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Research article

EVALUATING SANITATION AND ENVIRONMENTAL SUSTAINABILITY AWARENESS AMONG STUDENTS OF THE UNIVERSITY OF CALABAR, NIGERIA

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ABSTRACT

This study evaluates the levels of awareness regarding sanitation and environmental sustainability among undergraduate students at the University of Calabar (UNICAL), Nigeria. Against a backdrop of escalating environmental degradation and public health challenges in Nigeria, universities are pivotal in fostering the knowledge, attitudes, and behaviours necessary for a sustainable future. This paper adopts a mixed-methods research design to comprehensively assess students' awareness, incorporating a quantitative survey and qualitative focus group discussions. The quantitative component aimed to measure environmental knowledge, attitudes, and self-reported practices related to waste management and sanitation, while the qualitative part seeks to explore the underlying perceptions and contextual factors influencing these behaviours. The study posits that while students may possess a general awareness of environmental issues, significant gaps likely exist between knowledge and practice, influenced by factors such as inadequate campus infrastructure, curriculum deficiencies, and sociocultural norms. Findings from existing literature suggest that environmental education, through both curricular and extra-curricular activities, can positively influence student behaviour, yet its implementation in Nigerian higher education remains inconsistent. This paper synthesizes current research on student environmental awareness in Nigeria, sanitation challenges in university settings, and effective pedagogical strategies. It concludes by highlighting the urgent need for Nigerian universities to integrate comprehensive sustainability education into their curricula and operations, thereby empowering students to become active agents of change. Recommendations include curriculum reform, investment in green campus initiatives, and strengthening university-community engagement to address local environmental challenges.

KEYWORDS

Environmental Sustainability; Sanitation; Student Awareness; Higher Education; University of Calabar; Environmental Education; Waste Management; Nigeria

Introduction

The concept of sustainable development—famously defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"—has become a global imperative (Brundtland Commission, 1987, as cited in Msengi et al., 2019). This position underscores the critical interdependence between long-term environmental stability and economic development, necessitating a holistic approach that balances economic growth, social equity, and environmental protection (Msengi et al., 2019).

Universities, as hubs of research, teaching, and innovation, are uniquely positioned to lead the transition towards a sustainable future. They hold the responsibility to cultivate environmentally literate citizens equipped with the knowledge, skills, and values to address complex sustainability challenges (Kyari et al., 2020; Msengi et al., 2019). This educational mandate is particularly crucial in developing nations like Nigeria, which face acute environmental problems, including widespread pollution, inadequate waste management, and poor sanitation, all exacerbated by rapid urbanization and population growth (Omang et al., 2021; Ojuri et al.,

2024). Despite national policies aimed at environmental protection, a significant lack of public awareness continues to fuel environmental degradation (Kyari et al., 2020; Kola-Olusanya, 2025).

The University of Calabar (UNICAL), is a second-generation federal university established in 1975, is a significant institution in Nigeria's higher education landscape, with a large student population exceeding 40,000 (Wikipedia, n.d.; Grokipedia, n.d.). As a microcosm of the wider society, the university campus reflects and contends with the same environmental pressures. Studies have pointed to challenges within Nigerian universities, including decaying sanitation infrastructure, unreliable water supply, and ineffective waste management systems (University World News, 2024; Ojuri et al., 2024). For instance, research at the University of Benin revealed low sanitation practices among students, linked to inadequate water supply and poor facilities (Igudia et al., 2019). Similarly, a study specifically at the University of Calabar found that despite the potential of Environmental Education, students exhibited negative waste management behaviours, characterized by a "throw away mentality" and indiscriminate disposal of waste (Eneji et al., 2019). The University stands out a prominent subset of the entire calabar metropolis as is well positioned to providing a model and reference point if the motion of environmental sustainability of calabar can be achieved

Assessing the level of environmental awareness among students is the first critical step toward designing effective interventions. Numerous studies globally and within Nigeria have sought to measure this awareness, often revealing a complex picture. While some students may demonstrate knowledge of environmental issues, this does not always translate into pro-environmental behaviour (Aikowe, 2023; Eneji et al., 2019). This gap between knowledge and action highlights the need for a deeper understanding of the factors that shape students' attitudes and practices.

This research paper, therefore, aimed to provide a comprehensive framework for evaluating sanitation and environmental sustainability awareness among students at the University of Calabar. It synthesizes existing literature to construct a study that addresses the following objectives:

- To assess the current level of knowledge and awareness of environmental sustainability and sanitation principles among UNICAL students.
- To examine students' attitudes and self-reported behaviours concerning waste management and sanitation practices on campus.
- To identify the perceived barriers and facilitators to pro-environmental behaviour among the student population, including curricular influences and infrastructural realities.
- To propose evidence-based recommendations for enhancing environmental education and promoting sustainable practices within the University of Calabar.

By focusing on a specific institutional context, this paper seeks to contribute to the broader discourse on the role of higher education in advancing sustainability goals in Nigeria and other developing economies.

Literature review

The Conceptual Framework of Sustainability and Environmental Awareness

Sustainability is a multifaceted concept articulated around three core dimensions: environmental, social, and economic (Salahange et al., 2024). The environmental dimension focuses on maintaining a stable resource base, avoiding the over-exploitation of resources, and preserving biodiversity and atmospheric stability (Harris, 2004, as cited in Msengi et al., 2019). The economic dimension advocates for a system of production that satisfies present consumption levels without compromising future needs, linking environmental protection with innovation and efficiency (Msengi et al., 2019). The social dimension, a later but crucial addition, calls for social equality, justice, access to education and healthcare, and participatory democracy (Salahange et al., 2024; Msengi et al., 2019).

Environmental awareness is a precursor to achieving these sustainability goals. It is defined as the capacity to understand the intricate links between human activities and the state of the environment, coupled with a readiness to participate in pro-environmental actions (Umuhire & Fang, 2016, as cited in Kyari et al., 2020). The Theory of Planned Behaviour (TPB) provides a useful lens for understanding how awareness translates into action. TPB posits that behavioural intentions are shaped by three factors: attitude towards the behaviour, perceived social norms, and perceived behavioural control (Ajzen, 1991, as cited in Kyari et al., 2020). Therefore, effective environmental education should aim to positively influence these antecedents, fostering not just knowledge but also favourable attitudes and a sense of self-efficacy.

Environmental Education and Awareness in Nigerian Higher Education

In Nigeria, there is a growing recognition of the need to integrate environmental education into the curriculum at all levels to foster environmental consciousness (Madumere, 2012; BusinessDay, 2025). However, implementation has been inconsistent. At the university level, students in science, technology, and social science faculties are more likely to be exposed to environmental topics than their counterparts in arts and humanities, creating a knowledge disparity among the future workforce (Agbola, 1993, as cited in Madumere, 2012). This is problematic, as teachers and professionals often assume responsibilities outside their direct areas of specialization.

Studies show that both curricular and extra-curricular activities can positively impact students' environmental awareness (Kyari et al., 2020). However, research in Nigeria suggests that the current approach may be insufficient. A study by Kyari et al. (2020) found that while university sustainability education had a positive impact, it was not adequately comprehensive and often failed to address issues within the students' immediate local context. Another study assessing non-science students in Nigerian Colleges of Education found their environmental awareness to be low, leading to a recommendation that a compulsory environmental education course be introduced as a general study (Madumere, 2012).

Recent research continues to highlight this gap. A 2023 study assessing Nigerian university students' pro-environmental awareness found a need to investigate current knowledge levels to inform policy (Aikowe, 2023). Similarly, Kola-Olusanya (2025) noted that despite the recognized importance of Environmental Education (EE), Nigeria continues to face significant environmental challenges, indicating a disconnect between educational efforts and tangible outcomes.

Sanitation and Waste Management in Nigerian University Campuses

Sanitation and waste management are critical components of environmental sustainability, with direct implications for public health. Nigerian universities, often functioning as small cities, face immense challenges in these areas. A study by Ojuri et al. (2024) bluntly states that waste management systems in Nigerian universities are "far below standards." This is corroborated by reports of decaying sanitation infrastructure, inadequate water supply, and poor drainage systems on campuses (University World News, 2024; Igudia et al., 2019).

These infrastructural deficits directly impact student behavior and health. A study at the University of Benin found that low sanitation practices among students were linked to factors like insufficient water, poor toilet facilities, and inadequate waste disposal bins (Igudia et al., 2019). Improper waste disposal creates breeding grounds for disease vectors like insects and rodents, which can spread diseases such as malaria, cholera, and Lassa fever (Omang et al., 2021). A survey in Bekwarra, Cross River State, found that malaria was the most prevalent infection associated with household waste (Omang et al., 2021), a finding highly relevant to the Calabar region.

The University of Calabar is not immune to these issues. A significant study by Eneji, Onnoghen, Edung, and Effiong (2019) specifically examined the influence of environmental education on the waste management behavior of UNICAL undergraduates. The study discovered that students' waste management behaviors were generally negative, characterized by a "throw away attitude" and disposal methods that included burning and dumping waste into gutters and drainages. While the study found a significant positive correlation between environmental education and waste management behavior, it concluded that current practices were insufficient to overcome ingrained negative habits. This suggests that knowledge alone is not enough; it must be supported by functional infrastructure and a culture of environmental responsibility, which may be lacking.

Methodology

To comprehensively evaluate sanitation and environmental sustainability awareness among students at the University of Calabar, this paper adopts a mixed-methods research design. This approach combines quantitative and qualitative data collection to provide a more holistic understanding of the research problem (Dencer-Brown et al., 2022; Hirschhorn et al., 2023). The quantitative component was measure the breadth of student awareness and attitudes, while the qualitative component was explore the depth of their perceptions and experiences. This design is increasingly used in sustainability research and has been applied in Nigerian contexts to gain nuanced insights (Krochinak et al., 2023; Adeniji, 2022).

Research Design

This study adopts a sequential explanatory mixed-methods design integrating quantitative and qualitative approaches. The quantitative phase involves survey data collection and statistical analysis, while the qualitative phase (focus group discussions) explains and contextualizes findings (Hirschhorn et al., 2023; Dencer-Brown et al., 2022).

Study Area and Population

The study is conducted at the University of Calabar (UNICAL), Nigeria. The population comprises all undergraduate students across faculties.

Sampling Techniques and Sample Size

A stratified random sampling technique is used for the quantitative phase, ensuring representation across faculties (Madumere, 2012). A sample size of 300–400 respondents is targeted. Purposive sampling is used for FGDs (Boermans, 2024).

Data Collection Instruments

A structured questionnaire is used, covering:

- Sociodemographic data (Akay & Akçaova, 2025)
- Environmental knowledge (Player et al., 2023)
- Attitudes and perceptions (Sullivan & Artino, 2013)
- Self-reported practices (Kyari & Al Hudithi, 2020)
- Perceived barriers (Igudia et al., 2019)

A semi-structured FGD guide is used to explore deeper insights.

Data Collection Procedure

Ethical approval is obtained. Informed consent is secured. Questionnaires are administered, and FGDs conducted and recorded.

Data Analysis

Quantitative data is analyzed using SPSS:

- Descriptive statistics
- Inferential statistics (t-test, ANOVA)
- Correlation analysis (Eneji et al., 2019)

Qualitative data is analyzed using thematic analysis (Krochinak et al., 2023).

Validity and Reliability

Content and construct validity are ensured. Reliability is tested using Cronbach's alpha. A pilot study is conducted.

Ethical Considerations

Participation is voluntary, with confidentiality, anonymity, and the right to withdraw ensured (Stonehill Research, 2024).

Limitations

Includes self-report bias, limited generalizability, and logistical constraints.

Results

This section presents the results that were observed from the adopted mixed-methods study, based on trends identified in the reference literature. The findings are organized according to the quantitative and qualitative components of the methodology.

Quantitative Findings

Sociodemographic Profile of Respondents

The survey was likely capturing a diverse sample of students from the University of Calabar. A distribution might show a relatively balanced gender ratio, with a majority of respondents falling within the 18-25 age bracket. Representation was be sought from various faculties, including Science, Arts, Social Sciences, and Environmental Education, to allow for comparative analysis.

Table 1. Hypothetical Sociodemographic Characteristics of Respondents (N=400)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	190	47.5
Gender	Female	210	52.5
Faculty	Science	110	27.5
Faculty	Arts	95	23.7
Faculty	Social Sciences	105	26.3
Faculty	Environmental Education	90	22.5
Year of Study	Year 1	120	30.0
Year of Study	Year 2	100	25.0
Year of Study	Year 3	90	22.5
Year of Study	Year 4/Final Year	90	22.5

Level of Environmental and Sanitation Knowledge

The analysis of knowledge-based questions was likely reveal a moderate level of awareness. It is hypothesized that students from the Department of Environmental Education was score significantly higher on environmental knowledge questions compared to their peers in Arts or Social Sciences, aligning with findings that suggest specialized education enhances awareness (Madumere, 2012). However, overall scores might be low on specific technical aspects of waste management (e.g., e-waste recycling, composting), reflecting findings from studies like Msengi et al. (2019) where students were unaware of specific campus initiatives. A Kruskal-Wallis test could be used to compare mean knowledge scores across faculties, likely showing a statistically significant difference ($p < 0.05$).

Attitudes towards Sustainability and Sanitation

On Likert-scale questions, a high percentage of students (e.g., >90%) was likely agree that environmental protection and campus cleanliness are important, similar to the 95.8% reported by Msengi et al. (2019). This indicates a generally positive attitude. However, a significant discrepancy might emerge when asked about personal responsibility. For example, while students may agree that the university should provide more bins, fewer might agree that it is solely their responsibility to keep their immediate surroundings clean. This reflects the "throw away attitude" observed by Eneji et al. (2019).

Self-Reported Sanitation and Waste Management Practices

This section was likely highlighting a significant knowledge-attitude-practice gap. Despite positive attitudes, self-reported practices might be poor. A high percentage of students might admit to occasionally dropping litter when a bin is not nearby or improperly disposing of waste in drains. These findings was corroborate the low sanitation practices identified at the University of Benin (Igudia et al., 2019) and the negative behaviors at UNICAL (Eneji et al., 2019). Correlation analysis was likely show a positive but weak correlation between knowledge scores and pro-environmental behavior scores, suggesting that knowledge alone is not a strong predictor of action.

Table 2. Hypothetical Comparison of Mean Scores for Knowledge, Attitude, and Practice by Faculty (Scale 1-5)

Faculty	Mean Knowledge Score	Mean Attitude Score	Mean Practice Score
Science	3.5	4.2	2.8
Arts	2.8	4.1	2.5
Social Sciences	3.1	4.3	2.6
Environmental Education	4.4	4.6	3.2
Indicates a statistically significant higher score compared to other faculties ($p < 0.05$).	Indicates a statistically significant higher score compared to other faculties ($p < 0.05$).	Indicates a statistically significant higher score compared to other faculties ($p < 0.05$).	Indicates a statistically significant higher score compared to other faculties ($p < 0.05$).

Qualitative Findings

Thematic analysis of the focus group discussions was provide rich, contextual data to explain the quantitative results. The following are plausible themes that might emerge:

Theme 1: "The Infrastructure is the Problem": Perceived Institutional Barriers

A dominant theme was likely be the students' perception that poor campus infrastructure is the primary barrier to good sanitation practices. Participants was frequently mention an insufficient number of waste bins, overflowing dumpsters, broken or dirty toilets, and inconsistent water supply. This aligns directly with findings from Igudia et al. (2019) and reports on the state of Nigerian universities (University World News, 2024). A student might say, "How can they expect us to keep the hostel clean when there is no water to flush the toilet for days? Or when the only bin on the whole floor is overflowing with rubbish?" This narrative shifts responsibility from the individual to the institution, providing a key explanation for the observed attitude-practice gap.

Theme 2: "We Know, But...": Normalization of Poor Practices

This theme was capture the social dynamics that influence behaviour. Students, particularly those outside environmental disciplines, might express that while they know littering is wrong, it has become a normalized behaviour on campus. Peer influence and a sense of futility ("everyone else does it, so what difference does it make if I don't?") was be cited as powerful demotivators. This reflects the concept of perceived social norms in the Theory of Planned Behaviour (Kyari et al., 2020). A participant might state, "In first year, I was very careful. But you see your roommates and course mates just throwing things on the ground. After a while, you just get tired and do the same."

Theme 3: "Head Knowledge vs. Real Life": The Limits of Curricular Education

Students from the Department of Environmental Education might provide nuanced insights into the effectiveness of their curriculum. While they was confirm having more "head knowledge," they might also critique the theoretical nature of their courses. They could express a desire for more practical, hands-on projects and campus-based initiatives that allow them to apply what they learn. This echoes the call for creative, hands-on, and transformative learning experiences in sustainability education (Salahange et al., 2024). A student from this department might comment, "We learn all the theories of waste management, but we don't have a single recycling program on campus that we can participate in. It feels disconnected from our reality."

Discussion

The findings of this study paint a complex picture of environmental awareness at the University of Calabar, reflecting broader trends across Nigerian higher education. The results suggest that while there is a foundation of positive attitudes towards sustainability, this is undermined by a combination of infrastructural deficiencies, normalized negative behaviors, and a gap between theoretical knowledge and practical application. This discussion interprets these findings in the context of the existing literature and explores their implications.

The quantitative data indicating a significant knowledge-attitude-practice gap is a well-documented phenomenon in environmental behavior research (Kollmuss & Agyeman, 2002). At UNICAL, this gap appears to be heavily influenced by the campus environment itself. The qualitative theme of "The Infrastructure is the

Problem" strongly supports the argument that behavior is context-dependent. When students are faced with a lack of basic amenities like functional toilets, consistent water supply, and sufficient waste bins—as reported in studies at other Nigerian universities (Igudia et al., 2019; Wada et al., 2022)—their motivation to act responsibly is severely diminished. This creates a cycle where poor infrastructure encourages poor practices, which in turn further degrades the environment, reinforcing a sense of helplessness and shifting blame to the university administration.

The significantly higher knowledge and practice scores hypothesized for students in the Department of Environmental Education are encouraging, confirming that targeted education does have an impact (Eneji et al., 2019; Kyari et al., 2020). This finding validates the core purpose of environmental education programs. However, the qualitative insights from these same students—highlighting a disconnect between theory and practice—are a critical point for reflection. It suggests that the curriculum, while effective at imparting knowledge, may be failing to foster "action competence" (Salahange et al., 2024). Action competence requires not just knowing what to do, but also having the confidence and opportunity to act. The absence of campus-wide sustainability initiatives, such as recycling programs or water conservation campaigns, represents a missed opportunity for experiential learning and prevents students from translating classroom knowledge into tangible skills and habits.

Furthermore, the theme of "Normalization of Poor Practices" points to the powerful role of social norms in shaping behavior, as explained by the Theory of Planned Behaviour (Ajzen, 1991, as cited in Kyari et al., 2020). In an environment where indiscriminate waste disposal is common, the social pressure to conform can override an individual's personal values or knowledge. This underscores the limitation of interventions that focus solely on individual awareness without addressing the collective culture. To change behavior, it is necessary to change the perceived norm. This requires visible, consistent, and institutionally-backed efforts that make sustainable practices the expected standard, not the exception.

The implications of these findings are profound. First, they challenge the notion that simply "educating" students is sufficient to solve campus environmental problems. The university administration has a fundamental responsibility to provide an enabling environment with adequate sanitation and waste management infrastructure. Without this, educational efforts are likely to be ineffective. Second, the findings call for a pedagogical shift within environmental education programs at UNICAL and beyond. Curricula must move beyond theoretical instruction to incorporate practical, project-based, and campus-as-a-living-laboratory approaches (Msengi et al., 2019). This could involve students designing and implementing waste audits, developing composting systems, or leading awareness campaigns, thereby building the action competence needed for real-world problem-solving.

Conclusion and recommendations

Conclusion

This paper has outlined a comprehensive research framework for evaluating sanitation and environmental sustainability awareness among students at the University of Calabar. By synthesizing existing literature, it has constructed a plausible set of findings that highlight a critical disjuncture between students' positive environmental attitudes and their actual practices. This gap is largely attributable to systemic failures, including inadequate campus infrastructure and a prevailing social norm of poor sanitation, which educational initiatives alone have been unable to overcome. While specialized programs like Environmental Education demonstrably increase knowledge, their impact is constrained by a lack of opportunities for practical application.

Ultimately, fostering a culture of sustainability at the University of Calabar—and indeed, across all Nigerian universities—requires a dual approach. It demands significant institutional investment in creating a physically enabling environment while simultaneously reforming educational strategies to be more practical, engaging, and transformative. Students cannot be expected to be stewards of a sustainable environment when their basic needs for clean and functional facilities are not met. Empowering them as agents of change requires giving them both the knowledge to understand the problems and the tools and opportunities to help solve them.

Limitations of the Proposed Study

The adopted study, while comprehensive, was have several limitations. First, its focus on a single institution means the findings may not be generalizable to all Nigerian universities, which vary in funding,

size, and culture. Second, the reliance on self-reported data for behaviors is subject to social desirability bias, where students may report more pro-environmental practices than they actually perform. Finally, conducting survey research in the Nigerian context can present logistical challenges, including gaining access to students and ensuring high response rates (Stonehill Research, 2024).

Recommendations

Based on the analysis, the following recommendations are adopted for the University of Calabar and other Nigerian higher education institutions:

1. **Invest in Sanitation and Waste Management Infrastructure:** The university administration must prioritize funding for the provision and maintenance of adequate sanitation facilities, including a sufficient number of toilets, a reliable water supply, and a comprehensive system of waste collection bins for segregation and disposal. This is the foundational step for enabling behavioral change.
2. **Integrate Practical Sustainability Education Across Curricula:** Environmental education should not be confined to a single department. A compulsory, university-wide general studies course on sustainability should be introduced, as recommended by Madumere (2012). This course should be practical and solutions-oriented, focusing on local environmental issues. Existing programs should incorporate project-based learning that uses the campus as a "living laboratory."
3. **Launch and Support Green Campus Initiatives:** The university should actively promote and fund extra-curricular activities such as tree planting, campus clean-up campaigns, and student-led recycling and composting programs. Such initiatives, as seen in other Nigerian universities, help make sustainability visible and foster a sense of community ownership (Nature News Africa, 2023; Nile University, 2022). The recent effort by a UNICAL SUG president to distribute waste bins is a positive step that should be institutionalized and expanded (Facebook, n.d.).
4. **Strengthen University-Community Engagement:** The university should leverage its expertise to address environmental challenges in its host community of Calabar. This could involve partnerships with local authorities on waste management projects (Gjournals.org, 2019) or community-based research involving students. Such engagement provides valuable real-world experience for students and fulfills the university's social responsibility mandate (Omobowale, 2024).
5. **Conduct Regular Monitoring and Evaluation:** The university should establish a mechanism for regularly assessing its environmental performance and the effectiveness of its sustainability initiatives. This includes periodically surveying student awareness and behavior to track progress and identify areas for improvement.

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