

Effects of Climate Change on Students Learning Ability in Redeemers University, Ede, Osun State

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ABSTRACT: *This study investigated effects of climate change on students learning ability in Redeemers University, Ede, Osun State. The population of this study comprised all 200 level students and above of Redeemers University. A total of 125 students constituted the sample. The study adopted a descriptive survey research design. The students were selected using stratified and simple random sampling techniques. An instrument was used to draw relevant information from the respondents. The instrument was a self designed questionnaire titled 'Climate Change and Students Learning Ability Questionnaire' (CCSLAQ). The validity of the instrument was ascertained by experts in management and reliability stood at 0-76 Research questions were answered using frequency counts, percentages, mean and standard deviation. Hypotheses were tested using t-test. All hypotheses were tested at 0.05 level of significance. The findings of the study revealed that climate and weather condition of the school is influenced by the climatic factors which in turn affect the learning ability of students. It also revealed that there is no significant difference in the effects of climate change on the learning ability of students based on gender and level of study. It was concluded that climate change factors have negative effects on the students and thus disrupt their learning ability. The study therefore recommended that lecturers should be enlightened on the effects of climate change and the role to play in order to enhance the learning ability of students. Researches on how to reduce the effects of climate change on tertiary students' learning ability should also be supported by the government and education stakeholders.*

Keywords: climate change, students, learning ability

INTRODUCTION

The largest environmental issue in the world can be ascribed to climate change. Climate change is world-wide in its causes but its consequences are significant in developing countries, particularly Nigeria. It is a topical issue worldwide because of its attendant

problems that are threatening the sustenance of man and his environment. They could be serious in the under-developed and developing countries. Climate change has become the new reality of our time. It brings with it changes in weather patterns that can have serious repercussions for human beings, upsetting seasonal cycles, harming ecosystems and water supply, affecting agriculture and food production, causing sea-levels to rise. Climate change has a cumulative effect on natural resources and the balance of nature. The consequences of climate change are already obvious in Nigeria.

The intergovernmental panel on climate change (IPCC) working group (2007) emphasized that climate change refers to any change in climate overtime, whether due to natural variability or as a result of human activities. However, climate change has undergone tremendous changes in the past, it is still changing and will continue to change (UNFCCC, 2007). These changes affect not only the quality of life and environment of the current world but also the survival of human race. Udenyi (2010) emphasized that climate change means a change in the climate condition of the world and that the change is discovered by the scientists and others to be on the negative. United Nation on Environmental Programme (UNEP) (2000), described climate change as extreme reactions of the weather phenomenon that negatively impacted on agricultural resources, water resources, human health, depletions of ozone layer, vegetation, soil and doubling of Co₂ in the ecosphere. Omotosho (2007) explained that climate change is a change of climate that is attributable directly or indirectly to human activities and, which alters the composition of the global atmosphere, in addition to natural climate variability observed over comparable time periods. Scientists have intensified the greenhouse effect by increasing the concentration of greenhouse gases in the atmosphere. Medugu (2009) defined climate change as an increase in average global temperatures caused by natural events and human activities, which are believed to be contributing to an increase in average global temperatures.

Climate change arises from environmentally unfriendly human activities that tend to satisfy the present need of the people at the risk which will later pose a greater demand in the future. Climate change has a lot of effect on human and the environment at large. Climate change has affected the learning ability of students in Redeemers University because of the insufficient infrastructural and low standard of facilities among others. Change in climate overtime has affected and is still affecting the learning ability directly and indirectly. Climate change has affected the learning ability of students directly because of concentration of solar radiation and high amount of precipitation (sunshine and rainfall) and this phenomenon “climate change” has affected indirectly when the supply of infrastructural facility is over utilized or not appropriately used. For example, a lecture room meant for (50) fifty students being used by (80) eighty students will reduce the level of concentration and assimilation in the class because of the excess heat and carbon dioxide being produced by the extra 30 students which are not meant to be in class because of the atmosphere in question, this will indirectly reduce the learning ability of students.

Monguno & Monguno (2017) asserted that, any phenomenon natural or not that affects the smooth running of academic activities and impacts students’ learning ability, which is not in

the best interest of students, lecturers, management and socio-economic development of the nation which depends on the successful training of needed manpower from tertiary institutions. Phan (2021) described that, mental functions may be negatively affected by decreases in thermal comfort as a result of large differences in temperature in the classroom among students as the heat season peaks.

Previous studies indicated that young school students are strongly in support of actions designed to prevent the impact of human induced global warming. Young females are more concerned about their environment than their male counterparts. In some places, females are kept at home for domestic chores while males would go to school. If there is drought, it is mainly females that are responsible for collecting water—a burden which may also prevent them from either attending school or taking their learning seriously. Serious drought leads to food scarcity, which leads to hunger, which in turn affects the learning ability of students. The climate crisis is not gender neutral (Johnson & Wilkinson, 2020). In fact, gender and climate change are profoundly intertwined (United Nations, 2021). A study on the nexus between patriarchy and the high rate of women's vulnerability to climate change in Nigeria finds that traditional beliefs, which underpin cultural division of roles between men and women, also increase the vulnerability of women to the adverse impacts of climate change (Chidiebere, 2019). In this context the author also suggests that patriarchal structures provide men with more general adaptive capacity or capability to climate change for several reasons (Chidiebere, 2019). Adaptive capacity can be defined as the ability of a system to adjust in response to projected or actual changes in climate (Government of Canada, 2010). Women are often not given the same freedom in choosing how to participate publicly or economically as men, which causes their low level of adaptive capacity. In fact, the division of roles, in which women are conditioned to carry out activities within the domestic space while allowing men the liberty to easily determine their choice of occupation, means that threats arising from climate change can only compel men who are engaged in the agricultural sector to seek alternative sources of livelihoods, while women do not exercise this level of liberty because their attachments to the domestic sphere undermines their flexibility for occupational mobility or change (Chidiebere, 2019). Consequently, the privileged power status given to men by the patriarchal structures which persist in all societies provides them with greater adaptive capability to cope with the consequences of climate change (Chidiebere, 2019). Social background was also found to be important in determining environmental attitudes (Tranter & Skrbis, 2011). Students in tertiary institutions showed interest in issues relating to climate change and are willing to participate in measures that will help mitigate climate change (Bruinders, Canavan, Johnstone, Mabuza, Mattushak & Spencer, 2009). The lecturers who teach these students need to be highly informed too as previous studies indicated; although in some categories, lecturers are not aware of climate change (Ekpoh & Ekpoh, 2011; Hegde, Murthy, Shalini, & Sandeep, 2012; Ochieng & Koshe, 2013).

In another development, climate change interferes with all aspects of life including education. In Nigeria, especially in some states, many students are absent from school during heavy rains, especially in the villages or areas where there are little or no means of transportation. Such absenteeism obviously affects students' learning ability. It may also be possible among

the students of Redeemer University, Ede in Osun State, if the students are living very far from their classrooms, their learning ability may be negatively affected during a heavy rain. It may be possible for a student that lives on the school campus not to miss class during a heavy rain. Living on the school campus may give students a psychological relief from transportation stress. Students may find it easy to come for tutorials and also personal study in school area in the evening as a result of weather. Also, students might miss lectures and important test because of the long distance of the hostel. All these seem to have effect on the students learning ability. While there is emerging awareness of the current and potential impacts of climate change on education provision and learning, it is also clear that education, both formal and non-formal, from primary through to tertiary and adult education, has an important role to play in addressing this change. Education is recognized as an important first step in increasing resilience (Bonifacio Takeuchi & Shaw, 2010). The United Nations Framework Convention on Climate Change (UNFCCC) Article 6: Education, Training and Public Awareness (also known as the New Delhi work program) recognizes that education must play a key role in a holistic response to climate change at local, national and global levels. The Hyogo Framework for Action's (HFA; 2005-2015) priority 3 focuses on increasing resilience and building a culture of safety and resilience at all levels through the use of knowledge, innovation and education, and Goal 2 of the Millennium Development Goals (MDG) discusses the importance of primary education in reducing poverty.

In 2021 there were several climate-related events such as lightning and thunderstorms; floods, heavy rain, and landslides; cyclone storms; and others (Statista Number of Extreme Weather Events in India by Type, 2021). All these climate-related events highly impact the educational attainment of school children, particularly in the 5–14 years age group. Migrants, due to climate change, are not able to access housing and health care; children, specifically, lack access to quality education due to language barriers (Hari, Dharmasthala, Koppa, Karmakarn & Kumar, 2021). Frequent droughts and floods in India impact school attendance, especially at the primary school level (Plan International, 2015). Studies indicate that climate changes directly affect the socio-physical environment of children. In this regard, adequate adaptation techniques need to be developed to ensure children are protected from the severity of climate change (Berse, 2017), which may even result in the loss of lives due to their increased vulnerability (Berse, 2017). This results in adverse health outcomes, decreased safety, alerted access to education, disrupted play and recreation time, and ultimately, decreased social development (Chatterjee, 2015). According to Save the Children (2008) and UNICEF UK (2008), it is children who will be hardest hit by the effects of climate change. These impacts will be seen, for instance, in the direct effects on educational provision associated with increasing incidence of severe weather events such as drought, flooding, and heat waves. Over the longer term, incremental environmental changes such as sea level change, salination changes in season patterns, desertification, soil erosion, species loss, are also likely to result in deteriorating livelihoods, which impact upon both household expenditure on schooling and the nutritional status of children (Bangay & Blum, 2010).

It should be noted that climate change could either affect positively or negatively but climate change does more bad than good. During the period of harmattan, some students are unable

to learn effectively due to the dust and harsh winds. Likewise, asthmatic students avoid the dust so as not to trigger an attack on their health status (Jamila et al., 2018). In the period of harmattan, a class meant for only (50) fifty students can be averagely used. As a result of weather, a little addition to fifty students would suit the situation of students bringing about the generation of heat and would make the students convenient when listening to lecture. The adverse effects of climate change directly and indirectly affect the learning ability of students in the school. It is a known fact that climate change cannot be stopped, but an adaptational plan can be put in place to reduce the effects on man and its environment.

Statement of the Problem

The apparent effects of climate change on students learning ability in Redeemers University, Ede, Osun State in the recent past has called for urgent concern. Although the management of the school had taken several measure, yet it seems that the effects of climate change on students learning ability have not justified the huge amount of money which the management has spent on exercise. It is against this background that the study will examine the effects of climate change on students learning ability in Redeemers University, Ede, Osun State.

Research Questions

The following research questions were raised to guide the study

1. What are the effects of climate change on students' learning ability at Redeemer university, Ede

Research Hypothesis

The following null hypothesis was also formulated to guide the study.

1. There is no significant difference in the effects of climate change on students' learning ability based on gender.
2. There is no significant difference in the effects of climate change on learning ability based on level of study.

METHODOLOGY

The study adopted a descriptive survey design. This is based on the fact that the study examined the relationships on ground and at the same time they already existed in the sampled university. The population of this study comprised all 200L students and above of Redeemers University, Ede, Osun State. A total of 125 students constituted the sample. The students were selected using stratified and simple random sampling techniques. An instrument was used to draw relevant information from the respondents. The instrument was a self designed questionnaire titled 'Climate Change and Students Learning Ability Questionnaire' (CCSLA) which was filled by students. The CCSLA is divided into sections A and B. Section A included items that were used to gather demographic information from respondents. Section B (Learning ability in the residential location of each students and Learning ability under a conducive climate conditions) relating to the student's learning ability in Redeemers University, Ede, Osun State, which was rated by respondents using a Yes or NO scale. The instrument was used to test the learning ability of students as it was administered on only

students selected for the study. In order to ensure that the instrument measures what it is supposed to measure, face and content validity of the instruments were achieved through the experts in the researcher's area of study. The validity of the instrument was ascertained by experts in management and reliability stood at 0.76. Research questions were answered using frequency counts, percentages, mean and standard deviation. Hypotheses were tested using t-test. All hypotheses were tested at 0.05 level of significance. In order to ensure the reliability of this study, a split-half method was adopted. The correlation co-efficient of 0.26 was obtained via the Pearson's Product Correlation Co-efficient and tested at 0.05 level of significance. This study employed the use of frequency counts, simple percentage and chi-square for data analysis.

RESULTS

Research Question 1: What are the effects of climate change on students' learning ability at Redeemer University, Ede.

In answering this question, responses to items 1-19 Section B of "Climate Change and Students Learning Ability (CCSLA)" were subjected to descriptive analysis. The result obtained is presented in Table 1:

Table 1: Effects of climate change on students' learning ability at Redeemer University, Ede

S/N	ITEMS	YES		NO		REMARK
		No	%	No	%	
1	I find it easy to read for a long period when the weather is too hot.	34	27.2	91	72.8	Not accepted
2	My learning ability is better during harmattan semester than rain semester.	54	43.2	71	56.8	Not accepted
3	My body system is allergic to too cold weather.	72	57.6	53	42.4	Not accepted
4	Hot weather conditions disrupt my learning ability.	91	72.8	34	27.2	Accepted
5	Rainfall and sunshine supply disrupt my personal study and preparation for test and examination.	97	77.6	28	22.4	Accepted
6	Unfavourable weather condition (e.g. rainfall causing coldness, wind or high rate of sunshine) causing heat, affect my learning ability.	86	68.8	39	31.2	Accepted
7	I always fall sick during cold weather.	67	53.6	58	46.4	Accepted
8	Bad/Harsh temperature affect my rate of assimilation in class.	78	62.4	47	37.6	Accepted
9	Lecturers come to class regularly during harsh weather condition (e.g. Heavy rainfall or high rate of sunshine).	28	22.4	97	77.6	Accepted
10	Our classrooms are conducive enough for teaching and learning exercise.	79	63.2	46	36.8	Accepted
11	Weather condition reduces my effectiveness in learning.	98	78.4	27	21.6	Accepted

12	Heavy downpour usually delay students from attending lectures or going to school.	111	88.8	14	11.2	Accepted
13	Lecturers usually waive their lectures during heavy downpours.	101	80.8	24	19.2	Accepted
14	Modern facilities to aid teaching-learning exercise are available in my school.	90	72	35	28	Accepted
15	Heavy down pour usually occur during lecture hours in my school.	75	60	50	40	Accepted
16	My level of concentration and interest in my study is high during the heat period.	49	39.2	76	60.8	Not accepted
17	Inadequate circulation of air increases my rate of assimilation.	93	74.4	32	25.6	Accepted
18	High rate of sunshine reduce my rate of assimilation.	76	60.8	49	39.2	Accepted
19	My learning ability is influenced by the climate and weather condition of the school.	89	71.2	36	28.8	Accepted

Table 1 shows the responses on the effects of climate change on students' learning ability. The table depicts that 15 out of the nineteen effects were accepted as resulting from climate change. The accepted factors includes that hot weather conditions disrupt my learning ability; Rainfall and sunshine supply disrupt my personal study and preparation for test and examination; Unfavourable weather condition (e.g. rainfall causing coldness, wind or high rate of sunshine) causing heat, affect my learning ability; I always fall sick during cold weather; bad/harsh temperature affect my rate of assimilation in class; Lecturers come to class regularly during harsh weather condition (e.g. Heavy rainfall or high rate of sunshine) and our classrooms are conducive enough for teaching and learning exercise. Others include Weather condition reduces my effectiveness in learning; heavy downpour usually delay students from attending lectures or going to school; Lecturers usually waive their lectures during heavy downpours; Modern facilities to aid teaching-learning exercise are available in my school; Heavy downpour usually occur during lecture hours in my school; Inadequate circulation of air increases my rate of assimilation; High rate of sunshine reduce my rate of assimilation and My learning ability is influenced by the climate and weather condition of the school.

Research hypothesis 1: There is no significant difference in the effects of climate change on students' learning ability based on gender.

In order to test this hypothesis, responses to items 3 section A and 1-19 on the effect of climate change on learning ability in Section B of "Climate Change and Students Learning Ability (CCSLA)" were subjected to statistical analysis involving the use of t-test at 0.05 level of significance. The result obtained is presented in Table 2:

Table 2: t-test Analysis of differences in effects of climate change on student learning ability based on gender

Gender	N	Mean	Std. D	df	T	p-value
Male	49	21.655	3.925	123	1.387	0.168
Female	76	28.433	4.252			

The result in Table 2 indicated that there was no significant difference in the mean scores of male students ($M = 21.655$, $SD = 3.925$) and Female students ($M = 28.433$, $SD = 4.252$; $t = 1.387$, $p = .168$). Therefore, the null hypothesis was not rejected because the p-value of 0.168 was greater than 0.05 level of significance. In another word, there was no significant difference in the effects of climate change on students' learning ability based on gender.

Research hypothesis 2: There is no significant difference in the effects of climate change on learning ability based on level of study

In order to test this hypothesis, responses to items 2 section A and 1-19 on the effect of climate change on learning ability in Section B of "Climate Change and Students Learning Ability (CCSLA)" were subjected to statistical analysis involving the use of ANOVA at 0.05 level of significance. The result obtained is presented in Table 3:

Table 3: Differences in effects of climate change on student learning ability based on level of study

Source	Sum of Squares	Df	Mean Square	F	P
Between Groups	21.588	2	10.794	.307	.736
Within Groups	7010.970	122	33.739		
Total	7032.558	124			

Table 3 revealed that the Calculated F-ratio (0.307) with a p-value of .736. The result is not significant ($p > 0.05$) and the null hypothesis was not rejected. Hence, there is no significant difference in the effects of climate change on student learning ability based on level of study.

DISCUSSION OF THE FINDINGS

The results show that climate change has effects on students' learning ability during the period investigated. This implies that climate change factors such as hot weather conditions that disrupts learning ability of students; Rainfall and sunshine supply that disrupt study and preparation for test and examination; Unfavourable weather condition (e.g. rainfall causing coldness, wind or high rate of sunshine) causing heat; Sickness during cold weather; Bad/harsh temperature that affect the rate of assimilation in class; Lecturers coming to class regularly during harsh weather condition (e.g. Heavy rainfall or high rate of sunshine); Weather condition reducing students' effectiveness in learning; Heavy downpour that usually delay students from attending lectures or going to school; Lecturers usually waive their lectures during heavy downpours; Heavy downpour that usually occurs during lecture hours in the school and High rate of sunshine that reduces students' rate of assimilation and students' learning ability are all influenced by the climate and weather condition of the school.

There was no significant difference in the effects of climate change on students' learning ability based on gender. This means that the observed gender at Redeemer University, Ede cannot be directly related to students' learning ability. This conclusion contrasts Johnson & Wilkinson (2020) and Chidiebere (2019). According to the former, interaction between learning ability and gender does operate as a complete predictor of climate change. Similarly, the latter contended that a negative association existed between learning ability and gender.

There is no significant difference in the effects of climate change on student learning ability based on level of study. Learning ability of students cannot be linked to their level of study. This conclusion contradicts Plan International (2015) analysis, which evaluated that frequent droughts and floods impact school attendance, especially at the primary school level.

CONCLUSION

It can be concluded from the study that climate change has effects on students' learning ability at Redeemer University, Ede. This implies that climate change factors disrupt learning ability of students. More importantly, it was established that gender cannot be directly related to students' learning ability.

Recommendations

In view of the findings from this study, it was recommended that:

- Lecturers should be enlightened on the effect of climate change on students' learning ability and be educated on what role(s) they can play in educating the students and other people on this issue.
- The Federal Ministry of Education should organize sensitization programme such as workshops, seminars, conferences for university students in Nigeria to keep them aware of issues relating to climate change and how it affects students' learning ability.
- Research on the provision of better understanding of the effects of climate change on learning ability of tertiary students in Nigeria should be supported by the Ministry of Education.

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APPENDIX I
EKITI STATE UNIVERSITY, ADO-EKITI, NIGERIA
FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL MANAGEMENT
CLIMATE CHANGE AND STUDENTS LEARNING ABILITY (CCSLA)
(For Students)

Dear Sir/Ma,

This questionnaire is designed for the purpose of studying Effects of Climate Change on Students Learning Ability in Redeemers University, Ede, Osun State. The researcher depends much on your honest response to the items, as well as your cooperation in completing the questionnaire within the scheduled time.

The information provided will be treated with confidentiality and it is only for academic purposes.

Thanks.

ADESOLA, Michael Babatunde & AINA, Abimbola Christianah

SECTION A. Demographic Information

Please, complete the following by ticking the most appropriate

1. Faculty
2. Level
3. Gender A. Male () B. Female ()
4. Age A.12 – 15 years () B. 16 – 19 years () C. 20 - 23 () D. 24 and above ()

Section B: Climate Change and Students Learning Ability

Kindly, respond to the following items by putting a tick (✓) against the option that best represents your opinion. **YES/NO**

S/N	ITEMS	YES	NO
1.	I find it easy to read for a long period when the weather is too hot.		
2.	My learning ability is better during harmattan semester than rain semester.		
3.	My body system is not allergic to too cold weather.		
4.	Hot weather conditions do not disrupt my learning ability.		
5	Moderate rainfall and sunshine supply aid my personal study and preparation for test and examination.		
6.	Unfavourable weather condition (e.g. rainfall causing coldness, wind or high rate of sunshine) causing heat, thus does not affect my learning ability.		
7.	I do not always fall sick during cold weather.		
8	Bad/Harsh temperature does not affect my rate of assimilation in class.		
9	Lecturers come to class regularly during harsh weather condition (e.g. Heavy rainfall or high rate of sunshine).		

10	Our classrooms are conducive enough for teaching and learning exercise.		
11	Favourable weather condition enhances my effectiveness in learning.		
12	Heavy downpour does not usually delay students from attending lectures or going to school.		
13	Lecturers do not usually waive their lectures during heavy downpours.		
14	Modern facilities to aid teaching-learning exercise are available in my school.		
15	Heavy downpour does not usually occur during lecture hours in my school.		
16	My level of concentration and interest in my study is high during the heat period.		
17	Adequate circulation of air increases my rate of assimilation.		
18	High rate of sunshine does not reduce my rate of assimilation.		
19	My learning ability is influenced by the climate and weather condition of the school.		