



AWARENESS AND PERCEPTION OF CLIMATE CHANGE AMONG MEDICAL STUDENTS IN THE UNIVERSITY COLLEGE HOSPITAL, IBADAN

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ABSTRACT

The importance of being educated on climate change over a period of time usually comes with long lasting impact on the individual. However, there is a low level of perception of the meaning, causes and effects of climate change especially among students. This study was carried out in the University of Ibadan Campus using medical students as respondents to gather data. The students were selected from Medicine and Surgery, Dentistry, Physiology, Nursing, Human Nutrition and Physiotherapy using multistage random sampling. Three hundred copies of questionnaire were administered to the respondents' besides focus group discussion and analysed using descriptive statistics to present results in frequency and percentages on tables. The result showed the level of awareness among students, the sources of information and impacts of climate change. The students in Medicine Department take courses on climate change (33.7%) more than their counterparts in the college and submitted that climate change help to provide information (85.2%) in certain aspects of their course just like those in Human nutrition (88.2%) agreed. However, Physiotherapy students agreed more on climate change being a means of knowing what is happening in the world (85.7%) than other usefulness. All the students from each department proved that the internet was the best source of information on climate change. The consequential effect of climate change as identified by the students also gave an indication on their perception of climate change. In order to be able to achieve adequate preventive, adaptive and mitigative measures on climate change there is need for better education of these students through inclusion of climate change topics in their curriculum as climate change affects everyone irrespective of discipline, culture or climate.

Keywords: Awareness, climate, education, impact, information

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INTRODUCTION

Climate refers to the average weather conditions of a particular place studied over a period of time. The changes in rainfall pattern, wind speed and direction, light intensity all have direct impact on the growth and abundance of plant species and subsequently affect the animal population that rely on them for survival. Historically, agriculture develops over time in a given region based on "normal" or average climate conditions. The frequency of occurrence of extreme climate conditions dictates the response of agriculture to climate variability/change [1].

All over Nigeria, millions of people are already experiencing changing seasonal patterns of rainfall and increased heat [2]. This has led to severe changes in rainfall patterns and amount causing drought in the northern part and flooding in the southern parts of the country as well as an influx of pests and diseases. Climate also determines to a large extent availability of water, which impacts health and ultimately the level of poverty amongst Nigerians [2]. The changes in weather conditions, vegetation pattern, animal populations and ecological balance among others have been the bane of intellectual discussion among conservationists, ecologists, academia, policy makers and other stakeholders for about two decades

ago. However, the few individuals that think they are not directly affected are just being illusioned about the importance of these changes. Professionals in the medical world especially in Nigeria seems not to associate the invasion of new diseases, loss of medicinal plants, stress related ailments and diet induced sicknesses with climate change. Hence, the need to study the perception of climate changes among medical students in the University of Ibadan campus.

Falaki *et al.* and Boko *et al.* [2, 3] both submitted that the government and researchers focused on the social, environmental and financial implications as well as adaptive measures to climate change when majority of the populace still lacked perception of it. Meanwhile, public perception of an issue (climate change) is very important to the success or failure of any measures (economic, political or social) to be adopted in controlling or adapting to such. Zube *et al.* [4] once posited that the response of a man to issues pertaining to his environment can be broadly categorised as cognitive (related to knowledge and understanding), affective (related to feelings, attitudes, and emotions), behavioural (related to changes in behaviour of the viewer), and physiological (biological or physical effects on the observer's body). Perception determines the social

mental picture of climate change. Therefore, demographic information of students from the four faculties that made up medical and health sciences were examined to determine perception among respondents used for this study.

Perception of climate change is a precursor for mitigating and adaptive measures of climate change. Climate change has hitherto been associated more with agricultural sciences, environmental studies and some science courses; when in actual fact every individual is under the influence of climate change but some lack perception. This is why the medical students were targeted for this study as they spend most of their time at the University College Hospital.

METHODS

Study area

This study was carried out in the University College Hospital (UCH) with medical students being the respondents. UCH is located within Ibadan North Local Government which is the Southwest part of Agodi government reserved area (GRA) towards Mokola, Ibadan. Ibadan is located approximately on longitude 3°54' of Greenwich Meridian and latitude 7°26' North of the equator. It has a total land area of 130 km² and 750 m above sea level [5].

Sampling techniques

A multistage random sampling procedure was used to collect primary data from 300 respondents from the College of Medicine, University of Ibadan, using structured questionnaires. There are four faculties in the medical school, UCH. Each department from the four faculties of Basic Medical Sciences, Clinical Sciences, Public Health and Dentistry was ably represented at all levels. Based on the students' population, random selection was done on a 10% and 20% for lower and higher populations respectively.

Sources of data

Reconnaissance survey of the students and Departments in the College was carried out to determine students' population before the questionnaires were administered. The data was obtained through questionnaires and personal interview of the students.

Data analysis

The data obtained from the questionnaire was analysed by SPSS using descriptive statistics. The results of analysis are presented as frequency and percentages in tables

RESULTS AND DISCUSSION

Demographic characteristics of respondents

The total number of respondents was 300 (Table 1) of which 53.7% were males and 46.3% females. The Department of Nursing had the least number of students with no male respondents while Biochemistry, Dentistry, Physiotherapy and Medicine and Surgery had 55%, 59%, 100% and 59% males respectively. This implies that there are more male students in medical related courses than females except for nursing which seems to be a female dominated department. The age of respondents sampled for this study ranged from 16 to 30 years with the highest frequency (46.3%) being 21 to 25 years old and the oldest set of respondents were 27.0% of the sampled population.

Table 1: Demographic Characteristics of Respondents

Socio-characteristics	Range	Frequency
Gender	Male	161 (53.7%)
	Female	139 (46.3%)
Age	16-20	81 (27.0%)
	21-25	172 (57.3%)
	26-30	47 (15.7%)

Courses on climate change as prerequisite in the college

Teaching about climate change can be a daunting challenge, but it is a critical field for students to learn about, as it affects many parts of society. Table 2 showed that most of the respondents in the department of medicine and surgery (34%) as well as a few in nursing (3%) were of the opinion that they had no environmental based course in their curriculum while in Physiotherapy, Dental Surgery, Physiology, Human Nutrition, Biochemistry and Nursing; 4.7%, 4.7%, 4.3%, 4.3%, 4.3% and 1.3% respondents respectively agreed that they had taken climate change as an environmental-based course at one point or the other in their curriculum. The result obtained for this study is contrary to the report of Ayanlade and Jegede [6] that about 70.7% of university graduates received brief lectures in some special elective courses during their university education, while only 4.1% were taught to more than three semesters/terms in some special elective courses.

The importance of being educated on climate change over a period of time as a course usually comes with long lasting impact on the individual as submitted by Cordero *et al.* [7] through decisions made after graduation on what car to buy, food choices and reduction in carbon emissions. As medical students who would be saddled with meeting people on a daily basis; an educational background in climate change can help them to make informed decisions on diseases diagnosed from environmental causes,

nutrient deficiencies as well as counselling patients to live healthily.

Table 2: Courses on Climate Change as Perquisite in the College

Department	Yes Freq (%)	No Freq (%)	Total Freq (%)
Medicine & Surgery	80 (26.7)	102 (34)	182 (60.7)
Physiotherapy	14 (4.7)	9 (3)	23 (7.7)
Dental Surgery	14 (4.7)	11 (3.7)	25 (8.3)
Physiology	13 (4.3)	6 (2.0)	19 (6.3)
Human Nutrition	13 (4.3)	4 (1.3)	17 (5.7)
Biochemistry	13 (4.3)	8 (2.7)	21 (7.0)
Nursing	4 (1.3)	9 (3.0)	13 (4.3)
Total	151(50.3%)	149(49.7%)	300(100%)

Relevance of climate change courses to students

Table 3 showed that 85.2% of the respondents in the Department of Medicine and Surgery believed that climate change will be needed to meet their own information needs, while another 79.1% of this same set of respondents opined that the study of climate change gave them a better understanding of the world. For the Physiotherapy respondents, 78.6% agreed that climate change has provided them with useful information relating to their course of study; 64.3% considered it as an opportunity for getting jobs after school and 85.7% reported that climate change has given them a better understanding of the world surrounding them. Though, 68.2%, 83.3%, 88.2%, 85% and 80.8% in Dental surgery, Physiology, Human nutrition, Biochemistry and Nursing respectively all agreed that the knowledge of climate change has provided them with some needed information in their field. Another 68.2%, 57.9%, 82.4%, 70% and 73.1% from the departments listed above revealed that climate change classes have given them a better understanding of the world in general. However, 59.1% in Dental surgery, 52.9% in Human nutrition, and 50% in Biochemistry students respectively were of the opinion that the knowledge of climate change will increase their prospects for getting jobs. Moreover, 58.8% of the respondents sampled in Human nutrition submitted that climate change is a key factor influencing people's lifestyles.

The results presented above showed the level of awareness and depth of knowledge of the respondents on climate change. For the few that agreed that climate change provided much needed information, it could be an eye opener to the influx of certain diseases related to nutrient deficiencies as well as excessive heat and dust particles. According to Okali [8] climate change contributes to the global

burden of disease and premature deaths through human exposure to changing weather patterns and indirectly through changes in water, air, and food quality, not forgetting the changes in ecosystems, agriculture, industry, and settlements and economy.

Perception of students on impact of climate change

The perception of climate change among the medical students sampled is given in Table 4. Of the respondents, 42.0% perceived climate change as just the atmospheric condition of a place; another 17.7% could only see climate change literarily as a change in climate. 5.3% of these respondents argued that climate change meant the weather conditions experienced as well as significant changes observed in weather conditions in a particular place at a certain time. Meanwhile, 11.0% of the total respondents perceived climate change as global warming/ ozone depletion but 5.7% opined that it is a deviation from the normal climatic changes. The results above is in line with the findings of [9] where 18.2% of the students of Jalingo Tertiary institutions interviewed had never heard of climate change and 89% of those who had heard (81.8%) do not know what climate change was all about, its causes, effects, and possible adaptive or mitigative measures.

Sources of information on climate change

It is obvious that the students sampled possess literary understanding of climate change and lack adequate knowledge of the depth, causal factors and consequences of climate change that the world is battling with. This may be due to their curriculum being different from those of their counterparts in agriculture and environment-based disciplines. This observation supports the findings of [10] that students' involvement in climate change-related workshops and

campaigns significantly influenced their knowledge levels. Moreover, climate change affects all living beings under the sun regardless of career paths.

The lack of proper understanding of the issue being discussed is contrary to the findings of Ayanlade and Jegede; Ojomo *et al.*; Agboola and Emmanuel [6, 11, 12] in which student respondents clearly identified the impact of climate change on agriculture, fishery as well as labelling it the third prioritized environmental issue in Nigeria based on a significant level of awareness and perception.

Table 3: Relevance of Climate Change Courses to Students

Department	Information needs	Lifestyle	Job placement	World view				
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Medicine	155 (85.2)	27 (14.8)	70 (38.5)	112 (61.5)	63 (34.6)	119 (65.4)	144(79.1)	38(20.9)
Physiotherapy	11(78.6)	3(21.4)	6(42.9)	8(57.1)	9(64.3)	5(35.7)	21(85.7)	2(14.3)
Dental Surgery	15(68.2)	7(31.8)	7(31.8)	15(68.2)	13(59.1)	9(40.9)	15(68.2)	7(31.8)
Physiology	18(83.3)	3(16.7)	5(26.3)	14(73.7)	9(47.4)	10(52.6)	11(57.9)	8(42.1)
Human nutrition	18(88.2)	2(11.8)	10(58.8)	7(41.2)	9(52.9)	8(47.1)	14(82.4)	3(17.6)
Biochemistry	17(85)	3(15)	6(30)	14(70)	10(50)	10(50)	14(70)	6(30)
Nursing	26(80.8)	5(19.2)	11(42.3)	15(57.7)	9(34.6)	17(65.4)	19(73.1)	7(26.9)
Total	249(83.3%)	50(16.7%)	115(38.3%)	185(61.7%)	122(40.7%)	178(59.3%)	229(76.3)	71(23.7)

Table 4: Students Expression of Climate Change

Dept.	Atm. Condition (%)	Climate change (%)	Weather conditions experienced (%)	Negative change in climate (%)	Global warning/ozone depletion (%)	means any significant (%)	Deviation from normal atmos. Condition (%)	Average atmospheric condition of a place over a period time (%)	Total (%)
Med. & Sur.	73 (24.3)	30 (10.0)	10 (3.3)	15 (5.0)	23 (7.7)	11 (3.7)	10 (3.3)	10 (3.3)	182 (60.7)
Physiotherapy	13 (4.3)	8 (2.7)	1 (3)	-	1 (3)	-	-	-	23 (7.7)
Dental Surgery	8 (2.7)	2 (7)	2 (7)	2 (7)	4(1.3)	1(3)	3 (1.0)	3 (1.0)	25 (8.3)
Physiology	7 (2.3)	3 (1.0)	-	2 (7)	2 (7)	2 (7)	2 (7)	1 (3)	19 (6.3)
Human nutrition	7 (2.3)	3 (1.0)	2 (7)	1 (3)	1 (3)	1(3)	1 (3)	1 (3)	17 (5.7)
Biochemistry	14 (4.7)	5 (1.7)	1(3)	1 (3)	-	-	-	-	21 (7.0)
Nursing	4 (1.3)	2 (7)	-	-	2 (7)	1 (3)	1 (3)	3 (1.0)	13 (4.3)
Total	126 (42.0)	53 (17.7)	16 (5.3)	21 (7.0)	33 (11.0)	16 (5.3)	17 (5.7)	18 (6.0)	300 (100.0)

Table 5: Students Source of Information on Climate Change

Department		Main sources of Information							Total
		Internet	Newspaper	Office report	TV	Bullet	Radio	Media	
Medicine & Surgery	Freq	80	60	29	11	2	0	0	182
	%	26.7	20.0	9.7	3.7	0.7	0	0	60.7
Physiotherapy	Freq	9	11	0	1	1	0	1	23
	%	3.0	3.7	0	0.3	.03	0	0.3	7.7
Dental Surgery	Freq	9	8	1	3	2	1	1	25
	%	3.0	2.7	0.3	1.0	0.7	0.3	0.3	8.3
Physiology	Freq	4	7	4	3	0	0	1	19
	%	1.3	2.3	1.3	1.0	0	0	0.3	6.3
Human Nutrition	Freq	3	8	2	2	0	2	0	17
	%	1.0	2.7	0.7	0.7	0	0.7	0	5.7
Biochemistry	Freq	8	8	3	2	0	0	0	21
	%	2.7	2.7	0.7	0.7	0	0.7	0	7.0
Nursing	Freq	3	2	4	0	0	0	4	13
	%	1.0	0.7	1.3	0	0	0	1.3	4.3
Total		116 38.7%	104 34.7%	43 14.3%	22 7.3%	5 1.7%	3 1.0%	7 2.3%	300 (100%)

The various sources of information about climate change available to the students was also examined as shown in Table 6. The internet (38.7%), newspapers (34.7%), office reports (14.3%), Television (7.3%), Bulletin (1.7%), radio (1.0%) and social media (2.3%) provided the respondents at various times with needed information about climate change. [13] reported four sources of information for teachers on climate change to be the Internet; government sources; mass media and professional development courses. The students in turn obtain the same information directly or in edited form from the teachers. The problem with the internet as a source of information is the overabundance of information on the internet and social media still makes it a necessity for teachers to guide students such that only quality and beneficial information will be harnessed

Perception on possible challenges associated with climate change

Table 6 showed that 14.3% and 1.7% respondents from the department of medicine and surgery and human nutrition respectively agreed that poverty and famine were problems associated with climate change. In 2011, Oruonye [9] observed that the developing countries of the world such as Nigeria will suffer most from the impacts of climate change as was evident in subsequent years in poor agricultural yield, flooding, drought among others. This is because poverty has been known to push people into collecting firewood from the forest for sale as well as cooking which

consequently leads to deforestation. These two factors are also major problems that could arise from climate change when agricultural harvests are low, famine and poverty may likely set in. The Physiology (7%) and Physiotherapy (2.3%) respondents each agreed that desertification and flooding were major problems, causes and consequences of climate change. Meanwhile those in Dental surgery (3%) and Biochemistry (7%) both submitted ozone depletion as a major problem associated with climate change. However, ocean circulation was the major problem identified by the nursing department respondents.

Different problems were identified by the students but majority of them agreed poverty or famine problem is associated with climate change. The problem can be caused by flooding or drought, which affects planted crops and in turn affect the supply of the crops. This cause famine and as a result causes poverty to the farmers. Planting of more trees can help this situation in other to protect the environment. This study supports the position of Ojomo *et al.* [11] that Nigeria is currently exposed to and/or will be directly exposed to sea level rise, flooding, drought, coastal erosion, rising temperatures, desertification with an exception of melting glaciers as a result of climate change according to Nigeria's First National Communication under the United Nations Framework Convention on Climate Change [14].

Perception on aspects of climate change to be studied by respondents

Humans tend to care and focus more on things of interest than what the norm dictates. The respondents revealed the things that could motivate them to learn more about climate change (Table 7); such that 48.7% were found to be interested in the educational aspect probably because this might enlighten them on the whys, extent and consequences of climate change. Another larger set seemed to be more interested in the adaptation aspect. This may be as a result of uncertainty in putting an end to the menace of climate change and so have resigned them to learning the various ways of managing or adapting to climate change effects and consequences. This is line with what was opined in GREEN JOURNAL [15] that students learn how different adaptation methods can work for different regions and communities around the world, depending on their geographical setup, climate, and soil conditions.

One can only be interested in what is tangible as opposed to abstracts. Had there been a solution designed to ensure a kind of community participation, it would have given the students hope while creating a channel to express their interest. A design for students by Cordero *et al.* [7] presented real life climate change situations where students were allowed to compete for workable solutions. The experiment had the benefits of developing the students' interests on causes of, consequences of and their proffered solution to climate change.

Factor responsible for climate change

Table 7: Perception on Aspects of Climate Change to be studied by Respondents

Department	Educational Freq (%)	Adaptation Freq (%)	Mitigation Freq (%)	Total Freq (%)
Medicine & Surgery	96 (32.0)	16 (5.3)	70 (23.3)	182 (60.7)
Physiotherapy	16 (5.3)	4 (1.3)	3 (1.0)	23 (7.7)
Dental Surgery	13 (4.3)	5 (2.3)	7 (0.3)	25 (8.3)
Physiology	9 (3.0)	5 (1.7)	5 (1.7)	19 (6.3)
Human Nutrition	3 (1.0)	6 (2.0)	8 (2.7)	17 (5.7)
Biochemistry	7 (2.3)	4 (1.3)	10 (3.3)	21 (7.0)
Nursing	5 (1.7)	4 (1.3)	4 (1.3)	13 (4.3)
Total	149 (48.7%)	133 (44.3%)	15 (6.0%)	300 (100%)

From Table 8 below, deforestation (36.4%) followed by gases released (26.0%) into the atmosphere as well as anthropogenic activities (19.4%) were the major factors submitted by the respondents as being responsible for climate change. This is evident in the areas of forested lands available as at two decades ago compared to the status quo. Also, human activities affecting the environment are not encouraging despite the much propaganda on sanitation, health issues and clean environment among others.

Gone are the days when climate change was blamed on volcanic eruptions and solar heat changes [16]. According to Lehtonen *et al.* [17], human activity is the most important factor determining our future. Although various activities such as flooding, urban settlement were noted by the respondents to be responsible for climate change, majority agreed that deforestation was responsible for climate change. Deforestation by humans is the major factor responsible for climate change and it keeps increasing geometrically. This is in line with the submission of the IPCC [18] working group that past records showing that climate varied naturally over a wide range of time scales, does not explain the observed warming since the 1950s, as the over 95% human activities being the dominant cause of that warming. Afforestation, clean energy, reduced carbon emissions are some of the ways to stop its effect; hence, people should be sensitized in these aspects.

Table 6: Problem Associated with Climate Change

Department	Ocean circulation Freq %	Desertification flooding Freq %	Poverty famine Freq %	Ozone layer Freq %	Sun intensity Freq %	Sea level Freq %	Drought Freq %	Deforesta. Freq %	Env. Degrading Freq %	Total Freq %
Med. & Surgery	37(12.3)	38(12.7)	43(14.3)	33(11.0)	11(3.7)	7(2.3)	6(2.0)	4(1.3)	3(1.0)	182(60.7)
Physiotherapy	13(4.3)	2(7.)	4(1.3)	4(1.3)	-	-	-	-	-	23(7.7_
Dental Surgery	8(2.7)	8(2.7)	6(2.0)	1(3)	1(3)	-	-	-	-	25(8.3)
Physiology	4(1.3)	7(2.3)	6(2.0)	1(3)	1(3)	-	-	-	-	19(6.3)
Human Nutrition	1(3)	3(1.0)	5(1.7)	3(1.0)	3(1.0)	1(3)	-	-	1(3)	17(5.7)
Biochemistry	5(1.7)	6(2.0)	4(1.3)	2(7)	3(1.0)		1(3)	-	-	21(7.0)
Nursing	2(7)	1(3)	4(1.3)	2(7)	-	1(3)	1(3)	2(7)	-	13(4.3)
Total	70 (23.3)	65 (21.7)	72 (24.0)	46 (15.3)	19 (6.3)	9 (3.0)	9 (3.0)	6 (2.0)	4 (1.3)	300 (100.0)

Table 8: Factor Responsible for Climate Change

Departments	Deforestation (%)	Human activities (%)	Gases effect (%)	Weather condition (%)	Flooding (%)	Urban settlement (%)	Total (%)
Medicine & Surgery	63 (21.0)	39 (13.0)	49(16.3)	7 (2.3)	14 (4.7)	10(3.3)	182 (60.7)
Physiotherapy	14 (4.7)	2(.7)	6(2.0)	1(3)	-	-	23(7.7)
Dental Surgery	8(2.7)	6(2.0)	6(2.0)	1(3)	-	4(1.3)	25(8.3)
Physiology	9(3.0)	5(1.7)	4(1.3)	1(3)	-	-	19(6.3)
Human nutrition	7(2.3)	2(7)	5(1.7)	1(.3)	1(3)	1(.3)	17(5.7)
Biochemistry	8(2.7)	4(1.3)	8(2.7)	1(3)	-	-	21(7.0)
Nursing	6(2.0)	1(0.3)	5(1.7)	1(0.3)	-	-	13(4.3)
Total	115 (38.3)	59 (19.7)	83(27.7)	13 (4.3)	15 (5.0)	15 (5.0)	300(100.0)

CONCLUSION

This study was carried out to assess the perception level of climate change among the medical students of the University College Hospital. From the study, it can be inferred that the level of perception of the respondents is low; probably due to the lack of basic courses related to climate change. Moreover, the causal factors, problems associated with climate change were not new to the students as information on all these is readily available on the internet. The introduction of climate change studies in universities has a fundamental role in helping the general public, especially the next generations, to recognize the global challenges of climate change and to find ways of adapting to the changing climate.

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REFERENCES

1. RAYMOND, P.M. (2008). Developing an Adaptation Strategy for Sustainable Agriculture. USDA/WAOB Workshop on Climate Change Impacts and Adaptation to Agriculture, Forestry and Fisheries at the National and Regional Levels Orlando, Florida in ZUBE E.H., SELL J.L., TAYLOR, J.G. (1982). Landscape perception: Research, application, and theory. *Landscape Planning*, **9**: 1-33.
2. FALAKI, A.A., AKANGBE, J.A. & AYINDE, O.E. (2013). Analysis of Climate Change and Rural Farmers' Perception in North Central Nigeria. *Journal of Human Ecology*, **43**(2): 133-140.
3. BOKO, M., NIANG, I., NYONG, A., VOGEL, C., GITHEKO, A., MEDAN, M., OSMAN-ELASHA, B.T. & YANDA, P. (2007). Climate change 2007 - Impacts, adaptation and vulnerability in Africa. In: ML PARRY, OF CANZIANI, JP PALUTIKOF, PJ VAN DER LINDEN, CE HANSON (Eds.): *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press, pp. 433-467.
4. ZUBE, E.H., SELL, J.L. & TAYLOR, L.G. (1982) Landscape Perception: Research, Application and Theory. *Landscape and Urban Planning*, **9**, 1-33. doi.org/10.1016/0304-3924(82)90009-0
5. AKINLUYI M.L., ADELEYE O.O. & AWE F.C. (2018). The Influence of Socio-Economic Characteristics on Satisfaction in Selected Universities Students' Hostels in Southwestern, Nigeria. *American Journal of Computer Architecture*, **5**(1): 1-19. DOI: 10.5923/j.ajca.20180501.01
6. AYANLADE, A. & JEGEDE, M.O. (2016). Climate Change Education and Knowledge among Nigerian University Graduates. <https://doi.org/10.1175/WCAS-D-15-0071.1>: 465-473
7. CORDERO, E.C., CENTENO, D. & TODD, A.M. (2020): The role of climate change education on individual lifetime carbon emissions. DOI.org/10.1371/journal.pone.0206266.t001
8. OKALI, D.U. (2008). Climate change and sustainable development: Challenges to Nigeria. *Contemporary Issues in Sustainable Development: Lessons for and Challenges to*

- Nigeria, Ibadan Postgraduate School Publication Nigeria. pp. 61 – 80.
9. ORUONYE, E.D. (2011). 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*, **4**(9): 513-517.
 10. AKROFI M.M., ANTWI, S.H. & GUMBO, J. (2012). Students in Climate Action: A Study of Some Influential Factors and Implications of Knowledge Gaps in Africa. *Environments* **6**(2):12. DOI: 10.3390/environments6020012
 11. OJOMO, E., ELLIOTT, M., AMJAD, U. & BARTRAM, J. (2015). Climate change preparedness: A knowledge and attitudes study in southern Nigeria. *Environments*, **2**(4), 435-448. <https://doi.org/10.3390/environments204043>
 12. AGBOOLA, O.S. & EMMANUEL, M. (2016). Awareness of Climate Change and Sustainable Development among Undergraduates from Two Selected Universities in Oyo State, Nigeria *World Journal of Education*, **6**(3).pp 70-81
 13. PUTTICK STEVEN & ISOBEL TALKS (2021). Teachers' sources of information about climate change: A scoping review. *The Curriculum Journal* <https://doi.org/10.1002/curj.136>.
 14. MOE FEDERAL REPUBLIC OF NIGERIA (2003). *Nigeria's First National Communication under the United Nations Framework Convention on Climate Change*; MoE Federal Republic of Nigeria: Abuja, Nigeria.
 15. GREEN JOURNAL (2021): Climate Change Education – The Importance of Learning. AWM Network, 80-83 Long Lane, London, EC1A 9ET, UK. Retrieved on 11-05-2022 info@greenjournal.co.uk
 16. NATIONAL ACADEMY OF SCIENCES. (2020). Climate change: Evidence and causes: Update 2020. The National Academies Press, Washington, DC, p. 5. doi: 10.17226/25733
 17. LEHTONEN, A., SALONEN, A.O. & CANTELL, H. (2018). Climate Change Education: A New Approach for a World of Wicked Problems. Sustainability, Human Well-Being, and the Future of Education, pp 339–374.
 18. IPCC (2013). *Climate change 2013: The physical science basis. Working Group I contribution to the fifth assessment report of the Intergovernmental Panel on Climate Change* [STOCKER, T.F., D. QIN, G.-K. PLATTNER, M. TIGNOR, S.K. ALLEN, J. BOSCHUNG, A. NAUELS, Y. XIA, V. BEX & P.M. MIDGLEY (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, p. 869.