through primary to secondary and tertiary institutions. The knowledge acquired from the elementary stage is the basis for some courses in tertiary institutions such as medicine, biochemistry, microbiology, zoology, botany and environmental sciences, (Owolabi & Oginni, 2014).

Science education is meant to expose the learners to scientific nature (facts, principles and concepts), processes, attitudes and then equip learners with skills of professional scientist. The objectives of science curriculum as provided in the National Policy of Education according to Federal Ministry of Education (2004) include; adequate laboratory and field skills in science, meaningful and relevant knowledge, ability to apply scientific knowledge to everyday life, (Owolabi & Oginni, 2014). Knowledge in Basic Science is central and indispensable to the development of every nation. This is due to its crucial roles in child's survival, adjustment and adaptation to his/her immediate and wider environments dominated by scientific activities. Basic Science is a basic subject that lays foundation for the take-off of pure sciences (biology, chemistry and physics) in secondary school classes.

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. 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).

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).

In recent times, there have been complaints from almost all quarters of the Nigerian society that the standard of education has declined. Students' academic performances in the Junior School Certificate Examination (JSCE) conducted by Ekiti State Ministry of Education, Science and Technology and Junior NECO has continued to decline from year to year, particularly in Basic Science. In particular, reports on Junior School Certificate Examination results in Ekiti State over the years often revealed a low performance of students in Basic Science. A summary of students' performance in JSCE from 2012-2018 reveals further explanation as shown in Table 1

Table 1: Summary of trends of performance of candidates in JSCE results in Basic Science in Ekiti State (between 2012-2018)

Year	Total No Examined	Level of Passes		Failure
		50 and above (%)	40-49 (%)	0-39 (%)
2012	19,743	29.79	55.44	14.77
2013	20,716	53.41	30.20	16.39
2014	20,702	82.94	11.99	5.07
2015	18,697	55.89	29.98	14.13
2016	19,133	41.66	39.38	18.96
2017	10, 243	43.98	47.02	9.00
2018	16, 256	35.32	51.30	13.38

Source: Ekiti State Ministry of Education, Science and Technology, Ado – Ekiti. (2019).

A critical look at the analysis revealed that not very many of the candidates had up to 50% and above score in Basic Science examinations during the period of observations compared to their performance in some other subjects. In addition, a cursory look at the analysis revealed that over 40% of the candidates that were examined during the period (year 2014 exclusive) of observation scored below 50% grade level.

Researchers have given some reasons why students always perform below average in Basic Science which include methods of teaching adopted by the teachers in teaching Basic Science which is mostly conventional method, which is not recommended for

teaching Basic Science (Lakpini, 2012). This is because lecture method entails one way flow of communication from the teacher to the students and it is teacher-centered approach whereby most of the decisions are carried out by the teacher while the students remain passive listeners.

In this process, the students are denied the opportunity to develop the required manipulative skills needed in learning science (Owoeye, 2017). The use of conventional method is attributed to the fact that the school calendar in Nigeria is often interrupted by industrial actions and public holidays, and there is a need for completion and covering of the syllabus to prepare students for both external and internal examinations. Hence the use of conventional method which is less time consuming and can be used to teach large and small class size (Ashaolu, 2011).

Other factors contributing to the failure may not be unconnected to the way in which teachers introduce their lessons at the beginning, hence the need for teachers to change their pattern of introduction, psychological factors such as low self-esteem, anxiety and insufficient laboratory facilities (Olatunji, 2015). Teachers play vital role in the implementation of the curriculum; their responsibility is to ensure that science students attain national goals. Incidentally, learners have their particular characteristics which may manifest special learning needs.

Learners expect that the materials and method of instruction should be easily transferable to the real world. Thus, the task of the teacher includes, among others, to provide the materials and experiences to aid learning and meet the learner's expectation (Oludipe & Oludipe, 2010). Regular poor academic performance by majority of the students is fundamentally linked to application of ineffective teaching methods by teachers to impact knowledge to learners. Substantial research on the effectiveness of teaching methods indicates that the quality of teaching is often reflected by the achievements of learners (Elvis, 2013). Asikhia (2010) in his study clearly indicated that the teaching methods used by teacher have an impact on students' performance and that medium of instruction also impacts on students' performance.

Some hindering factors affecting Basic Science learning leading to students' poor academic performance in Basic Science have been identified. These factors were grouped into two (2) by the researcher namely: basic science teacher challenge and Basic Science students' challenge which includes teacher's teaching strategy, qualification, lack of dedication, lack of interest, lack of motivation, inadequate exposure to teaching practice, poor classroom management and control, poor computer skills, inability to communicate

effectively, lack of self-reliance and entrepreneurship, poor attitude to work; and students' lack of interest, medium of instruction, the challenges of infrastructure among others respectively. Since sense of hearing alone easily lead to forgetting, more effective learning goes on when many senses are involved. However, it could be improved upon by combining it with other more effective methods and strategies that are activity-based. The search for methods and procedures for effective teaching and learning has engendered the birth of many procedures and methods that include outdoor activities and advance organizer teaching strategies.

Basic Science outdoor teaching is the act of taking students outside the classroom to learn some Basic Science concepts and themes as they occur in natural settings. The students usually have first-hand experience in natural and technological settings. The experiences gained during outdoor lessons are perceived to be long lasting and vivid. This may discourage rote learning. 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).

Popov (2012) had used outdoor activities and found that the use of outdoor activities in the teaching of Basic Science produced many positive effects. The teaching of science subjects, and Basic Science in particular, provides the learner with understanding skills and scientific research, fostering technological and economic advancement in the society where they live thus improving the standards of living. Although there are many methods of teaching sciences in secondary schools, but according to Popov (2012), the conceptual nature of Basic Science, lends itself preferably to outdoor classroom teaching approaches.

Activity-based teaching strategy makes students active participants, aids retention of materials learnt, builds confidence, helps students to maximize their potentials and favour intrinsic motivation. Some outdoor Basic Science activities includes: environmental conservation and safety (to identify the various types of human activities that affect environmental balance; to distinguish between biodegradable and non-biodegradable materials), drug abuse (states the medical uses and the "side effects" of drugs), environmental pollution [identify the various types of pollution (water, air and soil), list their causes, ways of reducing their risks and how each type can be controlled], resources from non-living things [identify the types (soil, solid minerals & skill acquisition) as well

as for example; identify types of soil, describe the components of soil, distinguish between soil types based on composition, list the uses and importance of soil.

All these concepts are typical examples of Basic Science outdoor activities. Basic Science needs to offer children appropriate contexts for understanding about how they learn and about science itself. The classroom is not ideal for this; in fact, it suggests that the school classroom offers only a sanitized version of science and one in which many children have limited opportunities to develop independence and to use and apply their science in a range of real-life context (Bilesanmi-Awoderu & Oludipe, 2012).

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).

An Advance Organizer is a statement of inclusive concepts to introduce and sum up material that follows. Ausubel as quoted by Samuel, Anthony and Zachariah (2013) defined an Advance Organizer as a cognitive instructional strategy used to promote learning and retention of new information. This teaching was first introduced and used by

Ausubel in 1960. Every experienced teacher and developer of instructional materials knows that the way instructional material is introduced to a student influences student motivation and learning. Such introduction provides a perspective of what lies ahead and serves as a framework on which subsequent learning could be based. In addition, such introductions suggest to the learner that which is important or essential within the material. In designing instructional materials, thought and care should be given to choosing the best way of preparing students for, and introducing them to, new and different learning materials. These introductions have been termed Advance Organizer Ausubel as quoted by (Samuel et al, 2013).

An Advance Organizer is information that is presented prior to the learning that could be used by the learner to organize and interpret new incoming material, Mayer, as quoted by (uzZaman, Chouhury & Qamar, 2015). Mayer further explains Ausubel's theory in terms of his assimilation encoding theory. He emphasized that if the learner already had previous knowledge of the content to be learnt, the Advance Organizer would not be as effective as when the student is new to the content material. Hence Advance Organizer is effective for new learning. Results of several studies have revealed the efficacy of using Advance Organizer in teaching students. It is very easy for teachers to learn how to use Advance Organizer in their classrooms with minimal training, and is easy for students to show interest in using Advance Organizer.

The use of Advance Organizers has been argued by researchers to link previous knowledge with the new learning. Some researchers believed that the gap between prior knowledge and new learning can be closed and students are able to understand better and retain more when organizers are used. The use of Advance Organizers is not a teaching method on its own but a teaching strategy needed to help clarify the science concepts the students are trying to attain. Studies have revealed that Advance Organizers favours higher achievement and retention abilities and facilitate acquisition of more scientific concepts.

Advance Organizer is a tool or mental learning aids that help students integrate new information with their existing knowledge. They are devices that activate relevant schemes or conceptual learning patterns to enable new information more readily subsumed into the learners existing cognitive structures. Mayer opined that giving students a diagram before listening to a passage leads to better retention of materials; recall was enhanced for conceptual information in the lesson. Advance Organizer is used to provide support for new information. Teachers are to start with a "Big picture" of the incoming content. Ausubel as quoted by Samuel et al, (2013). Advance Organizer takes different forms such

as cards, maps, descriptions with pictures, flowcharts, story maps, Venn-diagrams and questions, orals and visuals (Owoeye, 2017).

Studies have shown that learning outcome is a generic name which could be used for both performance and attitude or achievement and attitude. In other words, outcome measures the general statement which provides for both academic performance/achievement and attitude. Learning outcome also provide for measurement of specific actions designed to achieve future behaviour. However, learning outcomes are more of curriculum content than measurement. Academic performance on the other hand according to the Encyclopedia (2013) is an act or a process of display in the level of understanding knowledge of what has been learnt as a student especially while studying in schools irrespective of the schools physical beauty or magnificence. It is of great benefit to know that the student's academic performance also depends on the teaching methods adopted by the class teacher. Academic performance of a student can be regarded as the observable and measurable behavior of a particular student in a particular situation. It consists of scores obtained from a teacher-made test, first term examination, and mid-semester test.

Gender has attracted the attention of many researchers. Gender was explained as the trait of male and female found in a person and obviously why there were combinations of both in most human beings. Gender difference is one of the factors interacting with learning and many researchers have focused on studies relating to its effects on students' performance. Gender issues in science have gained more increasing emphasis on ways of increasing manpower for technological development as well as increasing the population of females in science. It has been observed that there is gender inequality in science, technology and mathematics. Some studies reported that there is no significant effect of gender on students' academic achievement.

Bilesanmi –Awoderu as quoted by Oludipe (2012) carried out a study on the concept-mapping, students' locus of control, and gender as determinants of Nigerian high school students' achievement in Biology using Analysis of Covariance to analyze the data collected, she found that there was no significant main effect of gender on students' achievement in Biology. Dania (2014) observed that gender has significant influence in science achievement while Babajide (2010) found that gender has no significant influence on achievement in science.

Hence the need for Outdoor Activities and Advance Organizer teaching strategies 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:

1. There is no significant difference in the performance of students exposed to outdoor activities, advance organizer and conventional strategies.
2. There is no significant difference between the pre-test and post-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies.
3. There is no significant difference in the post-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies.
4. There is no significant gender difference in the academic performance of students exposed to outdoor activities.
5. There is no significant gender difference in the academic performance of students exposed to advance organizer.

METHODOLOGY

This study adopted non-equivalent pretest, post – test design using 3 x 2 x 2 factorial design with two experimental groups and one control group. The treatment that was applied to the experimental group 1 is the outdoor activities while advance organizer was applied to experimental group 2. The teacher in each group uses these strategies to teach students and determine the effect on students' performance in Basic Science subject.

The population for this study consisted of all 12,033 co-educational public junior secondary one (JSI) Basic Science students across the sixteen local government areas of Ekiti State. As at the time of this study, Ekiti State had a total of 191 public secondary schools. *(**Source**: Ekiti State Ministry of Education, Science and Technology, Ado, 2018)*

The sample for the study consisted of 138 junior secondary one (JSI) Basic Science students who were selected from three co-education public secondary schools across the sixteen LGAs of Ekiti State using multistage sampling procedure. At the first stage, three LGAs were selected from the sixteen LGAs using simple random sampling technique. The second stage involved the selection of three towns out of the three LGAs earlier selected using simple random sampling technique. The third stage is the selection of three co-

educational public secondary schools in each of the towns selected using simple random sampling technique. The last stage involved the selection of three intact JSI Basic Science class from each of the schools selected for the study.

The instrument titled: "Basic Science Performance Test (BSPT)" was used for this study. The research instrument was certified by professionals in Psychology, Test and Measurement and those in the field of Basic Science for face and content validities. The reliability of the validated BSPT instrument was ensured through split-half method. This was carried out on a selected secondary school which was not included in the main study. The instrument was administered on 26 JSI Basic Science students outside the experimental group. The reliability of the instrument was determined by split-half procedure with the reliability coefficient of 0.78.

The experimental procedure was in four stages namely: pre-treatment stage, treatment stage, post-treatment stage and retention stage. At pre-treatment stage, the schools were randomly selected and assigned to experimental and control groups respectively. The two research instruments were administered on Basic Science students in the selected school by the researchers, with the help of the Basic Science teachers in the school, who were trained to be the research assistants. The responses from the students were scored and analyzed using One –Way Analysis of Variance (ANOVA) in order to ensure that the groups were homogenous. The pre-treatment stage lasted a period of one week.

At the treatment stage, students in the experimental group 1 were taught using outdoor instructional package; students in the experimental group 2 were taught using pictorial advance organizer package while students in the control group were taught using conventional method of teaching (i.e. within the classroom). The students in the experimental groups were guided in the use and practice of the methods. Three separate lesson notes (one for each group) were prepared in form of packages for each of the selected topics. The topics that were taught are types of human activities that affect environmental balance; ways in which a community/school can dispose refuse; concept of biodegradable and non-biodegradable materials; classification of materials found in refuse dump site into biodegradable and non-biodegradable materials and the need for environmental sanitation. The treatment stage covered a period of four weeks.

The post-treatment stage involved the re-arrangement and administration of BSPT items on the students. This is done in order to determine the effects of teaching strategies used in the study. The study from pre-treatment stage to post-treatment stage lasted for six

weeks: the first week for pre-test, followed by four weeks for treatment and the last week for post-test. The retention was measured by administering the BSPT on the students two weeks after the whole exercise thereby making a total of eight weeks altogether.

The responses of the students to the research instrument were collated and analyzed using the appropriate inferential statistics using One-Way Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA) and t-test. All the hypotheses were tested at 0.05 level of significance.

RESULTS AND DISCUSSION

Hypothesis 1: There is no significant difference in the performance of students exposed to outdoor activities, advance organizer and conventional strategies.

Table 2: Analysis of Variance (ANOVA) for difference in pre-test mean score of students in experimental and control groups

Groups	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Between Groups	1.298	2	.649	1.02	.36
Within Groups	85.804	135	.636		
Total	87.101	137			

P > 0.05

The result presented in Table 2 showed that F-cal value of 1.02 is not significant because the P value (0.36) > 0.05. Hence, the null hypothesis is not rejected. This implies that there is no significant difference in the pre-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies. The students in the groups are homogeneous at the commencement of the study.

Hypothesis 2: There is no significant difference between the pre-test and post-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies.

Table 3: Analysis of Covariance (ANCOVA) for Pre – test and Post – test Mean Scores of Students under the Groups

Source	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Corrected Model	6203.374[a]	3	2067.791	466.13*	.00
Intercept	534.945	1	534.945	120.59*	.00

Pre-test	1.915	1	1.915	.43	.51
Groups	6106.292	2	3053.146	688.26*	.00
Error	594.430	134	4.436		
Total	**62841.000**	**138**			
Corrected Total	**6797.804**	**137**			

a. R Squared = .913 (Adjusted R Squared = .911) * P < 0.05

The result presented in Table 3 shows that there is a significant difference in the pre – test and post – test mean scores of students in the groups (outdoor activities, advance organizer and conventional strategies) as P= 0.00<0.05. There is a strong evidence to reject the null hypothesis which states that there is no significant difference between the pre-test and post-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies. This result led to the rejection of the null hypothesis. By implication, there is significant difference between the pre-test and post-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies. In order to find out the most probable effective strategy, Multiple Classification Analysis (MCA) was carried out. The result is shown in Table 8.

Table 4: Multiple Classification Analysis (MCA) of students' performance in Basic Science by treatment

Grand Mean = 19.34					
Variable + Category	N	Unadjusted Dev'n	Eta^2	Adjusted for Independent + Covariate	Beta
Experimental (Outdoor Activities)	50	8.38	.88	8.31	.08
Experimental (Advance Organizer)	51	0.27		0.22	
Control	37	-8.66		-8.72	
Multiple R					.956
Multiple R^2					.914

The result in Table 4 shows the Multiple Classification Analysis (MCA) of students' performance in Basic Science by treatment. It reveals that, with a grand mean of 19.34, students exposed to outdoor activities had highest adjusted mean score of 27.72(19.34+8.38) than their counterparts in advance organizer and conventional group with advance organizer having 19.61(19.34+0.27) and conventional group 10.68(19.34+(-

8.66)). This means that outdoor activities strategy was the most effective strategy of teaching Basic Science in Ekiti State, Nigeria. Followed by advance organizer strategy and the least was conventional strategy. The treatment explained about 88% ($Eta^2 = 0.88$) of the observed variance in students' performance in Basic Science. The three treatment strategies accounted for 91.3% ($R^2 = 0.913$) contribution to academic performance of the students in Basic Science.

Hypothesis 3: There is no significant difference in the post-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies

Table 5: Analysis of Variance (ANOVA) for difference in post-test mean score of students in experimental and control groups

Groups	**Sum of Squares**	**df**	**Mean Square**	**F**	**P**
Between Groups	6201.459	2	3100.730	701.94*	.00
Within Groups	596.345	135	4.417		
Total	6797.804	137			

* P < 0.05

The result presented in Table 5 showed that F-cal value of 701.94 is significant because the P value (0.000) < 0.05. Hence, the null hypothesis is rejected. This implies that there is significant difference in the post-test mean score of students exposed to outdoor activities, advance organizer and conventional strategies. In order to investigate the source of the differences observed, Post – hoc analysis (Scheffe) with mean difference was carried out.

Also, a significant difference was found between the performance of students exposed to outdoor activities strategy and advance organizer strategy in favour of students exposed to outdoor activities strategy. Also there was significant difference between the performance of students exposed to outdoor activities strategy and conventional group in favour of students exposed to outdoor activities strategy. Furthermore, there was significant difference between the performance of students exposed to advance organizer strategy and conventional group in favour of students exposed to advance organizer strategy.

Table 6: Scheffe Post – hoc analysis and mean for observed difference in the performance of students in the groups

Groups		**Outdoor Activities**	**Advance Organizer**	**Control Group**
	Mean	27.72	19.61	10.68
Outdoor Activities	27.72			
Advance Organizer	19.61	*		
Control Group	10.68	*	*	

* P < 0.05

On Table 6, the result of post – hoc analysis showed that, of all students exposed to outdoor activities, advance organizer and conventional, the performance of students exposed to outdoor activities was the highest. Their performance in Basic Science was significantly better than those exposed to advance organizer and conventional strategies. Again, the performance of students in Basic Science exposed to advance organizer strategy was better than those in conventional group, implying that the performance of students in Basic Science exposed to conventional strategy was the least.

Hypothesis 4: There is no significant gender difference in the academic performance of students exposed to outdoor activities

Table 7: t-test analysis for gender difference in the academic performance of students exposed to outdoor activities

Variations	**N**	**Mean**	**SD**	**Df**	**t_{cal}**	**p**
Male	19	27.84	1.07	48	0.67	0.51
Female	31	27.65	0.98			

P>0.05

Table 7 shows that the t-cal value of 0.67 is not significant because the P value (0.51) > 0.05. This implies that null hypothesis is not rejected. Hence, there is no significant gender difference in the academic performance of students exposed to outdoor activities.

Hypothesis 5: There is no significant gender difference in the academic performance of students exposed to advance organizer.

Table 8: t-test analysis of gender difference in the academic performance of students exposed to advance organizer

Variations	N	Mean	SD	Df	t_{cal}	p
Male	30	19.63	2.85	49	0.07	0.94
Female	21	19.57	3.43			

P>0.05

Table 8 shows that the t-cal value of 0.07 is not significant because the P value (0.94) > 0.05. This implies that null hypothesis is not rejected. Hence, there is no significant gender difference in the academic performance of students exposed to advance organizer.

Discussion

The findings of the study revealed that students' performance in Basic Science in both experimental and control groups before the commencement of treatment did not differ statistically. This implies that there was no significant difference in the pre-test mean scores of the students in the experimental groups (Outdoor Activities and Advance Organizer Strategies method group) and Control group (Conventional method group). This established the homogeneity of the three groups involved in the study prior to the experiment. In other words it could be said that the knowledge baseline for the groups involved in the study was equal.

The findings of the study showed that there was significant difference in the performance mean score of the groups after treatment. This implies that there was improvement in the performance of the students resulting from their exposure to the treatments. The implication is that the use of Outdoor Activities and Advance Organizer teaching strategies enhanced students' performance in Basic Science. The findings of the study also revealed that there was significant teaching effect on students' performance mean scores in the three groups. This assertion aligned with Asikhia (2010) and several others who were of the opinion that the use of the conventional method to teach Basic Science in school contribute very little to real learning.

The study further found out that there was significant difference in the performance of the students exposed to Outdoor Activities and Advance Organizer Strategies. This implies that students exposed to Outdoor Activities performed better than those exposed to Advance Organizer. This is in agreement with Ochu and Haruna (2014)

that students are better equipped with the necessary introductory scientific and technological knowledge and skill necessary to build a progressive society which forms the bedrock of scientific and technological studies and that where students attended an outdoor activities made greater cognitive gains than the other groups as it increases their motivation to learn and in addition, pupils were involved in planning, carrying out and evaluating investigations which equally leads to higher performance.

The findings from this study further revealed that gender has no significant effect on retention mean scores of students in Basic Science. This implies that male students are found to be as good as their female counterparts in retention in the three groups in this study. This is in agreement with the findings of Oludipe (2012) and Babajide (2010).

Conclusion

Based on the findings of this study, it was concluded that, the three groups (outdoor activities, advance organizer and conventional) were homogeneous at the commencement of the experiment. The use of outdoor activities enhanced better performance of students in Basic Science than advance organizer and conventional strategies. Outdoor activities and advance organizer strategies are not gender biased.

RECOMMENDATIONS

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

- The use of outdoor activities strategy should be encouraged in Basic Science class in secondary schools so as to enhance better academic performance of students in Basic Science.
- The use of advance organizer strategy should be encouraged in Basic Science class in secondary schools so as to enhance better academic performance of students in Basic Science.
- During Basic Science classes, there should be no discrimination between male and female students

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