DISCOVERY

# The awareness and effectiveness of environmental education among undergraduate students

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## ABSTRACT

This study examined the level of awareness and effectiveness of environmental education among tertiary students in Adeyemi College of Education, Ondo. A self-designed, structured questionnaire was used on a sample of one hundred (100) students to elicit information from them on their knowledge of environmental education. Mean, standard deviation and t-test were employed to analyze the data obtained. The findings revealed that most students were aware of the key environmental issues and they also understood the causes of some of these environmental issues. The findings further show that students had ideas about the problems facing the effectiveness of environmental education. This data was used as a springboard for exploring ways by which environmental education (EE) in tertiary institutions might capitalize on student knowledge and hence progress towards environmental action taking; and how this might occur through tertiary students being nurtured into the role of informed decision-makers and action-takers. Furthermore, it is therefore recommended that interactive teaching methodologies should be adopted in enhancing active teaching and learning of Environmental Education. The study finally concluded that environmental education in tertiary schools must be given equal importance like other conventional courses so that students who are the future citizens must be encouraged in eco- friendly activities for solving environmental problems.

**Keywords:** Environment, Education, Awareness, Effectiveness, Tertiary students

## 1. INTRODUCTION

The role that knowledge about environment can have in the education of its youth is an important question for any society which must not be overlook or handle with flippancy. Our environment is inseparable from life due to the indispensable attention-getting phenomenon it entails. Someone who described it thus: "environment is not a residual, but an entity which incorporates attitudes, values, institution economic, science and technology and ideology. On this basis, there is every need for the proper management of our environment which calls for effective environmental awareness to all and sundry in tertiary institutions at all levels especially in developing countries like Nigeria which has little or no provision for such awareness in curriculum or syllabus in areas of some related subject(s) among which is Environmental Education (EE) (Victoria, 2013; Osman et al., 2016).

DISCOVERY SCIENTIFIC SOCIETY

Why do we have Environmental education (EE)? It is evident that our "world" is quite changing or dynamic. The pressure on the environment due to climate change like higher temperature (Ansah et al., 2017), shifting seasons (Biswas et al., 2015), more frequent and extreme weather events (Bloetscher et al., 2016) such as flood and drought (Singh et al., 2015), the challenges for food production (Pandve, 2015; Aryal, 2015), overpopulation (Jargin, 2015), greater pollution (Kisku and Markandeya, 2015), the massive deforestation of forest for commercial purposes (Afunmilayo, 2016), the harm caused by numerous oil spills, the release of dangerous gases (greenhouse effect) in the atmosphere (Belcaro et al., 2016; Sadiq et al., 2016) becomes even more daunting. These problems bring about changes in social, economic and environmental consequences and in the face of these numerous, growing and complex environmental problems and crisis, we believe that humankind must alter its behaviour from contemporary, unsustainable ways to new and more responsible behavioural patterns.

Therefore environmental educators have globally accepted this role of preparing students to become critical thinkers, informed decision-makers and able communicators by educating them about their environment. Environmental Education was defined as "a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges and foster attitudes, motivations and commitments to make informed decisions and take responsible action" (UNESCO, 1978). UNESCO, (2014) emphasizes the role of Environmental Education (EE) in safeguarding future global developments of societal quality of life through the protection of the environment. If so, then Environmental Education (EE) should help to develop learners' environmental literacy and pattern of responsible behaviour. However, He argues that many of the environmental policies and programmes have failed to attain their objectives or fallen short of the ends they were set up to attain. And through several investigations carried out by researchers on various reasons for Environmental education ineffectiveness in classrooms, some main factors was discovered among many which include; lack of time, money and training, lack of support and other curriculum pressures.

Meanwhile, the goals of Environmental Education (EE) is to instill in learners knowledge about the environment, positive attitudes toward the environment, competency in citizen action skills and a sense of empowerment. In order to reach this goal of environmental literacy in tertiary students, Environmental Education programs must be effective. It is on this premise that this study is conceived to focus on the effectiveness of Environmental Education in sharpening students' behaviour bearing in mind the militating factors and other conditions associated to it (Akinnubi et al., 2016).

**Research problem**

Many universities and schools now have some kind of programmes with an environmental component. The major question is whether these programs are having a beneficial influence on the environmental values of students. Surveys of young people in several countries report generally low levels of factual knowledge relating to environmental issues. Examples include students confusing ideas about phenomena such as greenhouse effect and ozone depletion, or displaying poor understanding of processes such as melting or recycling (Rickinson, 2001). Amidst numerous, growing and complex environmental problems, the need for the preparation of world problem solvers is as great as ever (Wisconsin, 1994). Scholars agree that Environmental Education has enormous influencing role in forming people's knowledge and attitude and is highly practical in motivating to improve and protect environment (Asta, 2011). It is on this note that this study intends to examine the awareness and effectiveness of Environmental Education among undergraduates.

**Purpose of the study**

The drive behind this study is aimed at finding out the effectiveness of Environmental Education and behaviour among undergraduate students with regard to the barriers, consequences or outcomes and possible panacea. It also focused on how conscious and informed they are about the environmental issues around them. Also, it seeks to examine the extent to which Environmental Education has been able to influence the students' behaviour. Besides, the study goes further to provide suggestions that can enhance the effective implementation of Environmental Education in tertiary institutions.

**Research questions**

To achieve the aforementioned purpose, the following research questions are formulated to be tested by the study.

Are students fully aware of environmental education?

Are students well informed about trending environmental issues?

Are there enough supports to facilitate the students' learning process of Environmental Education?

What is the behaviour of students toward environmental issues?

Are there possible barriers militating against the implementation of functional Environmental Education among tertiary

students?

**Research hypothesis**

The level of environmental awareness among science and non-science students is significantly low.

There is no significant difference in the level of environmental awareness among male and female students.

**Literature Review**

**Environmental education: its meaning and concept**

Environmental awareness is the main product of environmental education. There are different definitions of this concept which is justified since the environmental awareness is a dynamic dimension. The dimension changes every day as the man itself, including changes in the nature and their mutual relationship. Environmental Education (EE) is seen as an avenue that prepares all citizens with essential skills that contribute to healthier, more environmentally sustainable and economically prosperous communities according to North American Association for Environmental Education NAAEE, (2008). Education involves the impacting of knowledge and development of skills for self-realization. It is also concerned with development of an individual's ability to think, reason, and create. Environmental Education is basically the study of relationship and interactions between natural and human systems.

Today, there are many information of global warming, recycling, irrational use of natural resources, extinction of certain plant and animal species, organic eco-tourism. All of these are elements of the environmental awareness (Goleman, 2010). Environmental Education is a complex and multidisciplinary field which covers or contains a variety of different topics or concepts that are related to the environment.

**Environmental education: its importance and influence on students' behaviour**

The importance of environmental studies is as follows:

To clarify modern environmental concept like how to conserve biodiversity.

To know the more sustainable way of living

To use natural resources more effectively

To know the behaviour of organism under natural conditions

To know the interrelationship between organisms in populations and communities

To aware and educate people regarding environmental issues and problems at local, national, and international levels.

Pro environmental behavior was cited as "behaviour the consciously seeks to minimize the negative impact of one's actions on the natural and built world", Horka and Vystricil, (2013) argued that education should be aimed to attitudes and behaviours which will determine the way of social and economic development in accordance with sustainable development. Surveys of young people in various countries report generally positive environmental attitudes i.e. greater agreement with pro-rather than anti-environmental sentiments. However, several studies find students to be less environmentally conscious in relation to certain issues, particularly those linked to their own lives and material aspirations. Therefore much emphasis was made on the need for these behaviours to increase and to encompass consumption practices and social political actions, as well as conservation practices. Also, it becomes imperative to focus more on the human rather than on the physical front for the solution of environmental problems considering that education as a vital instrument of systematic change is fundamental if we are to successfully change people's attitudes towards the environment (Meyers, 2004). It is now well established that knowledge about the natural world will in turn impact one's actions on behalf of the natural world.

**Environmental education: its effectiveness and barriers**

Active Environmental Education goes beyond teaching about environmental issues to imparting the students with necessary attitudes, behaviour, knowledge and actions practical skills that will enable them to continue learning after they leave the school to facilitate sustainable lifestyles because active Environmental Education (EE) is an ongoing process. Therefore, it was added that Environmental Education (EE) needs to be embedded in the curricula and action so that it continues even when there are staff changes. According to Carvalho et al., (2012), the entire education is environmental and it should include environmental dimension during the teaching process. Environmental education from the view of Mazoloumiyan et al., (2012) is the most effective method for protection of our environment and it is aimed to finding of best methods for information presentation and quality determination.

Most projects fail in implementation because the implementers are not fully committed to the project or do not fully understand the rationale of such project or more importantly do not possess the necessary knowledge, skills or information. (Omoogun et al., 2014) to achieve the goals of Environmental Education, the active teaching learning approach is widely recommended by several earlier workers who have found that traditional classroom lecture based teaching learning approach have limited effectiveness in helping students to retain information, become self-learners and develop skills in transferring knowledge and solving problems.

Field-based approaches also provide students with opportunities for learning in real situations connect new learning to students' prior experience (Smith, 2002), facilitate potential academic outcomes leading to self-perceptions provide significant connections between schools and the local communities or environment actively engage students in making sense of what they are learning. Hence, field based education is one component of active environmental education.

What are the barriers to the effective implementation of Environmental Education (EE)? In terms of public awareness, the general paucity of environmental awareness among the citizenry still leaves much to be desired. Many people do not sufficiently understand the meaning and significance of the environment. Some see it as sanitation; others see it as the wilderness, deforestation or pollution. However, there is significant interest in environmental issues, going by the number of NGO's environmental conferences, seminars, symposia, journals, periodicals, TV and radio talk shows, researches and even government sponsored programmes on sustainability of the environment. For instance, in June 2008, there was a Cross River Stakeholders Summit on the Environment and the theme: "Greening the environment for sustainable economic development". These are indications of the level of environmental awareness in the country. But how many people are really affected by all these seminars when there is no light to watch the TV and listen to the messages? These strategies are certainly not enough to achieve the desired goal of having an environmentally literate society. For instance, how many people participate in such seminars and workshops? How many people can afford to buy and read the newspapers etc? (Anijah et al., 2013) There is no doubt that some of the efforts made by the Federal government to improve the quality of the environment as mentioned earlier are quite commendable but surprisingly most of the policy initiatives have not yielded the expected results (Wiedemann and Farmers, 1993).

Apart from the above problem observed, other challenges or hindrances to effective Environmental Education execution are discussed as follows: (i) Mainstreaming environment in education. (ii) Poor integration of Environmental Education into university General Studies Programme. (iii) Inappropriate use of teaching methodology (iv) Inadequate training and retraining of teachers. (v) Lack of fund for Environmental Education programmes.

## 2. RESEARCH METHODOLOGY

This study is a descriptive research which studies the awareness and effectiveness of environmental education among undergraduate students in Adeyemi College of Education, Ondo state. A self- designed, structured questionnaire was used on a sample of one hundred (100) students to elicit information from them on their knowledge of environmental education. Simple random sampling technique was adopted to select one hundred (100) students which consist of fifty (50) students from science departments and fifty (50) students also from non-science departments in Adeyemi College of Education comprising of fifty (50) males and fifty (50) females irrespective of their departments. The research instrument was content validated by an expert in science education department and necessary corrections were made so that the instrument will measure what it is designed to measure. Mean, standard deviation and t-test were employed to analyze the data obtained.

**DATA ANALYSIS PROCEDURE**

***Research question one***

Are students fully aware of environmental education?

**Table 1** The mean and standard deviation showing the level of environmental awareness among students

| S/N | ITEMS | MEAN | STANDARD DEVIATION | REMARK |
|---|---|---|---|---|
| 1 | Climate changes, conservation of natural resources of ecosystem are some of the concepts in environmental education. | 3.12 | 1.05 | AGREED |
| 2 | Environmental education enhances our familiarization with the environment. | 3.55 | 1.25 | AGREED |
| 3 | Teaching and learning of environmental education help to Secure the environment. | 3.44 | 1.11 | AGREED |

| | | | | |
|---|---|---|---|---|
| 4 | Teaching and learning of environmental education enables us to know various ways of conserving natural resources. | 3.33 | 1.05 | AGREED |

The finding Table 1 shows that the students are aware of climate change conservation of natural resources and ecosystem (3.12=1.05). They are also aware that environmental education enables us to familiarize ourselves with the environment, to secure the environment and to know the various ways of conserving natural resources (3.55=1.25, 3.44=1.11 and 3.33=1.05).

***Research question two***

Are students well informed about trending environmental issues?

**Table 2** The mean and standard deviation showing the level of information about trending environmental issues

| S/N | ITEMS | MEAN | STANDARD DEVIATION | REMARK |
|---|---|---|---|---|
| 1 | Climate change is caused as a result of ozone layer depletion, greenhouse effect global warming and deforestation. | 3.33 | 0.95 | AGREED |
| 2 | Climate change can lead to flooding, food insecurity, ill health, high temperature, destruction of lives and properties. | 3.77 | 1.14 | AGREED |
| 3 | Oil spillage is an example of land and water pollution. | 4.25 | 1.45 | AGREED |
| 4 | Fuel scarcity is one of the current problems faced in the country. | 4.00 | 1.44 | AGREED |

The Table 2 indicates that respondents are fully aware of the causes of climate change (3.33=0.95). They are also aware of the impact of and problems caused by climate change and environmental degradation on the environment (3.77=1.14, 4.25=1.45 and 4.00=1.44).

***Research question three***

Are there enough supports to facilitate the students' learning process of environmental education?

**Table 3** Extent to which supports are rendered to enhances environmental education learning process.

| S/N | ITEMS | MEAN | STANDARD DEVIATION | REMARK |
|---|---|---|---|---|
| 1 | Standard textbooks and other literature materials on environmental education are recommended and made available in the school. | 4.08 | 1.00 | AGREED |
| 2 | Not all the contents of environmental education are taught. | 3.77 | 1.12 | AGREED |
| 3 | Environmental education personnel are invited to enlighten us on environmental issues. | 3.84 | 0.88 | AGREED |
| 4 | Occasionally, we are taken out of the school for field trip. | 4.00 | 1.11 | AGREED |

From the table 3, it shows that the supports like recommendation and provision of standard textbooks, teaching of all environmental education contents and invitation of resource person in environmental education and organization of field trip are given to facilitate the students' learning process of environmental education (4.08=1.00, 3.77=1.12, 3.84=0.88 and 4.00=1.11).

***Research question four***

What is the behaviour of students toward environmental issues?

**Table 4** Mean and standard deviation showing the behaviour of students toward environmental issues

| S/N | ITEMS | MEAN | STANDARD DEVIATION | REMARK |
|---|---|---|---|---|
| 1 | Workshop and seminars are attended or conducted on environmental management issues in and outside the school. | 4.00 | 1.13 | AGREED |

| | | | | |
|---|---|---|---|---|
| 2 | Too much heat prior to high temperature reduces the level of our concentration during the class. | 3.84 | 1.27 | AGREED |
| 3 | During practical, bursen burners are used instead of kerosene store to prevent environmental pollution. | 3.92 | 1.03 | AGREED |
| 4 | After the school hour, we participate in environmental sanitation | 3.92 | 1.03 | AGREED |

The table 4 shows that the students react positively toward certain environmental issues by attending or conducting seminars on environmental management, using bursen burners instead of kerosene store to prevent pollution and engaging in environmental sanitation (4.00=1.13 and 3.92=1.03). They also react negatively by losing their level of concentration due to much heat (3.84=1.27).

***Research question five***

Are there possible barriers militating against the implementation of functional environmental education among tertiary students?

**Table 5** The mean and standard deviation showing the barriers militating against the implementation of environmental education

| S/N | ITEMS | MEAN | STANDARD DEVIATION | REMARK |
|---|---|---|---|---|
| 1 | Environmental concepts such as weather and climate, environmental hazards, ecosystem, environmental health and conservation of natural resources are in some of the courses we've taken. | 3.63 | 1.09 | AGREED |
| 2 | In our department, environmental education related courses are offered as core course. | 3.77 | 0.94 | AGREED |
| 3 | At times, we partake in other environmental education related courses offered by other department. | 3.56 | 0.95 | AGREED |
| 4 | My lecturer's method of teaching makes the environment concepts not understandable. | 3.84 | 0.92 | AGREED |

From the Table 5, it indicates that there are no possible problems facing the implementation of environmental education in terms of the inclusion of the environmental concepts in some of the courses offered, the participation of the students in environmental related courses and the delivery methodology (3.63=1.09, 3.77=0.94, 3.56=0.95 and 3.84=0.92).

**Analysis of hypothesis**

***Ho1*:** The level of environmental awareness among science and non-science students is significantly low. The only variable is the level of environmental awareness among science and non-science students. T-test is used to analyze the data obtained. A summary of the result is presented in Table 6.

**Table 6** T-test analysis of the level of environmental awareness among science and non–science students

| Variables | N | Mean(x) | Standard Deviation (SD) | Calculated t-value ($t_{cal}$) | df | Critical t-value ($t_{tab}$) at 0.05 | Remark |
|---|---|---|---|---|---|---|---|
| Science | 50 | 3.12 | 1.05 | 2.96 | 98 | 1.96 | Significant |
| Non-science | 50 | 3.55 | 1.25 | | | | |

The results presented in this table 6 reveals that the calculated t- value, $t_{cal}$ of 2.96 is found to be higher than the critical t-value, $t_{tab}$ of 1.96 (i.e. $t_{tab} < t_{cal}$) at 0.05 level of significance and 98 degree of freedom. With this result, the null hypothesis is rejected while the alternate hypothesis is accepted. This means that the level of environmental education among science and non-science students is significantly high within the study area. In other words, the level of awareness of environmental education among non-science students with mean of 3.55 is higher than that of the science students with mean of 3.12 in the study area.

***$H_{02}$:*** There is no significant difference in the level of environmental awareness among male and female students. The only variable is the level of environmental awareness among male and female students. T-test is used to analyze the data obtained. A summary of the result is shown in table 7.

**Table 7** T-test analysis of the level of environmental awareness among male and female students

| Variables | N | Mean(x) | Standard Deviation (SD) | Calculated t-value ($t_{cal}$) | Df | Critical t-value ($t_{tab}$) at 0.05 | Remark |
|---|---|---|---|---|---|---|---|
| Male | 50 | 3.44 | 1.11 | 3.10 | 98 | 1.96 | Significant |
| Female | 50 | 3.33 | 1.05 | | | | |

The results presented in this table 7 indicate that the calculated t-value, $t_{cal}$ of 3.10 is higher than the critical t-value, $t_{tab}$ of 1.96 (i.e $t_{tab} < t_{cal}$) at 0.05 level of significance and 98 degree of freedom. Based on this result, the null hypothesis that "there is no significant difference in the level of environmental awareness among male and female students" is rejected while the alternate hypothesis is accepted. This means that there is significant difference in the level of environmental education among male and female students within the study area. Invariably, the level of awareness of environmental education among male with mean of 3.44 is higher than that of the females with 3.33 in the study area.

Female students who demonstrated lower level of environmental awareness as compared to male was corresponding with the results of previous studies (Anderson et al., 2007; Ewert & Baker, 2001; Mainieri, 1997; Olofsson & Ohman, 2006; Tikka et al., 2000). This implies that undergraduate students are generally fully aware of environmental issues. The outcome of the study is in consonance with the results of Azizan, (2008) which says that "students had a good awareness about environmental problems". This was also supported by Wahida et al., (2004) who stated that "the awareness towards environmental issues and awareness about the need to maintain the environment had increased among the society (students)". In view of this, awareness creation and environmental education are the measures to address the impact of environmental related issues.

## 3. CONCLUSION AND RECOMMENDATIONS

The results of this research obtained generally shows that the level of environmental education and behaviour is high among undergraduates. Meanwhile, it is higher among non-science students and also among male students than among science students and female students respectively. This shows that to improve the environmental practices, students should be provided with the knowledge to build awareness and develop a positive attitude towards the environment. Therefore it is suggested that environmental education should be inputted into all studies to ensure the continuity of environmental practices among students. Teaching and learning methodology in Environmental Education also should be focused to methods in field work such as conducting experiments and practical research in the field to solve environmental issues. Proactive role should be played by all tertiary institutions in improving the behavior of students to care and practice in environmental conservation.

**Ethical approval**

Not applicable.

**Informed consent**

Not applicable.

**Conflicts of interests**

The authors declare that there are no conflicts of interests.

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**Data and materials availability**

All data associated with this study are present in the paper.

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