

EFFECTS OF OUTDOOR ACTIVITIES ON BIOLOGY STUDENTS' ATTITUDE TO THE ENVIRONMENT

Dr Alice M Olagunju

Department of Teacher Education,
University of Ibadan – Nigeria
amolagunju@yahoo.com

Omolola O Oloyede

Department of Teacher Education,
University of Ibadan – Nigeria
oloyedelol@yahoo.com

ABSTRACT

The teacher's use of lecture method has been observed to be ineffective in bringing about the right attitude towards the environment and environmental problems. The purpose of this research is to find out what are the effect of outdoor activities and the influence of gender on secondary school students' environmental attitude to Biology. Outdoor activities are educational activities that occur outside the regular classroom activities to create awareness about the environment. The aim is for students to notice the environmental problems caused as a result of a negative attitude towards the environment and the need for a positive attitude instead. The study was carried out using a pre-test, post-test, and a control group. A quasi-experimental design data analysis was undertaken using descriptive statistics and inferential statistics such as analysis of covariance (ANCOVA). The outdoor activities had a significant effect on students' environmental attitude ($F=5.067$ $P<0.05$). Gender also played a significant role in the attitude of students to the environment ($F=6.939$, $P<0.05$). Outdoor activities were observed to have brought about significant attitudinal change in the students. Therefore, outdoor activities are recommended for teaching and learning environmental education in Biology for both genders.

Keywords: Attitude to environment; environmental concepts; environmental education; environmental problems; gender; outdoor educational activities.

INTRODUCTION

Environmental education (EE) is generally concerned with the development of the necessary motivation to make informed decisions about environmental issues. It is a learning process that increases an individual's awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations and commitments to make informed decisions and take responsible action (UNESCO's Tbilisi Declaration, 1978).

Teaching at any formal level of education should never be deemed a totally "talk-and-chalk" affair. Today, effective and meaningful teaching should be a process in which both the teachers and learners are actively engaged. If this process is to be fully realised, each significant step should be backed up with learning resources that are designed to make teaching easier and learning more meaningful (Ayodele, 2001, as cited by Orenuga, 2006).

Environmental education requires a "student-initiative education" in the sense that it is fundamentally oriented towards problem-solving. The inadequate environmental ethics, ignorance and inadequate environmental awareness, knowledge and skills in pupils and students in particular, can only be remedied through such education (Ogueri, 2004). There is thus a need for a methodology that will make the students functional in environmental education. The need is to have environmentally conscious and literate citizens who are concerned about saving the environment from disasters. It may happen only when people are knowledgeable about their environment and associated problems, are aware of the solutions to these problems and are motivated to work towards these solutions. This naturally means a change in attitude and behaviour of the public (Above, 2001). The more we learn, the better we realise the worth of our environment.

The *Oxford Advanced Learner's Dictionary* defines "gender" as "the fact of being male or female." Much research on factors that affect the performance of students in science and science-related subjects has been carried out. Among the factors that have received attention are learner characteristics, such as gender.

Attitude is a way of life or a human behavioural pattern that can always serve as a direction towards human endeavour (Afuwape, 2003). An attitude is a hypothetical construct about a mental state that is inferred from verbal reports and behavioural observation. As a concept, attitude takes its reality from our own introspection.

Attitude has been useful in understanding the behaviour of others. Attitudes are based on values, have horizontal and vertical structure and range from general to specific. Attitudes towards the environment are fundamentally important, widely discussed, frequently measured and poorly understood. They are conceptualised in terms of attitude theory as being composed of beliefs and affective components towards an object. Environmental concern appears to be a specific belief that is largely embedded in cognitive structure and should be considered as an opinion rather than an attitude.

Although the issue of gender and achievement in science is an important area that has involved a lot of research, available results have not yielded a conclusive trend in performance (Bilesanmi-Awoderu, 2002). For instance, Raimi (2002) has found a significant gender group difference (in favour of boys). In addition, female students have demonstrated better performance than their male counterparts as revealed in the study of Bilesanmi-Awoderu (1998). Some studies do not establish such differences or, at most, determine gender group differences to some levels of education and some science topics only (Raimi & Adeoye, 2002). According to Owoyemi (2007), students' achievement in physical chemistry courses has nothing to do with attitude or whether the student is male or female. In their separate research works, Ogunleye (2002) and Olatundun (2008) reveal in their findings that females display more verbal commitment to the environment than their male counterparts. Raimi and Adeoye's (2002) research results show that no significant influence of gender and/or effect of ability existed on science students' attitude to the environment.

The results of research that focus on gender and students' achievement in science and science-related subjects are thus conflicting. The present study is thus concerned with the influence of gender on the learning outcomes of environmental education. More studies on this influence can bring about a resolution of the conflicting nature of the subject.

RATIONALE FOR THIS STUDY

The study would perceive how much environmental change can be achieved through outdoor educational activities, especially when a holistic view of environmental problems and issues is portrayed to students through this method.

The study would enhance the utility of knowledge and skills acquired through the formal education system for better living and sustenance of the environment in the process of harnessing it for survival. This would help to remove purely cognitive achievement and eventually lead to a systemic change in society.

It may eventually bring about new educational policy or curriculum changes, especially in the areas of teaching methods and material for teaching, which would stimulate participatory learning by students.

STATEMENT OF THE PROBLEM

It has been observed that students exhibited poor knowledge of, negative attitudes towards and harmful practices to a healthy environment. This is evident in the way they sometimes litter.

Teaching science for utility is one of the goals of science education. A situation where students who are exposed to years of science instruction are still unable to tackle simple problems in their environments is highly undesirable. This occurs because such students have not grasped the vision of science application purposes (Ige, 2003).

Therefore, there is a need for a methodology of teaching that will lead to the acquisition of knowledge as well as its application to everyday life activities, especially those related to solving of problems in the environment and the development of a positive attitude towards the environment. The problem this study seeks to address is to determine the effect of using another teaching strategy (outdoor educational activities) on secondary school students' environmental attitude. It is to reveal how outdoor activities could bring about functional and holistic environmental education and an all-round national development and systemic change in education.

HYPOTHESES

The following null hypotheses were tested at 0.05 levels of significance.

Ho 1: There is no significant main effect of outdoor activities on students' attitude to the environment.

Ho 2: There is no significant main effect of gender on students' attitude to the environment.

METHODOLOGY

This study adopted a pre-test, post-test, control group and a quasi-experimental design using a 2x2x2 factorial matrix, which is represented below.

Table 1: The 2x2x2 factorial matrix

Treatment	School location	Gender	
		Male	Female
Experimental	Rural		
	Urban		
Control	Rural		
	Urban		

The researcher used 240 Senior Secondary School Two (SS II) students from four selected secondary schools in urban and rural areas of the Akinyele and Ibadan North local government areas of Oyo State, Nigeria, respectively. Two schools from the urban and two schools from the rural areas were randomly selected from all the secondary schools in the area.

The random sampling technique was used to assign the schools to experimental and control groups for the study. That is, two out of the four schools were randomly assigned as the experimental groups and the other two as the control groups. Intact classes were used. The biology teachers (one from each of the schools) were involved in the study.

Instruments

Four instruments, constructed by the researchers, were used for data collection in this study. These are as follows:

- Students' Environmental Attitude Scale (SEAS)
- Instructional Guide for Teaching with Outdoor Activities(IGTOA)
- Instructional Guide for Teaching with Conventional Method (IGTCM)
- Evaluation Sheet for Assessing Teachers (ESAT)

Students' Environmental Attitude Scale (SEAS):

This instrument consists of 14 positive items and six negative items with responses of "true" or "false" to be chosen by the students. Each item was designed to test the students' sense of responsibility towards the environment and how they as students could, through their attitude, show how much of the environmental education ethics have been inculcated in them, in order to conserve natural resources and solve environmental problems around them. The instrument was also trial-tested and the Cronbach Alpha measure was used to ensure its reliability. The reliability coefficient obtained for the scale is 0.82. This gave the indication that the items in the instruments were reliable.

Instructional Guide for Teaching with Outdoor Activities (IGTOA):

This is an instructional guide for teachers participating in the experimental group. It contains the statement of topic, objectives and the procedures expected to be followed by the teachers in teaching environmental education concepts during outdoor activities. This was prepared and used for the training of teachers to ensure uniformity in the teaching method.

Instructional Guide for Teaching with Conventional Method (IGTCM):

This is an instructional guide for teachers participating in the classroom using the conventional or lecture method of teaching. It contains the statement of the topic, objectives, instructional material and the procedures expected to be followed by the teachers in teaching the environmental concepts in the classroom. This was prepared and used for the training of teachers to ensure uniformity in the teaching method utilised in all the classes used as control groups.

Evaluation Sheet for Assessing Teachers (ESAT):

This instrument was designed to be used in evaluating the teachers' effective use of the instructional guides during the teaching process. It shows their presentation of concepts, mastery of the topics, use of materials and activities as directed, and how effective their presentation would be for the mastery of concepts by the students.

PROCEDURE FOR DATA COLLECTION AND ANALYSIS

In carrying out this research, the action plan was set out as follows:

- Two weeks for the training of teachers/scrutiny
- One week for the pre-test
- Eight weeks for the treatment
- One week for the post-test
- Total = 12 weeks

The researcher took time to train the teachers on the use of the provided teacher's guide in order to ensure uniformity. The areas of disparity of ideas were discussed and the reason why the guide should be used as expected was explained. The teachers were trained to teach with the instructional guides (IGTOA) in the experimental groups.

For a pre-test, the SEAS instrument was administered to the students to test their attitudes on environmental issues and concepts in Biology to compare the likely effect of the treatment on them.

The students in the environmental group were exposed to outdoor activities. The outdoor educational activities in this study included field trips and excursions. The experimental group visited illegal dumping sites in the markets and environment near their school. They went on excursions to rivers and streams where domestic waste was being dumped. This was to enable them observe the effects of human activities on the environment, so that they can suggest solutions to the problems. The experimental group also used the lecture method, as well as charts, pictures, field trips and excursions. These were used to enhance students' understanding of the concepts they were taught.

In the control group, the students were subjected to the conventional method of teaching and the outdoor activities by their Biology teachers. The conventional method involved the use of lecture method and various teaching materials such as charts, pictures etc.

For the post-test, the test (SEAS) was again administered on the subjects after the various treatments with the help of their Biology teachers in the school. The students' scripts were collected and marked. The scores were used to determine the extent of the effect of treatment (outdoor educational activities and lecture method) on students' attitudes to environmental education.

PROCEDURE FOR DATA ANALYSIS

Data collected were analysed using descriptive statistics of frequency counts, means, percentages and standard deviation. In addition, inferential statistics, such as analysis of covariance (ANCOVA), were also used. The hypotheses were tested at 0.05 level of significance. Multiple classification analysis (MCA) was also used to determine the magnitude of the differences of the various groups.

RESULTS

The results of this study and the summary in the tables are presented below using the research hypotheses as guide.

Table 2: Descriptive statistics of post-test attitude towards environmental education according to treatment, gender and school location

				N	Mean	Deviation
	Male	Location	Urban	24	18.42	1.349
			Rural	29	17.79	1.841
			Total	53	18.10	2.441
	Female	Location	Urban	36	17.86	1.807
			Rural	31	14.90	2.700
			Total	67	16.49	2.693
	Total	Location	Urban	60	18.08	1.650
			Rural	60	17.05	2.418
			Total	120	17.37	2.362

				N	Mean	Deviation	
Treatment	Gender	Male	Location	Urban	35	17.89	2.720
				Rural	24	15.90	2.568
				Total	59	16.90	2.384
		Female	Location	Urban	25	17.40	1.472
				Rural	36	16.59	2.645
				Total	61	16.50	2.264
		Total	Location	Urban	60	17.68	2.281
				Rural	60	15.38	2.662
				Total	120	16.73	2.589
	Gender	Male	Location	Urban	59	18.10	2.264
				Rural	53	16.75	2.441
				Total	112	17.46	2.434
		Female	Location	Urban	61	17.67	1.680
				Rural	67	15.79	2.777
				Total	128	16.69	2.496
		Total	Location	Urban	120	17.88	1.992
				Rural	120	16.22	2.667
				Total	240	17.05	2.493

Table 2 presents the descriptive statistics of students with respect to their attitude to the environment. It comprises the mean score, standard deviation and numbers of students involved in the research. A detailed study of the table reveals that, with respect to attitudinal disposition towards the environment, the experimental groups' performance was better than that of the control group. Furthermore, male students performed better than their female counterparts, and urban students performed better than students in the rural area. For further statistical clarification, the analysis of covariance – an inferential statistical method – was used to test the hypotheses in order to show whether the difference in the mean scores was significant or not. It was also used to make up for the initial differences that may have existed between the groups, since intact classes were used.

Ho1: There is no significant main effect of outdoor activities on students' environmental attitudes

Table 3: Summary of 2x2x2 ANCOVA of post-test attitude scores according to treatment, gender and school location

		Type III sum OF square	d	Mean square	F	Sig.
Source	Corrected model	394.443	8	38.055	7.444	.000*
	Intercept	929.712	1	929.712	181.856	.000
	ATTI_PRE	4.971	1	4.971	.972	.325
	TREATMENT	25.907	1	25.907	5.067	.025*
	GENDER	35.472	1	35.472	6.939	.009*
	LOCATION	120.434	1	120.434	23.557	.000*
	TREATMENT * GENDER	.064	1	.064	.012	.911*
	TREATMENT * LOCATION	71.811	1	71.811	14.046	.000*
	GENDER * LOCATION	5.020	1	5.020	.982	.323
	TREATMENT * GENDER* LOCATION	.238	1	.238	.046	.830
	Error	1180.957	231	5.112		
	Total	71254.000	240			
	Corrected Total	1485.400	239			

a.R squared = .205 (adjusted R squared = .177

The result of the 2x2x2 analysis of covariance in Table 3 reveals that outdoor activities have a significant effect on students' attitude to the environment ($F=5.067$ $P<0.05$). The hypothesis was therefore rejected. This means that the experimental group scored higher ($x=17.37$) than the control group ($X =16.73$), as shown in the mean scores in Table 4. This shows that students in the experimental group had a better attitude towards the environment than those in the control group.

Table 4: MCA on post-test attitude scores by treatment, gender and school location

Treatment + category		N	Adjusted for factors and co-variates	Unadjusted	Adjusted for factors and co-variates	Eta	Unadjusted	Beta
Treatment	Outdoor activities	120	17.37	17.37	0.317	0.127	0.322	0.129
	Conventional method	120	16.73	16.73	-0.317		-0.322	
Gender	Male	112	17.46	17.38	0.414	0.156	0.334	0.125
	Female	128	16.69	16.76	0.363		-0.292	
Location	Urban	120	17.88	17.80	0.833	0.335	.755	0.303
	Rural	120	16.22	10	-0.833		-0.755	

Grand mean = 17.05

Table 4 shows the results of the MCA on the post-test scores of attitude to the environment by gender, treatment and school location. The table revealed that the experimental group had a higher unadjusted mean ($X = 17.37$) than the control group ($X = 16.73$). The treatment is observed to have contributed 1.7% to students' predisposition towards the environment.

Ho 2: There is no significant main effect of gender on students' environmental attitudes

The results from Table 3 reveal that there gender had a significant influence on the students' attitudes ($F = 6.939, P < 0.05$). The hypothesis was therefore rejected. Table 2 shows that males had a higher attitude mean score ($x = 17.46, SD = 2.434$) than the female students ($x = 16.69, SD = 2.496$). The males are therefore more positively disposed towards the environment than their female counterparts. The results in Table 4 further show that gender accounted for 1.6% of the total variance in students' attitude scores, as given by the Beta value of 0.125.

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

The results of the analysed data revealed that outdoor educational activities had positive effects on the students' attitudes towards the environment. The effect of outdoor activities on attitude was significant. This, in a way, was in line with the findings of Olatundun (2008), Martins (2002), Stine (1997) and Knapp (1996).

The study has provided students with the opportunity to build attitudes based on their experiences encountered in the environment. This approach towards solving environmental issues and problems is a step in the right direction for future sustainable development and could bring about change in peoples' attitudes. This shows that the better an individual learns, the better he/she realises the worth of his environment and the better his repertoire of behaviour towards the environment.

Gender, which is the moderator variable in this study, was investigated to determine the influence it exerted on students' environmental attitudes. The results of the analysis of data revealed that gender had a significant main effect on students' environmental attitude. The male students performed better than their female counterparts. This is in line with the findings of Oyedeji (1996), Balogun (1994), Raimi (2002), who showed a significant gender group difference (in favour of boys). This stands, however, in contrast to the findings of Ogunleye (2002) and Olatundun (2008), whose research revealed a significant gender group difference (in favour of the girls). This finding further lends credence to the fact that the boys are more predisposed to the learning of science-oriented subjects/topics than the girls.

The present study was necessary to find a way of bringing about functional and holistic environmental education and an all-round national development and systematic change, and an acquisition of attitude for utility, especially towards the environment, which has been observed to play a vital role in all facets of life.

The outdoor activities were seen to be effective in achieving this. Thus, students are expected to make maximum use of outdoor activities as an opportunity to improve their attitudes towards the environment. Based on the findings of this study, the recommendations below are considered as appropriate for the following role-players:

1. Curriculum planners: The results of this study have shown the need for curriculum planners to include outdoor activities as one of the methods required in the curriculum, especially the student/teacher activities, to bring about effective environmental attitudes.
2. Teachers and students: Outdoor activities have been observed to have brought about significant attitudinal change in students. Therefore, outdoor activities are recommended for the teaching and learning of environmental education concepts such as pollution, erosion, desertification, deforestation, conservation of matter and energy, overpopulation and even ecological topics in Biology.

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