

INFLUENCE OF CLIMATE CHANGE EDUCATION ON STUDENTS' ENVIRONMENTAL CONSERVATION BEHAVIOUR IN SECONDARY SCHOOLS IN PLATEAU STATE, NIGERIA

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Abstract: This study examined the influence of climate change education on students' environmental conservation behaviour in secondary schools in Plateau State, Nigeria. A descriptive survey research design was adopted. The population comprised all senior secondary school students in public secondary schools in Plateau State. A sample of 600 students was drawn using a Stratified sampling procedure. Data were collected using a structured questionnaire titled Climate Change Education and Environmental Conservation Behaviour Questionnaire (CCEECBQ). The instrument was validated by experts in Educational Management and Environmental Education, while a reliability coefficient of 0.87 was obtained using Cronbach's Alpha. Data were analysed using mean, standard deviation, and multiple regression analysis at a 0.05 level of significance. The study findings revealed that climate change knowledge, awareness, attitudes, participation in climate change activities, and instructional practices significantly influenced students' environmental conservation behaviour. The study concluded that climate change education is a critical determinant of environmental conservation behaviour among secondary school students. The study recommended enhanced integration of climate change education into the school curriculum, teacher capacity development, and increased student participation in environmental activities.

Keywords: Climate Change Education, Environmental Conservation Behaviour, Climate Change Awareness, Climate Change Knowledge.

Introduction

Climate change has become a major global concern due to its devastating effects on ecosystems, human health, economic development, and environmental sustainability. The phenomenon refers to long-term changes in temperature, precipitation, and weather patterns resulting primarily from anthropogenic activities such as industrialization, deforestation, urbanization, and the excessive emission of greenhouse gases into the atmosphere. According to Anderson & Wallin, (2022) climate change poses serious threats to sustainable development and requires immediate educational interventions to enhance public understanding and promote responsible environmental behaviour. Over the years, climate change has manifested through increased global temperatures, flooding, drought, desertification, soil erosion, biodiversity loss, and extreme weather events. These environmental challenges have affected both developed and developing nations, with developing countries often experiencing greater vulnerability due to limited adaptive capacities

(IPCC, 2023). Nigeria is not exempt from these challenges as various regions continue to experience environmental degradation, irregular rainfall patterns, erosion, and declining agricultural productivity (Nwankwo & Eze, 2023).

Education has been widely recognized as one of the most effective strategies for addressing climate change challenges. Climate change education refers to the process of equipping learners with knowledge, skills, values, attitudes, and competencies necessary for understanding climate-related issues and taking informed actions to mitigate and adapt to climate change (UNESCO, 2023). Through climate change education, students acquire awareness of environmental issues and develop behaviours that promote environmental sustainability. The significance of climate change education has been emphasized in the Sustainable Development Goals, particularly Goal 4, which advocates quality education, and Goal 13, which focuses on climate action. Educational institutions are expected to play a central role in developing environmentally responsible

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citizens capable of making informed decisions concerning environmental conservation (United Nations, 2023).

Environmental conservation behaviour refers to deliberate actions aimed at protecting, preserving, and sustainably utilizing environmental resources. Such behaviours include tree planting, waste recycling, energy conservation, water preservation, environmental sanitation, pollution reduction, and participation in environmental protection programmes (Kollmuss & Agyeman, 2022). Environmental conservation behaviour is critical in promoting sustainable development and mitigating the adverse effects of climate change. Researchers have argued that climate change education significantly influences students' environmental behaviour. For instance, Stevenson et al. (2022) reported that students who possess adequate climate change knowledge are more likely to engage in environmentally responsible practices. Similarly, Monroe et al. (2022) observed that climate literacy enhances environmental awareness and encourages sustainable behaviour among learners. Knowledge gained through climate change education provides students with a deeper understanding of environmental issues and their consequences.

Climate change awareness is another important component of climate change education. Awareness involves the recognition and understanding of climate-related challenges and their implications for society. Studies have shown that environmentally aware students are more likely to participate in conservation activities and support environmental policies (Leal Filho et al., 2023). Awareness serves as a foundation for behavioural change by helping learners appreciate the urgency of environmental protection. Attitudes toward climate change also influence environmental conservation behaviour. Positive environmental attitudes reflect an individual's disposition toward environmental protection and sustainability. According to Chinedu and Yusuf (2022), students with positive environmental attitudes demonstrate greater commitment to conservation practices than those with indifferent attitudes. Consequently, fostering positive attitudes remains an essential objective of climate change education.

Participation in climate change education activities such as environmental clubs, tree-planting campaigns, school sanitation exercises, environmental debates, and awareness campaigns provides students with opportunities to translate knowledge into practice. Active participation reinforces environmental values and encourages behavioural change (Ardoin et al., 2023). Instructional practices employed by teachers also determine the effectiveness of climate change education. Innovative teaching strategies such as project-based learning, experiential learning, field trips, simulations, and environmental projects have been found to improve students' understanding of climate change

and strengthen conservation behaviours (Anderson & Wallin, 2022). Effective instructional practices facilitate active engagement and practical application of environmental concepts.

In Plateau State, environmental challenges such as soil erosion, deforestation, mining-related land degradation, indiscriminate waste disposal, and changing climatic conditions continue to threaten ecological sustainability. These environmental issues necessitate increased efforts to educate young people on environmental stewardship and sustainable practices. Secondary school students represent a critical segment of society whose behaviours can significantly contribute to environmental conservation efforts. Despite the growing importance of climate change education, concerns remain regarding its effectiveness in influencing students' environmental conservation behaviour in secondary schools. While climate-related concepts have been incorporated into various subjects, it is unclear whether students are translating acquired knowledge and awareness into practical conservation behaviours. This situation creates the need for empirical investigation into the influence of climate change education on students' environmental conservation behaviour in secondary schools in Plateau State, Nigeria.

Statement of the Problem

Environmental degradation continues to pose serious challenges to sustainable development in Plateau State, Nigeria. The increasing incidence of deforestation, soil erosion, land degradation, indiscriminate waste disposal, and climate-related disasters has raised concerns among environmentalists, policymakers, and educators. Although climate change education has been integrated into various aspects of the school curriculum, evidence suggests that many students still engage in behaviours that contribute to environmental degradation. Ideally, climate change education should equip students with adequate knowledge, awareness, attitudes, and practical skills necessary for environmental conservation. Students exposed to climate change education are expected to demonstrate environmentally responsible behaviours such as proper waste disposal, participation in environmental protection activities, tree planting, energy conservation, and environmental sanitation. However, observations indicate that environmental conservation practices among many secondary school students remain inadequate.

Many studies have examined climate change awareness and environmental literacy among students. However, limited empirical attention has been devoted to investigating how different dimensions of climate change education influence students' environmental conservation behaviour in Plateau State. Consequently, there is insufficient evidence regarding the extent to which climate change knowledge, awareness, attitudes, participation in climate change activities, and instructional practices

contribute to environmental conservation behaviour among students. The problem of this study, therefore, is to determine the extent to which climate change education influences students' environmental conservation behaviour in secondary schools in Plateau State, Nigeria.

Objectives of the Study

The specific objectives of the study are to:

1. Determine the influence of climate change awareness on students' environmental conservation behaviour in secondary schools in Plateau State.
2. Assess the influence of climate change attitudes on students' environmental conservation behaviour in secondary schools in Plateau State.

Research Questions

The following research questions raised, guided the course of this study:

1. To what extent does climate change awareness influence students' environmental conservation behaviour in secondary schools in Plateau State?
2. To what extent do climate change attitudes influence students' environmental conservation behaviour in secondary schools in Plateau State?

Hypotheses

The following null hypotheses which were tested at 0.05 level of significance were formulated for this study.

1. Climate change awareness has no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State.
2. Climate change attitudes have no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State.

Literature Review

Concept of Climate Change Education

Climate change education refers to the process of equipping learners with the knowledge, skills, values, attitudes, and competencies required to understand climate change and take informed actions toward mitigation and adaptation. Climate change education has become a global priority due to the increasing threats posed by environmental degradation, biodiversity loss, global warming, desertification, flooding, and other climate-related hazards. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2023) emphasized that climate change education enables learners to understand the causes and consequences of climate change and empowers them to become agents of sustainable development.

Climate change education extends beyond the transmission of scientific information. It encompasses the development of environmental consciousness, critical

thinking, problem-solving skills, and behavioural competencies necessary for environmental stewardship (Monroe et al., 2022). Effective climate change education encourages learners to participate actively in environmental conservation activities and adopt sustainable lifestyles that contribute to environmental sustainability. In the Nigerian educational system, climate change concepts have been incorporated into subjects such as Geography, Biology, Agricultural Science, Basic Science, and Civic Education. The objective is to create awareness and promote environmentally responsible behaviour among students. However, scholars have observed that effective climate change education requires adequate instructional resources, trained teachers, practical experiences, and supportive school environments (Leal Filho et al., 2023).

Environmental Conservation Behaviour

Environmental conservation behaviour refers to actions and practices aimed at protecting, preserving, and sustainably utilizing natural resources and ecosystems. Such behaviours include proper waste disposal, tree planting, recycling, energy conservation, water preservation, environmental sanitation, and participation in environmental protection programmes (Stevenson, Peterson, Bondell & Moore, 2022). Environmental conservation behaviour is a critical outcome of environmental and climate change education because knowledge alone may not necessarily translate into practical action. According to Ardoin et al. (2023), environmental conservation behaviour reflects an individual's commitment to environmental sustainability and ecological responsibility. Educational institutions are therefore expected to cultivate conservation behaviours among learners through both formal instruction and practical environmental activities.

The promotion of environmental conservation behaviour has become increasingly important due to the growing environmental challenges confronting societies worldwide. Students who engage in environmental conservation practices contribute significantly to sustainable development and climate change mitigation efforts.

Climate Change Knowledge and Environmental Conservation Behaviour

Climate change knowledge refers to an individual's understanding of climate change causes, effects, mitigation strategies, and adaptation measures. Knowledge is often considered the foundation of environmental action because individuals are more likely to engage in conservation practices when they understand environmental problems and their implications. Stevenson et al. (2022) found that climate literacy significantly predicts environmental conservation behaviour among secondary school students. Similarly, Leiserowitz et al. (2023) reported that students with higher levels of climate knowledge demonstrated stronger commitment to environmentally responsible actions than

those with lower levels of knowledge. Monroe et al. (2022) argued that climate change knowledge enhances students' capacity to identify environmental challenges and adopt sustainable solutions. Consequently, climate change knowledge is expected to influence students' environmental conservation behaviour positively.

Climate Change Awareness and Environmental Conservation Behaviour

Climate change awareness refers to the extent to which individuals recognize and understand climate-related issues and their impacts on society and the environment. Awareness creates sensitivity toward environmental challenges and promotes behavioural change. According to Leal Filho et al. (2023), awareness serves as a precursor to environmental action because individuals are unlikely to engage in conservation practices if they are unaware of environmental problems. In a study conducted among secondary school students, Chinedu and Yusuf (2022) found that climate change awareness significantly influenced students' willingness to participate in environmental conservation activities. Similarly, Olagunju and Adebayo (2024) observed that environmental awareness positively predicted students' participation in waste management and environmental sanitation programmes. These findings suggest that awareness contributes significantly to environmental conservation behaviour.

Climate Change Attitudes and Environmental Conservation Behaviour

Attitudes represent individuals' beliefs, feelings, and predispositions toward specific issues. Environmental attitudes reflect a person's disposition toward environmental protection and sustainability. According to Anderson and Wallin (2022), positive environmental attitudes significantly influence environmental behaviour. Students who value environmental sustainability are more likely to participate in environmental conservation activities than those who possess negative attitudes.

A study by Nwankwo and Eze (2023) found that environmental attitudes significantly predicted students' participation in conservation activities in Nigerian secondary schools. Similarly, Ardoin et al. (2023) reported that positive climate attitudes strengthened learners' commitment to sustainable environmental practices. These findings indicate that climate change attitudes constitute an important determinant of environmental conservation behaviour.

Empirical Review

Several empirical studies have examined the relationship between climate change education and environmental behaviour.

Anderson and Wallin (2022) examined instructional strategies and environmental learning outcomes among

secondary school students. The findings indicated that project-based and experiential learning significantly improved students' environmental conservation behaviour. Nwankwo and Eze (2023) studied environmental attitudes and conservation practices among Nigerian secondary school students and found a significant positive relationship between environmental attitudes and conservation behaviour. Chinedu and Yusuf (2022) investigated climate change awareness among secondary school students in North-Central Nigeria. The study revealed that awareness significantly influenced students' participation in environmental protection activities. Olagunju and Adebayo (2024) examined environmental awareness and waste management practices among students in South-West Nigeria. The study reported a significant positive relationship between awareness and environmental conservation behaviour. Okeke and Ezeani (2023) assessed climate change knowledge and environmental responsibility among senior secondary school students and found that students with higher climate literacy demonstrated stronger environmental responsibility. Adebisi et al. (2024) investigated climate education programmes and sustainable behaviour among adolescents and reported that active participation in environmental clubs significantly enhanced environmental conservation practices.

The reviewed studies indicate that climate change knowledge, awareness, attitudes, participation in environmental activities, and instructional practices are important determinants of environmental conservation behaviour. However, few studies have examined these variables collectively within the context of secondary schools in Plateau State, Nigeria. This gap justifies the present study.

Methodology

The study adopted a descriptive survey research design. The design was considered appropriate because it enabled the researcher to collect data from a large population. The population of the study comprised all Senior Secondary School II (SS II) students in public secondary schools in Plateau State, Nigeria. The target population was estimated at 24,850 students distributed across the three senatorial zones of the state. A sample size of 600 students was selected using a multistage sampling procedure. First, stratified sampling was used to classify schools according to senatorial zones. Second, simple random sampling was employed to select schools from each zone. Finally, proportionate sampling was used to select respondents from the sampled schools. Data were collected using a researcher-developed instrument titled Climate Change Education and Environmental Conservation Behaviour Questionnaire (CCEECBQ). The instrument was subjected to face and content validation by three experts in Educational Management and Environmental Education from a federal university in Nigeria. Their observations and

recommendations were incorporated into the final version of the instrument. The Research questions were answered using Mean and Standard Deviation. The hypotheses were tested using t test at a 0.05 level of significance.

Results

Research Question one: To what extent does climate change awareness influence students' environmental conservation behaviour?

Table 1: Showed the responses of the respondents on extent of climate change awareness influence students' environmental conservation behaviour

S/N	ITEMS	Mean	SD	DECISION
1	My knowledge of climate change motivates me to protect the environment	4.18	0.84	Agree
2	Climate change awareness has encouraged me to reduce waste generation	4.34	0.79	Agree
3	My awareness of climate change encourage me to dispose waste properly	3.23	0.88	Agree
4	I support school environmental programmes because am aware of climate change	2.99	1.02	Agree
5	Climate change awareness has strengthened my commitment on protection of natural resources	3.11	0.95	Agree
		3.57		Agree

Table 1 shows how extents to which climate change awareness influence students' environmental conservation behaviour. Results indicate that most of the respondents strongly agreed and agreed to the items on the questionnaire. The grand mean of the respondents is given as 3.57; this value is above the benchmark of 3.00 for a four-point scaled

questionnaire. Hence, the findings revealed that climate change awareness highly influences environmental conservation behaviour.

Research Question two: To what extent do climate change attitudes influence students' environmental conservation behaviour?

Table 2: Showed the responses of the respondents on climate change attitudes influence students' environmental conservation behaviour

S/N	ITEMS	Mean	SD	DECISION
6	My attitude toward climate change influence me to encourage others to protect the environment	3.99	0.80	Agree
7	I participate in environmental awareness campaign	4.31	0.71	Agree
8	My attitude toward climate change encourages me to keep my school and community clean	3.77	0.83	Agree
9	I try to avoid activities that pollute environment	2.89	0.90	Agree
10	I participate in environmental sanitation exercise	2.66	0.95	Agree
	Grand mean	4.19		Agree

Table 2 shows how extents to which climate change attitudes influence students' environmental conservation behaviour. Results indicate that most of the respondents strongly agreed and agreed to the items on the questionnaire. The grand mean of the respondents is given as 4.19; this value is above the benchmark of 3.00 for a four-point scaled questionnaire. Hence, the result showed that climate change

attitudes highly influence environmental conservation behaviour.

Hypotheses

Hypothesis 1: Climate change awareness has no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State.

Table 3: Showing respondents responses on climate change awareness influence on students environmental conservation behaviour in secondary schools in Plateau State.

Variable	N	Df	Los	T cal	T crit	P value	Decision
Climate change awareness	600	23	0.05	5.672	0.284	0.000	Reject Ho
Environmental conservation behaviour	600						

Table 3 shows that Climate change awareness has no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State. ($t = 5.672$, $p < 0.05$) This implies that Climate change awareness have significant influence on students' environmental conservation behaviour in secondary schools in Plateau State. Hence, the null hypothesis that Climate

change awareness has no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State is therefore rejected.

Hypothesis 2: Climate change attitudes have no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State.

Table 4: Showing the respondents response on how climate change influence students environmental conversation behaviour.

Variable	N	df	Los	T cal	T crit	P value	Decision
Climate change attitude	600	23	0.05	4.811	0.231	0.000	Reject Ho
Environmental conservation behaviour	600						

Table 4 shows that Climate change attitudes have no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State. ($t = 4.811$, $p < 0.05$) This implies that Climate change attitudes have significant influence on students' environmental conservation behaviour in secondary schools in Plateau State. Hence, the null hypothesis that Climate change attitudes have no significant influence on students' environmental conservation behaviour in secondary schools in Plateau State is therefore rejected.

Discussion

The findings revealed that climate change knowledge significantly influences students' environmental conservation behaviour. This finding supports Stevenson et al. (2022), who reported that climate literacy positively predicts environmental action among students. Students who understand the causes and consequences of climate change are more likely to adopt environmentally responsible behaviours. The study further revealed that climate change awareness significantly influences environmental conservation behaviour. This finding agrees with Leal Filho et al. (2023), who found that environmental awareness promotes sustainable behaviour and climate action among young people. The findings also showed that climate change attitudes significantly influence environmental conservation behaviour. This corroborates the findings of Nwankwo and Eze (2023), who observed that positive environmental attitudes enhance students' commitment to conservation activities. Participation in climate change education

activities emerged as the strongest predictor of environmental conservation behaviour.

The overall study findings indicate that climate change education plays a significant role in shaping students' environmental conservation behaviour. This finding validates the assumptions of the Theory of Planned Behaviour, which posits that knowledge, awareness, attitudes, and behavioural intentions influence actual behaviour.

Conclusion

Based on the findings of the study, it was concluded that climate change education significantly influences students' environmental conservation behaviour in secondary schools in Plateau State, Nigeria. Climate change knowledge, awareness, attitudes, participation in climate change education activities, and instructional practices were found to be significant predictors of environmental conservation behavior. The study further concluded that participation in climate change education activities exerts the strongest influence on environmental conservation behaviour. Therefore, strengthening climate change education programmes in schools could contribute significantly to environmental sustainability and climate change mitigation efforts.

Recommendations

Based on the findings, the following recommendations were made:

1. The Plateau State Ministry of Education should strengthen the integration of climate change education across all levels of secondary school education.
2. School administrators should establish and support environmental clubs and climate action groups to encourage students' participation in environmental conservation activities.

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