

Adequacy of Knowledge of Environmental Concepts among Junior Secondary School Teachers for the Multidisciplinary Approach of Implementing Environmental Education Curriculum

Omoogun¹, Ajayi C, Onnoghen¹, Usang Nkanu & Ateb², Gertrude Alorye

¹Department of Curriculum & Teaching
Faculty of Education, University of Calabar

²Department of Educational Foundations
Federal College of Education, Obudu.

INTRODUCTION

The important attributes of Environmental Education include the creation of environmental awareness, sustained concern for the environment and active participation in promoting environmental conservation. It is a subject necessary for every individual in the society, since every member of the society has something to do with the environment. This is perhaps why Gifford, Hay and Boros (1982) opined that a well-educated populace is the best insurance for preservation of the environment. Similarly, Ezeanya (1999) asserted that environmental education is essential to change the destructive relationship between human and the rest of nature. Ukpong (1993) emphasized the importance of environmental education in achieving the goals of environmental protection and management. He stressed various educational strategies such as analysis, sensitization, information and education among others that can provoke knowledge that would change the attitude and values towards the environment.

To prepare students with positive attitude towards the environment underscores the advocacy for Environmental Education curriculum (EEC). Essentially, Environmental Education is seen as a viable means of solving environmental problems. Jacobson (1985) summed up the aim of Environmental Education to include: helping individuals to acquire an awareness of and sensitivity to the total environment and to develop a basic understanding, skills, values of the total environment and the interrelationship between human and the environment

Sequel to the UNESCO/UNEP (1977) recommendation on EE curriculum, the Nigerian Education Research and Development Council (NERDC, 1998) developed the EEC for all the tiers of the education system- primary, junior secondary, and senior secondary schools and the non-formal education. The curriculum has three major objectives:

1. acquiring knowledge and understanding of the environment.
2. developing skills for solving environmental problems.
3. developing attitudes and values for the environment.

To achieve these objectives, EEC is structured into ecological foundations; human environment and development; environmental change and impact; and sustainable development. These are further divided into sub themes and the teacher is expected to incorporate them into existing school subjects.

The formal education system in Nigeria is organized in subject department basis and new subject which arise as a result of societal needs and demands will always be difficult to be introduced. Inyang-Abia (2001), many strategies have been suggested for adoption of EE in order to achieve the goals and objectives of environmental education. Among such strategies are:

- i. The introduction of environmental studies as a special subject taught by specially trained teachers. This entails offering EE as a course of study.
- ii. The introduction of environmental education issues into the various traditional subjects such as mathematics, English, history, science etc without having a need to design new courses or units. This is also known as the infusion approach as it involves the proper conceptualization of the link between EE concepts and the other contents within a subject.
- iii. The multidisciplinary approach: This is the approach in which EE is taught in two or more disciplines expressed in terms of interrelationship regarding EE issues. This approach is anchored on the fact that EE is not a new subject or discipline but that it is rather the orientation and dovetailing of different subjects and disciplines drawing from and striking a relationship between all these subjects. This is usually with modification of the subject matter in the traditional school subjects in line with the scope, aims, objectives, strategies and guiding principles of environmental education.

The Intergovernmental Conference on Environmental Education organised by UNESCO in cooperation with UNEP launched the International Environmental Education Programme in 1975. This was in response to Recommendation 96 of the Stockholm Conference held in 1972 which required International agencies to take

necessary steps to establish an international programme in Environmental Education, and to be interdisciplinary in approach, in schools at all levels of education. The objectives and priorities of EE include:

- i) to develop, refine the theory, principles and applications of environmental education as a dimension of knowledge and experience;
- ii) to integrate environmental education into existing formal and non-formal educational systems;
- iii) to assist governments in incorporating environmental dimension in educational policies, programmes and projects; and
- iv) to promote and support pre-and in-service training of personnel in environmental education.

Basically, the intergovernmental conference on environmental education organized in 1977 in Tbilisi, USSR, constituted the culminating point that laid the basis for the development of environmental education including the definition of goals, objectives and guiding principles of environmental education as a common ground for its activities in all processes of education.

.Nneji (2003) elucidated the responsibilities of the teacher in the educational system noting that the teacher is responsible for the control and management of all that obtains in the learning environment .No wonder Ukeje (1976) emphasized that teachers are at the hub of any educational system. For upon their number, quality, devotion, effectiveness depend the success of the system and no educational system can be stronger than what the teachers are. 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.

Teachers Knowledge

The key implementers of an environmental education programme are the teachers. Enuokoha (1991) commented that teachers' personal understanding of subject matter content exerts a powerful influence on the instructional methods and consequently the performance of pupils. No wonder the National Policy on Education, (FRN,2004) reaffirmed that no educational system rises beyond the level of the teachers.

Offorma and Ogah (2003) noted that effective teaching demands that the teacher should have a sound knowledge of all that the students must know together with a capability or an ability to relate content, method and sequence as well as the tempo of his work to the individual needs of the students

One of the reasons that some available curriculum materials are not being utilized by teachers, according to Ughamadu (1992), is lack of the necessary skills to operate them. Many researchers long agreed that mastery of the subject matter by the teacher is tantamount to effective teaching since it enhances the teacher's ability to plan and present the lesson effectively. They added that mastery of the subject matter facilitates the teachers' need to consider the general aims and specific educational outcomes the lesson intends to achieve, takes account of the content, and how to monitor and evaluate the learning processes (Esu,2004; Suleiman,2005; Fennema & Franke,2006; Isangedighi, 2007; Calderhead, 1984; Heywood, 1982; Waterhouse, 1983).

Robertson (1981) opined that mastery of the subject matter empowers the teacher to exhibit a behaviour which enhances their status to establish their authority in the classroom. A good knowledge of the subject, Robertson continued leads to interest and enthusiasm for the subject and the ability to set up a good learning experience. Similarly, Obebe (1980) warned that teachers who do not have the grasp of the subject matter with expertise or mastery find it very difficult to present a good lesson in the classroom. Etim (1985) maintained that teachers should have a thorough understanding of their discipline as the teacher who knows the subject matter very well can impart same adequately to the students and can wield a greater influence on them.

Teacher's knowledge affects both the content and processes of his instructions and influences what the teacher does and how he teaches the subject. One of the focus of the study is to determine teachers' knowledge of Environmental Education.

METHODOLOGY

Research design: The research design adopted the descriptive survey that seeks the views and opinions of a part or all of a population and describes the findings. This study was conducted in Cross River State (CRS).

The sample for the study included 737 teachers selected from 67 public secondary schools in Cross River State using a multi-stage proportionate sampling technique. From the 67 schools sampled, all the JSS3 teachers of subjects recommended by the National Policy on Education (2004) to be offered at the Junior Secondary School (JSS): English, Mathematics, Integrated Science, Social studies, Introductory

Technology, Religious Knowledge, Agricultural science, Business studies, Music/Fine Arts, French, Home Economics, Physical and Health Education. The sample size for the study was 737 teachers.

Instrument for data collection

The instrument for data collection was the questionnaire consisting of 30 items that seeks to determine the basic knowledge of teachers in EE curriculum. The items were validated by 3 experts from curriculum and educational measurement and evaluation. They were required to use their expertise to determine the suitability of the items in the instrument for the data collection. For further vetting and to ensure that the items are appropriately structured in terms of clarity of expression, and adequacy, the instrument was also examined by a language expert. Their observations were used to improve the quality of the instrument. These items were then approved for face validity as well as their relevance and appropriateness for the study.

The TCNQIEEC was trial tested in selected schools in Akwa Ibom State. Fifty copies of the questionnaire were administered to 50 teachers in 3 schools in Akwa Ibom State. The internal consistency reliability of the instrument was determined using the Cronbach Alpha (alpha) formula. The trial test result for the instrument yielded an alpha co-efficient of 0.74. This procedure is preferred because alpha is often based on parts of a test especially where the parts of the test are individual items (Wiersma and Jurs, 1985).

The TCNQIEEC constituted the source of data collection for the study. A total of 737 copies of the questionnaire were administered to teachers in 67 public secondary schools in three education zones of Cross River State. The researchers visited and consulted the various principals whose schools were to be used for the study to obtain permission to be allowed to administer the instrument to the teachers. The questionnaire was administered to the teachers by the researchers and two trained research assistants. The research assistants were Science Education post graduate students. They were briefed on the purpose of the research and their responsibilities in ensuring that valid and reliable data is obtained from the respondents. A total number of 737 copies of the questionnaire were administered and collected.

Method of data analysis

Teachers' responses were recorded on a four point rating scale. The responses from Section B were scored as follows: Very High Extent (VHE)- 4points; High Extent (HE)-3points; Some Extent (SE)-2points and Not at All (NA)-1point. The cut-off point for Section B was 1.5 the lower limit of the least expected score (SE)-2 points. Answers to the research question was provided through the use of frequency counts and means while the was tested using the independent t-test.

Results and Discussion

Research Question

Do teachers have the basic knowledge of Environmental Education concepts?

Data for answering the above research question were obtained from section c of the instrument and the results are presented in table 1

Table 1
Teachers' Knowledge of Environmental Education Concepts

Item No	Content area	X	\bar{X}	Remarks
1	Components of the solar system	1010	1.37	Inadequate
2	Source of earth's energy	1047	1.42	Inadequate
3	Biotic & abiotic factors	1157	1.57	Adequate
4	Food webs and food chains	1334	1.81	Adequate
5	Decomposers have no function in the Ecosystem	1341	1.82	Adequate
6	Biochemical circles	2491	3.38	Adequate
7	Continuous cropping	1304	1.77	Adequate
8	Tree planting	1570	2.13	Adequate
9	Sustainable development	1865	2.53	Adequate
10	Water pollution	1135	1.54	Adequate
11	Water quality can be improved by cutting down trees	1658	2.25	Adequate
12	Pollution control (recycling)	1392	1.89	Adequate
13	Pollution control (production attitude)	1223	1.66	Adequate
14	Wildlife/game reserve	1113	1.51	Adequate
15	Wildlife/zoological garden	1150	1.56	Adequate
16	Bush burning/extinction of life	1172	1.59	Adequate
17	Pollution/extinction of wildlife	1319	1.79	Adequate
18	Pollution and species of fisheries	1761	2.39	Adequate
19	Farming and industry	1386	1.88	Adequate
20	Urbanization	1319	1.79	Adequate
21	Depletion of forest	1209	1.64	Adequate
22	Land degradation	2432	3.30	Adequate
23	Ozone layer depletion	1452	1.97	Adequate
24	Soil conservation	1695	2.30	Adequate
25	Land expansion	1695	2.30	Adequate
26	Disposal of solid waste in streams and rivers	1798	2.44	Adequate
27	Degraded environment and economic growth	1349	1.83	Adequate
28	Pollution and Global warming	1415	1.92	Adequate
29	Rapid population growth and sustainability	1739	2.36	Adequate
30	Deforestation and climate change	1953	2.65	Adequate

Note: cut off point for adequate knowledge is 1.50 which is the lower limit of the average score per item

Table 1 shows the overall knowledge of Environmental Education concept. The result shows that a greater proportion of respondents indicated very good knowledge of environment concepts (above mean = 1.50) such as biotic/abiotic factors, food webs and food chains, biochemical circles, continuous cropping, water pollution, pollution control (recycling and production attitude), wildlife (game reserve and zoological garden), bush burning, farming and industry, urbanization, depletion of forest, land degradation, ozone layer depletion,

population and global warming, deforestation and climate change. The result also indicates that teachers demonstrated low level of knowledge with respect to the components of the solar system. Generally, the result on knowledge of environmental concepts indicates that most teachers tend to demonstrate a high level of knowledge of environmental concepts.

The findings of the study revealed that teachers have basic knowledge of environmental concepts. This is due to the fact that environmental concepts are derived from all subject areas - the natural and allied sciences, social sciences, humanities, languages, and arts. Environment by its nature touches all facts of society and its ubiquitous nature offers a robust opportunity for connections with all areas of study in the school. By its very nature, EE is thus interdisciplinary and integrating it in every school subject provides a sense of connectedness. EE cannot be studied in isolation since it is related to a social process that occurs within a cultural, 'social, economic and political milieu'. Duguet (1992) supported the interdisciplinary approach when he observed noted that we have long known that making connections between and among the disciplines provides the setting for increased understanding, retention and application. Going by the findings most teachers can teach EE concepts and thus would be able to implement EE curriculum.

Conclusion and Recommendation

Generally teachers may have the basic knowledge of EE, but may not discuss these concepts during lessons on the conventional school subjects. This accounts for the low status of the implementation of EE in classroom instruction. Most of the Instructions are examination driven and since EE concepts do not form a part of the planned syllabus, it is often not given any attention by the subject teacher. Again, the pedagogy of multidisciplinary approach is not integrated into the teacher education and so many of the teachers many possess the knowledge of EE but lack the strategies for promoting EE during instruction. Teacher preparation programmes should provide the training for EE integration and part of the examination questions that could come in form of projects should be in the area of solving environmental problems.

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