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Creating Awareness, Curriculum Modification and Training as Instruments for Combating the Challenges of Climate Change in Nigeria

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Abstract

This study investigated creating awareness; curriculum modification and training as instruments for combating the challenges of climate change in Nigeria. Descriptive survey research design was adopted for the study. A simple random sampling technique was used to select 3 universities in 3 Southwestern states. 240 from the 646 Lecturers from the faculty of Science in the selected universities were sampled for the study. Awareness, Curriculum Modification and Training Questionnaire (ACMTQ) was used and validated, and the reliability coefficient was 0.82. Mean and standard deviation were used to analyse the research questions. The grand means of 3.43, 3.51 and 3.45 showed that the respondents agreed that creation of awareness, curriculum modification and training had an influence on the challenges of climate change to a high extent. *It was recommended that more awareness should be created, even to the grassroots, through the launching of various enlightenment campaign programmes. Also, community members should be trained and re-trained on the negative effect of deforestation, the importance of tree planting, ways of controlling floods, erosion and how to open blocked drainages*.

Keywords: Awareness, Curriculum Modification, Training, Climate Change, Global Warming

Introduction

In Nigeria the trends of climate hazards such as erosion, pollution, flood, changes in precipitation, gas emissions and diseases have brought a lot of hardship in the country. Nwafor (2010) classified the environment where an individual lives as physical and social, and known and unknown which affect directly or indirectly, his living and working conditions. The physical environment, according to him, includes; the living being, non-living things, geographical landmarks, topography and climatic conditions, man-made features and health, nutrition and sanitation, while the social environment is made up of

his family, community life, festivals, community helpers, services and mode of production, and procurement and supply of essential commodities. He further explained that the classified environment constituted socially accepted habits and attitudes for an effective living and functioning in a society. Society continuously interferes with the natural environment which leads to land depletion such as bush burning, deforestation and water pollution. Therefore, human induced-processes acting upon our natural resources such as the land, may bring some changes or disturbances so to it is perceived as an encroachment on the constituents of the ecological balance.

Odey (2010) opined that man tried to modify his environment continuously to satisfy his needs and desires through exploitations of agricultural produce and mineral resources. The main outcome of an increasing decrease in natural resources causes a major stress on vulnerable land that accelerates soil erosion and land desertification, and creates food shortage, poverty, diseases and other health problems to the people. The major effects of climate change on the environment as summarized the Intergovernmental Panel on Climate (2007) & Osaat (2010) are: a rise in sea level due to melting glaciers ice and expansion of warmer sea water thus threatening coastal communities; sea-surface temperatures warming and contributing to the death of coral animals after being weakened by bleaching, a process tied to warm water; occurrences of heat waves and violent downpours which have increased; warmer temperatures which have led to heavier rainfall thus causing flooding in many regions; higher temperatures causing higher rate of evaporation and more droughts in some areas of the world; warming also causing changes in timings of spring events and the length of the growing season; cold nights becoming less frequent over land areas and more frequent hot days and nights, etc. One of the problems facing Nigeria as a nation is how to provide an enabling environment for its citizenry especially, in the face of a prevalent increase in natural disasters occasioned by climate change. In recent times, there have been media reports of flooding in Oyo, Sokoto, Kebbi, Niger, Lagos, Ogun, and other States of the Federation which claimed several lives and valuable resources. Isah, Erwat and Ayeni (2010) pointed out that the Northwest and North eastern axes of Nigeria had been experiencing increased desertification, and also that the coastal experienced increased ocean surge activities especially in Epe, Lekki and Victoria Island of Lagos State.

Studies have shown that diverse ecological problems which face Nigeria as a country are directly linked to the on-going climate change (Odjugo, 2001; 2005; Odjugo and Ikhuoria, 2003; NEST 2003; Chindu and Nyelong, 2005; Mshelia, 2005; Ayuba et al. 2007). While Odjugo (2005) observed erratic patterns

of weather elements as the cause of ecological problems in the country, Odjugo and Ikhuoria (2003) and Ayuba et al. (2007) submitted that climate change had a serious negative impact on plant species composition and desertification in Northeastern Nigeria. The Nigerian government has made some efforts to tackle the problem of climate change but the problem still persists.

Awareness and enlightenment campaigns about climate change would help individuals and communities make informed decisions and take sustainable actions to build a climate resilient society. Pugliese and Ray (2009) revealed that majority of people across the world, especially in developing countries, were still unaware of climate change despite their high vulnerability to its impacts. Supporting this claim, Taderera (2010) opined that African countries were poorly informed about global climate change despite their knowledge and experience of changing weather patterns. UNFCCC (2007), in its submission reported that the low level of awareness of climate change across sub-Saharan African countries was attributed to limited awareness campaigns, on the one hand, and the fact that African countries had got too many problems ranging from poverty to political conflicts, on the other hand, hence climate change was never a priority issue.

Majority of Nigerians are unaware of climate change and the likely challenges despite the havoc caused in the country yearly. The Nigerian Government, in creating awareness, put measures in place to mitigate the impacts of climate change. Ochieng (2014) argued that even as resources were put together to mitigate climate change, there was the need to educate people on what climate change really was. Increasing people's awareness of climate change through education is an important measure to persuade people at all levels in the community to play an active role in mitigating and adapting to climate change. It is a known fact that awareness and enlightenment of people/communities on issues related to climate change and its effects on humans and their environment could definitely be the right instrument in combating the challenges of climate change in Nigeria in particular, and the world in general.

Curriculum according to Doll (1996) is the formal and informal content and process by which learners develop skills, gain knowledge and understanding, and alter attitudes, appreciations, and values under the support of an academic institution. He argued that curriculum was the total experience which included not only the content selected and delivered, but also the planned and unplanned activities individuals participate in as students. Offorma (2002) defined curriculum as the total experience involving the school in the process of educating young people which included the subjects, content, teacher, method of teaching and evaluation as well as the psychological and physical dimensions of the experience. Batchuluun et al. (2014), in a study showed that concepts related to

climate change were not in the secondary school curriculum. In addition to this, Geography as a subject, was mostly focused on academic knowledge about the climate which was not enough to change the life style of young generation. Based on the above submission, the researchers were of the view that Curriculum must be modified to consider the knowledge, skills, attitudes and assessment criteria of learners' objectives, teaching methodologies and steps of activities which are based on daily life cases, critical thinking questions and self-learning oriented investigations and not just scientific background.

Charles (2017) found out in one of his studies that climate-related issues were only taught in Human and Nature Subject at the primary school level, and Geography and Science Subjects at the secondary school level. In tertiary institutions, climate change issues were mostly taught in Natural Sciences. Consequently, students who did not take the subject/ course, lacked the basic understanding and skills relevant to climate change adaptation. He concluded that climate change curriculum at all levels should be inclusive, not discriminatory. He further explained that subjects/courses where climate-related issues were taught needed modification to enable learners to develop skills, gain knowledge and apply such to solving the challenges of climate change in their environments. Charles (2017) asserted that the curricula of most developing countries, especially in Africa, showed a critical shortage of climate change content in all educational levels, from primary to tertiary levels and as a result, Africa had the least intellectual capacity to deal with the climate change challenge. African countries, therefore, have to make significant and well-targeted investments in Education and training, curriculum development and modification, research and effective practices for the communication of research findings. Such investments would yield dividends when carried out on climate change.

However, institutions in some African countries as pointed out by Nkechi (2014) had made efforts to arrest the challenges of climate change through curriculum modification. For instance, Egerton University, through its Tegemeo Institute, modified its curriculum to incorporate climate change research in its research agenda. The University of Nairobi equally modified its curriculum to focus on climate change adaptation. Ochieng (2014) revealed that primary pupils in Kenya were taught basic principles of weather and climate addressed through Science and Social Studies Subjects. He submitted further that the teaching of basic principles of weather and climate only offered limited knowledge as the syllabus only addressed factors influencing climate and the impacts of climate on human activities. Buttressing this point, RoK (2012) stated that only 0.36% of issues related to climate change were either addressed directly or indirectly by the

Kenya's primary school curriculum. He recommended the integration of climate change knowledge into all subjects taught in the curriculum. The story was not different across various levels of education in Nigeria, as the curriculum of primary, secondary and tertiary education failed to properly address the infusion of climate change content (i.e, specific areas such as alternative clean energy and reduction of deforestation) that could likely equip learners with climate adaptation and mitigation skills.

Training is the process of learning the skills needed to combat the challenges of climate change. Through training, discussions reveal the causes of climate change and how a changing climate may affect a variety of environmental and public health services such as providing safe drinking water and managing the effects of drought, fires and floods. The knowledge of a changing climate and its effects on human activities was very germane to people and communities to nip the changes of climate change in the bud. UNFCCC (1992), UNESCO (2010), and Sustainable Development Goal 13 (2015) emphased the importance of the awareness of climate change and its effects so as to have a well informed and enlightened world citizenry. Training plays a significant role in reducing the problems associated with climate change. Pandve (2007) opined that the sensitization of the general population regarding global warming and climate change was urgently needed to tackle the challenges of climate change in many developing countries.

Global climate change impacts range from physical, to social and cultural aspects. Climate change is a great threat to the regions of developing countries because its effects are not equally distributed all over the world. The large and poor populations of developing countries are likely to be more affected by climate change impacts as compared to rich developed countries (Mertz et al., 2009). Climate change is a serious global environmental issue that nations of the world are currently trying to provide lasting solutions to. Adequate training is needed as a measure to curb the challenges of climate change because it will provide adequate knowledge and equip people and the public with the right knowledge to tackle the problems of climate change in their environment. Raudsepp (2001) submitted that training was positively associated with environmental awareness such as climate change. In a study carried out by Zareen & Awias (2016), the training of people and communities was emphasized to be one of the strategies to fight the challenges of climate change in Punjab, Pakistan. The above submissions show the pivotal role training plays in solving problems related to climate change in human environment.

Statement of the Problem

The issues of climate change have been of great concern to society in recent times. The effects have been felt in some villages and major cities in Nigeria. Farmlands have been washed away, Human lives and railway lines destroyed, communities were rendered homeless due to heavy rainfall associated with flooding and erosion gullies threatened communities. Those were some of the end products of the challenges of climate change, particularly in Lagos, Ogun, Oyo, Ondo and Ekiti States, all in Southwest Nigeria. Previous studies traced the causes of the climate change challenges experienced in the states mentioned above to human and non-human factors. Several recommendations were made, yet the problem still persists. Therefore, this study was undertaken to examine new independent variables which are different from the ones many authors have researched into. Such variables include creation of awareness, curriculum modification and training.

Purpose of the Study

Specifically, the study sought to:

1. Find out the influence of the awareness of the challenges of climate change in Southwestern Nigeria.
2. Identify the impact of curriculum modification on the challenges of climate change in Southwestern Nigeria.
3. Investigate the influence training had on the challenges of climate change in Southwestern Nigeria.

Research Questions

The following research questions guided the study.

1. To what extent has awareness influenced the challenges of climate change in Southwestern Nigeria?
2. To what extent has curriculum modification exerted an influence on the challenges of climate change in Southwestern Nigeria?
3. To what extent has training influenced the challenges of climate change in Southwestern Nigeria?

Methodology

The descriptive survey research design was adopted for the study. The target population was all the academic staff in the Faculty of Science in six federal universities in Southwestern Nigeria, namely:

1. The University of Ibadan (UI) Oyo State; established in 1948.

2. Obafemi Awolowo University (OAU) Osun State: established in 1962.
3. The University of Lagos (UNILAG) Lagos State: established in 1962.
4. The Federal University of Technology (FUTA) Ondo State: established in 1981.
5. The University of Agriculture, Abeokuta (UNAAB) Ogun State: established in 1988.
6. Federal University, Oye Ekiti (FUOYE) Ekiti State: established in 2011.

Figure 1.2: South-West Nigeria consisting of Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States

Source: Internet**;**
https://www.google.com.ng/imgres?imgurl=http://article.sapub.org/image/

The simple random sampling technique was used to select 3 universities in 3 Southwestern States (University of Lagos, Lagos State, University of Ibadan, Oyo State and Obafemi Awolowo University, Osun State). 240 from the 646 Lecturers who cut across the Faculty of Science in the selected universities were sampled for the study.

Table 1: Sampling technique for the respondents to the instruments

Institutions	**State**	**Number of Academic Staff (Faculty of Science)**	**Sampled Academic Staff**
University of Lagos	Lagos	207	80
University of Ibadan	Oyo	223	80
Obafemi Awolowo University	Osun	216	80
TOTAL		**646**	**240 (37.2%)**

Source: Preliminary study (2018)

One structured questionnaire titled; Influence of Awareness, Curriculum Modification and Training on Challenges of Climate Change Questionnaire (IACMTCCCQ) was used to gather data for the study. The instrument was designed in 4-Points Rating Scale made up of four response options of Very High Extent (VHE), High Extent (HE), Low Extent (LE), and Very Low Extent (VLE). The instrument was validated by experts. The coefficient for Awareness was 0.78, Curriculum Modification 0.80 and Training 0.82. The value of the reliability obtained for the 3 variables was 0.81.

Mean score and standard deviation were used to answer the research questions. To determine the extent to which Awareness, Curriculum Modification and Training influenced the Challenges of Climate Change in Southwestern Nigeria, a decision rule was taken as very high extent with a rating of 3.50-4.49, high extent had a rating of 2.50-3.49, low extent had a rating of 1.50-2.49, and very low extent had a rating of 0.05-1.49. A score of 2.50 and above was taken as the cut-off point for accepting grand mean as high extent while a score less than 2.50 was taken to be low extent.

Results and Findings

Analysis of Research Question One: To what extent has awareness influenced the challenges of climate change in Southwestern Nigeria?

Table 2: Analysis showing the extent of influence Awareness had on the challenges of climate change in Southwestern Nigeria

S/N	ITEMS	VHE	HE	LE	VLE	X	SD	DECISION
1	Awareness has helped people to know the nature of climate change.	189	48	9	4	3.69	0.619	VHE
2	Awareness has helped communities to know the causes of erosion.	156	92	-	2	3.61	0.510	VHE
3	Awareness has made people to know the effects of ozone level depletion by greenhouse gas.	96	144	1	9	3.30	0.663	VHE

4	Awareness has made people to see the need to properly channel flood in their environment.	105	115	19	11	3.26	0.780	VHE
5	Awareness has exposed communities to the various disease a poor drainage system can cause.	83	155	8	4	3.27	0.598	VHE
	Grand Mean =					**3.43**	**0.63**	**HE**

Source: Researchers' Field Study (2019)

The data shown in Table 2 revealed the mean responses and standard deviation of the extent to which awareness had an influence on the challenges of climate change. The value of the mean responses ranged from 3.26 to 3.69 revealing that the respondents agreed that awareness had an influence on the challenges of climate change to a very high extent. The value of the standard deviation ranged from 0.510 to 0.780 further revealing that the responses were relatively in consensus with the mean values. The grand mean of 3.43 conclusively showed that the respondents agreed that awareness had influence on the challenges of climate change to a high extent.

Analysis of Research Question Two: To what extent has curriculum modification influenced the challenges of climate change in Southwestern Nigeria?

Table 3: Analysis showing the extent of influence Curriculum Modification had on the challenges of climate change in Southwestern Nigeria

S/N	ITEMS	VHE	HE	LE	VLE	X	SD	DECISION
1	Inclusion of climate change in the school curriculum will enhance knowledge of the people of its consequences.	201	49	-	-	3.80	0.179	VHE
2	Curriculum modification will help people in addressing environmental challenges.	103	115	29	2	3.27	0.695	VHE

3	Inclusion of atmospheric radiation measurement programme into the school curriculum will help people in addressing climate change problems.	87	127	17	19	3.13	0.841	VHE
4	Environmental Science, when included in the school curriculum, will help people in addressing environmental challenges.	146	88	11	3	3.49	0.640	VHE
5	Employment of resource persons to teach the modified curriculum will help people to address the problems of climate change.	223	25	2	-	3.88	0.345	VHE
	Grand Mean =					**3.51**	**0.54**	**HE**

Source: Researchers' Field Study (2019)

The data shown in table 3 revealed the mean responses and standard deviation of the extent to which curriculum modification had an influence on the challenges of climate change. The value of the mean responses ranged from 3.13 to 3.88 revealing that the respondents agreed that curriculum modification had an influence on the challenges of climate change to a very high extent. The value of the standard deviation ranged from 0.179 to 0.840, further revealing that the responses were relatively in consensus with the mean values. The grand mean of 3.51 conclusively showed that the respondents agreed that curriculum modification had an influence on the challenges of climate change to a high extent.

Analysis of Research Question Three: To what extent has training influenced the challenges of climate change in Southwestern Nigeria?

Table 4: Analysis showing the extent of influence Training had on the challenges of climate change in Southwestern Nigeria

S/N	ITEMS	VHE	HE	LE	VLE	X	SD	DECISION
1	Training assisted experts in sensitizing the communities on the effects of climate change.	111	126	7	6	3.67	0.809	VHE
2	Training has made the communities to know the importance of planting economic trees in their environment.	95	132	21	3	3.28	0.664	VHE
3	Through training, communities now understand the implications of building houses on water channels.	66	154	19	11	3.10	0.762	VHE
4	Training helps the communities to understand the effects of deforestation.	197	53	-	-	3.79	3.650	VHE
5	Training exposes community members to the danger of blocking water ways with refuse.	103	141	6	-	3.39	0.536	VHE
	Grand Mean =					**3.45**	**1.28**	**HE**

Source: Researchers' Field Study (2019)

The data shown in Table 4 revealed the mean responses and standard deviation of the extent to which training had influence on the challenges of climate change. The value of the mean responses ranged from 3.10 to 3.79 revealing that the respondents agreed that training had an influence on the challenges of climate change to a very high extent. The value of the standard deviation ranged from 0.536 to 3.650, further revealing that the responses were relatively in consensus with the mean values. The grand mean of 3.45 conclusively showed that the respondents agreed that training had influence on the challenges of climate change to a high extent.

Discussion of Results and Findings

The analysis in Table 2 indicated the mean responses and standard deviation of the extent to which awareness had influence on the challenges of climate change. The value of the mean responses ranged from 3.26 to 3.69 revealing that the respondents agreed that awareness had influence on the challenges of climate change to a very high extent. The value of the standard deviation ranged from 0.510 to 0.780, further revealing that the responses were relatively in consensus with the mean values. The grand mean of 3.43 conclusively showed that the respondents agreed that awareness had influence on the challenges of climate change to a high extent. The findings of this study were in line with the reports by UNFCCC (2007); Pugliese and Ray (2009); and Taderera, (2010).

The analysis in Table 3 showed the mean responses and standard deviation of the extent to which curriculum modification had influence on the challenges of climate change. The value of the mean responses ranged from 3.13 to 3.88 revealing that the respondents agreed that curriculum modification had influence on the challenges of climate change to a very high extent. The value of the standard deviation ranged from 0.179 to 0.840, further revealing that the responses were relatively in consensus with the mean values. The grand mean of 3.51 conclusively showed that the respondents agreed that curriculum modification had influence on the challenges of climate change to a high extent. These findings were in line with the opinion of Batchuluun et al. (2014); and Charles (2017).

Table 4 revealed that the mean responses and standard deviation of the extent to which training had influence on the challenges of climate change. The value of the mean responses ranged from 3.10 to 3.79 revealing that the respondents agreed that training had influence on the challenges of climate change to a very high extent. The value of the standard deviation ranged from 0.536 to 3.650, further revealing that the responses were relatively in consensus with the mean values. The grand mean of 3.45 conclusively showed that the respondents agreed that training had influence on the challenges of climate change to a high extent. The results were supported with the reports of UNFCCC (1992); UNESCO (2010); and Sustainable Development Goal 13 (2015).

However, the major findings in the study are summarized thus:

1. That awareness had influence on the challenges of climate change to a high extent.

2. That curriculum modification had influence on the challenges of climate change to a high extent.
3. That training had influence on the challenges of climate change to a high extent.
4. That each of the independent variables (awareness, curriculum modification and training) had relative contribution to the challenges of climate change in Southwestern Nigeria. R^2 is 0.16 i.e. 16%, this implies that independent variables only accounted for 16% of variation that occurred in dependent variable.
5. That there was a composite significant effect of Independent variables (awareness, curriculum modification and training) on the challenges of climate change. [$F = 58.240$. $P < 0.05$].

Conclusion

The study investigated the extent awareness, curriculum modification and training influenced the challenges of climate change in Southwestern, Nigeria. It was discovered that awareness, curriculum modification and training influenced the challenges of climate change to a high extent. Also in this study each of the independent variables had relative contribution to the challenges of climate change. And that there was a composite significant effect of independent variables on the challenges of climate change. By implication, awareness, curriculum modification and training are good instruments to tackling the challenges of climate change in Southwestern, Nigeria.

Recommendations

Based on the findings, the following recommendations were made:

1. More awareness should be created even to the grassroots through the launching of various enlightenment campaign programmes. Such campaign should primarily focus on actions people and communities can take to combat the havoc or challenges of climate change in their environment.
2. Information on environmental issues, trends, conditions and solutions should be improved on by using any means of communication ranging from interpersonal to mass communication.
3. More topics on environmental education should be added to the school curriculum, especially in the primary school because good childhood habits are hard to undo. School curriculum should also leave a little or extra energy for environmental clubs at all levels.

4. Community members should be trained and re-trained on the negative effects of deforestation, the importance of tree planting, ways of controlling floods, erosion and how to open blocked drainages

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