JOURNAL OF LIAONING TECHNICAL UNIVERSITY (NATURAL SCIENCE EDITION)
ISSN: 1008-0562

FACTORS AFFECTING ENVIRONMENT-RELATED BEHAVIOURS OF SECONDARY SCHOOL SOCIAL STUDIES STUDENTS IN IBARAPA NORTH LOCAL GOVERNMENT AREA OF OYO STATE

Daramola C. O. (Ph.D) & Ojebisi O. O.

Department of Social Science Education, Bamidele Olumilua University of Education, Science and Technology Ikere Ekiti.
Email: daramola.clement@bouesti.edu.ng, ojebisiopeoluwa@yahoo.com

ABSTRACT

Today, Nigerians and human beings all over the world are facing one form of environmental problem or the other. These problems have come from various sources include global population explosion, growing demands for food, deforestation, and extraction of biological resources, poverty and uncontrolled use of the world resources, among others. Various steps have been taken to address the problems but little attention has been paid to the causal factors of these problems which are related to people's behaviour. It is on this basis that the study focuses on the factors affecting environment-related behaviour of secondary school Social Studies students in Ibarapa North Local Government Area of Oyo State.

The study adopted the descriptive survey research design using one thousand, three hundred and twelve respondents and the questionnaire was tagged "Predictor of Students' Responsible Environmental Behaviour Scale (PSREBS) and Environmental Liteartcy Test (ELT). This test was designed to measure students' feeling and tendencies about the environment. Three research questions were raised and analyzed using frequency counts, percentage and the multiple regression analysis.

Results of the study indicated that students' moderate level of cognitive skills, it also showed no significant difference between urban public schools students' and rural public school students environmental related behaviour (ERB). On the other hand, the students in urban private schools engaged in ERB more than their counterparts in public urban and public rural schools. The students could not show high willingness to put much effort into taking responsible action. In addition, it was revealed in the study that knowledge of environmental problems and issues did not explain the variation in ERB.

The study concluded that, environmental education contributes positively to the environmental literacy in terms of knowledge, attitude and skills. It is, therefore, recommended that environmental education content should be vigorously integrated into Social Studies curriculum and environmental education should start from the nursery school and progress to the university level so that students could be environmentally responsible and literate.

Key word: Environmental literacy, Environmental responsible behaviour, Nigeria, Oyo State

Introduction

Developing countries, like Nigeria, are facing rapid economic growth with its accompanying environmental problems in the form of air, water, soil, and waste problems. A more threatening

aspect is the relative unawareness of the influence of the human beings themselves on their environment (Ajiboye and Ajitoni, 2007). For, in the face of these problems, human beings have continued to deplete environmental resources extensively without thinking of the sustainability of the environment in which they live. The necessity of being aware of these problems and preventing the extensive use of environmental resources are manifest for protecting our environment and for sustainable future and quality life (Scoullos and Malotidi, 2004).

Although people seem to be indifferent for protecting the environment and developing environmental literacy and responsible behaviour for a long time, they might have opportunities to develop responsible behaviours toward the environment. Furthermore, they can have understanding for sustainable future when they become knowledgeable about the environment through education (formal, non-formal and informal) and have positive attitudes. Education is an important and crucial way of making people aware of their environment and the problems human beings may face (Ajiboye and Ajitoni, 2007). Education in general and environmental education in particular, as a solution to the problem has played and will continue to play important role in mitigating environmental problems. Environmental education grew out of movement in the early 1900s by taking students outdoor to experience nature (Gbadamosi, 2012) directly rather than trying to build on classroom conceptual instruction. These outdoor experiences have increased students' interest and concern and helped them to develop positive behaviour toward environment since then (Dogan, 1997). A review of substantial literature in the area of Environmental Education (EE) reveals that the major outcome of Environmental Education is to develop environmentally literate people (Roth, 1992). Further, the acquisition of environmentally responsible behaviour is considered as the ultimate goal of Environmental Education (Hungerford & Peyton, 1997). It is a common sense that participation of people in environmental protection studies seems to be crucially important for preventing and solving environmental problems and issues for sustainable future.

The importance of developing environmentally literate individuals as a major outcome of Environmental Education is apparent in a number of studies (Disinger, 1983; UNESCO, 1977, 1978; and United Nations, 1992). Even though the term, environmental literacy, has long been used in the professional literature, no universal definition has been indicated. Some of the researchers relate Environmental Literacy with the cognitive terms (e.g. Daudi, 1999) whereas some others believe that it should not be only related with cognitive terms, but also with affective and connative terms (Roth, 1992; Schneider, 1997; Staples, 1998). Harvey (1977) surveyed an extensive review of literature so as to conceptualize Environmental Education. He identified three levels of Environmental Education as (i) environmentally literate person, (ii) environmentally competent person, and (iii) environmentally dedicated person. Then, he defined environmentally literate person as the "one who possesses basic skills, understandings, and feelings for the human-environment relationship." Thus, EL includes four main categories; (1) Knowledge, (2) Affect, (3) Skill, and (4) Behaviour (Hsu, 1997). Several research studies have

investigated individuals' EL status in different countries (The USA, Taiwan, and Israel, among others) and the predictors of Environmental Responsible Behaviour (ERB).

The importance of these variables of environmental literacy-knowledge, affect, skill, and behaviour-has long been of interest to education researchers investigating individuals' conceptions. Indeed, educational researchers have argued convincingly that individuals' prior knowledge or experience significantly influences classroom learning and teaching (Sethusha, 2006). Children's prior knowledge and perceptions are very important for teachers and educators to consider because learning has to build on learners' existing mental structures. According to Taber (2001), a paramount factor in any meaningful learning is what has previously been learnt. That was why Frick and Kaiser (2004) argued that to be fully effective, educational campaigns need to be designed with a profound understanding of the underlying knowledge structure. Before any intervention can be taken or introduced it is important to ascertain how much children already know and what type of knowledge or intervention is essential to promote target behaviour. This is what this present study sought to do in the context of learners' environmental literacy and factors affecting their responsible environmental behaviour.

One major reasons for this interest is that children's knowledge. Conceptions and assumptions about the environment are unfortunately ignored, when developing curricula or lessons on many subjects. Children's prior knowledge or experience and perceptions are often translated by some as previously learned school facts, and for others they are misconceptions to be swept away (Geelan, 2007). Two reasons may be given for this neglect. The first is either because we do not know enough about what these conceptions and assumptions are; or the second because we do not take children's ideas and conceptions seriously to base curricula or lesson plans and decisions on them. Social Studies as well as the new emerging areas such as environmental education is no exception to this trend of ignorance (Sethusha, 2006). Hence, Ajiboye and Ajitoni, 2008) asserted that ignorance is the root of most of Nigerians' environmental problems.

In addition to the environmental knowledge, attitudes and curiosity, Cordano, (1998) pointed out that there are several background variables such as age, gender, socio-economic status, education level, motivation, culture, media (TV and press media), urban and suburban areas, and social class affecting the environmental concern and the responsible environmental behaviour(s). Among the variables mentioned age has been found to negatively correlate with environmental concern. One predominant finding mentioned in these studies is that when the individuals get older, they tend to show lower environmental concern. Other predominant findings are associated with income (residence), gender, and education level. The individuals living in urban areas showed more responsible behaviours than the ones living in rural areas. The research findings indicated that females showed more environmental responsible behaviours when compared to males. Furthermore, the findings revealed that education level was positively correlated with environmental concern. In other words, the higher the educational level the

individuals have, the higher they show responsible behaviour. It is clear from the foregoing that these findings are inconclusive and more work needs to be done.

In order to protect the environment in which we live and leave a sustainable environment for future generations, the individuals need to become more aware of influences of the problems on natural environment and on their life pace, and develop environmentally responsible behaviour so that they can cope with the problems. Studying with these mentioned variables and their influences on the responsible behaviour would support the literature and provide understanding about Nigerian culture and students.

Statement of the Problem

The curriculum of schools in Nigeria is undergoing constant changes and Social Studies Education is no exception to these changes. Although the new Social Studies curriculum has emphasized the dimensions of environment and concepts in environmental education integrated not much attention paid to children's prior environmental experiences. One major reason for this is the lukewarm attitude to the fact that learning takes place everywhere even outside of the school, which provides learners with a rich prior experience and perception for teachers to consider in their classroom interactions. Unfortunately, these prior experiences (knowledge) and perceptions are not usually considered in curricula development and or lessons on many subjects. It is essential to put these experiences into consideration and find out what knowledge and conceptions children bring along to the learning of environmental education concepts in Social Studies classrooms, and how these conceptions and knowledge may be used as a basis for introducing interventions to improve their understanding of the environment and other related concepts. This study, therefore, investigated environmental literacy level of Junior Secondary Social Studies students in Ibarapa North Local Government of Oyo State, and examined four of the factors that could influence the environmentally responsible behaviours of these students– gender, education level, types of school, and residence.

Research Questions

The following research questions guided and shaped this study.

1. What are the levels of environmental literacy of Junior Secondary 2 and 3 Social Studies students in Ibarapa North Local Government with regard to:
   (a) Environmental knowledge
   (b) Environmental attitude, and
   (c) Environmental problem- solving skills
2. What are the levels of Junior Secondary 2 and 3 Social Studies students' environmentally responsible behaviour with regard to:
   (a) Political action;
   (b) Eco-management
   (c) Industrial and public persuasion?

3. To what extent do gender education, level, type of school, and residence influence environmentally responsible behaviour (ERB) of Junior Secondary 2 and 3 Social Studies students in Ibarapa North Local Government of Oyo State?

Methodology

This chapter presents the method used for conducting the study and explains why this method was preferred for addressing the research questions. The chapter starts with the research design of the study, population and sample, data collection instrument, validity and reliability of instrument, procedure for data collection and method of data analysis.

The design of the study was a survey, that is, one of the descriptive methods of quantitative studies (Frankel and Wallen, 2006). This design helps to describe the basic characteristics of the target group. This study was designed as two-fold. In the first fold, it was aimed to describe environmental literacy characteristics of JS 2 and 3 students through collecting survey data. In the second fold, it was aimed to investigating the factors affecting JS 2 and 3 students' environmentally responsible behaviours that are assumed to be one of the dimensions of Environmental Literacy (Volk & 7McBeth, 1997).

The population for this study consisted of all Junior Secondary 2 and 3 students in public and private schools in Ibarapa North Local Government of Oyo State.

The sample for this study was 1,312 Social Studies students in Junior Secondary 2 and 3 classes in Ibarapa North Local Government Area of Oyo -State. These students were selected from 16 secondary schools in the Local Government Area. 8 of these schools were public schools while the remaining 8 were private schools. Five of the public schools were from the rural area and three from the urban centre. Similarly, five of the private schools were from urban centre and three from the rural area. The simple randomly sampling procedure was used in selecting the schools as well as the various classes in the schools. There were three main rationales for selecting these categories of students. First, the students in these classes had experienced a sufficient part of the Social Studies curricula which would be enough to influence the students' environmental literacy and environmentally responsible behaviour. Second, the schools selected and the sample size were sufficient to be representative of the students' population. Third, at the time of the study, students in JS 2 and 3 classes were not preparing for any internal or external examinations; a situation that could lead to anxiety. Thus, it was assumed that the students in the two classes might not be experiencing such anxiety.

In order to collect data from the sampled students the following instruments were used.

1. Environmental Literacy Test (ELT)
2. Predictors of Students Responsible Environmental Behaviour Scale (PSREBS).

Environmental Literacy Test (ELT)

This was a 20-item test which was adapted from Erdogan and McBeth (2006). It consists of students' environmental knowledge, attitudes and problem-solving skills. The items in the knowledge aspect were selected based on (i) knowledge of ecology; (ii) knowledge on

environmental issues and problems; and (iii) social, political and economic knowledge. The attitude aspect of the Test was designed to measure students' feelings and tendencies about the environment. The skills components of the questions were made to measure students' problem identification and problem solving skills. Finally, the responsible environmental behaviour aspect was based on the five categories of behaviour: ecomanagement, economic/consumer action, persuasion, political action and legal action.

The Test had been validated by the original author, Erdogan (2009). The knowledge aspect was validated with a coefficient of .79 using the Kuder Richardson 21 (Kr 21) formula. The attitude aspect was also validated and was found to yield a coefficient of .78 using the Cronbach's alpha correlation coefficient.
The students' responsible environmental behaviour aspect of the Test consisted of 10 items and was adapted from McBeth (2006). It consisted of items pertaining to eco-management, consume action and economic action, individual and public persuasion, and political action. In the questionnaire, the students were asked to indicate, at least, up to five behaviours that they demonstrated and or planned to demonstrate to help prevent and resolve environmental issues and problems in the last one year. The original author of this aspect had validated the instrument with the use of item analysis and the result yielded .90.

Predictors of Students' Responsible Environmental Behaviour Scale
This scale consisted of 15 items and was designed by the researcher to measure the relative influence of selected predictors of environmentally responsible behaviour among students-gender, school type (public and private), education level (JS 2 and 3), and residence (urban-rural or city-village). The name of the school was asked so as to cross-match the type of the school and the residence in which students are living.

The validation of this instrument which, in a way, implies its appropriateness, correctness, meaningfulness and usefulness, was done by taking expert opinions on research instruments. Finally, the researcher's supervisor's comments and advice resulted in the production of the final copies of the assessment scale.

A letter of authority was collected from the Department of Teacher Education, to the Principals of the schools selection for the study. This was to ease the logistics problems the researcher could encounter. The list of the public and private schools was obtained from the Teaching Service Commission and the State Universal Basic Education Board and the support and permission of these boards obtained.
The scales and tests were administered with the assistance of Social Studies teachers in the various schools sampled for the study. Three weeks were spent on the whole on administering the instrument and gathering the data.
The data collected were analyzed through the use of descriptive statistics of frequency counts and simple percentages to measure the distribution of each environmental literacy variable value.

The Multiple Regression Analyses were used to assess the most parsimonious sets of variables that best predicted responsible environmental behaviours of the students and to ascertain the amount of variance in responsible environmental behaviour that could be attributed to the variables.

Results

This chapter presents the analysis of data and results of the study. A total of 1,345 questionnaires were distributed but 1,312 were retrieved and filled correctly. The status of the background information of the respondents will be first described. This will be followed by the results of data analyses in the order of the research questions as stated in Chapter One.

4.1 Students' Background Information

Gender, Education Level, School Types and Residence

Table 1: Summary of Students' gender, education level, school type and residence

Gender	**F**	**%**
Male	611	46.57
Female	701	53.43
Total	1,312	100.00
Education level		
JS 2	689	52.51
JS 3	623	47.49
Total	1,312	100.00
School type		
Public	1,116	85.06
Private	196	14.94
Total	1,312	100.00
Residence		
Urban	740	56.40
Rural	572	43.60
Total	1,312	100.00

Table 4.1 shows that distribution of the respondents according to their gender, educational level, school type and residence. 46.57% of the students were male while 53.43% were female. The students were either in Junior Secondary 2 (52.51%) or Junior Secondary 3 (42.49%). A majority of the students (85.06%) were in public schools while 14.94% were in private schools. 740 (56.40%) were in urban schools and 572(43.60%) came from the rural areas of the Local Government.

4.2 Respondents' Environmentally Literacy

Research Question 1: What are the levels of environmental literacy of JS 2 and 3 Social Studies students in Ibarapa North Local Government with regard to:

Environmental knowledge;

Environmental attitudes; and

Environmental problem-solving skills?

Descriptive statistics were used to present the distribution, central tendency and variability of each Environmental literacy variable value.

Table 4.2: Summary Knowledge of Male and Female Students according to and Residence, Educational Level and School Type

Gender	Male	Female
% (N= 1,312)		
Residence:		
Rural	38.9	43.5
Urban	46.7	47.8
Educational Level:		
JS 2	43.5	46.3
JS 3	41.8	43.3
School Type:		
Public	43.1	45.8
Private	47.4	48.6

The summary of results in Table 4.2 shows that the knowledge of female students in the urban centre relative to environmental issues was higher than their male counterparts (47.8% and 46.7% respectively). Similarly, the female students in the rural area showed a higher performance (43.5%) than the male (38.9%). Female students in Junior Secondary 2 class showed a better performance (46.3% than the male in the same class (43.5%). The male in Junior Secondary 3 performed lower (41.8) than their female classmates with 43.3. A comparison of the performances of the female and male students in JS 2 and 3 shows that female students in JS 2 had a higher score (46.3) than female students in JS 3 and that the male students in JS 2 did better (43.5) than their male counterparts in JS 3 (41.8).

The analysis on school type shows a higher performance of female in public schools (48.6) than female in private schools (45.8) while the male in private schools scored 47.4 their male counterparts in public schools scored 43.1.

Table 4.3: Summary of Male and Female Students' Environmental Attitudes According to Residence, Educational Level School Type

Gender	Male	Female
% (N= 1,312)		
Residence:		
Rural	38.1	39.7
Urban	45.3	48.3
Educational Level:		
JS 2	35.6	37.9
JS 3	38.4	40.6
School Type:		
Public	32.1	34.5
Private	38.6	37.4

The result on the table of male and female environmental attitude according to residence, educational level and school type show that female student in rural areas with (39.7) are positive and higher than male counterpart with 38.1. While in urban areas it was 48.3 to 45.3 showing female attitude are more positive than the male.

On their educational level, female student in both rural and urban centres have more positive environmental attitude than male counterpart which are 35.6 and 37.9 in JS 2 and 38.4 and 40.6 respectively. On school type, female students in public school 34.5 shows more positive and

higher performance than male with 32.1. In private schools make students shows greater performance 38.6 than female counterparts with 37.4.

Table 4.4: Summary of Male and Female Students' Environmental Problem Solving Skills according to Residence Educational level and School type

Gender	Male	Female
Residence:		
Rural	15.6	14.4
Urban	22.3	21.3
Educational level:		
JS 2	16.3	15.7
JS 3	17.5	19.3
School Type:		
Public	14.3	18.4
Private	16.2	15.8

The summary of results in Table 4.4 shows that the knowledge of male students in problem-solving skills was higher than their female counterparts in their various educational level in public schools. While the problem-solving skills is higher in private schools (16.2 and 15.8 receptively).

The results on the table shows that the environmental problem solving skills according to residence shows that male in rural and urban centres have more knowledge of problem-solving skills then their female counterparts (15.6 and 14.4 respectively. While according to educational levels, the female counterparts have more knowledge than their male counterparts (17.3 and 19.3 in JS 3.

Table 4.5: Summary of Male and Female Social Studies Students Environmentally Responsible Behaviour with regards to Political Action

Gender	Male	Female
Residence:		
Rural	20.5	25.2
Urban	30.3	36.4
Educational Level:	24.6	25.5
JS 2	36.3	34.3
JS 3		
School Type:		
Public	30.6	45.3
Private	37.4	44.6

The results on the table shows that environmental responsible behaviour of female students in rural areas are more positive than male counterparts with 20.5 and 25.2% respectively while the urban male student attitude are more environmental responsible. Also, female students in JS 2 25.5 are more environmentally responsible then the male counterparts with 24.6%. In JS 3, male student 36.3 are more environmentally responsible than female with 34.3%.

The environmentally responsible behaviour of female students 45.3 in public schools was higher than their male counterparts with 35.6%. In the same vein, female students in private schools with 44.6 positive environmentally responsible behaviour than the male with 37.4%.

Table 4.6: Summary of Male and Female Social Studies Students Environmentally Responsible Behaviour with regards to Eco-management

Gender	Male	Female
Residence:		
Rural	14.5	15.4
Urban	28.6	30.2
Educational Level:		
JS 2	15.6	16.3
JS 3	21.5	25.8
School Type:		
Public	26.4	28.7
Private	28.3	25.3

On eco-management, the results show that female students in both rural and urban with 15.4 rural, urban 30.2 are more environmentally responsible than male counterparts with 14.5 rural and 28.6 urban. The result on their educational level shows that the higher the level the more environmentally responsible they become. This is evident as shown on the result on the table e.g. the female students are more environmentally responsible i.e. JS 2-female 24.6 and JS 3 39.16 respectively while male performance in JS 2 and JS 3 are 22.3 and 34.1 receptively.

Table 4.7: Summary of Male and Female Social Studies Students Environmentally Responsible Behaviour with regards to Industrial and Public Persuasion

Gender	Male	Female
Residence:		
Rural	30.6	28.8
Urban	45.7	44.2
Educational Level:		
JS 2	22.3	24.6
JS 3	34.1	39.1
School Type:		
Public	35.6	37.3
Private	32.2	33.6

The result of male and female social studies student environmentally responsible behaviour with regards to industrial and public persuasion with regards to residence show that the male are more environmentally responsible 30.6- rural and 45.7 urban while the female counterpart are with 28.8 rural and 44.2% urban. On their educational level, female students in JS 2 (24.6%) are more environmentally responsible than their male counterpart with 22.3% again in JS 3, female student 39.1 and 34.1 male students.

Also, on school type, female students are more environmentally responsible than their male counterpart e.g. public schools the male students scored 35.6 while the females scored 37.3. In private schools, male 32.2 and 33.6% respectively.

Discussions of Results

The purpose of the study was twofold. In the first fold, JS 2 and 3 students' level of Environmental Literacy (EL) was assessed. For this analysis, composite EL score was calculated by combining the components of EL. The procedure proposed by McBeth et al. (1997) was adapted for the present study for calculating EL score. In the second fold, the factors affecting JS 2 and 3 students' Environmentally Responsible Behaviours (ERB) were investigated. More specifically, in this fold, the present study examined the effects of various selected categorical variables, cognitive variables and personality variables on JS 2 and JS 3 students in Ibarapa North Local Government Area of Oyo State

In this study across Ibarapa North Local Government Area nation-wide study across EL composite mean score of JS 3 students was found 149.66 (*SD* =26.19, Range =15-240), reflecting a moderate level of environmental literacy. The contribution of each of four dimensions to total EL score was assumed to be equal (McBeth et al., 2008). Among the students, 27.3% showed high level EL, 64.1% showed moderate level EL and 0.9% showed low level EL. The highest scores were attained in environmental knowledge and affect, and moderate score was attained in behaviour. The lowest score was obtained in the cognitive skills.

***Environmental Knowledge*:** Among the 22 knowledge more than 75% of the students correctly answered half of the knowledge items. With these eleven items, students' knowledge was examined regarding species [microscopic living organisms], geographic pattern [layer of the Earth], cause of environmental problems, a-biotic factors [energy, light and sound], recycling [recyclable materials], ecosystem [energy in food chain], risk, health and toxicology [human health], effects of environmental problems, geography [types of water] and solutions of environmental problems [erosion and landslide]. 50% to 74% of the students correctly answered other eight items each of which assessed students' knowledge regarding habitat, natural disaster [earthquake], species and populations [endangered and protected species], cause of environmental problems [natural balance], eco-system [food chain], environmental problems [proper disposal of waste product] and clean and alternative energy [wind energy]. The remaining three items were correctly answered by only 25% to 49% of the students. These three items assessed students' knowledge of natural history [tourism and effects of nature on places], use of energy at home and causes of environmental problems on species [animals].

Cognitive Skills: This component of EL assessed students problem identification and problem solving skills of the students for the environmental pollution. Only 120 (4.98%) students correctly ordered the scientific processes for identifying and assessing the environmental problem in the given case regarding water pollution. 1128 students (%46.8) knew that identifying an environmental problem and issue starts with obtaining relevant information regarding the problem from the printed and electronic sources. As far as students' action strategies and plans for solving the water pollution was concerned, it could be stated that the students tended to demonstrate mainly three different types of environmental behaviours; physical action, persuasion and political action. 37.2% (n = 897) of students showed moderate level cognitive skills whereas 39.5% (n = 952).

Residence: Residence is the other variable the impact of which has been significantly observed in the literature. The present study indicated no significant mean difference between urban public schools students' and rural public schools students' ERB. On the other hand, the students in

urban private schools engaged in ERB more than the ones in public urban and public rural schools.

Willingness to Take Environmental Action; Another variable which contributed to the variance of ERB was willingness to take environmental action (intention). This was also confirmed with the existing literature in that intention is one of the best psychological predictors of ERB (Barr, 2007; Bogner & Wilhelm, 1996). This result indicated that the JS 2 and 3 students could transfer high environmental sensitivity into ERB whereas they could not show high willingness to put much effort into taking responsible action. Even though the students indicated high level of willingness to take environmental action, they could not appropriately turn them into action. One of the possible explanations of this poor relationship could be due to students' knowledge of the consequences of their actions on the natural environment. The other explanation might be that students were willing to take action, but did not know how to act responsibly toward the environment. This is related to know-how paradox. In addition, Kuhlemeier et al. (1999) discussed other possible reason to explain this poor relationship. They asserted that school-aged students are more dependent to their parents. The students do not have entire liberty, for example, to do shopping. They may want to purchase appropriate products, but they are not allowed.

Environmental Knowledge; The relationship between environmental behaviour and environmental knowledge was significant, but low in magnitude ($\beta = 0.08$) suggesting that students were knowledgeable about the ecology and natural sciences, but they could not appropriately transfer their knowledge into action. The low strength of the relationship was observed to be due to the fact that Test for Environmental Knowledge basically assessed students' knowledge on ecology, environmental sciences, problem and issues, and socio-politic-economic knowledge, but not the knowledge on action strategies. Barr (2007) in this sense reported knowledge for action as a significant predictor of behaviour. Parallel with this finding, as also reported by Hsu and Roth (1999), knowledge of environmental action was one of the best predictors of ERB. In addition, it was indicated in the study that knowledge of environmental problems and issues did not explain the variation in ERB.

Recommendations

It is recommended that government in all tiers should embark on environmental protection activities such as aforestation activities programmes to check the menace of wind and erosion activities on buildings and other structures. This is to improve the qualities and quantities on residence especially in the urban areas.

Furthermore, the government at all tiers to enact law that would prevent reckless extraction of natural resources. Mining activities can stimulate earth quake. The curricular developers and policy makers be encouraging to always formulate learning activities that would encourage indepth acquisition of environmental literacy and development of environmentally responsible behaviour.

The environment is dynamic so also the curriculum be made dynamic so that learners at all levels would be able to learn with regards to environmental demands and realities of the moment. It is also recommended that environmental education content be vigorous integrated into social studies content.

Environmental Education (EE) should start from the nursery to the university so that student could be environmentally responsible and literate.

References

Adams, W.J. 2003. *Promoting environmentally responsible behaviour: An evaluation of the global learning and observations to benefit the environment (GLOBE) programme.* Unpublished masters' thesis, University of South Africa, South Africa.

Ajiboye, J.O. 1996. A self-learning programme, the modified lecture method and students' cognitive and affective learning outcomes in some population education concepts. Ph.D Thesis, Department of Teacher Education, University of Ibadan, Ibadan.

Barr, S. 2007. Factors influencing environmental attitudes and behaviours: A UK case study of household waste management. *Environment and Behaviour, 39*(4), 435-473.

Daudi, S.S. 1999. Environmental Education as a vehicle to promote environmental

EETAP – Environmental Education & Training Partnership 2002. Johannesburg, summit: Implications for environmental education. EETAP Resource Library "Advancing Education & Environmental Literacy", EPA, 111.

Hines, J., Hungerford, H., & Tomera, A. 1986/87. Analysis and synthesis of research on responsible environmental behaviour: A meta-analysis. *The Journal of Environmental Education, 18*(2), 1-8.

Hornik, J., Cherian, J., Madansky, M., & Narayana, C. 1995. Determinants of recycling behaviour: A synthesis of research results. *Journal of Socio-Economics, 24*(1), 105-127.

Hungerford, H.R., Peyton, R.B., & Wilke, R.J. 1980. Goals for curriculum development in environmental education. *The Journal of Environmental Education, 11*(3), 42-47.

Knapp, D. 1997. Twenty years after Tbilisi: UNESCO interregional workshop on reorienting environmental education for sustainable development. *NAI's Environmental Education Newsletter, 1*(1), 6.

literacy in low literate communities of the world. (pp. 85-92) International Workshop on Environmental Education in Asia and Beyond, October, 11-15, Korea.

Marcinkowski, T., & Mrazek, R. (Eds.) 1996. *Research in environmental education research, 1981-1990.* Troy, OH, NAAEE.

McBeth, W. (Primary investigator – PI). 2006. National environmental literacy assessment of middle school students in the U.S. (A Special Project Award to the North American Association for Environmental Education [Award no NAO6SEC4690009] by the National Oceanic and Atmospheric Administration, U.S. Department Commerce). Washington, D.C.: NAAEE.

McCrea, E.J. 2006. The roots of environmental education: How the past supports the future. Retrieved on 07 Sepetmber, 2006 from www.eetap.org

Roth, C.E. 1992. *Environmental literacy: Its roots, evolution and directions in the 1990s*. (ERIC Reproduction service No. ED348 235).

Sato, M. 2006. *Evolving environmental education and its relation to EPD and ESD: Overview of the conceptual development based on a series of international discussion on environmental education.* A paper presented at the UNESCO Expert Meeting on Education for Sustainable Development (ESD): Reorienting Education to Address Sustainability, 1-3 May 2006 at Kanchanaburi, Thailand.

Simmons, D. 1995. *Working paper # 2: Developing a framework for national environmental education standards.* In papers on the Development of Environmental Education Standards (pp. 53-58). Troy, OH: NAAEE.

Stapp, W.B. 1975. UNESCO's Environmental Education program. *The Journal of Environmental Education, 6*(4), 6-8.

Stapp, W.B. 1978. Impressions on the first intergovernmental meeting on environmental education. *The Journal of Environmental Education, 9*(2), 2-4.

Swam, M. 1984. Forerunners of environmental education. In N. McInniss and D. Albrecht (eds), *What makes education environment?* (pp. 4-20) Medford, NB.J: Plexus Publishing Company.

UNESCO, 1978. Intergovernmental conference on environmental education: Final report. 14-26 October, UNESCO and UNEP: Tbilisi (USSR).

UNESCO 1997a. International Conference Environment and Society: Education and Public Awareness for Sustainability; Declaration of Thessaloniki. Retrieved on October 02, 2006 from http://ncseonline.org/ncseconference/2003 conference/thessaloniki_declaration.pdf.