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ABSTRACT

The paper investigated the differences in environmental attitude of science students as a result of their different age groups, class levels and major field of study. A survey approach was used to gather data from 620 science students from 51 secondary schools in Niger State, Nigeria. The instrument used was adapted from the Attitude Scale developed in Nigeria by Ato and Wilkinson (1979). It was revalidated and a reliability coefficient of 0.83 was determined through split-half method. Three hypotheses were tested using two-way analysis of variance statistic and all of them were found to have significant differences. Therefore, it was recommended that a separate Environmental Education Subject Curriculum should be developed and studied as science subject instead of the continuation of the infusion approach. This is hoped will ensure the sustainability of EE in schools in Nigeria and the third world for the purpose of environmental sustainability.

BACKGROUND TO THE STUDY

In the last two decades the world has witnessed wide spread increases in global climate change and other serious environmental problems. This issue has been the concern and focuses of the international community and is in the front burner of public discourse. Environmental problems and global climate change occurs due to man's uncontrolled exploitation of environmental resources and the attendant effects of his activities. Adefolalu (2002) observed that human activities have resulted in increased emission of green house gases (GHG) from burning of forest and other forms of deforestation which drastically affect the natural composition of the atmosphere. This would have increased the earth temperature between 1^{0c} and 2^{0c} by the year 2025-2050. Hence, if this is not checked it may result in increased severe flood landslide, desertification with severe loss of lives and properties. Nigeria has responded to the global appeal to reduce environmental degradation through various actions.

Niger State was created in 1976 from the old Niger Province of North-Western State of Nigeria. It is geographically located between latitude 8° 20''N and 11° 30''N and longitude 3° 30''E and 7° 20''E. The state has a total land area of 76,000 square kilometers which is approximately about 9% of Nigeria's land mass.

This study is focused on the attitudinal differences of secondary school science students' on the concept of natural environment even though there are other aspects that may reflect the different weight given to environment to include;

- a. The natural environment
- b. The built and man-made environment
- c. The social and cultural environment
- d. The spatial and temporal environment (O'Riordan, 1981)

The natural environment has been suffering sustainable degradation ranging from deforestation, desertification, flood, bush burning, deposition of toxic materials, pollution, over-grazing, illegal mining activities, over population and urbanization. All these factors contribute to climate change which is fast ravaging the ecosystem and becoming a global menace (Timothy and Doug, 1998).

The natural environment of Niger State is not exempted from these problems listed above. The state has suffered from flood conditions as a result of overflows of its dams in Kainji, Jebba and Shiroro towns. Of recent, flooding has become a seasonal recurring experience in the state leading to the creation of Niger State Environmental Protection Agency (NSEPA). This agency sensitize people about the dangers of flooding and environmental degradation so as minimize lost of crops, animals and human lives. Nevertheless, 290 villages; 60, 273 people; 2,321 houses were destroyed in six local governments areas of Agaie, Lapai, Katcha, Lavun, Edati and Shiroro in the 1990's (Fourth Quarterly Report, 2000).

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More than 200,000 people were displaced and properties worth several millions of naira were lost. Farm lands of about more than 50,000 hectares of cultivated rice, maize and others crops were submerged and wash away by flood. 2000 heads of cattle and goats, 20 villages and 1000 residential homes and properties worth millions of naira were destroyed (NSEPA, 2010).

The foregoing environmental disasters posed serious threats to the natural environment. The solution to these problems lies in the understanding of the importance of sustainable development of environmental resources by people. This understanding could be achieved through education. This was however, identified by the Agenda 21 of the Rio de Janeiro, 1992 Earth Summit. The summit identified education as a veritable tool for environmental awareness and changing of people's attitude and fostering environmental responsibility which enhances the environment (Timothy and Doug, 1998). People indulge in activities that abuse environmental resources thereby limiting their chances of having safe environmental conditions. Therefore everyone needs to be prepared to recognize his responsibilities and act upon them. This involves behaving in a way and manner that will nurture the natural resources as a result of the consideration of their importance to human interdependence. To achieve these goals, the students' becomes a very important target group to be nurtured as future leaders and possible policy makers and implementers in their various capacities as lawmakers and heads of organizations. It should be noted that such sense of environmental responsibility is a potential outcome of education under certain conditions (Mathew and Riley, 1995). So, based on Agenda 21 of Rio de Janeiro Earth Summit, Nigeria infused elements of Environmental Education into science secondary school curriculum. How far have this affected students' attitude and the differences in this attitude to environment at different levels is left to be investigated. It is these reasons that prompted this study of the differences in science students' environmental attitude for sustainable development of environmental education in Niger State, Nigeria.

STATEMENT OF THE PROBLEM

The natural environment is facing a lot of problems such as deforestation, desertification, flood, bush burning, deposition of toxic materials, pollution, over-grazing, illegal mining activities, over population and urbanization in Niger State. There have been campaigns on television and radio sensitizing people on the need to be environmentally friendly through planting trees and upholding safe environmental practices. Also, at the school level, science students have been studying elements of environmental education infused in science curricula particularly in third world countries. This therefore necessitated the study of students attitude towards the natural environment in order to see how it could be used to enhance the sustainable development of Environmental Education (EE) in schools. This forms the reason for investigating differences based on students' age groups, class levels and major field of study.

Objective of the Study

The objective of this study is to determine the differences in science secondary school students' environmental attitude for the purpose of ensuring sustainable development of Environmental Education in schools.

Research Questions

Three research questions were formulated;

1. Do science students ages have any effect on their attitude towards the environment?
2. Do science students class level have any effect on their attitude towards the environment?
3. Does science students major field of study have any effect on their attitude towards the environment?

Null Hypotheses

The following three null hypotheses were tested;

- HO₁:** There is no significant difference between science students' age and their attitude towards the environment.
- HO₂:** There is no significant difference between the science students' class level and their attitude towards the environment
- HO₃:** There is no significant difference between science students' major field of study and their attitude towards the environment.

METHODOLOGY

A survey method was used to conduct the study. This is because it is used to gather data from a relatively large number of cases at a particular time (Best and James, 1989). A total of 32, 908 Niger State Secondary School Science Students constituted the population for the study spread through 147 public secondary schools. A stratified random sampling technique was used to select fifty-one schools for the study. In these schools simple random sampling technique (i.e. Hat-draw method) was used to select 620 subjects. The instrument used for the study is the Students Attitude to the Environment Questionnaire (SAEQ). This is adapted from the 5-point Likert attitude scale designed in Nigeria by Ato and Wilkinson (1979) developed in Nigeria. In adapting the instrument, the six theoretical constructs used by them were structured to suit the demands of the present study. This modification of science attitude scale from the existing scales is supported by (Fraser, 1977). The instrument was validated by two experts in science education and an expert in environmental science from the Federal University of Technology, Minna, Niger State. It was certified to have for content validity. The SAEQ reliability was found to be 0.83 by split-half method. The Pearson's Product Moment Correlation Coefficient Statistic was used with the aid of statistical package for the Social Science (SPSS).

DATA ANALYSIS AND RESULT

The results of students' scores from SAEQ were arranged in frequency distribution table. The range of 83 to 224 scores with a class interval of 10, starting from 83 and a mean score of 155.6, a standard deviation of 28.5 were used to determine the positive, neutral and negative attitude of students. Students who scored above half standard deviation ($1/2$ SD) added to the mean (169.8) are regarded as having positive attitude. Those who scored below ($1/2$ SD) subtracted from the mean (141.4) are regarded as having negative attitude. Those that have scores between the two extremes are regarded as those having neutral attitude. This procedure was used by Orode (1987). Therefore, results from these analyses were used to test the three hypotheses using a two-way Analysis of Variance (ANOVA) statistic using SPSS application.

Hypothesis One (HO₁)

Table 1: ANOVA for difference in Environmental Attitude as a result of students' age group

Source of Variance	df	Sum of Squares	Mean Squares	F-ratio	P-Value
Between groups	1	560.66	560.66	6.02	0.0012
Within groups	2	186.34	93.17		
Total	3	747			

From table 1 above, $P < 0.05$ Therefore, there is significant difference

Hypothesis Two (HO₂)

Table 2: ANOVA for differences in Environmental Attitude as a result of students' class level

Source of Variance	df	Sum of Squares	Mean Squares	F-ratio	P-Value
Between groups	2	226.89	113.45	0.12	0.0000
Within groups	3	2863.11	954.37		
Total	5	3090			

From table 2 above, $P < 0.05$. Therefore, there is significant difference

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Hypothesis Three (HO₃)

Table 3: ANOVA for differences in Environmental Attitude as a result of students' major field of study

Source of Variance	df	Sum of Squares	Mean Squares	F-ratio	P-Value
Between groups	1	12880.67	12880.67	38.89	0.0000
Within groups	2	662.22	331.17		
Total	3	13543			

From table 3 above, $P < 0.05$. Therefore, there is significant difference

SUMMARY OF FINDINGS

1. There is significant difference in environmental attitude of science students as a result of their different age groups.
2. There is significant difference in environmental attitude of science students as a result of their different class levels
3. There is significant difference in environmental attitude of science students as a result of their major field of study.

DISCUSSION OF RESULTS

All the three hypotheses tested showed that there is a significant difference the environmental attitude of students as a result of students' age, class level and major fields of study. Hypothesis one was in consonance with the finding of Muzafer (1992) which found that, older people with college education showed higher level of environmental concern than did their young and less educated counterparts. However, hypothesis two which was tested to determine attitudinal difference based on students' environmental attitude is influenced by the class level. This may be due to the fact that, most of the schools survey in the study was from rural environments and so students do not notice the devastation done to the environment. Again, it could be because of the agrarian nature of their rural environment, harmful practices and hazards are not considered hazards to the environment. Nevertheless, Rhoder (1990) corroborated this finding that, grade level of students increase the prospect for them to have moralistic and humanistic (positive) attitudes towards the environment in a study conducted among ninth grade students who had higher utilitarian and scientist attitudes than twelfth grade students. The third hypothesis also indicated that there is significant difference in students' environmental attitude based on their fields of studies. This is an indication also that, their area of specialty is inconsequential in their relationship with the environment, hence all science students showed similar attitudinal approach towards the environment.

CONCLUSION

This study concludes that significant differences exist in the environmental attitude of students as a result of their different age groups, class levels and field of study.

RECOMMENDATION

From the results of the study, it is instructive to say that the differenced in the environmental attitude of science students portends advancing environmental responsibility and interest in environmental care. It is considerations, it is recommended that instead of continued infusion approach to Environmental Education (EE) in school curriculum particularly in Nigeria, a separate EE Curriculum should be developed and studied EE studies in Nigeria and by implication the third world in order t foster environmental responsibility

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