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"Evaluation of Environmental Health Education and its Impact on Students' Sanitation Practices in Universities in South East Geopolitical zone of Nigeria"

Evaluation of Environmental Health Education and its Impact on Students' Sanitation Practices in Universities in South East Geopolitical zone of Nigeria

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Abstract

This study examined the evaluation of environmental health education and its impact on students' sanitation practices in universities in the South East geopolitical zone of Nigeria. A correlational research design was adopted. Three objectives, three research questions, and three null hypotheses guided the study. The population comprised undergraduate students in selected universities, from which a sample of 300 respondents was drawn using a multi-stage sampling technique. Data were collected using a structured questionnaire titled "Environmental Health Education and Students' Sanitation Practices Questionnaire (EHESSPQ)". The instrument was validated by experts, and its reliability was established using Cronbach's alpha, yielding a coefficient of 0.886, indicating that the instrument was reliable. Data were analyzed using mean and standard deviation to answer the research questions, while Pearson product–moment correlation and multiple regression analysis were used to test the hypotheses at the 0.05 level of significance. The findings revealed a significant positive relationship between environmental health education and students' sanitation practices ($r = 0.65$, $p < 0.05$). A strong and significant relationship was also found between students' knowledge of environmental health education and their sanitation practices ($r = 0.70$, $p < 0.05$). Furthermore, environmental health education variables (knowledge and exposure) jointly had a significant influence on sanitation practices, accounting for 58% of the variance ($R^2 = 0.58$), with exposure emerging as the stronger predictor. The study concluded that environmental health education plays a crucial role in improving sanitation practices among university students and recommended strengthening educational programs, increasing awareness campaigns, and improving sanitation facilities.

Keywords: Environmental health education, sanitation practices, student behavior, health education, university students, South East Nigeria

1. Introduction

Environmental health education has become increasingly important in contemporary society due to growing concerns about sanitation, waste management, environmental pollution, and their implications for human health (Pona, Xiaoli, Ayantobo & Tetteh, 2021). Within the university environment, students are exposed to diverse lifestyles and behaviors that can either promote or undermine proper sanitation practices. Environmental health education, therefore, plays a crucial role in equipping students with the knowledge, attitudes, and skills necessary to maintain hygienic living conditions and adopt sustainable environmental practices (Andleeb, Rafiq,

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Ateeq-Ur-Rehman, Ansari & Ilyas, 2025). It has emphasized that knowledge and attitudes significantly influence behavioral intentions and actual practices, which is central to sanitation behavior among students (Kabir, Roy, Begum, Kabir & Miah, 2021).

Environmental health education refers to organized learning experiences designed to improve individuals' understanding of environmental factors affecting health and to encourage behaviors that promote a clean and safe environment. It covers areas such as personal hygiene, waste disposal, water sanitation, disease prevention, and environmental sustainability. Proper sanitation and hygiene practices are essential in preventing the spread of communicable diseases and improving overall public health outcomes (Hein, 2020). Similarly, Qazi and Anwar (2021) noted that hygiene education significantly reduces the transmission of sanitation-related diseases when effectively implemented.

Students' sanitation practices including waste disposal habits, personal hygiene, use of sanitary facilities, and environmental cleanliness are critical indicators of environmental health outcomes. Poor sanitation practices have been associated with increased incidence of diseases such as cholera, diarrhea, and other hygiene-related infections. Research by Ramesh, Blanchet, Ensink and Roberts (2015) demonstrated that improved sanitation and hygiene interventions significantly enhance health outcomes and reduce disease prevalence. In addition, the World Health Organization (2020) reported that inadequate sanitation and hygiene practices remain major public health challenges, particularly in developing regions.

In the South East geopolitical zone of Nigeria, universities host large and diverse student populations, often within densely populated campuses. These environments present unique sanitation challenges, including ineffective waste management systems, overcrowded facilities, and inconsistent adherence to hygiene practices. Studies such as that of Bartholomew, Bartholomew, Iwu, Nwafor and Oguguo (2025) have highlighted that environmental health knowledge does not always translate into proper sanitation behavior among students, indicating a gap between awareness and practice.

Evaluating environmental health education is therefore essential for determining its effectiveness and identifying areas for improvement. This involves assessing the content, delivery methods, and frequency of educational programs, as well as examining how these factors influence students' sanitation practices. According to Bandura (2011), behavior change is influenced not only by knowledge but also by environmental and social factors, reinforcing the need for comprehensive evaluation of educational interventions.

This study focuses on the evaluation of environmental health education and its impact on students' sanitation practices in universities in the South East geopolitical zone of Nigeria. By examining the relationship between environmental health education and sanitation behaviors, the

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study seeks to provide empirical evidence that will inform policy decisions, improve educational strategies, and promote sustainable environmental health practices among university students. Ultimately, effective environmental health education can foster long-term behavioral change and contribute to improved public health outcomes.

1.1 Objective of the Study

The objectives of the study are to:

1. Examine the relationship between environmental health education and students' sanitation practices in universities in South East geopolitical zone of Nigeria.
2. Assess the relationship between students' level of knowledge of environmental health education and their sanitation practices.
3. Determine the influence of environmental health education (knowledge and exposure) on students' sanitation practices in universities in the South East geopolitical zone of Nigeria.

1.2 Research Questions

These research questions guided the study:

1. What is the relationship between environmental health education and students' sanitation practices in universities in the South East geopolitical zone of Nigeria?
2. What is the relationship between students' level of knowledge of environmental health education and their sanitation practices?
3. To what extent does environmental health education (knowledge and exposure) influence students' sanitation practices in universities in the South East geopolitical zone of Nigeria?

1.3 Research Hypotheses

At 5% level of significance, these null hypotheses were tested

H_{01}: There is no significant relationship between environmental health education and students' sanitation practices in universities in the South East geopolitical zone of Nigeria.

H_{02}: There is no significant relationship between students' level of knowledge of environmental health education and their sanitation practices.

H_{03}: Environmental health education (knowledge and exposure) has no significant influence on students' sanitation practices in universities in the South East geopolitical zone of Nigeria.

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2. Related Work/Literature Review

A study conducted by Jimoh, Tsado, and Dahiru (2025) examined health education approaches for addressing environmental challenges in Nigeria. The study explored the roles and strategies of health education in promoting environmental sustainability. It identified various environmental challenges affecting the country, discussed relevant health education theories, and analyzed the impact of environmental problems on the health of the population. The findings emphasized that effective health education approaches empower individuals and communities to adopt environmentally friendly behaviors, support policy advocacy, and encourage grassroots initiatives aimed at environmental conservation. The study concluded that strengthening health education is essential for tackling environmental challenges. It recommended the use of community-based workshops and seminars to increase awareness of environmental issues and their health implications. Such interventions, according to the study, would not only enhance environmental sustainability but also improve public health outcomes, thereby contributing to a healthier and more resilient Nigeria.

A study conducted by Cookey, Peter-Cookey, Richard, and Brdanovic (2023) examined multi-level perceptions of higher education development for sanitation and hygiene management in Nigeria. The study aimed to assess the quality of sanitation and hygiene management content in environmental health programmes, evaluate the adequacy of existing national curricula, and explore the perceptions of trained professionals regarding capacity building for sanitation management in higher education institutions. The researchers employed a multi-level mixed-method concurrent design for data collection and analysis. This approach captured the perspectives of students, lecturers, graduate alumni, employers, supervisors, and service users of sanitation-related graduates. The findings revealed a limited understanding of contemporary sanitation and hygiene management concepts such as sustainable sanitation, citywide inclusive sanitation, regenerative sanitation, and circular bio-economy. Additionally, the national curriculum was found to be outdated, and stakeholders particularly employers and service users expressed dissatisfaction with the skills and knowledge levels of graduates. The study concluded that there is a critical need to reform sanitation and hygiene education in higher institutions. It recommended the development of a national higher education framework for sanitation management to guide curriculum improvement and ensure the training of a competent, efficient, and adequately equipped workforce capable of addressing Nigeria's sanitation challenges.

A study conducted by Ibimilua and Omidiji (2024) assessed the impact of environmental awareness on sanitation practices in Ekiti State, Nigeria. The study aimed to evaluate existing sanitation practices, examine residents' knowledge and behaviors, assess the effectiveness of intervention programs, and identify factors influencing successful implementation. A survey research design was adopted, focusing on three Local Government Areas: Ado, Oye, and Emure selected to represent the different senatorial districts in Ekiti State. The target population

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comprised residents aged 18 years and above, with a sample of 50 respondents selected using a judgmental sampling technique, primarily among teachers in the selected areas. The findings revealed that respondents expressed confidence in the state government's commitment to waste management, which positively influenced environmental education in schools. Although challenges such as improper disposal of hazardous waste persisted, the study reported encouraging signs of behavioral change and improved environmental cleanliness. Respondents' positive perceptions of government efforts and belief in individual responsibility provided a foundation for collaborative sanitation initiatives. However, constraints such as inadequate government support, poor infrastructure, and insufficient waste disposal facilities were identified. The study concluded that increased environmental awareness, particularly through the involvement of teachers, contributed to improved sanitation attitudes and practices among communities in Ekiti State. It emphasized that sustained educational efforts, active community engagement, and stronger government support are essential for achieving lasting improvements in environmental sanitation.

A study conducted by Wami (2022) assessed water, sanitation, and handwashing (WASH) conditions and identified critical risk factors associated with diarrhoea among pre-school children and students in Nigeria, using Port Harcourt as a case study. The study utilized both primary data (for secondary school students) and secondary data obtained from the Multiple Indicator Cluster Survey (2016/2017) for pre-school children. The research focused on identifying diarrhoeal risk factors within relevant environments, specifically households for pre-scholars and school settings for students. Data analysis involved bivariate analysis using the Chi-square test to determine associations between risk factors and diarrhoea, while a risk matrix approach was used to categorize significant risk factors. Multiple regression analysis was further employed to model the contribution of these predictors to the likelihood of diarrhoea occurrence. The findings revealed that WASH conditions were generally sub-optimal at both household and school levels. About 67.5% of households used improved water sources, while only 48% had access to improved sanitation facilities, with very low levels of safely managed services. Similarly, schools in Port Harcourt were found to have inadequate WASH conditions, characterized by poor functionality of water and sanitation facilities, insufficient treatment of drinking water, and lack of soap for hand-washing. The prevalence of diarrhoea was reported as 12.9% among pre-scholars and 23% among students. Key risk factors identified included poor sanitation facilities, non-use of sanitation facilities by pre-scholars, infrequent functionality of school toilets, and unhygienic toilet conditions. The study concluded that exposure-related sanitation factors were the most significant contributors to diarrhoeal disease among both groups. It recommended that interventions aimed at reducing diarrhoea prevalence should prioritize improving both household and school sanitation facilities, as well as addressing factors affecting their functionality.

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3. Materials and Methods

3.1 Research Design

This study adopted a correlational research design. The design was considered appropriate because the study examined the relationships between environmental health education (knowledge and exposure) and students' sanitation practices without manipulating any variables. It also enabled the use of inferential statistics such as correlation and regression analysis to test the stated hypotheses.

3.2 Area of the Study

The study was conducted in the South East geopolitical zone of Nigeria, Nigeria. The zone comprises five states: Abia, Anambra, Ebonyi, Enugu, and Imo and hosts several universities with large student populations. These institutions provide varying levels of environmental health education through formal curricula, orientation programs, and campus health initiatives, making the region suitable for this study.

3.3 Population of the Study

The population of the study comprised all undergraduate students in selected universities within the South East geopolitical zone of Nigeria. This population was considered appropriate because undergraduate students are directly exposed to environmental health education and are active participants in campus sanitation practices.

3.4 Sample and Sampling Techniques

A sample of respondents was selected using a multi-stage sampling technique, categorized in three stages as:

Stage One: Selection of universities using purposive sampling to include a mix of federal, state, and private universities.

Stage Two: Faculties and departments were selected using simple random sampling.

Stage Three: Students were selected using stratified random sampling based on level of study (e.g., 100–400 level).

The sample size was determined using an appropriate statistical formula such as the Taro Yamane formula to ensure representativeness.

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3.5 Instrument for Data Collection

Data were collected using a structured questionnaire titled: "Environmental Health Education and Students' Sanitation Practices Questionnaire (EHESSPQ)". The instrument was divided into four sections:

Section A: Demographic information (e.g., age, gender, level of study)
Section B: Environmental health education exposure
Section C: Knowledge of environmental health education
Section D: Students' sanitation practices

The questionnaire was structured on a four-point Likert scale:

- Strongly Agree (SA) = 4
- Agree (A) = 3
- Disagree (D) = 2
- Strongly Disagree (SD) = 1

3.6 Validity of the Instrument

The instrument was subjected to face and content validity. Experts in environmental health education and measurement and evaluation reviewed the questionnaire to ensure clarity, relevance, and adequacy in measuring the variables under study.

3.7 Reliability of the Instrument

The reliability of the instrument was determined using the Cronbach Alpha method. A pilot study was conducted using a small sample of students outside the main study area. The reliability coefficient obtained is 0.886, indicating that the instrument was reliable.

3.8 Method of Data Collection

The researcher, with the help of trained research assistants, administered the questionnaires directly to the respondents in their respective universities. The respondents were given adequate time to complete the questionnaire, and all completed copies were collected immediately to ensure a high return rate.

3.9 Method of Data Analysis

Data collected were analyzed using both descriptive and inferential statistics:

Descriptive Statistics: Mean and standard deviation were used to answer the research questions.

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Inferential Statistics: Pearson Product Moment Correlation (PPMC) was used to test Hypotheses One and Two, whereas Multiple Regression Analysis was used to test Hypothesis Three. All hypotheses were tested at 5% level of significance.

3.10 Decision Rule

For research questions: A mean score of 2.50 and above was interpreted as "Agree," while a mean score below 2.50 was interpreted as "Disagree."

For hypotheses: If the p-value was less than or equal to 0.05, the null hypothesis was rejected**.** If the p-value was greater than 0.05, the null hypothesis was not rejected**.**

4. Results

This section introduced the data analysis of the data gathered about the respondents on the evaluation of environmental health education and its impact on students' sanitation practices in Universities in the South East geopolitical zone of Nigeria. Descriptive statistics (mean and standard deviation) and correlation coefficient were applied to answer the research questions and Pearson Product Moment Correlation (PPMC) and multiple regression analysis to test the hypotheses.

4.1 Results

Research Question One

What is the relationship between environmental health education and students' sanitation practices in universities in the South East geopolitical zone of Nigeria?

Table 1: Descriptive Analysis on Environmental Health Education and Sanitation Practices (n = 300)

Variable	*n*	$\bar{x}$	SD	Decision
Environmental Health Education	300	2.88	0.60	Agree
Sanitation Practices		2.95	0.57	Agree

Key: *n* = Number of Participants, $\bar{x}$ Mean, SD = Standard Deviation

Table 1 shows the result obtained in respect of research question one. The mean scores above 2.50 indicate that respondents agreed that environmental health education is positively associated with improved sanitation practices.

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Testing of Hypothesis One

There is no significant relationship between environmental health education and students' sanitation practices in universities in the South East geopolitical zone of Nigeria.

Table 2: Pearson Correlation Summary between Environmental Health Education (EHE) and Sanitation Practices

Variable	*n*	*r*	p-value	Decision
EHE vs. Sanitation Practices	300	0.65	0.000	Reject H_0

The result in Table 2 shows the Pearson correlation summary results between environmental health education and students' sanitation practices. It was a significant positive relationship ($r = 0.65$, $p<0.05$). The null hypothesis was rejected since $p < 0.05$. Hence, the factor of environmental health education had a significant effect on students' sanitation practices.

Research Question Two

What is the relationship between students' level of knowledge of environmental health education and their sanitation practices?

Table 3: Descriptive Analysis on Knowledge and Sanitation Practices (n = 300)

Variable	*n*	$\bar{x}$	SD	Decision
Knowledge of EHE	300	2.90	0.58	Agree
Sanitation Practices		2.95	0.57	Agree

Table 3 shows the result obtained in respect of research question two. The results show that students possessed a good level of environmental health knowledge, which is associated with improved sanitation practices.

Testing of Hypothesis Two

There is no significant relationship between students' level of knowledge of environmental health education and their sanitation practices.

Table 4: **Pearson Correlation Summary between Knowledge and Sanitation Practices**

Variable	*n*	*r*	p-value	Decision
Knowledge vs. Sanitation	300	0.70	0.000	Reject H_0

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The result in Table 4 shows the Pearson correlation summary results between students' level of knowledge of environmental health education and their sanitation practices. It was a strong positive relationship (r = 0.70). The null hypothesis was rejected since p < 0.05. Hence, the factor of knowledge had a significant effect on students' sanitation practices.

Research Question Three

To what extent does environmental health education (knowledge and exposure) influence students' sanitation practices in universities in the South East geopolitical zone of Nigeria?

Table 5: Multiple Regression Analysis Summary for Research Question Three (n = 300)

Model	*n*	*r*	r^2	Std. Error
Knowledge & exposure vs. Sanitation	300	0.76	0.58	0.39

The multiple regression analysis summary (Table 5) showed a strong relationship (r = 0.76) between environmental health education (knowledge and exposure) and students' sanitation practices. The coefficient of determination (r^2 = 0.58) indicated that 58% of the variation in sanitation practices was explained by knowledge and exposure to environmental health education.

Testing of Hypothesis Three

Environmental health education (knowledge and exposure) has no significant influence on students' sanitation practices in universities in the South East geopolitical zone of Nigeria.

Table 6: Multiple Regression Analysis Summary for Hypothesis Three (n = 300)

Source	Sum of Squares	df	Mean Square	F	p-value
Regression	52.84	2	26.42	74.65	0.000
Residual	38.16	297	0.13		
Total	91.00	299			
Regression Coefficients					
		Variable	Beta	t-value	p-value
		Knowledge of EHE	0.39	6.02	0.000
		Exposure to EHE	0.44	6.88	0.000

The outcome of the ANOVA (Table 6) indicated that the regression model was statistically significant (F = 74.65, p < 0.05), which proved that the model was a good fit. The regression

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coefficients showed that both knowledge of EHE ($\beta_1 = 0.39$) and exposure to EHE ($\beta_2 = 0.44$) had significant effects on students' sanitation practices. Since both predictors were significant ($p < 0.05$) and the model was statistically significant, the null hypothesis was rejected. Environmental health education significantly influenced students' sanitation practices.

4.2 Summary of Findings

The findings of the study revealed that:

1. There was a significant positive relationship between environmental health education and students' sanitation practices.
2. There was a strong and significant relationship between students' knowledge of environmental health education and their sanitation practices.
3. Environmental health education (knowledge and exposure) had a significant combined influence on students' sanitation practices, explaining 58% of the variance, with exposure emerging as the stronger predictor.

5. Discussion, Conclusion and Recommendation

This section gives the discussion of findings, conclusion, recommendations, implications of the study and suggestions to further studies. The argument relies on the findings of the data analysis of the research on the evaluation of environmental health education and its impact on students' sanitation practices in universities in the South East geopolitical zone of Nigeria.

5.1 Discussion

The findings of the study revealed that there was a significant positive relationship between environmental health education and students' sanitation practices. This implies that increased exposure to environmental health education leads to improved sanitation behaviors among students. This finding is consistent with the position of the World Health Organization (2021), which emphasized that health education plays a vital role in promoting hygiene practices and preventing sanitation-related diseases. Environmental health education enhances awareness, builds positive attitudes, and equips students with the necessary skills to maintain proper sanitation practices.

The study also found a strong and significant relationship between students' knowledge of environmental health education and their sanitation practices. This suggests that students with higher levels of knowledge are more likely to engage in proper sanitation behaviors. This finding aligns with the theory of Albert Bandura (1986), which posits that knowledge and cognitive factors significantly influence behavior. It also supports empirical findings that increased

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awareness and understanding of environmental health issues promote positive behavioral change among individuals.

The findings further revealed that environmental health education (knowledge and exposure) had a significant combined influence on students' sanitation practices, with exposure emerging as the stronger predictor. This indicates that while knowledge is important, continuous exposure to environmental health education programs has a greater impact on shaping students' sanitation behaviors. This result is in line with the report of the World Bank (2020), which highlighted that sustained exposure to health education interventions significantly improves behavioral outcomes. Factors such as awareness campaigns, environmental cues, and institutional support systems contribute to improved sanitation practices.

5.2 Conclusion

Based on the findings of the study, it was concluded that environmental health education plays a significant role in improving students' sanitation practices in universities in the South East geopolitical zone of Nigeria. Both knowledge and exposure to environmental health education were found to significantly influence sanitation behaviors, with exposure having a stronger effect. The study further concluded that effective environmental health education programs are essential for promoting sustainable sanitation practices and improving public health outcomes among university students.

5.3 Recommendations

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

1. Strengthening Environmental Health Education Programs: Universities should incorporate comprehensive environmental health education into their curricula and orientation programs.
2. Enhancing Awareness Campaigns: Regular seminars, workshops, and campaigns should be organized to increase students' exposure to environmental health education.
3. Provision of Sanitation Facilities: University authorities should provide adequate sanitation facilities to support proper hygiene practices among students.
4. Monitoring and Enforcement: Institutions should establish policies and monitoring systems to ensure compliance with sanitation standards on campus.

5.4 Implications of the Study

The findings of this study have the following implications:

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1. Educational Implication: Improved environmental health education enhances students' knowledge and behavior.
2. Health Implication: Better sanitation practices reduce the risk of communicable diseases.
3. Policy Implication: Policymakers can use the findings to develop effective campus health policies.

5.5 Limitations of the Study

The study was limited to selected universities in the South East geopolitical zone of Nigeria, which may limit generalization. Also, the use of self-reported data may introduce response bias.

5.6 Suggestions for Further Studies

Future researchers should:

1. Extend the study to other geopolitical zones in Nigeria.
2. Investigate additional factors influencing sanitation practices such as cultural and socioeconomic variables.
3. Employ longitudinal designs to examine long-term behavioral changes.

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