

PERCEPTIONS OF CLIMATE CHANGE EDUCATION AMONG UNIVERSITY UNDERGRADUATES IN SOUTH-WEST NIGERIA

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Abstract

This study examined the perceptions of university undergraduates in South-West Nigeria on the introduction and implementation of climate change education. It employed a descriptive survey design, and was able to collect data from a large, representative sample of university undergraduates. The study used a combination of purposive and random sampling techniques to select a total of 171 participants out of 317 Geography Education students. A broad representation of institutions in the region was maintained and an unbiased selection process within the targeted departments. Data was collected through a structured questionnaire disseminated via Google Forms, chosen for its efficiency in reaching a wide number of participants across multiple institutions. Data analysis primarily employed quantitative methods, using descriptive statistics. The findings of the study revealed the critical role of education in addressing climate change challenges, aligning with UNESCO's Climate Change Education for Sustainable Development program. Some of the recommendations include; institutional prioritization of climate change education by allocating more resources and integrating it more fully across all disciplines; developing more discipline-specific climate change content and applications; investment by universities in up-to-date teaching resources and materials for climate change education; Climate change education should be included in the curricula for both primary and secondary schools because of the many benefits it may have on all students. The study's outcomes can inform policy decisions and educational practices, potentially leading to more effective integration of climate change education in Nigerian higher education institutions and secondary schools.

Keywords: perceptions, Climate change, education, university undergraduates

Introduction

The word climate simply refers to the average weather condition and pattern of a place over a period; usually between 35-40 years. The United Nations Framework Convention on Climate Change (1992) defines climate change as changes in climate that is usually attributed straightforwardly or not directly to human activity which alters the composition of the overall atmosphere in addition to the usual climate changeability observed over similar periods. In addition, climate change is closely associated with global warming. The United Nations Intergovernmental Panel on Climate Change defines the concept of climate change as the statistical variations that persist for an extended period, typically decades or longer. It includes shifts in the frequency and magnitude of sporadic weather events as well as the slow continuous rise in the global mean surface temperature. According to Spore, each day the sun emits rays of light onto the earth's surface, the earth absorbs part of the heat, reflects another part into the atmosphere and sends out a third part in the form of infra-red rays. These rays are cushioned by the clouds and water vapor, which stabilize the earth's temperature under normal circumstances.

Changes in climate are currently at the center of man's daily life, as its impacts and consequences are being experienced in all regions of the world. Climate change is considered one of the greatest challenges of our time, as it is damaging ecosystems and affecting the social and environmental determinants of global health (Innocenti, Santarell, Lombardi, Ciabini, Zjalic, Di Russo, and Cadeddu. 2023). Climate change refers to the alterations in the atmosphere that are over and above natural climate variations and are caused by human activity. This means that the situation can be changed if human beings transform their ways of living to be more environmentally sustainable and friendly. Climate change is therefore the alterations in the atmosphere and numerical distribution of weather patterns that are over and above natural climate variations and are caused by human activity over a period. This means that the situation can be changed if human beings transform their ways of living to be more environmentally sustainable and friendly. Hence, Climate change is as old as human existence and human lifestyles affect climate through its dispositions in the carbon and water cycles and such means as albedo, cloud formation, evapotranspiration and weathering. The ways in which human life may have affected past climate over the years is triggered by the evolution of oxygenic photosynthesis; long-term interment of decomposition challenging detritus of vascular land plants (forming coal). People around the globe have been experiencing alternate cooling and warming of the earth which has been caused by eruptions of volcano, increasing the carbon dioxide content of the atmosphere and changes in the amount of energy emitted from the sun and other sources.

Changes in climate are caused by factors that include oceanic processes (such as oceanic circulation), variations in solar radiation, biotic processes, volcanic eruptions and plate tectonics, as well as human-induced alterations of the natural world. It is the human-induced effects that are currently causing global warming, and climate change. It should be noted that the actions that governments and individuals take today will influence the magnitude of warming and the amount of greenhouse gas emissions. These activities also affect people's ability to take action and adapt to changes in weather conditions, and potentially reduce the susceptibility of people and places.

Educating students about the effects and causes of global change in weather conditions is very crucial because putting into practice viable solutions depends on well informed populace. Education is the United Nations Educational Scientific and Cultural Organization's top priority because it is a basic human right and the foundation for peace and sustainable development (UNESCO, 2015). Education is therefore an essential element of the global response to climate change. It helps young people understand and address the impact of global warming, encourages changes in their attitudes and behavior, and helps them adapt to climate change-related trends. Climate change education should therefore be a core curriculum component in every country: Climate change and climate variability are principal issues confronting the global community and through the Climate Change Education for Sustainable Development program, UNESCO aims to make climate change education a more central and visible part of the international response to climate change. Climate change education in Nigeria as in other parts of the world aims to support teachers in the senior secondary schools to develop expertise that they need to prepare young people for a climate-altered future. This aim is achieved through research carried out in the universities which address pressing questions related to climate change and sustainability education as well as proper implementation

of professional climate change knowledge mainly for geography teachers. Climate change education helps young people understand and address the impact of global warming, encourages changes in their attitudes and behaviors and helps them to adapt to climate change-related trends (Amanchukwu, Amadi & Oluebube, 2015). There is hence a need to shift from simple content-based, silo approach of pedagogy to a more systemic and 'deeper' enquiry that draws together biophysical, socio-economic and socio-psychological understandings. In this light, concepts such as Education for Sustainable Development (ESD), as an integral component of quality education and critical tool for sustainable development has gained global currency. (Leal Filho, Matandirotya, Lütz, Alemu, Brearley, Baidoo, Kateka, Ogendi, Adane, Emiru, & Mbih, (2021). Climate change education should not be considered as just a topic but should be actively placed at the centre of what we teach and learn, especially in under the subject geography. Also, it should be taught extensively in those countries that are more heavily responsible for the climate change crisis, so that its education can lead to the urgently needed transformation of our societies (UNESCO 2021). The researcher is of the opinion that when education geography students in Nigerian universities are well educated on climate change, they become prepared not only to teach it in senior secondary school, but to use it as proposed tool for sustainable development.

Climate change education has been described as a 'hyper-complex' concept (Breiting, Læssøe, Rolls, & Schnack, (2009), cited in Rushton, Sharp and Walshe, 2023) that brings two independently complex concepts of 'education' and 'climate change' together and, as well as sustainability which has been variously conceptualised in the context of education. Concomitantly, the importance of education as a fundamental part of the response to global climate and environmental crises has been underlined by the recent joint statement of the education and environment ministers at COP26 (UNFCCC, 2021). Across the literature there is wide variation in what is understood as the most appropriate and effective climate change education pedagogy and curriculum across regions and countries, between schools and across disciplines. In their cross-national report on climate change education, Læssøe, Schnack, Breiting, Rolls (2009), cited in Rousell and Cutter-Mackenzie-Knowles, (2020) find that climate change has been a central facet of environmental education in recent decades but has yet to be established as an independent field of practice and inquiry in many countries.

Though Climate change is a global phenomenon, it is quite 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). Climate change education is therefore very important for children in Nigeria to achieve sustainable development Anabaraonye. B et al, 2022. According to United Nations Children's Fund Annual Report 2015, the major climate related risks which can have a profound impact on children arise from the following phenomena: (i) Drought and water stress; (ii) Floods and severe storms; (iii) Heat stress; (iv) Air pollution; (v) Change in the incidence and geographic spread of diseases (UNICEF, 2015). Young people at every stage of their education should be informed about the dangers of environmental degradation and the overuse of fossil fuels as well as the prospects of renewable energy. Educators are therefore urged to include climate change education, environment and energy-related topics in the curricula for children (UNICEF, 2015, cited in Anabaraonye,

Okon, Dibia, Onwuzurike, Olisah and Ewa, 2022). Nigerian children need to be educated on the issues of climate change and encouraged to deploy their skills and talents which should be used effectively to help overcome the environmental and economic challenges facing the country, and there is no better platform to do this than in including climate change education in the school curriculum. Hence, climate change education should be integrated across all levels and disciplines of learning to ensure thorough inclusiveness.

There is a need to strengthen climate change knowledge architecture in Nigeria to reach policymakers, students and researchers, as well as community-based organizations and NGOs, who are in the frontline of delivering adaptation projects. This knowledge architecture has already been developed in Nepal (Nepal Climate Change Knowledge Management Centre).

Climate change and related environmental issues have in recent times been seen as an important aspect of education for Nigerian students. Students can participate in educating the citizenry on climate change in their various localities. Hence, the goals of climate change education are more than informative i.e. the goal is not merely to produce knowledge, but to inspire changes in attitude and behavior as well, preparing young people to become tomorrow's (or perhaps today's) climate-conscious citizens, leaders, and problem solvers. In conclusion, the article emphasizes the importance of periodical curriculum change in order to be abreast of the latest developments.

Many Nigerians are aware that some changes occur in the environment year in and year out but lack knowledge of the reasons for such changes. They are also aware of increase in prevalence of diseases (especially communicable diseases), food shortages, erosion and extreme flooding at various localities during certain periods of the year. Yet there have been no efforts to reduce the occurrences or avert them altogether. Therefore, there is need to educate the public of the signs of climate change as well as management and prevention strategies.

Mitigation and adaptation approaches were also referenced in the literature and were generally associated with community education and local governance. While mitigation initiatives aim to reduce the human impacts which are contributing to climate change (Burton, 2007), adaptation initiatives aim to build adaptive capacity and reduce the vulnerability of individuals, communities and environments in response to changing climatic conditions (Anderson, 2012). Mitigation and adaptation approaches are often mobilized in tandem in climate change education programs which aim to reduce the risk of disaster in vulnerable communities and ecosystems (Gero, Meheux & Dominey-Howes, 2011; Kagawa & Selby, 2012). The researcher believes that mitigation and adaptation can be taught and understood through climate change education right from secondary school to the university, leading to reduction in the effect of climate change on the Nigerian society.

Statement of the Problem

The study of climate change, more than other geographical topics or courses, is one that may be challenging for both teachers and students in Nigeria. This is because climate change education is considerably new in the Nigerian school system and there is limited awareness and understanding of its causes, consequences, and mitigation strategies among university undergraduates. Despite the growing urgency of climate change, there is a

knowledge gap regarding the effectiveness of climate change education among university undergraduates in South-West Nigeria. Most lecturers may not be adequately educated on the subject matter and may find it difficult to access materials and resources to help educate their students. Furthermore, some lecturers are yet to come to terms with the fact that climate change is a phenomenon caused primarily by humans as against the belief that it is mainly a natural occurrence. Hence, they do not attach much importance to its teaching. Also, there is inadequate integration of climate change education into university curricular and insufficient research on perceptions and attitudes of university undergraduates towards climate change education.

Research Objectives

The main purpose of this study was to examine the perceptions of university undergraduates in South-West Nigeria regarding the introduction and implementation of climate change education. the study also sought to:

1. determine the extent to which climatology and climate change are being taught in Nigerian Universities.
2. examine the relevance of climate change education to university undergraduates in South-Western Nigeria.
3. determine how university undergraduates in South-Western Nigeria perceive climate change education to be to their course work.
4. Examine ways in which teachers in Nigerian universities are limited by a Lack of Resources for Teaching Climate Change courses.
5. ascertain the quantity of climate change education covered in undergraduate programmes and gaps identified.
6. determine if the introduction of climate change education to university undergraduates in South-Western Nigeria timely enough.
7. ascertain ways in which lecturers in Nigerian universities are teaching the subject of climate change, and determine the successes or challenges they encounter in doing so.

Research Questions

The following questions were answered for this study:

1. To what extent is climatology and climate change being taught in Nigerian Universities?
2. How relevant is climate change education to university undergraduates in South-Western Nigeria?
3. How relevant do university undergraduates in South-Western Nigeria perceive climate change education to be to their course work?
4. In what ways are teachers in Nigerian universities limited by a Lack of Resources for Teaching Climate Change courses?
5. How much of climate change education is covered in undergraduate programmes?
6. Is the introduction of climate change education to university undergraduates in South-Western Nigeria timely enough?

7. How, if at all, are lecturers in lecturers in Nigerian universities teaching the subject of climate change? What successes or challenges do they encounter in doing so?

Methodology

This study employed a descriptive research survey design which is relatively quick and cost effective to investigate the perception of undergraduates in Nigerian universities regarding climate change education. The study sought to examine the perceptions of university undergraduates in South-West Nigeria regarding the introduction and implementation of climate change education, and it was able to collect data from a large, representative sample of university undergraduates. The scope was limited to university undergraduates in South-West Nigeria, with a specific focus on students in Geography education and those taking courses in climatology and climate change education. however, the results can be generalized for universities in the whole countries. Covering all public universities in South-Western Nigeria, the study used a combination of purposive and random sampling techniques to select a total of 171 participants out of 317 Geography Education students. This approach ensured a broad representation of institutions in the region while maintaining an unbiased selection process within the targeted departments. Data collection was conducted through a structured questionnaire disseminated via Google Forms, chosen for its efficiency in reaching a wide number of participants across multiple institutions. The questionnaire was designed to address the study's research questions, covering areas such as the extent and integration of climate change education in curricula, its perceived relevance, integration with specific coursework, availability and quality of resources, timeliness of introduction, and teaching methods and challenges. Data analysis primarily employed quantitative methods, using descriptive statistics. Mean and standard deviation were used to determine the level of agreement among participants. The study adhered to ethical research principles, including obtaining informed consent and ensuring anonymity and confidentiality of responses.

Results

Research Question 1: To what extent is climatology and climate change being taught in Nigerian Universities?

Table 1:

Extent is climatology and climate change being taught in Nigerian Universities

S/N	Items	SA	A
1	Climate change and climatology are sufficiently taught in my university	3.19	0.73
2	I have taken a course/module specifically on climate change	3.91	0.88
3	Climate change topics are regularly discussed in various courses in my programme	3.68	0.74
4	I believe more courses on climate change should be introduced in my university	3.41	0.78
5	My university prioritizes the teaching of climate change topics	3.15	0.73

Table 1 presents data on students' perceptions regarding the coverage of climate change in their university curriculum. I have taken a course/module specifically on climate change

received the highest mean score ($M = 3.91$, $SD = 0.88$). This suggests that a large proportion of respondents have been exposed to dedicated climate change courses or modules. Climate change topics are regularly discussed in various courses in my programme also received a high mean score ($M = 3.68$, $SD = 0.74$). This indicates that climate change is not confined to specific courses but is integrated into various aspects of the curriculum. I believe more courses on climate change should be introduced in my university received a moderately high mean score ($M = 3.41$, $SD = 0.78$). This suggests that despite the apparent coverage of climate change topics, there is still a desire among students for more dedicated climate change courses. Climate change and climatology are sufficiently taught in my university received a moderate mean score ($M = 3.19$, $SD = 0.73$). This score suggests that students perceive room for improvement in the sufficiency of climate change education. My university prioritizes the teaching of climate change topics received the lowest mean score among these items ($M = 3.15$, $SD = 0.73$). This indicates that while climate change is covered in the curriculum, students perceive a moderate, rather than high, level of prioritization for these topics by their universities. It's noteworthy that all mean scores are above 3, indicating a generally positive perception of climate change coverage in the university curriculum.

Research Question 2: How relevant is climate change education to university undergraduates in South-Western Nigeria?

Table 2:

Climate change education to university undergraduates in South-Western Nigeria

S/N	Items	SA	A
1	Climate change education is relevant to my academic studies	3.33	0.71
2	I believe understanding climate change will be useful for my future career	3.41	0.78
3	Climate change education is critical for addressing societal issues	3.63	0.82
4	Climate change education should be integrated into all university programmes	3.44	0.78
5	I feel that climate change education is important for all students, regardless of their course of study	3.56	0.81

Table 2 presents data on students' perceptions regarding the importance and relevance of climate change education. Climate change education is critical for addressing societal issues," received the highest mean score ($M = 3.63$, $SD = 0.82$). This suggests that students strongly recognize the societal importance of climate change education. I feel that climate change education is important for all students, regardless of their course of study also received a high mean score ($M = 3.56$, $SD = 0.81$). This indicates a strong belief among respondents that climate change education has universal relevance across academic disciplines. Climate change education should be integrated into all university programmes," received a moderately high mean score ($M = 3.44$, $SD = 0.78$). I believe understanding climate change will be useful for my future career," received a similar mean score ($M = 3.41$, $SD = 0.78$). Climate change education is relevant to my academic studies," received the lowest mean score among these items ($M = 3.33$, $SD = 0.71$), though

it's still well above the midpoint (assuming a 5-point scale). This suggests that while students see climate change education as broadly important, they may perceive slightly less direct relevance to their current academic studies compared to its importance for society or future careers. It's noteworthy that all mean scores are above 3.3, indicating a generally high perception of the importance and relevance of climate change education across various contexts. These findings highlight a strong overall recognition of the importance of climate change education among students.

Research Question 3: How relevant do university undergraduates in South-Western Nigeria perceive climate change education to be to their course work?

Table 3:
University undergraduates in South-Western Nigeria perception of climate change education to be to their course work

S/N	Items	SA	A
1	I can apply knowledge from climate change education to assignments or research in my course of study	3.08	0.87
2	Climate change education is directly related to my coursework	2.62	0.71
3	Topics on climate change appear in my core courses	3.47	0.79
4	I find the climate change content in my coursework to be relevant to current global challenges	3.49	0.79
5	There is a strong connection between climate change education and my field of study	3.46	0.79

Table 3 presents data on students' perceptions regarding the relevance and application of climate change education in their coursework. I find the climate change content in my coursework to be relevant to current global challenges received the highest mean score ($M = 3.49$, $SD = 0.79$). This suggests that students generally perceive the climate change content in their courses as relevant to contemporary global issues. Similarly, Topics on climate change appear in my core courses also received a high mean score ($M = 3.47$, $SD = 0.79$). There is a strong connection between climate change education and my field of study received a comparably high mean score ($M = 3.46$, $SD = 0.79$). This reinforces the perception that climate change education is seen as relevant and connected to students' specific fields of study. I can apply knowledge from climate change education to assignments or research in my course of study received a moderate mean score ($M = 3.08$, $SD = 0.87$). These findings highlight a generally positive perception of the relevance and integration of climate change education in coursework.

Research Question 4: Are Teachers in Nigerian universities limited by a Lack of Resources for Teaching Climate Change courses?

Table 4:
Teachers in Nigerian universities limited by a Lack of Resources for Teaching Climate Change courses

S/N	Items	SA	A
1	Climate change is covered in a significant portion of my undergraduate programme	3.37	0.77
2	Climate change education forms a major part of the curriculum in my department	3.43	0.78
3	I am satisfied with the amount of climate change education included in my university's courses	3.21	0.74
4	I would like to see more climate change topics included in the undergraduate curriculum	3.11	0.72
5	My university's curriculum is up to date in covering the latest climate change issues	3.22	0.71

Table 4 presents data on student perceptions regarding the coverage of climate change in their undergraduate curriculum. Climate change education forms a major part of the curriculum in my department," received the highest mean score ($M = 3.43$, $SD = 0.78$). This suggests that respondents generally agree that climate change education is a significant component of their departmental curriculum. Climate change is covered in a significant portion of my undergraduate programme," also received a high mean score ($M = 3.37$, $SD = 0.77$). This reinforces the perception that climate change is a substantial part of the undergraduate curriculum. I am satisfied with the amount of climate change education included in my university's courses," received a moderate mean score ($M = 3.21$, $SD = 0.74$). This indicates a general satisfaction with the quantity of climate change content, although there may be room for improvement. I would like to see more climate change topics included in the undergraduate curriculum received the lowest mean score ($M = 3.11$, $SD = 0.72$). My university's curriculum is up to date in covering the latest climate change issues received a moderate mean score ($M = 3.22$, $SD = 0.71$). These findings highlight a generally positive perception of climate change education coverage in undergraduate programs. Students seem to agree that climate change forms a significant part of their curriculum and are moderately satisfied with the amount and currency of the content.

Research Question 5: How much of climate change education is covered in undergraduate programmes?

Table 5:

Climate change education is covered in undergraduate programmes

S/N	Items	SA	A
1	There are insufficient teaching resources (e.g., textbooks, videos, labs) available for climate change education at my university.	3.17	0.73
2	Lecturers in my university are limited by a lack of educational materials for climate change courses	3.06	0.71
3	The available resources for teaching climate change are outdated	2.55	0.51
4	There are inadequate practical sessions on climate change topics due to limited resources	2.67	0.59
5	The university needs to invest more in climate change education resources	2.98	0.69

Table 5 reveals that there are insufficient teaching resources (e.g., textbooks, videos, labs) available for climate change education at my university received the highest mean score ($M = 3.17$, $SD = 0.73$). This suggests that respondents generally agree that there is a shortage of teaching resources for climate change education. Lecturers in my university are limited by a lack of educational materials for climate change courses also received a high mean score ($M = 3.06$, $SD = 0.71$). This reinforces the perception of resource limitations, specifically in terms of educational materials available to lecturers. The available resources for teaching climate change are outdated received the lowest mean score ($M = 2.55$, $SD = 0.51$). This suggests that while resources may be insufficient, those that are available are not necessarily perceived as outdated. There are inadequate practical sessions on climate change topics due to limited resources received a moderate mean score ($M = 2.67$, $SD = 0.59$). This implies that the lack of resources may be impacting the practical aspects of climate change education, though to a lesser extent than the overall resource availability. The university needs to invest more in climate change education resources received a relatively high mean score ($M = 2.98$, $SD = 0.69$). This suggests general agreement that more investment in resources is needed, aligning with the perceptions of resource insufficiency.

Research Question 6: Is the introduction of climate change education to university undergraduates in South-Western Nigeria timely enough?

Table 6:

Introduction of climate change education to university undergraduates in South-Western Nigeria timely enough

S/N	Items	SA	A
1	The introduction of climate change education in Nigerian universities is timely	3.66	0.83
2	Universities should have introduced climate change education earlier	3.51	0.50
3	Climate change education is being introduced at a crucial time in Nigeria	3.34	0.76
4	The content of climate change education is keeping pace with global developments	3.11	0.72
5	The timing of climate change education is appropriate for addressing Nigeria's environmental challenges	3.24	0.74

Table 6 presents data on perceptions regarding the timing of climate change education in Nigerian universities. The introduction of climate change education in Nigerian universities is timely received the highest mean score ($M = 3.66$, $SD = 0.83$). This suggests that respondents generally agree with the timeliness of introducing climate change education in Nigerian universities. Universities should have introduced climate change education earlier also received a high mean score ($M = 3.51$, $SD = 0.50$). This implies that while respondents agree that the current introduction is timely, they also believe it could have been introduced earlier. The low standard deviation for this item suggests a more consistent opinion among respondents.

Climate change education is being introduced at a crucial time in Nigeria received a moderate to high mean score ($M = 3.34$, $SD = 0.76$), further supporting the perceived

timeliness of the introduction. The lowest mean score was observed for the content of climate change education is keeping pace with global developments ($M = 3.11$, $SD = 0.72$). While still above the midpoint of the scale (assuming a 5-point scale), this score suggests that respondents are less confident about the currency of the educational content compared to global standards. The timing of climate change education is appropriate for addressing Nigeria's environmental challenges, received a moderate mean score ($M = 3.24$, $SD = 0.74$), indicating general agreement but with room for improvement. It's worth noting that all mean scores are above 3, suggesting an overall positive perception of the timing and relevance of climate change education introduction in Nigerian universities. However, the lack of information about the scale used limits the precision of these interpretations. These findings highlight the perceived importance and timeliness of climate change education in Nigerian universities, while also indicating areas for potential improvement, particularly in keeping the content up to date with global developments.

Research Question 7: How, if at all, are lecturers in Nigerian universities teaching the subject of climate change? What successes or challenges do they encounter in doing so?

Table 7:
Lecturers in Nigerian universities teaching the subject of climate change

S/N	Items	Mean	SD
1	Lecturers in my university use effective methods to teach climate change	2.91	0.68
2	Lecturers face challenges in delivering climate change education due to limited time	3.67	1.12
3	Lecturers are passionate about teaching climate change education	2.11	0.52
4	Climate change education is taught using a variety of interactive methods in my university	3.96	0.89
5	Lecturers encounter difficulties in teaching climate change due to lack of expertise or support	3.58	0.81

Table 7 presents data on climate change education in universities, focusing on lecturers' methods and challenges. The data is presented using means (M) and standard deviations (SD) for five items related to climate change education. Climate change education is taught using a variety of interactive methods in my university received the highest mean score ($M = 3.96$, $SD = 0.89$), suggesting that respondents generally agree with this statement. This indicates a positive perception of the diversity of teaching methods employed for climate change education. Conversely, Lecturers are passionate about teaching climate change education, received the lowest mean score ($M = 2.11$, $SD = 0.52$). This low score might indicate a perceived lack of enthusiasm among lecturers for teaching climate change topics. Challenges in delivering climate change education are evident from the relatively high mean scores Lecturers face challenges in delivering climate change education due to limited time had a mean of 3.67 ($SD = 1.12$), while Lecturers encounter difficulties in teaching climate change due to lack of expertise or support, had a mean of 3.58 ($SD = 0.81$). These scores suggest that time constraints and lack of expertise or support are significant barriers to effective climate change education. The effectiveness of

teaching methods (Item 1) received a moderate mean score ($M = 2.91$, $SD = 0.68$), indicating a neutral to slightly positive perception of the methods used by lecturers to teach climate change.

Discussion of Findings

To answer the question on extent to which climatology and climate change is being taught in Nigerian Universities. The study reveals that climate change and climatology are being taught moderately in Nigerian universities, with students reporting exposure to dedicated climate change courses and regular discussions of climate change topics across various courses. This aligns with findings from (2011), who noted an increasing integration of climate change topics in Nigerian higher education curricula. However, the relatively lower score for university prioritization of climate change topics suggests room for improvement. This echo concerns raised by Akpodiogaga and Odjugo (2010), who argued that despite progress, climate change education in Nigeria still lacks adequate prioritization at the institutional level.

On how relevant climate change education is to university undergraduates in South-Western Nigeria. Students strongly recognize the societal importance and broad relevance of climate change education, regardless of specific fields of study. This perception aligns with global trends highlighted by UNESCO (2019), which emphasize the critical role of climate change education in addressing societal issues and preparing students for future careers.

For the question on how relevant do university undergraduates in South-Western Nigeria perceive climate change education to be to their course work. The study recorded, slightly lower score for direct relevance to current academic studies suggests a potential gap between perceived societal importance and immediate academic applicability. This gap was noted by Leal Filho et al. (2019) in their global study of climate change education in higher education institutions, that while students generally perceive climate change content as relevant to current global challenges, there seems to be a moderate level of integration with specific coursework. This partial integration reflects findings by Ojomo et al. (2015), who observed varied levels of climate change content incorporation across different disciplines in Nigerian universities. The lower score for direct relation to coursework suggests potential challenges in fully integrating climate change education across all disciplines, a problem also identified by Henderson et al. (2017) in their international review of climate change education in higher education.

Are Teachers in Nigerian universities limited by a Lack of Resources for Teaching Climate Change courses? The study indicates significant resource constraints for climate change education, including insufficient teaching materials and limited practical sessions. This aligns with broader challenges in Nigerian higher education noted by Ezeudu et al. (2016), who highlighted resource scarcity as a major obstacle to effective environmental education. However, the perception that available resources are not necessarily outdated contrasts with findings from Akpodiogaga and Odjugo (2010), who emphasized the outdated nature of climate change educational resources in many Nigerian institutions.

To answer the question on how much of climate change education is covered in undergraduate programmes, the study generally is in agreement that more investment in resources is needed to cover more of climate change topics in undergraduate programmes, aligning with the perceptions of resource insufficiency. The lower score for keeping pace with global developments suggests potential delays in updating curricula, a challenge also

noted by Leal Filho et al. (2019) in their assessment of climate change education in higher education institutions worldwide.

While respondents agree that the current introduction is timely, they also believe it could have been introduced earlier, suggesting an overall positive perception of the timing and relevance of climate change education introduction in Nigerian universities. This is in line with Leal Filho et al (2019) who opined that Universities globally are increasingly recognizing their responsibility to prepare students and society to actively contribute to the mitigation of and adaptation to climate change. This however contradicts Eilam, (2022), Who is of the opinion that globally, climate change is scarcely addressed in school curricula, and school graduates are mostly uneducated about climate change. However, the lack of information about the scale used limits the precision of these interpretations. These findings highlight the perceived importance and timeliness of climate change education in Nigerian universities, while also indicating areas for potential improvement, particularly in keeping the content up to date with global developments. This again resonates with Eilam (2022), that the limited conceptualisation of Climate Change by educators is one of the main problems leading to its poor representation in school education. Hence the need to build a case for conceptualising Climate Change as a discipline, and to further suggest that Climate Change should be included in school curricula as a disciplinary-subject.

Finally, the low score for lecturer's passion is concerning and contrasts with findings from some international studies, such as Lombardi and Sinatra (2013), who found generally high levels of engagement among educators teaching climate change. This discrepancy may reflect specific contextual challenges in Nigerian higher education or potential areas for professional development. The study reveals a mixed picture of teaching methods and challenges in the selected universities. While there is a positive perception of the use of interactive methods, there are also significant challenges related to time constraints and lack of expertise or support. This aligns with findings from Obiora and Ugwu (2018), who identified similar challenges in environmental education in Nigerian universities.

Conclusion

Based on the findings of this study, it was concluded that there is a generally positive perception of climate change coverage in the Nigerian university curriculum, as well as a generally high perception of the importance and relevance of climate change education across various contexts. The study also highlights a generally positive perception of the relevance and integration of climate change education in university education geography coursework and students seem to agree that climate change forms a significant part of their curriculum and are moderately satisfied with the amount and currency of the content. These findings highlight a strong overall recognition of the importance of climate change education among students, as well as positive perception of the methods used by lecturers to teach climate change. However, more investment in resources is needed, aligning with the perceptions of resource insufficiency in most Nigerian universities. While there's a growing recognition of the importance of climate change education and efforts to further integrate it into university curricula, significant challenges remain, particularly in terms of resources, full integration across disciplines, and keeping pace with global developments.

Recommendations

Based on the outcome of the study, the following recommendations were made.

1. Universities should increase institutional prioritization of climate change education by allocating more resources and integrating it more fully across all disciplines.
2. University curricular should enhance the direct relevance of climate change education to students' current academic studies by developing more discipline-specific climate change content and applications.
3. Nigerian universities should invest in up-to-date teaching resources and materials for climate change education, including equipment for practical sessions and interactive learning tools.
4. Universities should develop and implement a comprehensive professional development program for lecturers to improve their expertise in climate change topics and boost their enthusiasm for teaching the subject.
5. Universities should establish partnerships with international institutions to ensure Nigerian climate change curricula keep pace with global developments and best practices in the field.
6. Climate change education should be included in the curricula for both primary schools, secondary schools because of the many benefits it may have on all students.

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