



# Teacher's Competence Needs in the Multidisciplinary Approach of Implementing of Environmental Education

C. Omoogun Ajayi<sup>1\*</sup>

<sup>1</sup>Department of Curriculum & Teaching, University of Calabar, Nigeria.

## Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

## Article Information

DOI: 10.9734/BJESBS/2015/13969

### Editor(s):

(1) David A. Kinnunen, Department of Kinesiology, California State University, Fresno, USA.

### Reviewers:

- (1) Anonymous, Brazil.
- (2) Anonymous, Taiwan.
- (3) Anonymous, Slovenia.

Complete Peer review History: <http://www.sciencedomain.org/review-history.php?id=1067&id=21&aid=8944>

Original Research Article

Received 12<sup>th</sup> September 2014  
Accepted 6<sup>th</sup> April 2015  
Published 23<sup>rd</sup> April 2015

## ABSTRACT

This study was designed to determine the competence needs of teachers under this approach. The study adopted the descriptive survey design. The sample consisted of 737 teachers proportionally sampled from 67 public secondary schools in the three education zones of Cross River State. The teacher competencies needs questionnaire in the implementation of Environmental Education Curriculum was used for data collection. The data analyzed showed that majority of the teachers require basic competencies needs in several areas of environmental issues.

*Keywords: Competence needs; multidisciplinary approach; environmental education; curriculum.*

## 1. BACKGROUND TO THE STUDY

The environment is undergoing induced anthropocentric deterioration through the unsustainable use of both renewable and non-

renewable environmental capitals- freshwater, forest, fossil fuels, land etc. The human modifications that is implicated in loss of biodiversity, increasing levels of pollutants, climate change, water shortages, air pollution,

\*Corresponding author: E-mail: [omoogun.ajayi@yahoo.com](mailto:omoogun.ajayi@yahoo.com);

and energy have grave consequences for human health and livelihood [1-5]. For instance, the Intergovernmental Panel on Climate Change stated that, "Warming of the climate system (as a result of human activities) is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level" [3] with deleterious effects to human health especially the vulnerable population. Environmental problems have reached very critical and dangerous points and continue to grow rapidly. Global warming, ozone layer depletion, rise in solid waste, nuclear pollution, extinction of some kind of animals and plants are clear evidence of some environmental problems. [6-8].

[9] explained that human activities are resulting in loss of biodiversity to the level of mass extinction of fauna and flora with grave consequences for the future of all life. The most effective way to address environmental problems is through the education of the societies. [10-12]. The education about the environment not only aims at increasing the educational knowledge of the individuals but also to the development of positive attitudes about the environment that can influence behaviour in some desirable ways. Basically, the tenet for environmental education is to continue to educate people and affect the values, attitudes and behaviors which they hold towards the environment [6,13].

The role of environmental education in reorienting our attitude for caring for the environment is well documented [14]. The need for teacher training in environmental education has been emphasized by the United Nation International Belgradeworkshop of 1975 and the Tbilisi conference of 1977. The report from Tbilisi plus 10 International Congress on Environmental Education and Training emphasized that all teacher training programmes should be designed for a maximum multiplier effect in providing the needed knowledge and skills in environmental education. One of the crucial goals of Contemporary education is promoting environmental awareness within the context of the interdependence between humankind and the natural world [15,16]. As [7] argued that nature defines both our existence and our relationship with the world at large. If we desire to develop new advocates of the environment that will look critically at burning issues such as global warming, we might consider targeting students who are going to be and some are on

the threshold of becoming policy makers and drivers of sustainability [17].

The Tbilisi Declaration [14] recommends EE goals to include providing education opportunities for citizens so they acquire requisite skills, knowledge, values and attitudes for the protection of the environment; fostering action-oriented behaviours towards environmental conservancy and sustainability. The United Nations environmental scientific and cultural organization [16] stated the importance and objective of EE:

*The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.*

Most countries globally are cognizant of the crucial role of EE and as such have charted approaches to its inclusion in formal education.

The Belgrade International Conference on Environmental Education and the Intergovernmental Environmental Education workshop in Tbilisi recommended that EE should be taught using the multidisciplinary approach. Under the multidisciplinary approach, topics in Environmental Education are plugged or infused at appropriate points in the existing subjects which serve as the carriers of Environmental Education messages and concepts. By this approach, the EE curricular would be implemented through all the traditional school subjects taught in the schools. By this method teachers of all subjects in the school curriculum are expected to infused environmental issues in the contents of their subject and use such topics to promote environmental awareness and sustainability.

To achieve this, the Nigeria Education Research and Development Council (NERDC) developed EE curricula and appropriately identified the contents to include four broad areas namely, ecological foundation, human environment, environmental change and sustainable development. Ecological foundation consists of abiotic and biotic components, ecosystems as well as energy flow with the systems. The human environment comprises population and human activities in the environment. Environmental

change and impact consist of pollution, wildlife management, soil erosion among others. Sustainable development includes methods of conserving bio-diversity and how to use environmental resources without degrading them. It is expected that each teacher will promote these core areas within the framework of their subject curricular contents.

Teachers are responsible for the translation and actual implementation of educational programmes, policies, curriculum or courses offered [18]. Teachers thus have immense potentials to influence the effectiveness of the implementation of any curriculum. The effective implementation of environmental education in the school system rests primarily on teachers. Teachers' knowledge therefore is central to any curriculum implementation effort [19] explored how pre-service elementary teachers' perceive environmental issues and found that the group of teachers lacks the knowledge necessary to be tagged environmentally literate. In a similar study [20] corroborated this finding that pre-service teachers lack conceptual understanding of major ecological concepts. [21] reported limited environmental knowledge among pre-service teachers drawn from three higher education institutions. As empirical evidence suggests [22] awareness facilitates a shift or change in perspective.

The inclusion of EE or its integration has been slow down by teacher availability and competence concerns, the overload of school curriculum. One of the most acceptable ways of implementing EE curricula is through infusion. Infusion involves the inclusion of environmental concerns into existing curricula and content, and this is done in a manner that the subject matter retains its integrity in terms of contents and skills. The curriculum is also seen as it is at present is rigid and inflexible as many courses are descriptive and structured into the various disciplines. This makes it difficult to teach from the interdisciplinary perspectives. Again, subjects are crowded with examination based syllabus, which places the teacher almost always under pressure to complete the syllabus for examination driven motivation and leaving no time and opportunity to discuss environmental issues. In addition there is lack of guidance about cross-curricular themes in many teacher education programmes. Teacher generally faces the challenge of how to infuse and integrate the learning experiences from the window of their subjects with current environmental issue.

Basically, teachers are expected, therefore, to possess the ability to articulate the contents on EE to enable them implement it. The pre-service programme should train teacher with basic knowledge of environmental issues and how some of the issues can be integrated in their teaching subjects. Given that the teacher education programme did not include EE contents and teachers are not trained within the multidisciplinary approach pedagogies, it is important to find out the competencies area the teacher have and need that will enable them to implement the EE curriculum contents. This research will therefore answer the following question:

1. To what extent has the teachers' subject areacurriculum contents prepared them to implement Environmental Education curriculum?

And test the hypothesis below:

- 2 There is no significant influence of teachers' subject area on their competencies needs for the multidisciplinary approach of implementing EE curriculum.

## 2. METHODS

### 2.1 Study Area

The study was carried out in Cross River State, Nigeria. Cross River State is rich in biodiversity and has one of the richest parks in Nigeria. CRS is situated in the rainforest zone and houses 95% of Nigeria's rainforest. Already, most of the species that are found only in CRS are classified as critically endangered by the World Conservation Union's 2006 Red list and are also listed on International Trade in Endangered Species (CITES).

### 2.2 Design and Sample

The study adopted the descriptive survey design. The sample for the study included 737 teachers selected from 67 public secondary schools in the three education zones in Cross River State using a multi-stage proportionate sampling technique. From the 67 schools sampled from the 228 schools in the zone, all the JSS3 teachers of subjects recommended by the Federal Republic of Nigeria (2004) National Policy on Education 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 and Physical/ Health Education.

### 2.3 Data Collection

The instrument for data collection was a structured Teacher Competence Needs Questionnaire for the implementation of Environmental Education Curriculum (TCNQIEEC). The questionnaire was developed by the researcher based on the Environmental Education Curriculum for Junior Secondary Schools developed by NERDC. The instrument consists of two sections, A and B. Section A consist of Teachers' Bio-data, Section B consist of 37 items with four Likert-like options To ascertain the face and content validity of the instrument, the instrument was given to three inter-raters that are experts in the area of test and measurement, and environmental education curriculum for ratings. The average score of the inter-rater co-efficient yielded 0.74, which is high enough to confirm the validity of the instrument. The instrument was pilot tested on 50 teachers who did not constitute sample for the study. The test-retest reliability co-efficient was found to be 0.67 which was considered high enough to make the instrument reliable.

A total number of 737 copies of the questionnaire were administered in person by the researchers and collected. For each school visited, the most senior teacher within a given subject matter that was present completed the questionnaire and returned them promptly. In schools where a subject teacher head is not disposed, the purposive sampling was used to pick another teacher in the same subject area to complete the questionnaire.

## 3. RESULTS

Research question one: To what extent has your teaching subject curriculum contents prepared you to implement Environmental Education curriculum?

To answer this question, teachers were asked to state the extent to which their teaching subjects prepare them to teach the content identified by NERDC. The mean average of their responses and the decision on their competence needs are presented below in Table

The Table 1 shows that teachers' indicated that their subject areas have not adequately prepared them for the competencies needed in

implementing EE curriculum in twenty five out of the thirty- seven recommended areas. This means the teachers' competencies needs improvement in twenty-five areas of Environmental Education contents.

Research question 2: What is the influence of teacher subject area on competency needs in the implementation of environment development?

The result of the data analysis is shown in Table 2 below:

Table 2 shows how competency needs in implementing Environment Education are influenced by teachers' subject area. The table shows that social studies teachers indicated highest competency mean score of 108.20 followed by agricultural science and home economics with a mean score of 104.45 and 100.67 respectively. French teachers had the lowest competency mean score of 75.75. From the result social studies, agricultural science and Home economics have higher competencies to implement the multidisciplinary approach of environmental education curriculum.

### 3.1 Hypothesis one

There is no significant difference in the mean rating of teachers from different subject teachers on their competency needs in implementing Environmental Education.

To test this hypothesis, the various subjects were grouped into three broad groups – Arts/Languages, Science/Mathematics and Vocational subjects and the mean rating of competency needs in implementing Environmental Education were computed. They were then compared using the one-way analysis of variance and the result is reported in Table 3. The alpha level of 0.05 was used as the acceptable significant level for rejecting or upholding the assumption.

Table 3 shows that the analysis of variance produced an F-ratio of 0.886, which was not statistically significant at 0.05 probability level ( $p > 0.05$ ) this result suggest that teachers of different subject areas (Arts/Languages, Science/Mathematics and Vocational subjects) do not differ significantly in their competencies needs in implementing the EE Curriculum ( $F = 0.886$ ;  $ns, p > 0.05$ ). Hence, the null hypothesis is upheld.

The result shows no significant difference in different subject teachers' mean rating. This result is an indication that subject specialization is not an obstacle to the implementation of EE curriculum. In other words irrespective of a teacher's subject area she/he can participate in the implementation of EE curriculum. Teachers

of various subjects showed no difference in their competencies needs because of the sources of the content of EE which are derived from different subject areas. Environmental Education contents are derived from many subject disciplines (Science, Social Science, Arts, etc).

**Table 1. Mean responses of teachers on the extent to which their teaching subjects prepare them to teach environmental concepts and decision on their Competencies Needs. (N = 737)**

Serial number	Contents	N	Mean	Decision
1	Agrochemicals	1717	2.33	competence needs
2	Carbon, oxygen, and nitrogen cycles	1718	2.33	competence needs
3	Consequences of developmental activities like mining	1732	2.35	competence needs
4	Ecosystems	1773	2.41	competence needs
5	Effects of altering the atmosphere	1671	2.27	competence needs
6	Effects of climatic hazard	1733	2.35	competence needs
7	Energy flow in the ecosystem	1675	2.27	competence needs
8	Global warming and effects on the environment	1721	2.34	competence needs
9	Methods and benefits of conserving biodiversity	1776	2.41	competence needs
10	Methods of pollution control	2034	2.76	Competent
11	population and population growth	2218	3.01	Competent
12	Socio-cultural practices and their effects on land	1801	2.44	competence needs
13	Sources of earth's energy	1841	2.49	competence needs
14	Strategies for conserving wildlife	1773	2.41	competence needs
15	Water pollution	2137	2.89	Competent
16	Ways of improving quality of water for human use	2152	2.92	Competent
17	Acid rain	1711	2.32	competence needs
18	Causes and effects of desertification	1835	2.48	competence needs
19	Causes, effects and control of air pollution	2123	2.88	Competent
20	Causes, effects and control of Land pollution	2064	2.80	Competent
21	Causes, effects and control of soil erosion	2108	2.86	Competent
22	Climate change	1776	2.41	competence needs
23	components of the solar system	1822	2.47	competence needs
24	Deforestation	2137	2.89	Competent
25	Effects of bush burning	2233	3.03	Competent
26	Human practices that affect the environment	2108	2.86	Competent
27	Methods of controlling flooding	1739	2.36	Competence needs
28	Mineral resources in the environment	1806	2.45	competence needs
29	Mining and the environment	1739	2.36	competence needs
30	Natural and man-made disasters	2049	2.78	Competent
31	Natural disaster.	1742	2.36	competence needs
32	Ocean resources, exploitation and the effects	1776	2.41	competence needs
33	Structure of the atmosphere	1822	2.47	competence needs
34	Sustainable agriculture	2086	2.83	Competent
35	Sustainable development	1771	2.40	competence needs
36	Urbanization	1778	2.41	Competence needs
37	Water cycle	1802	2.45	Competence needs

Average mean=2.5

**Table 2. Means and standard deviations of teachers' scores in competency needs by subject specializations**

Serial number	Teaching subject	No	Mean	SD
1	English language	86	88.23	24.81
2	Mathematics	94	97.31	24.58
3	Integrated science	86	98.63	24.88
4	Social studies	190	108.20	22.81
5	Introductory technology	62	94.40	19.96
6	Religious knowledge	28	92.36	25.86
7	Agricultural science	80	104.45	18.28
8	Business studies	64	97.95	23.25
9	Music	4	69.00	21.94
10	Physical and health education	29	92.97	18.26
11	French	8	75.75	30.35
12	Home economics	6	100.67	5.47
	Total	737	99.08	23.89

**Table 3. Summary data of one-way analysis of the influence of teachers' subject on competency needs in implementing environmental education**

Source of Variance	SS	Df	Ms	F	p-level
Between group	1012.048	2	506.024	0.886	.413
Within group	418999.39	734	570.7844		
Total	420011.44	736			

*ns. p>0.050.05 level*

#### 4. DISCUSSION

Discussion Environmental education should not just be taught as qualitative information but it should increase the awareness of the students towards nature and environment and this should begin from the Pre-school period. It is argued by many researchers that separate subject approach is not suitable for teaching EE at the secondary school level, because the time table at this level is already crowded. Others feared that many teachers have not been trained for the implementation of EE while some think that since environmental issues cut across boundaries of regular knowledge classification it gives validity to the multidisciplinary approach as recommended by UNESCO-UNEP.

Nigeria and indeed the global village is desirous of a healthy environment for sustainable socio-economic development. One of the strategies is the mainstreaming of environmental education into the national education system. The importance of environmental education for teachers is thus critical to their pedagogical and professional development, as the teacher is the overall driving force in the implementation of any curriculum decision. Environmental issues will be of utmost concern to future generations who will live with the consequences of our past and

present actions. This is where education must play an important role. By encouraging learners to be aware and sense a connection with their environment, EE may affect the choices that these students will make as part of society. [23] stated, "Students will be living in a world different from the one they now occupy, and schools should enable them to deal with that world" (p. 6). Therefore, in order to promote the development of students' skills and knowledge for the future, education should strive to include environmental content, critical thought, outdoor experiences, and classroom practices that incorporate the development of a personal environmental ethic.

#### 5. CONCLUSION AND RECOMMENDATIONS

The environment is our natural home and to effectively protect it, the role of education is very fundamental. The role of the teacher in this direction is very crucial. Teachers' knowledge of environmental concepts and the ability to communicate these in everyday pedagogy is essential. To be educated in contemporary world requires knowledge and application of Information, communication technology (ICT). Education without knowledge of the environment,

human relationship with the environment and how to interact with earth's resources in a sustainable manner is grossly incomplete. The teachers must be the torchbearer for environmental pristinity and prepare our the future generation to be responsive to environmental sustainability. This requires that they have the competence for the pedagogy of EE within the paradigm of the multidisciplinary approach.

Regular workshops should be organized by the government and Non-Governmental-Organisations (NGOs) for serving teachers on how to use their teaching subjects to implement environmental education curriculum. Authors of books in the various subjects taught in schools should integrate environmental issues in their text to aid in implementing EE curriculum. The textbooks should demonstrate how each topic or lesson can be used to promote knowledge, skills and awareness of the environment. Teacher training institutions should include environmental education themes in all course content and methodology. This will ensure the training of the pre-service teacher on the use of environmental concepts in teaching the traditional subjects. Professional bodies like the World Curriculum Council, WWF, WCCI and World Environmental Education Congress should take sustained interest in EE pedagogy. Curriculum Organization of Nigeria (CON), educational parastatals like the Nigerian Educational Research and Development Council (NERDC), faculties of education, and environmental educators should initiate further research in finding ways of improving the integration environmental issues and concepts in teacher education curriculum. Teacher exchange programme across regions countries specifically on Environmental Education pedagogy should be promoted by WWF, World Bank and other donor agencies.

### COMPETING INTERESTS

Author has declared that no competing interests exist.

### REFERENCES

1. Shiva V. Water wars: Privatization, pollution, and profit. Cambridge, MA: South End Press; 2002.
2. Wilson EO. The future of life. New York, NY: Vintage Books; 2002.
3. Intergovernmental Panel on Climate Change (IPCC). Climate change. The

- physical science basis. Working group I contribution to the fourth assessment report. Cambridge University Press, Cambridge, New York; 2007.
4. World Watch Institute. Worldwatch projects. Retrieved from World Watch Institute; 2011.  
Available:<http://www.worldwatch.org/>
5. United Nations. Global Issues. Retrieved from United Nations; 2012.  
Available:<http://www.un.org/en/globalissue/s/>
6. Serhat Arslan. The Influence of Environment Education on Critical Thinking and Environmental Attitude. *Procedia - Social and Behavioral Sciences*. 2012;55: 902–909.
7. Bonnett M. Environmental Education and the Issue of Nature. *Journal of Curriculum Studies*. 2007;39(6):707–721.
8. Mert M. Determination of consciousness level of high school students on the Environmental training and solid wastes topics. Hacettepe University, Master of education; 2006.
9. Miler T, Sladeka P. The climate literacy challenge. *Social and Behavioural Sciences*. 2011;12:150–156.
10. Alöm M. Environment and environmental education in primary school in Turkey within the process of the membership of European Union. *Kastamonu Education Journal*. 2006;14(2):599-616.
11. Pooley J, O'Connor M. Environmental education and attitudes emotions and beliefs are what is needed. *Environment and Behavior*. 2000;32(2):711-731.
12. Stevenson R. Schooling and environmental education: Contradictions in purpose and practice. *Environmental Education Research*. 2007;13(2):139–153.
13. Rempel J. Contextualized evidence of learning in environmental education. Department of Secondary Education. Edmonton, Alberta. Master of education; 2009.
14. United Nations Environmental, Scientific, and Cultural Organization (UNESCO) (1987). The Tbilisi Declaration: Final report intergovernmental conference on environmental education. Tbilisi, USSR, 14-26. October; 1977. Paris, France.
15. Slattery P, Rapp D. Ethics and the foundation of education. Boston: Allyn & Bacon; 2003.

16. UNESCO. Intergovernmental Conference on Environmental Education Final Report. Paris. UNESCO; 1978.
17. Kishore Padmini, Kisiel James. Exploring high school students' perceptions of solar energy and solar cells. International Journal of Environmental & Science Education. 2013;8(3):521-534.
18. Taiwo FL. Quality Assurance and Implementation of Educational Programme in Nigeria Schools. Challenges and Prospects. Lagos: Linestar; 2012.
19. Desjean-Perrota B, Moseley C, Cantu LE. Pre-service teachers' perceptions of the environment: Does ethnicity or dominant residence experience matter? Journal of Environmental Education. 2008;39(2):21-31.
20. Zak K, Munson H. An exploratory study of elementary preservice teachers' understanding of ecology using concept maps. The Journal of Environmental Education. 2008;39(3):32-46.
21. Pe'er S, Goldman D, Yavetz B. Environmental literacy in teacher training: Attitude, knowledge, and environmental behavior of beginning teachers. The Journal of Environmental Education. 2007;39(1):45-59.
22. Hadzigeorgiou Y. Fostering a sense of wonder in the science classroom. Research in Science Education. 2012;42: 985-1005
23. Elliot W, Eisner EW. Preparing for Today and Tomorrow. New Needs, New Curriculum. 2004;16(4):6-10.

---

© 2015 Omoogun; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*  
*The peer review history for this paper can be accessed here:*  
<http://www.sciencedomain.org/review-history.php?iid=1067&id=21&aid=8944>