Journal of Science and Technology, Vol. 9 No. 4 (2017) p. 30-36

Investigating the Environmental Awareness Level of Secondary School Students: Effects of Race, School Type, and Location

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Received 30 September 2017; accepted 30 November 2017; available online 26 December 2017

Abstract: Environmental education is considered as a life-long process starting from pre-school level continuing through all stages of formal and informal education. Student's environmental awareness as one of the components of environmental education has been investigated for many years in Nigeria. Due to lack of sufficient literature, this paper is aimed to investigate the level of environmental awareness and also ascertain the effects of race, type of school, and location on environmental awareness level of secondary school students in Kano State, Nigeria. It was done by conducting a survey study method. A total of 1200 respondents were selected out of 507,061 secondary school students who were in SS 2 in Kano State using simple random sampling techniques. Environmental Awareness Test was used as the instrument for data collection. The data collected were analysed using descriptive and inferential statistics. Mean and Standard Deviation was used to answer the research question while one-way ANOVA was used to test the hypotheses. The results show that the secondary school students in Kano have low environmental awareness level. It was further revealed that significant differences exist in the environmental awareness level of students for all the three levels of independent variables.

Keywords: Environmental awareness; Race; Type of school; Location; Secondary school students.

1. Introduction

Environment nowadays has received maximum concern from the government and non-governmental organizations. It has become a major concern of the whole world. Major environmental problems such as the effect of global warming, globalization, desertification, desert encroachment, flooding and depletion of ozone layer among others have received primary concern of researchers. As urged by the 5th Malaysian Prime Minister "Malaysian should not forget the importance of managing and utilizing natural resources in a sustainable way and developers are warned to ensure that environment must not be sacrificed in favour of economic development" [2]. The patterns of production by industries and consumers pattern of consumption and behaviour and directly or indirectly remain the causes of environmental problems in [3]. For individuals to develop new forms of behaviour, shaping attitude, skills, and commitments needed to preserve and protect the environment has to begin at an early age. Therefore, the school would be a better place for that.

Furthermore, since the commitment to preserve and protect the environment begins at an early age, secondary school students have a role to play in determining the achievement of environmental sustainability goals as declared by Tiblisi declaration. Henceforth, identifying the gap in the level of environmental awareness is essential in preparing the young generation to adopt a sustainable lifestyle.

Among the significant environmental challenges facing Kano State tremendously in ensuring sustainability are river water quality; hazardous waste; the high increase in the rate of deforestation; urban air quality which falls below moderate level [4]. Also, household waste which is 1.0kg/day per person despite the rigorous recycling campaigns by the government among others is converting Kano from a home to dump ground. However,

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protection and preservation of the environment are necessary for the quality of life of the present and future generations.

Moreover, various policies and strategies are currently carried out by the government to ensure environmental sustainability, and this cannot be adequate without grooming the younger generation to act environmentally. It was reported that the quality of the environment depends on the level of knowledge, attitude, values, and practice of people [5, 6].

However, the objective of this survey is to determine the level of environmental awareness of students. The differences in the level of environmental awareness concerning race, type of school, and location were also investigated. The following hypotheses were formulated to guide the research.

Ho1. There is no significant difference in the level of environmental awareness (EA) of students between different races.

Ho2. There is no significant difference in the level of EA between the types of schools.

Ho3. There is no significant difference in the level of EA of students regarding their location.

2. Materials and Method

The survey was conducted on Secondary school students in Kano State, Nigeria. The study was conducted between September to December 2016. The sample of the survey constitutes students from SS 2, drawn from the six selected secondary schools in Kano.

The population of the study comprises all of the senior secondary school students in Kano totalling of 507,061 and 877 senior secondary schools. The breakdown of the population by gender is 308,558 males and 198,504 females as at the time of the present research.

A total of 1200 students were selected randomly to participate in the current survey exercise using multi-stage random sampling technique. In the first stage, six zones were selected from the 14 Educational Zones in Kano State. From each zone, one school was selected to make the six selected secondary schools for the study. In this stage, 200 students were selected randomly to form the sample of 1200 respondents comprising male and female that will respond to the questionnaire. Each school was allocated with 200 questionnaires to fill by the students. The selected schools were:

1. Government Girls Senior Secondary School, Rano (GGSS Rano)
2. Government Secondary Commercial School, Wudil (GSCS Wudil)
3. Government Girls College, Dala (GGC Dala)
4. Rumfa College Kano (RCK)
5. Government Secondary School, Karaye (GSS Karaye)
6. Police Girls Secondary School, Shanono (PGSS, Shanono)

Environmental Awareness Test extracted from Hassen Taj Environmental Awareness Test was used for the data collection. The selected items were pilot tested to suit the present study. Cronbach's alpha of 0.84 and KMO of 0.652 was found which is significant. According to many researchers, a Cronbach's alpha of 0.70 or higher is desirable [1].

The Environmental Awareness Test was examined with a series of questions regarding environmental awareness. It contained ten items based on multiple-choice test questions with four options following each question. The multiple-choice items were considered the most accepted method among all the objective test items. The student needs only to choose one option from the list of options. The total score was calculated by the ten questions that each item has 1 score and the total score is 10. If students choose the correct answer, s/he would be scored one point and if otherwise, will be scored 0 (correct answer = 1, wrong answer = 0).

The data analysis was conducted using SPPS version 20. Descriptive statistics were applied to measure the mean score and standard deviation on the Environmental awareness Test. A one-way ANOVA was used to compare the differences in the level of environmental awareness of students. However, where there is no homogeneity of variance in the one-way ANOVA, Welch test and Games-Howel statistics were applied to compare the means. All the empirical statistics were calculated at 0.05 level of significance ($\alpha = 0.05$). If the calculated p-value is less than the alpha value ($p < 0.05$), the formulated null

hypothesis is rejected and accept the alternate hypothesis. It means that there exists a significant difference between the means. However, if the obtained p-value is greater than the alpha value, the alternate hypothesis is rejected.

3. Results and Discussion

Environmental Awareness (EA) Level of Students

The results of Table 1 shows that the secondary school students' level of environmental awareness is below average (M = 0.40, SD = 0.15). The level indicator was ranged from 0.10 - 0.40, low awareness; 0.41-0.69, moderate awareness; and 0.70 - 1.00, high awareness.

Table 1 Environmental awareness mean scores and standard deviation (N = 1180)

	High School Students	
Variables	Mean	±SD
Environmental awareness	0.404	0.145

As indicated in Table 1, the level of environmental awareness of students is low. The result is the same with the finding of [7] where they found that the level of environmental concern among Malaysian teachers is fair. They also added that the teachers also lack a general understanding of the causes of environmental problems. The result consists of a study conducted in Terengganu, Malaysia where the secondary school students were reported the to have a low level of environmental awareness [15].

However, the above finding is contrary to studies in the other parts of the world. For example, in a study conducted in Selangor, it was found that the level of environmental awareness of secondary school students in the concepts of sustainable development is high [8]. Also, 11th-Grade students in New York scored low on environmental knowledge, but the scored high performance in the environmental awareness and concern [10]. Also, in a study conducted in Mysore city, India to assess the environmental awareness of secondary school teachers. It is found that the majority of them have a moderate level of environmental awareness [11]. In another study conducted in Sta. Elena High School in the Philippines, it was reported that the students had a moderate level of environmental awareness [13]. It could be discovered that other studies in a different part of the world reported a considerable high level of environmental awareness compared to what is obtained in the present study. For example, in another study conducted in Penang, Malaysia. The Higher School students had a high level of environmental awareness and knowledge towards sustainable development [14]. This is an indication that the secondary school students in Kano and Nigeria as a whole were left behind in issues regarding environmental concern and sustainability because there are little researchers that carried out to assess students' level of environmental awareness, knowledge, attitude or behavior.

As obtained in Table 1, the level of environmental awareness of students is below average. There is a need for curriculum developers to design a curriculum that will make students aware of common environmental problems. The world we are living in is confronted with many environmental challenges such as haze, desertification, and pollution due to human interference with nature. There is an urgent need to educate the students at the initial stage (primary and secondary school levels) on environmental problems like pollution, global warming, ozone layer depletion, etc. The students can make efforts in restoring the globe from the environmental threats as they grow up if they learn about environmental issues from their early age.

Differences in the Level of Environmental Awareness of Students between Races

Results from Table 2 showed that there exist significant differences in the level of environmental awareness of secondary school students based on their races as determined by the result of one-way ANOVA, $F(3, 1176) = 4.54$, $p = 0.004$. It was indicated that the formulated null hypothesis was rejected.

Table 2 Differences in the level of environmental awareness with respect to Race

Environmental Awareness					
Groupings	N	Mean	SD	F	Sign.
Hausa	990	0.39	0.14	4.54	0.004
Kanuri	12	0.37	0.14		
Fulani	172	0.45	0.15		
Others	6	0.30	0.15		

The result was calculated at 0.05 level of significnt. A significant difference exist in the level of environmental awareness based on students' race. Thus, the level level of environmental awareness for Hausa is (M = 0.39, SD = 0.14); Kanuri (M = 0.37, SD = 0.14); Fulani (M = 0.45, SD = 0.15); and other races (M = 0.30, SD = 0.15).

Table 3 Showing effect size of each group

(I) Race	(J) Race	Mean Difference (I-J)	Std. Error	Sig.
Hausa	Kanuri	0.029	0.059	0.960
	Fulani	-0.057*	0.017	**0.004**
	Others	0.096	0.083	0.659
Kanuri	Hausa	-0.029	0.059	0.960
	Fulani	-0.087	0.061	0.483
	Others	0.067	0.102	**0.914**
Fulani	Hausa	0.057*	0.017	**0.004**
	Kanuri	0.087	0.061	0.483
	Others	0.153	0.085	0.268
Others	Hausa	-0.096	0.083	0.659
	Kanuri	-0.067	0.102	0.914
	Fulani	-0.153	0.085	0.268

Furthermore, Turkey HSD multiple comparisons were conducted to determine where the significant difference lies between the groupings. From the result in Table 3, it was found that the secondary school students' environmental awareness based on the groupings is significant between Hausa and Fulani with effect size (p = 0.004). It is indicated that Fulani has the highest level of environmental awareness (M = 0.45, SD = 0.15) than Hausa (M = 0.39, SD = 0.14). No significant effect size was found between the other groupings.

However, in a study conducted to investigate the differences in the level of environmental awareness between Indian and Iranian students, a significant difference was found on their level of environmental awareness [9].

Moreover, from the above results, Fulani students were found to have the highest mean score in the level of environmental awareness compared to Hausa tribe who are the majority in Kano and Kanuri. The high performance in the level of environmental awareness by the Fulani people may be attributed to the fact they are more attached to changes in the weather condition due to their keen interest in farming and rearing activities. Their interests in farming and rearing of domestic animals serve as their only occupation to depend on for survival. They were all known for that. It is necessary for them to prepare for the climatic conditions (i.e., short wet season and the prolonged dry season) in the bid for their farming and raring activities. They virtually migrate from one location to another in search for the grasses to feed their livestock within and outside the Nigeria. "They usually depend on their herds of zebu cattle for subsistence and whose life is turned to continuous transhuman, migratory drift and periodic migration" [16]. This various kind of movement of the Fulani people may be their source of environmental information on which they have scored higher mean than the Hausas and Kanuris.

Differences in the Level of Environmental Awareness of Students with Respect to SchoolType

The differences in the level of environmental awareness of students were calculated based on their school type. From the result in Table 4, it was found that there is a significant difference in the level of environmental awareness of students, F(5, 1174) = 23, p = 0.000. The null hypothesis is rejected. The Mean and SD of each school were presented in Table 4.

Furthermore, following the fact that the condition for homogeneity of variance was not achieved, Welch test and Games-Howel multiple comparison tests were carried out to determine the significant differences and the effect size of each group. The calculated effect sizes for the groups are presented in Table 5.

Table 4 Differences in the level of environmental awareness between the Type of Schools (N = 1180)

Environmental Awareness					
Groupings	N	Mean	SD	F	Sign.
GGSS	192	0.41	0.14	23.0	0.000
GSCS	190	0.40	0.15		
GGC	200	0.30	0.16		
RCK	200	0.49	0.06		
GSS	200	0.45	0.14		
PGSS	198	0.38	0.15		

Table 5 Environmental awareness group comparisons between Type of School (ToS)

(I) ToS	(J) ToS	Mean Diff (I-J)	Std. Error	Sig.
GGSS	GGC	0.106	0.022	0.000
	RCK	-0.081	0.015	0.000
GSCS	GGC	0.099	0.023	0.000
	RCK	-0.088	0.017	0.000
GGC	RCK	-0.187	0.017	0.000
	GSS	-0.148	0.022	0.000
	PGSS	-0.075	0.020	0.004
RCK	PGSS	0.112	0.014	0.000
GSS	PGSS	0.073	0.019	0.002

From the Games-Howel multiple comparisons, it was indicated that a significant difference exist between the groups of schools. There is difference in the level of awareness between GGSS (M = 0.41, SD = 0.14) and GGC (M = 0.30, SD = 0.16, effect size = 0.000). Also, a significant difference was found between GGSS (M = 0.41, SD = 0.14) and RCK (M = 0.49, SD = 0.06, effect size = 0.000). RCK had higher level of environmental awareness than GGSS. The EA of students of GSCS (M = 0.40, SD = 0.15) differs significantly from students of SM GGC (M = 0.30, SD = 0.16, effect size = 0.000). It was indicated that students of GSCS had better environmental awareness level than GGC. The results are the same for GSCS/RCK (effect size = 0.000); GGC/RCK (effect size = 0.000); GGC/GSS (effect size = 0.000); GGC/PGSS (effect size = 0.004); between RCK/PGSS (effect size = 0.000); and GSS/PGSS (effect size = 0.002). No significant effect size was found between the other groups.

Moreover, [9] found that type of school management (government and private) influence the level of environmental awareness of students. Also, [11] found that teachers working in private schools recorded high level of environmental awareness compared to those teaching in government schools. As far as the results on Table 4, RCK had the highest score on the overall environmental awareness level. It could be because they encourage their students in the active participation in different environmental awareness programmes and emphasis are given more to outdoor experiences within the school during play time.

Also, it was discovered that Rumfa College Kano (RCK) is the oldest college among the secondary schools chosen for the present study. It was established since 1972 as Kano Middle School by the Northern Regional Government and later to secondary school as Government College Kano in 1957. And since the establishment of the college, it is maintained by the state government and the old students, private organizations, etc. All the old plans that were provided by the British at the school since before independence were still active. It includes the School Garden, Mini Zoo, etc. The remaining schools were perhaps established in recent years compared to RMK and were not even equipped with such gardens and zoo to help students know much about nature and the environment they live.

Differences in the Level of Environmental Awareness of Students with Respect to Location

The result of one-way ANOVA (Welch test) on Table 6 shows that the level of environmental awareness with respects location differs significantly, $F(2, 1177) = 22.5$, $p < 0.05$. The proposed null hypothesis is rejected.

Table 6 Differences in the level of environmental awareness of students between location of students residence (N = 1180)

Environmental Awareness					
Groupings	N	Mean	SD	F	Sign.
Urban	384	0.40	0.15	22.5	0.000
Sub-urban	596	0.35	0.16		
Rural	200	0.44	0.12		

Moreover, Games-Howel test was conducted to determine where the difference lie and also find the strength of the differences between the groups. From the result on Table 7, it was indicated that there is significant effect size between secondary school students residing in urban area (M = 0.40, SD = 0.15) and students residing in sub-urban area (M = 0.35, SD = 0.16, effect size = 0.032). Students from the urban area had high environmental awareness score than students from the sub-urban areas. However, no significant difference was found between urban (M = 0.40, SD = 0.15) and rural (M = 0.44, SD = 0.12, effect size = 0.063). A significant difference was found between sub-urban (M = 0.35, SD 0.16) and rural (M = 0.44, SD = 0.12, effect size = 0.000).

Table 7 Differences in the environmental awareness of students based on their location of residence

(I) Location	(J) Location	M/Diff. (I-J)	Std. Error	Sig.
Urban	Sub-urban	0.048	0.019	0.032
	Rural	-0.038	0.017	0.063
Sub-urban	Rural	-0.087	0.013	0.000

It is justified from Table 7 that there is a difference in the level of EA of students between the three groups. Students from the rural area were found to have higher environmental awareness level compared to their counterparts. It may be a result of their willingness to learn more about the environmental issues and their attachment to the environment-related phenomenon. However, [8] found that urban school students had higher environmental awareness than the sub-urban school students.

However, in a study conducted in U.S. to ascertain the differences in the level of environmental awareness and environmental knowledge between U.S. citizens and International (Indiana), it was found that the U.S. based residence had environmental awareness knowledge [12].

4. Conclusion

It was concluded that the level of environmental awareness of secondary school students in Kano is low. It shows that there is a need for proper implementation of environmental awareness campaign within and outside the schools. Environmental Education should be taught as an independent subject and be integrated compulsory upon all the students regardless of their disciplines since it is regarded as national and international issues.

There exist significant differences in the environmental awareness of students among all the variables of the present study, efforts should be made to minimize this difference. Students regardless of their races, school type and location should be given equal opportunity to act in a sustainable environmental way.

5. Recommendations

It is recommended that Environmental Education could be regarded as an independent subject in the High Schools and should be taught separately. More environment-related programmes should be made available time to time so that the secondary school students could be well nourished with environmental issues. Secondary school students should also be involved in seminars and educational talks to get them aware of local and international environmental issues such as flooding; hurricane; haze and its effects on health; economic threats to the environment and lots more. Moreover, awareness towards the environment is enough to solve and protect the earth from the entire environmental malady.

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