Original Research Article

Environmental Knowledge and Perception of Secondary School Students in Katsina, Nigeria

Abstract

This study assesses environmental knowledge of some selected secondary school students in Katsina, Nigeria. Three representative schools out of total 39 were selected for the purpose of this study. These are (i) Ulul Al-Bab Science Secondary School (Co-educational School, both girls and boys), (ii) Government College, Katsina (Boys only school) and (iii) Government girls college Katsina (Girls only school). 150 students (25 students per each of levels 1-6 of secondary education) were sampled in each of the three selected schools. The selected students were issued with the prepared questionnaire addressing some key issues that probe students' depth of knowledge of environmental problems, their consequences and solutions of solving them. ANOVA statistical test was used to test for significant variation in the level of environmental knowledge of the students within the individual schools studied in order to identify the extent to which variation in levels of study (i.e. age-grade) on environmental knowledge level of the students. The same test was also used to test for significant difference in the environmental knowledge of the students between different schools in order to determine the effect of variation in gender characteristics on the knowledge level. The results obtained indicate in general that the secondary school students in the town display medium to high level of knowledge on the causes, consequences and solutions of environmental problems, but gender and level of study have generally significant influences the environmental knowledge levels of the students. Appropriate recommendations were made to help improve the level of student's knowledge of environmental issues in the area.

Keywords: Environment; Students; Knowledge; Schools; Katsina; Secondary;

1 Introduction

The value and importance of Environmental Education (EE) has been endorsed internationally long before the sustainable development debate assumed international dimension (e.g. UNESCO, 1978; 2004; 1980; NAAEE, 2000). For long, educational efforts are increasingly being seen as means for increasing individuals' environmental knowledge and capacity to work towards addressing environmental problems, with schools seen as important media through which such knowledge can be acquired. Accordingly, large volume of published research information is available on environmental knowledge of school students for many areas of the world such as USA (Orr, 1992, 1995; Barrow and Morrisey, 1989; Hausbeck et al., 1992; Wilke, 1995; Sivek, 2002), Lebanon (Makki, et al., 2003), Netherlands (Kuhlemeier et al., 1999), Malaysia (Said, et al., 2003), Israel (Goldman et. al., 2006; Negev et al., 2008), Taiwan (Hsu and Roth, 1999), Canada (Puk and Makin, 2006), Turkey (Tuncer et. al., 2005; Alp et al., 2008; Kilinc, et al., 2008; Tuncer et. al., 2009), Greece (Boyes et al., 1999; Spiropoulou, 1999; Dimitriou, 2007; Kastani, 2009; Tsekos,

2013), Australia (Wosley and Skrzpiec, 1998), China (Boyes et al., 2008), Cross-country (China, USA, Switzerland and England) study (De Chano and Lisa,, 2006) and Jordan (Zyadin, et al., 2012).

In Nigeria, the role of EE in achieving sustainable development has for long been appreciated. Twenty years ago, the country produced its first draft Curriculum for Infusing Environmental Education in Secondary Schools (NERDC, 1992) and the same year a workshop was convened by the country's curriculum development agency to develop strategies for integrating EE in school programmes, with secondary schools (the second of the three-tier education system) seen as the most strategic. Subsequently, much attention has particularly been paid by many research workers towards evolving strategies of effectively integrating EE into elementary and secondary school curricular in the country (Lawal, 1991; Noibi, 1991; Adara, 1996; 1997; Adebayo and Olawepo, 1997).The Draft EE Curriculum for the country became fully operational in 1998 but to date few researchers (Mansaray et al., 1998; Ajiboye and Ajitomi, 2008; Ifegbesan, 2010) have focused on the role of schools as means for increasing people's environmental knowledge in Nigeria. Even then, these studies were conducted in the humid, southern part of the country and unfortunately, more than 2/3 of the country's landmass lie in the northern part which ecologically is dry and dry sub humid in nature with enormous challenges for sustainable environmental development. The personal experience of secondary school students of environmental condition (which is an important determinant of environmental knowledge) is no doubt going to remarkably be different between the southern and northern regions of the country. Consequently, there appears to be a gap in understanding the basic relationship between personal traits of secondary school students (especially gender, age and level of study) and their level of environmental knowledge in northern part of Nigeria. Given the strategic importance of northern Nigeria, especially being the most populous region of country, and Nigeria being the most populous black nation in the world, there is the need for such a gap to be filled and the need for this constitutes the problem of research interest to this study.

This study was hence initiated with the central aim of assessing the environmental knowledge of a sample of secondary school students of Katsina town, in Katsina state of Nigeria.

The objectives of the study are:

1. Ascertaining students' information sources and personal levels of interest in environmental issues as well as their factual knowledge,
2. Assessing their views towards selected environmental issues.
3. investigate the relationships between students' environmental knowledge and their demographic characteristics (study level, age and gender)

2 Methodology

2.1 Study Population

The study was conducted in Katsina town, the capital of Katsina state, Nigeria. The town is one of the largest in the northern region of the country and has the oldest history of western education in the region, with the first college in the region founded there in 1912. The town has a total of 16 public and 23 private secondary schools. As with other states of the country, Katsina state runs a 3-tier education system (primacy, secondary and tertiary). The secondary

schools in the state are operated in line with the Nigeria's 6-3-3-4 educational system (6 years of primary, 3 years of junior secondary, 3 years of senior secondary and 4 years of tertiary education). The various secondary schools in the state can be categorised into 3 groups depending upon the composition of students' population:

i. Co-educational (with students' population being both boys and girls) schools
ii. Boys-only schools
iii. Girls-only schools

Three schools considered to be representative of the remaining 36 others and belonging to the above 3 groups were selected for the purpose of this study. The schools are:

i. Ulul Al-Bab Science Secondary School (Co-educational School)
ii. Government College, Katsina (Boys only school)
iii. Government girls college Katsina (Girls only school)

The average students' population of each of the three schools is 1,500 and 10% of this population was considered as representative enough for the purpose of this study. Accordingly, 150 students (25 students per each of levels 1-6 of secondary education) were sampled in each of the three selected schools. For each level, selection of the 25 students was based purely on examinations results, with the results of the students stratified into five groups (top 20%, next 20%, next 20%, next 20% and last 20%). 5 students were randomly picked from every strata. The selected students were issued with the prepared questionnaire designed.

2.2 Research Instrument

In this study, a two-part questionnaire, Children's Environmental Attitudes and Knowledge Scale (CHEAKS), which was originally developed by Leeming and Dwyer (1995) and adopted by Alp *et. al.* (2008) was modified to suit the local situation of the study area and used. The questionnaire consisted of 35 multiple-choice Likert-type items (strongly agree, agree, no idea, disagree and strongly disagree) that systematically sample the different environmental issues that probe students' depth of knowledge of environmental problems, their consequences and solutions of solving them. This was done to assess students' knowledge of problems related to environment.

The questionnaire was first administered to a total of 90 students of the three selected schools for pilot testing which helped to eliminate ambiguities and unfamiliar terms and items. After the pilot testing, the contents of the questionnaire were modified and validated. Following this, the revised questionnaire was administered to a total of 450 students (150 per school, and 25 per study level) to assess participants' knowledge of the environment, factors causing its problems, as well as environmentally responsible actions that need to be taken to take care of such problems..

Appropriate permission was obtained from the authorities of the selected schools and the measuring tool was administered by the authors during free lecture hours. The participant students duly were informed about the purpose of the study. It was clearly explained to them that their identity would be kept secret and the results of the study would not affect their grades in school.

2.3 Statistical Analysis

The Statistical Package for the Social Sciences (SPSS, version 11.0) was used to analyse the data. Means and percentage values were determined through descriptive statistics to assess participants' environmental knowledge. The mean values of the responses received for the various items in the questionnaire were compared, using Analysis of Variance (ANOVA) statistical test, within each school in order to determine the significance of difference in participants' environmental knowledge between the six levels of study in a school. The same statistical test was also used to test for significant difference in participants' environmental knowledge between the three types of schools studied.

3 Results and Discussion

3.1 Level of Environmental Knowledge

Table 1 presents data on the percentage responses received from the respondents on the five Likert-type items used in assessing their knowledge of the causes of environmental problems that will define the extent to which the students know what exactly the environment is all about and the major problems affecting it. Table 2 on the other hand presents the responses received on the items used in assessing their knowledge of consequences of environmental problems while Table 2 presents the responses received on the items used in assessing their knowledge of solutions to solving environmental problems.

It could be seen from Table 1 that about 40% to 70% of the respondents indicated correctly the various knowledge test items they were asked to respond to. On the other hand, between about 5% and 19% of the respondents indicated having no idea on the various items they were asked to respond to, while between about 8% and 24% responded wrongly to the various knowledge test items they were asked to respond to.

These indicate clearly that comparatively greater proportion of the respondents have medium to high level of knowledge of the various environmental knowledge test items on causes of environmental problems on which they were tested. On the other hand, low (less than 25%) of them indicated wrong responses while less than 20% of the respondents indicated having no idea at all on the various environmental problems test items. These indicate that students in general did acquire a satisfactory understanding of causes of environmental problems.

It could be seen from Table 2 that less than 25% of the respondents indicated having no idea of the consequences of environmental problems and solutions to them. Between about 8% and 30% gave wrong responses to the items they were asked on consequences of environmental problems and their solutions. On the other hand, between about 18% and 80% of the respondents responded correctly to the various items they were asked on consequences of environmental problems and their solutions. These indicate clearly that the respondents have generally medium to high level of knowledge on the major items listed in the questionnaire on the consequences and solution of environmental problems.

The variations in the responses received between the schools selected on the knowledge test items of both causes of environmental problems (Table 4) and the consequences and solutions of the problems (Table 5) are in general statistically both within the individual schools selected (indicating that differences in age and level of study are influencing

variations in the level of environmental knowledge) as well as between the selected schools (indicating that variation in gender is also influencing variations in the level of knowledge).

3.2 Implications of the Findings

In this study, the effect of age/grade level and gender on students' environmental knowledge was investigated and the results obtained indicated that the variations in levels of knowledge of the various environmental knowledge items considered are in general statistically significant both within the individual schools considered (signifying that variation in age of the students cause significant variations in the level of knowledge) and between the different schools (signifying that variation in gender of the students cause significant variations in the level of knowledge).

A study by McCright (2010) has noted that women convey greater assessed scientific knowledge of climate change and express slightly greater concern about it than do men. He argued that this could not be attributed to differences in key values and beliefs or in the social roles that men and women differentially perform in society.

Tikka *et al.* (2010) carried out a research to establish whether differences in environmental knowledge and attitudes exist among students of different educational establishments. They found out that major variations related to gender and educational level exists among the students, with female students showing more responsibility towards the environment. Students reading subjects related to living things (plants, animals) were found to exhibit more positive attitudes than those reading other subjects (such as economics and engineering).

Kuhlemeier, et. al. (1999) ,In the Dutch National Assessment Program, environmental knowledge, environmental attitudes, and environmentally responsible behavior were studied in a nationwide sample of more than 9,000 students (aged ± 15 years) from 206 secondary schools. Fifty-seven percent of the 9th-grade students had a (very) positive attitude toward the environment, and 35% were prepared to take extra pains or to make (financial) sacrifices for the environment. The students' knowledge about environmental problems was fragmentary and often incorrect, however. Similarly, the environmentally responsible behavior of many of the students was inadequate. The relation between environmental knowledge and environmental attitudes and behavior proved to be very weak. There was a substantial relation between environmental attitude, willingness to make personal sacrifices, and environmentally responsible behavior. Consistent with theories on attitudes, environmentally responsible behavior was more strongly connected with willingness to make sacrifices than with attitude toward the environment.

However, the levels of knowledge of the students can in general be regarded as medium to high and this is slightly at variance with findings of some similar researches undertaken in other countries, which indicated that school students had low levels of knowledge on basic environmental issues, but relatively uniform and favourable attitudes toward the environment (Kuhlemeier *et al.*, 1999; Makki *et al.*, 2003). In Turkey, alp et al. (2008) have found out that secondary school students are seemed willing to make sacrifices and take precautions to protect the environment, but lacked necessary knowledge to make informed decisions. Their results showed that higher grade level students had significantly higher levels of knowledge on environmental issues and attributed this to the fact that that as students grow older and have more experience with nature, it becomes easier to understand the basic environmental

issues. In this study, though differences related to level of study of the students were found to be influencing variations in level of knowledge, the differences are generally low. The relatively low variations might be reflection of the fact that formal environmental education developed in Nigeria since 1998 has still not become fully operational in most schools in the country.

Based on the evaluation of the responses received on some items related to how the students are willing to take part in solving environmental problems appeared to to indicate that the students possess favourable attitudes toward the environment. This finding, which correlates favourably to that made in turkey (Dettmann-Easler and Pease 1999; Dimopoulos and Pantis, 2003), can be attributed to their willingness in the preservation of nature and strong emotional bonding to animals or pets.

In a research study undertaken by Tuncer *etal*. (2005), it was also reported that environmental attitudes of Turkish young people were positive. At the same time, these children suggested that environmental problems in Turkey would become much more complicated unless the individuals make the necessary changes in their lifestyles.

Dimopoulos and Pantis (2003) reported no remarkable difference in environmental attitudes between 5th and 6th grade level students. The results of the present study showed that positive attitudes toward the environment decreased by grade level. The reason why these students gradually lose favourable attitudes may lie in the way environmental issues are presented.

4 Conclusions

The results obtained in this study are generally supportive lf the following conclusions:

i. Secondary school students in the town display medium to high level of knowledge on the causes of environmental problems
ii. The students in the town also display medium to high level of knowledge on the consequences and solutions of environmental problems
iii. Gender, and level of study have generally low influence on variations in level of environmental knowledge of the students

In light of the conclusions reached, the following recommendations are considered as appropriate here:

i. There is the need to ensure full and effective implementation of the developed EE curriculum in secondary schools of the country in order to enhance the level of environmental of knowledge of the students
ii. Besides, traditional knowledge about the environment as it is taught especially at junior secondary school level which at any rate is not in essence action-oriented, there is the need to focus on passing practical proactive knowledge to students.
iii. There is the need to make science teachers to be in a position to stimulate student interest, creativity and motivation in environmental issues.

iv. Teaching of courses related to environment (Geography, Integrated Science, Social Studies, Biology etc) in secondary schools should be re-focused from being teacher-centred, into students-based, activity-based science classrooms in order to prepare environmentally sensitive students who would play an active role in the preservation of nature through making informed decisions.
v. There is the need to explore the possibility of putting in place school-based environmental field projects appear in order to enhance students' environmental knowledge level.
vi. Further research, such as qualitative and longitudinal studies, is needed to investigate deeply the enhancement of students' environmental attitudes, and formation of true environmental concepts. In addition, investigation of other predictor variables of a model focusing on environmentally responsible behaviours may be required to fully comprehend the determinants of students' behaviours.

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Table 1: Knowledge of Causes of Environmental Problems

S/N	Cause of Environmental Problem	School	Percentage Responses Received for the Various Options					
			SAG	AG	NID	DAG	SDA	Total
1	Environmental problem is anything that negatively affect soil, water, plants, air, living things, towns and villages	KTC	41.3	28	12	9.3	9.4	100
		UAB	31.2	12.6	12.2	32	12	100
		GGC	28.2	30.6	14.6	14.6	12	100
2	Human activities cause environmental problems that affect this generation only	KTC	40.1	28.4	14.2	9.3	8	100
		UAB	36.7	30	12	13.3	8	100
		GGC	30.2	19.2	17.3	20	13.3	100
3	Human activities cause environmental problems that affect future generation only	KTC	39	23.1	13.2	13.5	11.2	100
		UAB	30.6	30.6	17.3	13.3	8.2	100
		GGC	22.1	17.4	19	24	17.5	100
4	Human activities cause environmental problems that affect both the present and future generations	KTC	24.1	33.3	17.3	16	9.3	100
		UAB	43.1	19.2	10.5	15.2	12	100
		GGC	21	33.3	12	20.2	13.5	100
5	Removal of trees make the environment hotter	KTC	31.6	26.6	16.7	14.5	10.6	100
		UAB	42.6	32	10.7	9.3	5.4	100
		GGC	34	25.6	16.3	12.1	12	100
6	Planting of trees make the environment cooler	KTC	40	31.5	12	10.1	6.4	100
		UAB	50.6	28	8	6.6	6.8	100
		GGC	37.7	34.6	9.3	10.6	7.8	100
7	Throwing of waste all over the place make the area look ugly	KTC	37.1	25.1	16.4	12.1	9.3	100
		UAB	68	10.6	8	6.6	6.8	100
		GGC	32	33.3	16	12.1	6.6	100
8	Improper disposal of waste can cause many problems such as pollution and diseases	KTC	38.6	14.6	17.3	16.2	13.3	100
		UAB	60	17.3	8	6.6	8.1	100
		GGC	24	30	15.3	16.1	14.6	100
9	Environmental problems are occurring largely because government and people are not protecting the environment	KTC	44	12	14.6	17.3	12.1	100
		UAB	28	34.6	12.3	13.3	11.8	100
		GGC	32.6	24.2	12.6	17.3	13.3	100
10	Environmental problems are occurring because people and government are protecting the Environment	KTC	34.7	29.4	13.3	12	10.6	100
		UAB	34.4	29.2	9.4	20.4	6.6	100
		GGC	29.3	24.1	17.3	13.3	16	100
11	Environmental problems can occur even if human activities are not taking place	KTC	20.7	36.2	11.5	19.2	12.4	100
		UAB	41.2	20	14.3	12.6	11.9	100
		GGC	17.3	37.3	13.3	12.1	20	100
12	Increase in number of people in a town is causing more environmental problems	KTC	26.6	22.6	17.6	18.6	14.6	100
		UAB	43.6	20.5	10.6	16	9.3	100
		GGC	36	21.9	14.1	16	12	100
13	As town grows, more environmental problems occur	KTC	16	24.1	17.3	26.6	16	100
		UAB	21.3	33.3	13.3	20.1	12	100
		GGC	38.6	13.3	17.3	18.6	12.2	100

Note: KTC (Katsina College); UAB (Ulul Al Bab); GGC (Government Girls College)
SAG (Strongly agree); AG (Agree); NID (No Idea); DAG (Disagree); SDA (Strongly disagree)

Table 2: Knowledge of Consequences of Environmental Problems

S/N	Consequences of Environmental Problems	School	Percentage Responses Received for the Various Options					
			Strongly Agree	Agree	No Idea	Disagree	Strongly Disagree	Total
1	Most human activities are damaging the environment	**KTC**	21.3	25.3	16.6	15.6	21.2	100
		UAB	36.2	28.4	5.3	24	6.1	100
		GGC	26.5	34.6	16.3	12	10.6	100
2	Our ways of life are in most cases destroying the environment	**KTC**	25.3	31.3	10.0	17.6	15.8	100
		UAB	26.6	29.3	10.6	20.2	13.3	100
		GGC	29.3	20.5	18.6	13.3	18.3	100
3	Most economic activities help in damaging the environment	**KTC**	45.9	15.2	14.4	12.1	12.4	100
		UAB	25.3	24	16	24.2	10.5	100
		GGC	30.6	20.3	14.6	21.3	13.2	100
4	Human beings are the major damagers of the environment	**KTC**	35	24.1	10.3	9.3	21.3	100
		UAB	43.1	30.3	9.3	9.3	8	100
		GGC	38.1	30.7	16.6	14.6	10;6	100
5	Science and technology often create more problems than they solve	**KTC**	37.3	34.6	12.2	13.3	2.6	100
		UAB	21.3	33.3	13.3	20.1	12	100
		GGC	46.9	15.9	11.7	13.3	12.2	100
6	Environmental problems make the future to look not bright	**KTC**	25.3	27.6	8.3	12.2	26.6	100
		UAB	32	22.6	10.6	18.6	16.2	100
		GGC	27.1	19.6	7.9	25.3	20.1	100
7	Flooding is occurring in the town because drainages are blocked	**KTC**	26.6	30.3	14.6	17.6	10.9	100
		UAB	39.2	27.6	6.6	16	10.6	100
		GGC	18.1	33.3	16	20.6	12	100
8	Worldwide, most childhood deaths are the results of water pollution	**KTC**	24	29.3	18.6	17.5	10.6	100
		UAB	22.6	41.6	10.6	14.6	10.6	100
		GGC	20	22.6	24	20.1	13.3	100

Note: KTC (Katsina College); UAB (Ulul Al Bab); GGC (Government Girls College)

Table 3: Knowledge of Solutions to Solving Environmental Problems

S/N	Solutions to Solving of Environmental Problems	School	Number and % of Responses Received for the Various Options					
			Strongly agree	Agree	No Idea	Dis-agree	Strongly Disagree	Total
1	Proper education of the people can help is protecting the environment	**KTC**	42.6	22.6	16	12.2	6.6	100
		UAB	56	18.6	9.3	8.1	8	100
		GGC	33.3	30.6	16.1	12	8	100
2	People worry too much about environmental problems	**KTC**	36.2	17.3	18.6	14.6	13.3	100
		UAB	32.1	36	6.6	16	9.3	100
		GGC	30.6	25.5	17.3	17.3	9.3	100
3	Science and Technology can be used to reduce damage of the environment	**KTC**	34.6	26.6	16.2	13.3	9.3	100
		UAB	33	35.1	13.1	10	8	99.2
		GGC	33.3	17.3	14.6	17.3	17.5	100
4	Cleaning of the environment can help in solving environmental problems	**KTC**	34.6	26.6	17.3	9.3	12.2	100
		UAB	54.6	14.6	9.3	9	12.5	100
		GGC	24	26.6	13.5	16.6	19.3	100
5	Finding food is more important than protecting the environment	**KTC**	21.3	18.6	14.6	21.3	24.2	100
		UAB	28	26.6	8	21.3	16.1	100
		GGC	26.6	32.6	16.6	14.6	9.6	100
6	Environmental problems can be solved if people become more proactive	**KTC**	32	16.3	9.7	26	16	100
		UAB	38.6	22.6	12.2	14.6	12	100
		GGC	21.3	41.3	13.3	12	12.1	100
7	Sacrifices by people can help solve environmental problems	**KTC**	33.2	20.2	13.2	12.1	21.3	100
		UAB	26.6	37.4	13.2	13.5	9.3	100
		GGC	28	21.3	24.1	17.3	9.3	100
8	Environmental protection can reduce level of human activities	**KTC**	21.3	22.6	22.6	17.3	16.2	100
		UAB	38.6	24	12	16.1	9.3	100
		GGC	26.6	25.3	16.2	18.6	13.3	100
9	All living things have the same right to the environment	**KTC**	14.6	29.3	20.2	21.3	14.6	100
		UAB	22.6	25.3	12.2	26.6	13.3	100
		GGC	25.3	26.6	24.1	16	8	100
10	People have the right to damage the environment in order to survive	**KTC**	14.6	18.6	24	28.2	14.6	100
		UAB	21.3	22.6	9.5	29.3	17.3	100
		GGC	31.2	28.3	12.1	13.8	14.6	100
11	The earth is vast, with almost unlimited room and resources so no need to worry about environmental problems.	**KTC**	17.3	26.6	20	16.1	20	100
		UAB	36.3	31.9	18.5	17.,3	13.3	100
		GGC	25.3	21.3	17.3	20.1	16	100
12	People must learn to control nature in order to survive	**KTC**	20	28	14.6	21.4	16	100
		UAB	36.1	38.4	17.6	5.3	2.6	100
		GGC	39.4	17.5	18.6	10.2	14.3	100
13	Nature should be used to produce goods for people no matter the consequences	**KTC**	28	25.3	16	13.2	17.5	100
		UAB	22.6	40	12.2	10.6	14.6	100
		GGC	25.3	18.5	23	18.6	14.6	100
14	People must learn to live in harmony with nature to survive	**KTC**	19.4	22.1	12.1	16.4	30	100
		UAB	28	28.2	14.6	14.6	14.6	100
		GGC	32	22.6	18.2	15.6	11.6	100

Note: KTC (Katsina College); UAB (Ulul Al Bab); GGC (Government Girls College)

Table 4: Assessment of Variation in Responses Received on Knowledge of Causes of Environmental Problems among and between the Schools Studied

S/N	Item	Yes/No	School	ANOVA F-Ratio Assessing the Significance of the Variations	
				Variation within the School	Variation between the Schools
1	Environmental problem is anything that negatively affect soil, water, plants, air, living things, towns and villages	**Yes**	**KTC**	7.8*	9.6**
			UAB	5.6*	
			GGC	10.2**	
2	Human activities cause environmental problems that affect this generation only	**No**	**KTC**	8.2*	7.4*
			UAB	13.4**	
			GGC	12.4**	
3	Human activities cause environmental problems that affect future generation only	**No**	**KTC**	14.0**	4.3*
			UAB	7.1*	
			GGC	5.4*	
4	Human activities cause environmental problems that affect both the present and future generations	**Yes**	**KTC**	10.9**	5.0*
			UAB	8.8*	
			GGC	13.7**	
5	Removal of trees make the environment hotter	**Yes**	**KTC**	10.9*	4.1
			UAB	7.4*	
			GGC	5.2*	
6	Planting of trees make the environment cooler	**Yes**	**KTC**	9.3*	4.5
			UAB	10.0**	
			GGC	4.2	
7	Throwing of waste all over the place make the area look ugly	**Yes**	**KTC**	5.8*	7.3**
			UAB	6.4*	
			GGC	5.4*	
8	Improper disposal of waste can cause many problems such as pollution and diseases	**Yes**	**KTC**	10.7**	2.3
			UAB	11.2**	
			GGC	5.5*	
9	Environmental problems are occurring largely because government and people are not protecting the environment	**Yes**	**KTC**	7.2*	5.6*
			UAB	14.7**	
			GGC	10.7**	
10	Environmental problems are occurring because people and government are protecting the Environment	**No**	**KTC**	5.8*	6.2*
			UAB	6.3*	
			GGC	7.5*	
11	Environmental problems can occur even if human activities are not taking place	**Yes**	**KTC**	11.0**	5.1*
			UAB	3.4	
			GGC	14.5**	
12	Increase in number of people in a town is causing more environmental problems	**Yes**	**KTC**	15.7**	6.8*
			UAB	11.4**	
			GGC	5.1*	
13	Most human activities are damaging the environment	**Yes**	**KTC**	4.1	4.0
			UAB	5.7*	
			GGC	7.7*	
14	Our ways of life are in most cases destroying the environment	**Yes**	**KTC**	5.8*	5.0*
			UAB	5.5*	
			GGC	5.5*	
15	Most economic activities help in damaging the environment	**Yes**	**KTC**	5.9*	3.6
			UAB	7.8*	
			GGC	5.6*	
16	Human beings are the major damagers of the environment	**Yes**	**KTC**	4.9	4.3
			UAB	7.1*	
			GGC	9.8*	
17	Science and technology often create more problems than they solve	**Yes**	**KTC**	5.9*	7.8**
			UAB	5.6*	
			GGC	10.8**	
18	Environmental problems make the future to look not bright	**Yes**	**KTC**	13.4**	5.3*
			UAB	5.6*	
			GGC	8.2*	

Note: KTC (Katsina College); UAB (Ulul Al Bab); GGC (Government Girls College)
The asterisk denote the F-ratios that are statistically significant
*(Significant at 0.001 probability level); **(Significant at 0.001 probability level);

Table 5: Assessment of Variation in Responses Received on Knowledge of Consequences of and Solution to Environmental Problems among and between the Schools Studied

S/N	Item	Yes/No	School	ANOVA F-Ratio Assessing the Significance of the Variations	
				Variation within the School	Variation between schools
1	Proper education of the people can help is protecting the environment	**Yes**	**KTC**	11.1**	8.4**
			UAB	7.9*	
			GGC	4.8	
2	People worry too much about environmental problems	**No**	**KTC**	13.4**	5.4*
			UAB	3.1	
			GGC	5.2*	
3	Science and Technology can be used to reduce damage of the environment	**No**	**KTC**	3.8	7.0*
			UAB	9.6*	
			GGC	14.5**	
4	Cleaning of the environment can help in solving environmental problems	**Yes**	**KTC**	7.9*	4.3
			UAB	11.0**	
			GGC	4.2	
5	Flooding is occurring in the town because drainages are blocked	**Yes**	**KTC**	6.6*	8.6**
			UAB	5.5*	
			GGC	7.2*	
6	Worldwide, most childhood deaths are the results of water pollution	**Yes**	**KTC**	3.9	7.1*
			UAB	5.6*	
			GGC	7.7*	
7	As town grows, more environmental problems occur	**Yes**	**KTC**	11.1**	7.3*
			UAB	8.2*	
			GGC	3.9	
8	Finding food is more important than protecting the environment	**Yes**	**KTC**	11.0**	6.9*
			UAB	7.3*	
			GGC	10.5**	
9	Environmental problems can be solved if people become more proactive	**Yes**	**KTC**	5.2*	4.7
			UAB	5.9*	
			GGC	6.4*	
10	Sacrifices by people can help solve environmental problems	**No**	**KTC**	7.0*	5.5*
			UAB	4.8	
			GGC	5.2*	
11	Environmental protection can reduce level of human activities	**Yes**	**KTC**	5.9*	5.8*
			UAB	7.3*	
			GGC	11.2**	
12	All living things have the same right to the environment	**Yes**	**KTC**	5.7*	8.6**
			UAB	6.3*	
			GGC	7.3*	
13	People have the right to damage the environment in order to survive	**Yes**	**KTC**	7.5*	7.4*
			UAB	11.0**	
			GGC	8.2*	
14	The earth is vast, with almost unlimited room and resources so no need to worry about environmental problems.	**Yes**	**KTC**	3.6	7.1*
			UAB	6.4*	
			GGC	5.1*	
15	People must learn to control nature in order to survive	**Yes**	**KTC**	6.6*	8.3*
			UAB	14.5**	
			GGC	8.0*	
16	Nature should be used to produce goods for people no matter the consequences	**Yes**	**KTC**	16.7**	3.7
			UAB	9.7*	
			GGC	6.4*	
17	People must learn to live in harmony with nature to survive	**Yes**	**KTC**	4.7	4.7
			UAB	5.6*	
			GGC	7.9*	

Note: KTC (Katsina College); UAB (Ulul Al Bab); GGC (Government Girls College)
The asterisk denote the F-ratios that are statistically significant
*(Significant at 0.001 probability level); **(Significant at 0.001 probability level);