CLIMATE CHANGE AWARENESS AND ADAPTATION AMONG EDUCATION STUDENTS IN UNIVERSITY OF NIGERIA, NSUKKA

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Abstract

This paper focused on the climate change awareness and adaptation needs assessment of teacher education students in Nigeria as a 21st century global challenge. Four research questions and four hypotheses guided the study. The study involved all the teacher education students in the Faculty of Education, University of Nigeria, Nsukka. Simple random sampling technique was used to sample two hundred (200) students. This sample is made up of one hundred and twenty female students and eighty male students. Two structured questionnaire developed by the researchers were used for data collection. The instruments were titled "Climate Change Awareness Scale (CCAS) and Climate Change Adaptation Scale (CCADS). The instruments were subjected to face validation by three experts. Two of the experts are in Environmental Education while one of the experts is in Measurement and Evaluation all in University of Nigeria, Nsukka. The reliability of the instruments was established using Cronbach Alpha method. Satisfactory reliability of index of 0.78 and 0.82 were obtained for CCAS and CCADS respectively. Mean score and standard deviation were used to answer the research questions while t-test was used to test the research hypotheses. The findings of the study were that there is significant difference between male and female students' climate change awareness mean score; and that there is a significant difference between students who take environmental education content and those who do not take with respect to their climate change awareness and adaptation. Based on the findings of the study, relevant recommendations were made.

Keywords: Climate Change, Awareness, Adaptation, Gender and Location.

Introduction

Climate change is posing a great challenge on a global scale to life forms. The global scientific community views climate change as the most significant environmental threat endangering sustainability of biosphere, its agriculture and consequently human health. Igwe (2013) defined climate change as the variation in global or regional climates over time. It reflects changes state of the atmosphere over time scales ranging from decade to thousands of years. Climate change according to Nzewi (2009) refers to the measurable increase in the average temperature of earth's atmosphere, oceans and landmasses. Ezeudu (2009) defined climate change as a long term significant change in the average weather that a given region experience. Nwagu & Nzewi (2009) explained that climate change is the significant change in weather (wind, precipitation and temperature) over an extended period of time. Indeed, climate change is simply a change in the climate condition of the world and the change is found by the scientists and other concerned agencies to be on the increase line.

Onuoha and Ezirim (2020) defined climate change as any change in climate overtime as a result of both natural variability and anthropogenic factors. The major concern here is the anthropogenic global climate variability since it is principally caused by the synergic

interaction between human induced activities. This according to Uzoegbunam and Nwofia (2012), is because an understanding of the scientific basis of climate change and its causes as well as the immediate and long term impact will enable government and decision makers (including curriculum planners) to direct their policy-thrust towards the amelioration of the menace at local and global levels.

The major causes of climate change are the increase in carbon dioxide (CO2) level due to emissions from fossil fuel combustion, the use of aerosols and cement manufacture. Other factors include deforestation, ozone layer depletion, land use, animal agriculture among others. The core effect of these is the increase in the concentrations of greenhouse gases (GHGs). Greenhouse gases include any gas in the atmosphere that is capable of absorbing infrared radiation or heat particularly because of their molecular structure. Similar to the glass in a greenhouse which allows the sunlight pass through but traps the heat formed and preventing it from escaping thereby causing a rise in temperature.

In addition to carbon dioxide, other gases implicated in the greenhouse effect include water vapour, chloroflorocarbons, methane, nitrous oxide, ozone and halocarbons. The chlorine and bromine atoms from man-induced emission of chloroflorocarbons (used in air-conditioners, refrigerators, aerosols, foams and sterilants) and haloes (used in fire-extinguishers) exacerbates global warming by thinning the ozone layer that shields the infrared wavelengths from the sun (Igwe, 2013).

The sun's solar energy (sunlight) penetrates the atmosphere and the earth's surface radiates the heat (infrared wavelength) back to the atmosphere and some escapes into space. The greenhouse gases absorb the heat in the atmosphere and radiate a substantial portion of them towards the earth thereby preventing the entire terrestrial radiation from escaping into space. This seemingly innocuous, gradual process of continuous and consistent redirection of the infrared to the atmosphere alters the natural process of the atmosphere hence, climate change.

The differential absorption of GHGs across the globe depending on the rate of emission results to region specific consequences such as higher average surface and ocean temperature, more rapid evapouration and rainfall, severe and variable floods and droughts, rising sea levels, extreme weather occurrences and extended range of tropical disaster (Melinda, 2015). In Nigeria, the effects of climate change manifest as desertification, erosion, water shortages, spread of diseases, population displacement, decreased food production, infrastructure degradation, economic disruption and poverty, social disorder, insecurity, economic and financial collapse among others. In view of these consequences of climate change, it then becomes perhaps, wise to agree with Turbuck and Lutgens (2018) who assert that it would be prudent to begin thinking about what the changes might be and how humankind might best avoid or ameliorate the unfavourable effects and gain the most benefit from the favourable ones.

The above assertion calls for concerted efforts directed at massive campaign and education of the global citizens on climate change awareness and adaptation measures. Awareness according to Oragwam (2014) is a state of consciousness and purpose. Chinedu (2018) viewed awareness as the condition of being aware and able to understand what is happening around one. Awareness is the state or ability to perceive, to feel or to be conscious of events, objects or sensory patterns. Awareness means having idea of the existence of something. In relation with the above views, Turbuck and Lutgens (2018) equates awareness with knowledge of, understanding of, appreciation of, recognition of, attention to, perception of, conscious of, acquaintance with,

enlightenment with, mindfulness of, cognizance of, something. Belloti (2012) explained that awareness involves knowing who is talking with whom; it provides a view of one another in the daily work environment. In the context of this study, though in relation to the above views, awareness implies understanding and knowledge of the activities and events (like climate change) going on around one's environment. This knowledge and understanding to a large extent could perhaps determine the adaptation strategies taken by these individuals against the effects of climate change. Adaptation means to become used to something. It is the ability to change something to make it more suitable. Onweremadu and Udebani (2012) explained that climate change adaptation is an adjustment in natural or human system in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities. It involves managing new risks and strengthening resilience in the face of change.

Indeed, the focus of this study is to assess the climate change awareness and adaptation needs of teacher education students in Nigeria. This focus has become necessary in view of the fact that the teacher education students are indispensable tools for effective curriculum implementation in the nearest future. To ensure this future role, policies and procedures were developed to inculcate relevant knowledge, skills, attitude and values necessary for effective delivery of teaching tasks. For quality and relevant of the products of teacher education in Nigeria, contemporary issues in human environment particularly climate change have to be adequately inculcated to them. This will enable the teacher education students, when they assume the responsibility of teaching, to effectively promote environmental friendly attitude such as proper disposal of waste, tree planting, avoidance of deforestation and bush burning to the students. In view of the above, the major question is what are the climate change awareness and adaptation needs of these teacher education students that will help them to be functional in the classroom (in the nearest future) in promoting knowledge and positive attitude of their students towards climate change?

In order to provide a comprehensive answer to the above question, certain factors need to be taken into cognizance. First, it is important to examine the existing status of teacher education students' climate change awareness and adaptation. This is because what they already know about climate change and its adaptation strategies will determine what they would need to know more. Secondly, there is need to determine if the field of study of the teacher education students has influence on their climate change awareness and adaptation needs. In determining the influence of field of study on students' climate change awareness and adaptation, attention needs to be paid on the extent to which the climate change awareness and adaptation of the students who has environmental education contents infused in their curriculum (like Education/Geography and Social Studies) significantly or otherwise differ from the students who do not have environmental education contents in their curriculum. Finally, for the purpose of relevance in the review of curriculum, the influence of gender on the students' climate change awareness and adaptation need to be established. Discussing on the influence of gender on environmental issues as climate change, Oruonye (2021) noted that the different ways male and female are socialized tend to determine their environmental exploration, degree of environmental knowledge and manipulation, including their overall relationship with the environment. However, Musa (2004) earlier argued that through gender is a crucial issue in the discussion of environmental issues as climate change, but that it could have no influence on individuals' knowledge of the challenges of climate change. Thus, it is important to find out if gender has any influence on the teacher education students' climate change awareness and adaptation.

The findings, no doubt, will guide the curriculum planners for effective review of teacher education curriculum to accommodate the identified needs for achievement of quality and relevant teachers who will be relevant in proffering solutions to the global challenges. This study therefore intends to contribute to this crucial task by determining the climate change awareness and adaptation needs of teacher education students in Nigeria.

Research Questions

The following research questions guided the study.

1) What is the climate change awareness mean score of teacher education students in Nigeria?
2) What are the climate change awareness needs of teacher education students in Nigeria?
3) What is the climate change adaptation mean score of teacher education students in Nigeria?
4) What are the climate change adaptation needs of teacher education students in Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

Ho$_1$: There is no significant difference in the climate change awareness mean score of male and female teacher education students.

Ho$_2$: There is no significant difference in the climate change awareness mean score between students who have environmental education contents infused in their curriculum and those who do not have.

Ho$_3$: There is no significant difference in the climate change adaptation mean score of male and female teacher education students.

Ho$_4$: There is no significant difference in the climate change adaptation mean score between students who have environmental education contents infused in their curriculum and those who do not have.

Research Methods

The study adopted descriptive survey research design. This design according to Nworgu (2006) enables the researcher to collect data from few members of population who are however considered a representative of the entire population. The analysis of the data collected will enable the researcher to describe existing status of the population with respect to the issue investigated and such result can be generalized to the entire population. This design is considered appropriate for this study that tends to describe the climate change awareness and adaptation needs of the teacher education students.

The study involved all the teacher education students in the Faculty of Education, University of Nigeria, Nsukka. Simple random sampling technique was used to sample two hundred (200) students. This sample is made up of one hundred and twenty female students and eighty male students. Two structured questionnaire developed by the researchers were used for data collection. The instruments were titled "Climate Change Awareness Scale (CCAS) and Climate Change Adaptation Scale (CCADS). The instruments were subjected to face validation by three experts in Environmental Education and the reliability of the instruments were established using Cronbach Alpha method. Satisfactory reliability of index of 0.78 and 0.82

were obtained for CCAS and CCADS respectively. Mean score and standard deviation were used to answer the research questions while t-test was used to test the research hypotheses.

Results

Research question one was answered by hypothesis 1.

Ho₁: There is no significant difference in the climate change awareness mean score of male and female teacher education students.

Table 1: Independent t-test analysis of gender influence on students' awareness of climate change.

Gender	N	Mean	SD	Df	t-cal	t-crit	Decision
Female	120	34.82	5.59	198	-1.246	0.214	Significant
Male	80	35.72	5.57				

The analysis of Ho₁ resulted in t (198) = -1.246, p <.05. Based on this, the null hypothesis was rejected and the alternative hypothesis was accepted, hence there is a significant gender influence on students' awareness of climate change. Thus, table 1 indicates that being a male or female have significant influence on students' awareness on climate change.

Research question two was answered by hypothesis 2.

Ho₂: There is no significant difference in the climate change adaptation mean score of male and female teacher education students.

Table 2: Independent t-test analysis of gender influence on students' adaptation to climate change.

Gender	N	Mean	SD	Df	t-cal	t-crit	Decision
Female	120	62.03	13.06	198	0.257	0.797	Significant
Male	80	61.58	14.18				

The analysis of Ho₂ resulted in t(198) = 0.257, p<0.05. Based on this result, the null hypothesis was rejected while the alternative hypothesis was accepted. Therefore, there is a significant difference in the climate change adaptation mean scored of male and female teacher education students.

Research question three was answered by hypothesis 3.

Ho₃: There is no significant difference in the climate change awareness mean score between students who have taken environmental education course and the students who have not.

Table 3: Independent t-test analysis of environmental education (EE) course influence on students awareness of climate change.

Environmental Education (EE)	N	Mean	SD	Df	t-cal.	t-crit.	Decision
No EE content	114	35.12	5.39	198	-.035	0.972	Significant
Yes EE content	86	35.14	5.83				

The analysis of Ho$_3$ resulted in t(198) =-.035, p<.05. Based on this, the null hypothesis was rejected and the alternative hypothesis was accepted. Thus, taking environmental education has significant influence on students' awareness of climate change.

Research question four was answered by hypothesis 4.

Ho4: There is no significant difference in the climate change adaptation mean score between students who have taken environmental education and the students who have not taken environmental education.

Table 4: Independent t-test analysis of environmental education influence on students' adaptation to climate change (n= 278).

Environmental Education (EE)	N	Mean	SD	Df	t-cal.	t-crit.	Decision
No EE content	114	61.87	12.89	198	-.066	0.948	Significant
Yes EE content	86	61.98	14.06				

The analysis of Ho$_4$ showed that the calculated t-value is -.066 while the critical t-value is 0.948 at 0.05 level of significant. Thus, the null hypothesis was rejected while the alternative hypothesis was accepted; hence there is a significant difference in the mean score of students who have taken environmental education and those who have not taken environmental education in terms of their climate change adaptation.

Discussion of Findings

The findings of the study with respect to hypothesis one analyzed in table 1 showed that there is significant difference between male and female students climate change awareness mean score. This result is in line with the findings of the United Nation Development Project (UNDP, 2020) that gender has influence on individual perception and knowledge of environmental issues as climate change. Omotosho (2017) noted that men and women play different roles in their daily relationship with the environment, hence they poses different perception and knowledge of the environment and the events in the environment. The study in table two further showed that there is a significant different between male and female adaptation to climate change. These findings agree with Oruonye (2021) who found a significant difference between male and female tertiary education students adaptation strategy to climate change. These findings however, disagree with Ofebe (2018) who found that being a male or female student has no significant different with respect to their knowledge and attitude towards environmental events like climate change. Although, Ofebe (2018) conducted the study with secondary school students while the present study and that of Oruonye (2021) were conducted in tertiary education level.

The findings of the study also showed that there is a significant difference between students who take environmental education content and those who do not take with respect to their climate change awareness and adaptation. These findings indicated that taking environmental education course helps the students to acquire better knowledge, and attitude

towards environmental issues like climate change. This finding is not surprising if one considered the core goals of environmental education as identified by Anon (2022) as directed towards providing opportunities to acquire the knowledge, values, attitudes, commitment and interpret the environment from a variety of perspective –physical, geographical, biological, aesthetic, ethical and spiritual. Furthermore, environmental education aims at arousing people's awareness, curiosity about the environment and encourages active participation in resolving environmental problems. Environmental education intends to create new patterns of behavior of individuals, groups and society as a whole towards the environment. In support of the above findings that taking environmental education influence students knowledge of the events in the environment, Nwobi (2012) noted that to sustain the environment for the future, there is need to spread environmental education across disciplines.

Recommendations

Based on the findings of the study, the following recommendations are made:

(1) For relevant and quality of teacher education programme for sustainable development, environmental education course should be made compulsory in teacher education institutions in Nigeria. This, if adopted, will enable the student teachers in the concerned institutions to acquire relevant environmental knowledge and attitude; which expectedly will be inculcated effectively to the students in other lesser levels of education when the student's teachers finally assumed teaching responsibility. This is more important because no teacher can inculcate what he/she do not know and no student can rise against the knowledge level of the teacher.

(2) The teachers of environmental education should take into consideration the influence of gender on environmental knowledge and attitude while teaching the course. To do this, there is need to diversify the teaching methods such that every student, gender notwithstanding, will be able to internalized the environmental content delivered by the teacher in the classroom.

Reference

Anon, C. (2022). *Introducing environmental education*. In course manual international centre for conservation education ICEEL. Longman Press.

Chinedu, C. (2018). Environmental education awareness & attitude of secondary school students in Owerri Education Zone, Imo State. *M.ED. Project of the Department of Science Education, UNN.*

Ezeudu, F. O. (2009). Using concept map to teach ozone layer depletion and green house effects to senior secondary school chemistry students. *STAN. Environmental Educational Series* No 13 pp 78-87.

Igwe, I. O. (2013) *Impact of climate changes on environment*. London: Cambridge University Press.

Musa, A. O. (2014). Global climate change: The issues and challenges. *Biological and Environmental Sciences Journal for the Tropics (BEST)* 1(1) October, pp 66-74.

Nwagu, E. N. & Nzewi, U. M. (2009). Strategies for teaching recent climate change to primary, secondary and higher education students. *STAN. Environmental Educational Series* No 13 pp 55-65.

Nwobi, A. U. (2012). Needs assessment of environmental education in the curriculum for use in Adult and Non-formal education programmes in Nigeria: A critical analysis. International Journal of Educational Research. 12 (1),191-200.

Nworgu, B. G. (2015). *Educational research: basic issues & methodology*. Ibadan: Wisdom Publishers Ltd.

Nzewi, U. (2009). Climate change and the biosphere. *STAN. Environmental Educational Series* No 13 pp 37-54.

Ofoebe, C. (2019). Environmental education awareness & attitude of secondary school students in Okigwe Education Zone, Imo State. *M.ED. Project of the Department of Science Education, UNN.*

Omotosho, D. O. (2017). Farmer's perception of the impact of climate change on agricultural development in Edo State. *Ph.D Project of the Department of Agriculture Economics, Michael Opkara University of Agriculture, Umudike.*

Onuoha, F. C. & Ezirim, G. E. (2020). Climate change and national security: Exploring the conceptual and empirical connections in Nigeria. *Journal of Sustainable Development in Africa.* 12(4) pp 255-269.

Oruonye, E. D. (2021). An assessment of the level of awareness of the effects of climate change among students of tertiary institutions in Jalingo Metropolis, Taraba State Nigeria. *Journal of Geography and Regional Planning.* Vol 4 (9). Pp 513-517.

Turbuck, E. J. & Lutgen, F. K. (2014). *Earth Science*. London: Merrill Publishing Company.

United Nations Development Programme UNDP (2020) Climate change awareness and adaptation in Cross River State Retrieved from *http://aradin.org/modules/AMS/article.php?storyid=11*

Uzuegbunam, A. O. & Nwofia, J. E. (2012). Climate change and its challenges to development in the 21st century: Anambra state of Nigeria experience. In P-J Eze (ed) *Weathering Global Warming through relevant knowledge.* Nsukka: Great AP Express Publishers.