



### **PERCEIVED IMPACT OF CLIMATE CHANGE ON THE ACADEMIC PERFORMANCE OF PUBLIC SECONDARY SCHOOL STUDENTS IN UDI EDUCATION ZONE OF ENUGU STATE, NIGERIA**

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#### **Abstract**

The study examined the perceived impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State, Nigeria. Descriptive survey research design was adopted for the study. Based on the purpose of the study, two research questions were formulated to guide the study. The population of the study was 785 (seven hundred and eighty five) Public Secondary School teachers. Simple random sampling technique was used to select a sample of 118 (one hundred and eighteen) teachers who participated in the study. The instrument used for the study was researcher-constructed questionnaire titled “Impact of Climate Change on the Academic Performance of Students Questionnaire (ICCAPSQ). Data collected were analyzed using Mean and Standard Deviation to answer the research questions. The result of the study showed that climate change has a great negative impact on the academic performance of public secondary school students in Udi Education Zone of Enugu State, Nigeria. Based on the findings, some recommendations were made.

#### **Keywords**

climate change, Education, Academic performance, Secondary School, Student.

#### **Introduction**

Education is a very instrumental and essential tool for sustainable development of any country. As a result, improving the quality of education has become the concern of all nations. In Nigeria, education continues to be rated high in the national development plans because it is seen as an instrument “per excellence” for effective sustainable national development. It is in recognition of the above fact that governments at all levels in Nigeria continue to ensure that funds, school infrastructural facilities, instructional materials, teaching personnel and a suitable learning environment, among others, are made available for quality education. In recent times, education stakeholders have expressed their concern over the poor and dwindling academic performance of secondary school students especially in their career

determining examinations such as WAEC, NECO, NABTEB, and JAMB (Usman, 2015). Some blamed the school administrators (the principals) and the teachers; while some blamed the students themselves and the parents. But, the fact remains that both the school and its organization management and other factors such as learning environment and the climate change have link with the academic achievement of students.

Climate change is an issue that is generating wide spread apprehension and is taking centre stage in virtually every human endeavour in the world today (Bristow and Ford, 2016). As a matter of fact, climate change issues seem to be provoking powerful impacts not only on agriculture but also on human development (Bruno et al, 2009). One element of the impact on human development is academic development which when amplified

further, would also have impacts on economic development (Hamilton, 2011). Climate change is widely recognized as an overarching problem (Bodansky, 2001) (Riebeek, 2010). It poses a great challenge to sustainable development and progress globally. Indeed, the impact of climate change has become an integral component of today's environmental forums (Abbasi, 2006) (Young, 2011). Overcoming the consequences of climate change is perhaps, found to be the greatest challenge environmentalists are facing (Boyd, 2010).

Climate change has been given several definitions Moreno and Perdomo (2018), for instance, define climate change as stable and durable change in the distribution of climate patterns over a period of time ranging from decades to millions of years. Ekpoh (2009) defines climate change as long-term change in the pattern of average weather of a specific region or the whole earth. Climate change is significant and lasting change in statistical distribution of weather patterns over a period (Wikipedia, 2012) it includes patterns of temperature, humidity, wind and seasons. Climate change is a global phenomenon which is evident in Nigeria. It is an international issue which requires both national and international approach and indigenous knowledge. The impact of climate change has no border and it directly affects global sustainable development, livelihood and man's ability to coexist on earth (Sambo, 2010). Mitchell et al (2017) define climate change as any change in climate, whether is due to natural variability or as a result of human activity

Even as the list of definitions of climate change may not be exhaustive, what comes up clear is the fact that the change in the climate might occur naturally or might be influenced by human activities. More importantly, especially for the context of this study, is to find out how such changes may or may not impact on the academic performance of the learners, especially, the public secondary school students.

Secondary school occupies a unique position among all levels of education. It is the bridge between the primary and tertiary levels of education (Ekundayo, 2013). Secondary schools in Nigeria are classified into public and private schools. Public secondary schools are schools owned, controlled and managed by various arms of government. Alimi and Akinfolarin (2012) admitted that in Nigeria, secondary schools, irrespective of their location and ownership, are expected to function in compliance with the achievement of the national education

objectives; and consequently aspire a brilliant performance in the final examination. As such, students' performance greatly depends on the quality of instruction they gained in school. According to Ekundayo (2013), the broad goals of secondary education include: the preparation of the individual for useful living within the society and for higher education. Thus, in order to achieve the stated goals, there is need to address the issues of climate change impacts at all levels of education system.

There is enough evidence that climate change is taking place at the Local level of Nigeria. Ileuma and Isah (2010) reported that effects of climate change are all over Nigeria. Flooding resulting from increase in rainfall is felt in all parts of the country on a yearly basis. Assessment report of the governmental panel on climate change by Building Nigeria's Response to climate change (BNRCC) project (2011) shows that Nigeria and all the countries within sub-saharan Africa are highly vulnerable to the impact of climate change. The international Federation of Red Cross and Red Crescent Societies said in a report of October 2019, that "Arising from high-water levels in rivers Niger and Benue and heavy rainfall, Cross River, Kogi, Niger and Taraba states have experienced flooding from 21st to 27th September, 2019". Odey (2009) points out that climate change impacts pose enormous dangers with consequences such as desertation, sea level rising and flooding among others. Even more alarming concerns were raised by Ekpo (2009) who believes that climate change will affect every citizen, every part of our environment and our natural resources.

As temperatures rise, researchers are noticing more and more ways in which the hotter weather impacts our lives. Increased temperature may create uncomfortable conditions for learning and difficulty in classroom management. This means that when the classroom is hot due to increased temperature, both the teachers and the learners will not be comfortable to teach and learn; as well, seeing that some subjects deal with calculation and need to be taught in a cool environment for proper understanding. It also causes heat stress which affects teaching and learning and other teaching activities. The above listed conditions of teaching and learning can reduce learning capacities which in turn may lead to poor performance of students in academic work.

Furthermore, increased frequency of heavy rainfall, floods, strong winds and storms can cause damage to school buildings and property, resulting

in an uncondusive environment for teaching and learning activities; possible harm to students and teachers; impacts on school attendance and achievement by students (BNRCC project, 2011)(Shah and Steinberg,2015).Change in rainfall and extreme weather events may have short-term and long-term social-economic and health affects on students and teachers. These include: increased spread of endemic water and vector-born diseases; and other infectious diseases; shortage of water and flood leading to malnutrition and famine in extreme cases. These socio-economic and health impacts can reduce school attendance and result in poor performance in academic work.

In the context of Africa, studies have shown a number of adverse effects felt on the continent as a result of climate change. Some of these adverse effects include: soil fertility loss, deforestation, flooding, health decline, natural desasters, etc. Studies conducted in various parts of the world indicated that climate change can have very serious consequences in different aspects of human life. For instance, a study conducted by World Energy Council (2006) in western part of Australia revealed that rampant emission of the greenhouse gases that cause climate change had a serious impact on the health of the residents in the region. A study conducted by United State Environmental Protection Agency (USEPA, 2001) reported that heat waves resulting from climate change are dangerous to human health and can cause deaths. Empirical studies have demonstrated that, indeed, academic performance of students is influenced directly or indirectly by changes in the climate. Selby (2007) was among the first scholars who noted that, indeed, academic performance can be adversely affected by changes in the climate. The menace of climate change affects whatsoever comes across it. It's negative effect is felt on how people live, work and achieve result (Muraguri, 2018).

Most studies have focused on the agricultural impacts of climate change. However, other areas such as academic performance have received little attention. Therefore, it is against this background that the researchers decided to investigate the impact of climate change on the academic performance of public Secondary School Students in Udi Education Zone of Enugu State.

### **Statement of the Problem**

The issue of climate change has received a lot of attention in scholarly circles in the recent past notably due to the effect it has in many sectors of the

society. Recently, for instance, a study by Patz and Frankin (2016) established a link between climate change and human health; however, their study did not focus on how climate change influences academic performance of learners. A study of Nguimalet (2018) focused on comparing adaptation strategies for drought and floods as a result of climate change, yet did not address how climate change associates with academic performance. The list of empirical studies may not be exhaustive but what becomes apparent is that there is scarcity of literature that focuses on how climate change influences academic performance especially of public secondary school students. Nevertheless, despite these academic researches, there are still many gaps in research, especially the crucial impact of climate change on academic performance. It is this gap the researchers sought to fill in this study hence, this study investigated the impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State.

### **Purpose of the Study**

The purpose of the study was to examine the perceived impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State.

Specifically, the study was designed:

- i. To examine the impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State.
- ii. To examine the extent the approaches in managing climate change mitigate the adverse effect of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State.

### **Research Questions**

**The following research questions guided the study:**

- i. What impact does climate change have on the academic performance of public secondary school students in Udi Education Zone of Enugu State?
- ii. To what extent do approaches in managing climate change mitigate the adverse effect of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State?

**Methods**

The researchers adopted descriptive survey design. This design is suitable for the study because it gives the researchers the opportunity to obtain the opinions of the sampled population to infer the opinions of the entire population. The target population was 785 teachers from 54 public secondary schools which constituted the total number of public secondary schools in Udi Education Zone of Enugu State. A sample of 118 teachers was selected from the target population using simple random sampling technique. This technique was used because simple random sampling technique ensures that each member of the population has an equal chance of being selected (Iketaku, 2011).

The instrument used for data collection in the study was researchers' constructed questionnaire, titled, "Impact of Climate Change on the Academic Performance of Students Questionnaire (ICCAPSQ). It's content and face validities were established by three experts in measurement and evaluation. The reliability coefficient was found to be 0.85 using test-retest

method as well as pearson(r) statistical tool. Melissa (2015) said for a test or instrument to be highly reliable, its reliability coefficient must be from 0.80 to 0.90 and above. The research instrument was administered by the researchers with the help of two research assistants. Direct delivery and retrieval system was used. This helped the researchers recover all the questionnaires from the respondents. Data collected were analyzed using Mean and Standard Deviation in answering the research questions. The mean score above 2.50 is an indication of agreement, while below 2.50 is disagreement with the items.

**Results**

**Research Question 1:** what impact does climate change have on the academic performance of public secondary school students in Udi Education Zone of Enugu State?

**Table 1:** Mean and Standard Deviation on the impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State.

| S/N | Item Statement  | X    | CX   | SD   |
|-----|---|------|------|------|
| 1.  | Students always find it difficult to study whenever the weather is extremely hot leading to poor academic performance     | 3.65 |      |      |
| 2.  | Students are slow in understanding what the teacher is teaching during severe cold leading to poor academic performance   | 3.70 |      |      |
| 3.  | Learning facilities are damaged whenever there are strong winds and storms  | 3.53 |      |      |
| 4.  | Radiation from the sun can lead to brain damage   | 3.12 |      |      |
| 5.  | Heatwave can cause mental retardation in students leading to poor academic performance                                    | 3.75 | 3.53 | 0.26 |
| 6.  | Flooding can make many schools to close   | 3.79 |      |      |
| 7.  | Students' risk of heat-related illness increases during heatwaves   | 3.50 |      |      |
| 8.  | Hotter weather makes it harder for students to concentrate on homework out of school leading to poor academic performance | 3.20 |      |      |
| 9.  | Increased temperature creates uncomfortable conditions for teaching and learning leading to poor academic performance     | 3.92 |      |      |
| 10. | Change in the climate can contaminate the classroom atmosphere  | 3.31 |      |      |
| 11. | Heavy rain fall can stop students from attending classes  | 3.39 |      |      |

X=Mean of the respondents, CX=Cumulative Mean, SD=Standard Deviation.

Table 1 above presents the various opinions of the responses on the impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State. The table shows that all the items have mean scores above the acceptance mean of 2.50 on a 4-point rating scale. The cumulative mean score of 3.53

, with the standard deviation of 0.26, shows that the respondents agreed that climate change affects academic performance of public secondary school students. In other words, this indicates that climate change has a great negative impact on the academic performance of public secondary school students in Udi Education Zone of Enugu State.



| S/N | Item Statement  | X    | CX   | SD   |
|-----|---|------|------|------|
| 1.  | Institution of tree planting in schools has mitigated the adverse effect of climate change on academic performance of students  | 3.31 |      |      |
| 2.  | Training students and teachers on climate change adaptation has mitigated the adverse effect of climate change on academic performance of students                                  | 3.40 |      |      |
| 3.  | Increased public awareness and education on climate change risks and adaptation has mitigated the adverse effect of climate change on academic performance in schools               | 3.22 | 3.35 | 0.20 |
| 4.  | Upgrading school buildings with good ventilation has mitigated the adverse effect of climate change   | 3.70 |      |      |
| 5.  | Effective classroom control and management by the teachers has mitigated the adverse effect of climate change on academic performance of students                                   | 3.50 |      |      |
| 6.  | Developing educational materials in the field of climate change for schools by the Ministry of Education has mitigated the adverse effect of climate change on academic performance | 3.20 |      |      |
| 7.  | Creating more avenues for further training of students on the climate change issues and environmental problems has mitigated the adverse effect of climate change                   | 3.12 |      |      |

X=Mean of the respondents, CX=Cumulative Mean, SD=Standard Deviation.

Table 2 above presents various opinions of respondents on the extent to which approaches in managing climate change mitigate the adverse effect of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State. The table shows that all items above have mean scores above the acceptance mean of 2.50 on a 4-point rating scale. The cumulative mean score of 3.35, and the standard deviation of 0.20, show that the respondents agreed that all the identified approaches in managing climate change mitigate the adverse effect of climate change on the academic performance of students. In other words, this indicates that the approaches in managing climate change, to a large extent, mitigate the adverse effect of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State.

### Discussion of the findings

The Study examined the perceived impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State. It was found that climate change has a great negative impact on the academic performance of public secondary school students in

Udi Education Zone of Enugu State. It was identified that students always find it difficult to study whenever the weather is extremely hot leading to poor academic performance; students are slow in understanding what the teacher is teaching during severe cold leading to poor academic performance; learning facilities are damaged whenever there are strong winds and storms; radiation from the sun can lead to brain damage; heatwave can cause mental retardation in students leading to poor academic performance; flooding can make schools close; students' risk of heat-related illnesses increased during heatwave. These findings agree with the findings of Zivin et al (2015) who stated that performance decreased when students take tests in warmer days and warmer years. In other words, hotter weather makes it harder for students to study lessons in school and to concentrate on home work out of school which affects their academic performance. Muraguri (2018) pointed out that change in the climate can contaminate the classroom atmosphere and affect the overall learning environment which leads to poor performance and low achievement of set goals and outputs and this ultimately affects the academic performance of

students.

It was also found in the study that the approaches in managing climate change, to a large extent, mitigate the adverse effect of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State. It was identified that institution of tree planting in schools has mitigated the adverse effect of climate change on the academic performance of students; training students and teachers on climate change adaptation has mitigated the adverse effect of climate change on the academic performance of students; increased public awareness and education on climate change risks and adaptation has mitigated the adverse effect of climate change on the academic performance; upgrading school buildings with good ventilation has mitigated the adverse effect of climate change on the academic performance of students. In line with the above findings, Mangipudy and Kenkata (2010) stated that a school that is equipped with infrastructural facilities is likely to appreciate the better educational outcome than one that is deprived of these facilities. It is important to note that school air-conditioning appears to offset nearly all of the damaging impacts of cumulative heat exposure on academic achievement.

### Conclusions

Climate change is a global phenomenon which requires both national and international approaches and indigenous knowledge to tackle. In Nigeria, everybody, both government and civil societies, are making concerted efforts in mitigating the challenges of climate change through several independent approaches.

This study examined the perceived impact of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State. Based on the findings of the study, there is no doubt that climate change has a great negative impact on the academic performance of public secondary school students in Udi Education Zone of Enugu State. It is also apparent from the study findings that the approaches in managing climate change, to a large extent, mitigate the adverse effect of climate change on the academic performance of public secondary school students in Udi Education Zone of Enugu State. Therefore, the public secondary school students in Udi Education Zone of Enugu State require assistance both from the State and Federal Governments in ensuring that impacts of climate change are mitigated with proper interventions.

### Recommendations

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

1. The government at all levels should upgrade public school buildings with better ventilation and air conditioning.
2. There should be climate change legislation and increased access to high quality learning environment for all students.
3. Both the public and the private organizations should be actively involved in sensitizing the public on climate change risks and adaptation.

It is hoped that if the above recommendations are thoroughly and effectively considered, the impact of climate change on academic performance of public secondary school students would be mitigated.

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