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Energy Efficiency and Carbon-Neutral Knowledge, Attitudes and Perception (KAP) across the Campuses of Lagos State University (LASU), Nigeria

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Abstract. This study investigated students' awareness, participation, and commitment to sustainability initiatives across the four campuses of Lagos State University (LASU), Ojo, Ikeja, Epe, and Badagry. Data were collected from 214 randomly selected students. The data obtained were analyzed using simple percentages, tables, Pearson correlation, and One-Way ANOVA. The results obtained revealed that 49.1% of the respondents demonstrated high awareness of sustainability initiatives, with Badagry campus recording the highest awareness at 95.5%, and Ikeja the lowest at 35.6%. Furthermore, 63.1% of students indicated familiarity with LASU's sustainability programmes, reflecting a moderate level of institutional visibility, while 48.1% rated the visibility of these efforts as high, again with Badagry leading at 95.5%. Despite these levels of awareness, only 26.6% of students strongly agreed that LASU is committed to sustainability. Among campuses, Badagry (50.0%) and Ikeja (42.2%) showed the strongest perceptions of institutional commitment. Opinions on LASU's energy initiatives were mixed: 54.2% rated them as somewhat effective, 28.5% as very effective, and 39.3% believed the efforts were insufficient. Statistical analysis showed positive correlations between awareness and energy-saving behavior ($r = 0.224$, $p = 0.001$), as well as between awareness and intentions for future participation ($r = 0.174$, $p = 0.011$). Adoption of energy-saving behaviors varied significantly across campuses ($F = 10.841$, $p = 0.000$), while intentions to participate in future initiatives

did not show significant differences (F = 2.023, p = 0.112). The result generally revealed that LASU students exhibited moderate to high levels of engagement with sustainability initiatives. The notable variations in awareness, perception, and participation across campuses, especially between Badagry and others, highlight the need for tailored, campus-specific strategies to ensure more balanced and widespread adoption of sustainable practices.

Keywords:

Awareness of sustainability initiatives, Adoption of energy-saving behavior, Participation in future energy-saving programmes.

1. Introduction

Sustainability has emerged as a paramount concern in global discourse, driven by urgent environmental and social challenges such as climate change, resource depletion and social inequality. Higher education institutions (Heis) are increasingly recognized not merely as centers of knowledge but also as critical sites for fostering sustainability, innovation and implementation [1]. The comprehensive integration of Sustainable Development Goals (SDGs) into university frameworks- encompassing academic curricula, institutional policies, campus operations, and community engagement, represents a holistic approach to addressing these global challenges [2; 3]. Globally, HEis play a pivotal role in shaping youth perspectives and influencing future policy directions. However, the adoption of sustainability initiatives varies significantly across campuses due to heterogeneous levels of awareness, participation, and infrastructure readiness [4; 5]. Lagos State University (LASU), as a prominent Nigerian public institution with multiple campuses, offers an exemplary context for investigating student perceptions and engagement with diverse sustainability initiatives.

Effective sustainability transitions necessitate not only robust infrastructural development but, crucially, significant behavioral shifts. This renders student and staff awareness, commitment, and active participation indispensable for successful implementation [6; 7]. In multi-campus universities, disparities in accessibility, administrative priorities, and available campus resources invariably lead to distinct sustainability experiences. While national policies such as Nigeria's Climate Change Act, 2021 and the 2050 Long-Term Vision (LTV) establish broad frameworks, their successful implementation is fundamentally dependent on localized awareness and active engagement [8]. Research consistently demonstrates a strong correlation between research sustainability awareness and pro-environmental behavioral change. For instance, studies by [9] indicate that student processing greater knowledge of eco-conscious practices are more predisposed to adopting energy-saving behaviors, reducing waste, and engaging in climate activism [10]. Crucially, institutional visibility profoundly influences students' inclination to act: students are more likely to participate when they perceive clear sustainability measures and strong leadership commitment within university environment [11]. Therefore, evaluating student engagement necessitate a thorough assessment of the visibility and accessibility of campus sustainability programs.

Despite the increasing volume of sustainability research within African universities, there remain a paucity of studies examining intra-institutional variations. [12], for example, contend that disparities in infrastructure and centralized administrative structures often contribute to uneven diffusion of sustainability practices within Nigerian universities. Campuses endowed with superior infrastructure and accessibility may demonstrate greater efficiently in implementing technologies like renewable energy systems, thereby enhancing

students' perceptions of institutional commitment to sustainability [13;14]. Active engagement in energy-saving behaviors and awareness campaigns fosters a vital culture of environmental responsibility [15]. However, participation levels are contingent upon factors such as programme visibility, perceived effectiveness, and the presence of supporting structures like green clubs and faculty-led initiatives [16]. Analyzing participation disparities between campuses therefore, provides critical insights into issues of institutional equity and informs the necessity for strategic planning.

Students' long-term commitment to sustainability is shaped by a confluence of factors. According to [17], behavioral intention is influenced by individual attitudes, perceived individual control, and subjective social norms. This assertion is also supported by [18], who found that students exposed to high environmental visibility on campus demonstrated stronger intentions to engage in energy-efficient initiatives. Campus sustainability efforts are also profoundly shaped by cultural and social influences. LASU's diverse student population, representing various socio-economic and religious background underscore the relevance of collective norms and ethical values, which prior research indicates contribute to differing levels of engagement with sustainability initiatives [19].

Despite the substantial progress in higher education sustainability research, many studies lack comparative intra-institutional analyses, which limits the ability to determine optimal strategies for specific contexts. This approach is congruent with the spirit of the UN Decade of Action for the SDGs [20], emphasizing the imperative for targeted, evidence-driven solutions tailored to unique local institutional reality. Through its exploration of these dynamics within LASU, this research significantly contributes to the broader academic discourse on sustainability in higher education.

2. Methodology

The study was conducted at Lagos State University (LASU), a public institution established in 1983 in southwestern Nigeria. LASU, operates a main campus in Ojo and satellite campuses in Ikeja, Epe, and Badagry. The University is situated within a humid tropical climate, characterized by distinct wet and dry seasons, with average temperatures between 28°C and 34°C and annual rainfall ranging from 1,650 to 2,000 mm [21]. The campus environment features secondary forest regrowth and landscaped areas, particularly on the Ojo campus, which is underlain by moderately fertile, well-drained sandy-loamy soil typical of Lagos's coastal terrain [22].

This study employed a descriptive cross-sectional survey design to investigate undergraduate students' and staff members' awareness, perceptions, participation, and behavioral tendencies regarding sustainability initiatives across LASU campuses. The primary objective was to assess knowledge levels, adoption patterns, and engagement in energy-related behaviors, consistent with SDGs such as climate action (SDG 13), responsible consumption and production (SDG 12), and quality education (SDG 4).

Data were collected using a structured questionnaire administered to respondents, both students and staff members across all the four campuses: Ojo, Ikeja, Epe, and the affiliated Badagry campus. A multi-stage sampling approach which ensured representativeness. Was adopted. Initially, the university was stratified into campuses, faculties, and departments. Within each stratum, systematic sampling was applied to select students. Faculty and non-teaching staff members were also systematically selected. Out of 240 questionnaires distributed, 214 valid responses were received, yielding an 89.2% response rate.

Ethical considerations were rigorously observed. Informed consent was obtained from all participants, and confidentiality and anonymity were assured. The study protocol received approval from relevant university authorities, and participation remained entirely voluntary. This structured methodological framework provided comprehensive and comparative insights into sustainability-related knowledge, attitudes, and behaviors across LASU campuses, highlighting campus-specific dynamics for enhancing sustainability initiatives in HEIs.

Descriptive statistics, including tables and simple percentages, were used to summarize campus-level patterns in sustainability awareness, familiarity, attitudes, and program participation. For inferential analysis, Pearson's correlation was employed to assess relationships between variables, while One-Way Analysis of Variance (ANOVA) was applied to measure variations in participation in sustainability programs and adoption of energy-saving behaviors across campuses. To facilitate these analyses, relevant questionnaire items were recoded into dummy variables, assigning a value of '1' to positive responses and '0' to negative responses, following established research protocols [23; 24; 25]. This coding strategy enabled effective analysis of dichotomous response patterns. All statistical computations were performed using SPSS (Version 22.0) and Microsoft Excel, which were also utilized for data entry, cleaning, and preliminary processing. Datasets were meticulously cleaned and coded with numerical values for categorical responses to ensure consistency, accuracy, and reliability in data interpretation

3. Results and Discussions

3.1. Students' Awareness of Sustainability Initiatives

Table 1 presents the variations in student and staff awareness and familiarity with sustainability initiatives across Lagos State University's (LASU) four campuses: Ojo, Ikeja, Epe, and Badagry. Overall, 49.1% of respondents reported being "very aware" of these initiatives. However, awareness levels differed significantly by campus. Badagry campus demonstrated the highest awareness, with 95.5% of students reporting high awareness, compared to Ojo (50.0%), Ikeja (35.6%), and Epe (40.7%). This elevated awareness in Badagry may stem from specific programmatic interventions, campus size, community-driven sustainability efforts, or proactive campus leadership. This partial engagement aligns with findings indicating inconsistent implementation of sustainability frameworks within Nigerian universities [28].

The proportion of respondents indicating "not aware" was particularly concerning on the Ojo (18.2%) and Ikeja (20.0%) campuses, especially given Ojo's status as the main campus. This suggests that central university efforts may not effectively permeate all student populations. As emphasized by [29] and [30], without deliberate integration into academic curricula and co-curricular activities, sustainability awareness often remains superficial.

Regarding familiarity with specific initiatives, 63.1% of respondents across all campuses reported being "familiar." However, disparities persisted; Ojo led with 73.9% familiarity, while Epe (54.2%) and Badagry (50.0%) lagged. This discrepancy in Badagry—high general awareness but lower familiarity with specific programs—suggests that while students and staff members recognize broad sustainability concepts, they may lack detailed knowledge of particular initiatives. This gap between awareness and deeper understanding has been previously noted in relevant literature [31]. Furthermore, the high percentage of "not sure" responses in Badagry (45.5%) may indicate confusion between general sustainability rhetoric and formal institutional initiatives, reflecting broader challenges in clearly defining sustainability in higher education, a concern also reported by [32]. In summary, the findings

in Table 1 reveal that LASU's sustainability efforts have an uneven impact across its campuses.

Table 1. Awareness of Sustainability Initiatives among Students in LASU

Variables	Categories	Campuses				Campuses Aggregate (%)
		Ojo %	Ikeja %	Epe %	Badagry (%)	
Awareness of sustainability initiatives	Very aware	50.0	35.6	40.7	95.5	49.1
	Somewhat aware	31.8	44.4	42.4	4.5	34.6
	Not aware	18.2	20.0	16.9	0	16.3
Familiarity with sustainability initiatives	Yes	73.9	60.0	54.2	50.0	63.1
	No	23.9	31.1	42.4	4.5	28.5
	Not Sure	2. 2	8.9	3.4	45.5	8.4

3.2. Level of Commitment and Visibility of Sustainability Measures on Campus

The results in Table 2 show student perceptions of LASU's commitment to sustainability and the visibility of these initiatives across campuses. It revealed that the majority (61.6%) of respondents agreed with LASU's sustainability efforts, but this support varied significantly across locations.

Table 2. Commitment and Visibility of Sustainability Measures on Campus

Variables	Categories	Campuses				Campuses Aggregate (%)
		Ojo %	Ikeja %	Epe %	Badagry (%)	
LASU's level of commitment to sustainability initiatives	Strongly Agreed	19.3	42.2	16.9	50.0	26.6
	Agreed	51.1	24.4	32.2	0	35.0
	Neutral	25.0	26.7	45.8	50.0	33.6
	Disagreed	3.4	6.7	5.1	0	4.2
	Strongly Disagreed	1.2	0	0	0	.6
Visibility of sustainability measures on campus	Very visible	42.0	55.6	33.9	95.5	48.1
	Somewhat visible	34.1	24.4	39.0	4.5	30.4
	Not visible	23.9	20.0	27.1	0	21.5

Badagry had 50% of students who strongly agreed, reinforcing earlier findings, while Ikeja also showed strong confidence. Remarkably, 30.4% of the respondents rated sustainability efforts as somewhat visible, while 21.5% found them not visible at all. These results and assertions align with the study of [33], who suggested that universities fostering student involvement through co-curricular sustainability projects and clubs tend to achieve higher perceived commitment and visibility. Moreover, positioning LASU's sustainability strategies with the United Nations Sustainable Development Goals (SDGs) and the African Union Agenda 2063 could create a unified framework for action. Studies by [34] and [35]

reported that student perceptions of commitment are closely tied to how sustainability practices are integrated into governance, academics, and campus life.

3.3. Effectiveness of LASU's Energy Initiatives and Perceived Institutional Effort

Table 3 provides insights into student perceptions of the effectiveness of LASU's energy initiatives and the broader institutional commitment to sustainability. The findings indicate that the perceived effectiveness of LASU's energy initiatives is moderate, with only 28.5% of students rating them as "very effective," while the majority (54.2%) considered them "somewhat effective." This suggests that while energy-related efforts are acknowledged, their broader impact and visibility across campuses may be limited. This observation aligns with research indicating that Nigerian universities often encounter challenges in maintaining and integrating energy projects into broader institutional systems, thereby limiting their overall effectiveness [36].

Regarding perceived institutional commitment to sustainability, 53.3% of students acknowledged ongoing efforts, while 39.3% expressed dissatisfaction due to unmet expectations, and 7.5% remained unsure. This disparity suggests that while some students may directly benefit from specific energy initiatives, others may feel excluded due to infrastructure inconsistencies or insufficient engagement efforts. To enhance the perceived impact and actual effectiveness of LASU's energy initiatives, several key strategies should be prioritized. First, strengthening reporting and feedback mechanisms would empower students to monitor energy-saving goals and assess performance, as advocated by organizations like [37].

Table 3. Level of Effectiveness of LASU Energy Initiatives and Initiatives Effort

Variables	Categories	Campuses				Campuses Aggregate (%)
		Ojo %	Ikeja %	Epe %	Badagry (%)	
Level of effectiveness of LASU Energy initiatives	Very Effective	25.0	51.1	27.1	0	28.5
	Somewhat Effective	52.3	35.6	54.2	100.0	54.2
	Neutral	20.5	11.1	16.9	0	15.4
	Ineffective	1.1	2.2	1.	0	1.4
	Very Ineffective	1.1	0	0	0	.5
If LASU is making sufficient efforts	Yes	54.5	46.7	55.9	54.5	53.3
	No	38.6	40.0	37.3	45.5	39.3
	Not sure	6.9	13.3	6.8	0	7.4

Second, expanding energy infrastructure equitably across all campuses, particularly smaller or less centrally located sites such as Badagry, would ensure a more uniform distribution of benefits. Furthermore, promoting participatory governance by actively involving students in energy committees or sustainability task forces would foster accountability and encourage active student involvement [38]. Finally, the moderate effectiveness ratings and mixed perceptions underscore the need for more ambitious, transparent, and student-centered approaches to sustainability. This resonates with findings that emphasize stakeholder engagement and institutional transparency as crucial for

improving sustainability efforts in Nigerian higher education [39].

3.4. Participation in Sustainability Programmes and Adoption of Energy-Saving Behaviours

Table 4 presents data on students' engagement in sustainability programs, their energy-saving habits, and their willingness to adopt sustainable behaviors across Lagos State University (LASU) campuses. The results indicate a promising level of student engagement in LASU's sustainability programs, with 56.1% reporting participation in at least one initiative. This finding supports research by [40], which highlights that awareness alone does not guarantee involvement.

Regarding energy-saving habits, students demonstrated a strong inclination towards sustainable practices. Approximately 44.4% consistently engaged in energy-saving actions like turning off lights or unplugging devices, while 53.3% did so often, with only 2.3% rarely practicing such behaviors. These findings suggest that behavioral change itself is not a significant barrier; rather, institutional mechanisms need to reinforce and reward these sustainable habits. In this regard, [41] argue that Nigerian universities can effectively harness student motivation for campus-wide energy reductions if supported by enabling infrastructure, such as smart meters and automated lighting, alongside sustainability pledges and green dormitory certifications.

Table 4. Students' Participation in LASU Sustainable Programs and the Possibility of Adopting Energy-Saving Behaviour on Campus

Variables	Categories	Campuses				Campuses Aggregate (%)
		Ojo %	Ikeja %	Epe %	Badagry (%)	
Participation in any LASU sustainable programs	Yes	50.0	60.0	62.7	54.5	56.1
	No	50.0	40.0	37.3	45.5	43.9
Frequency of engaging in energy-saving practices	Always	44.3	40.0	44.1	54.5	44.4
	Often	52.3	57.8	54.2	45.5	53.3
	Rarely	3.4	2.2	1.7	0	2.3
Adopting energy-saving behaviour on Campus	Yes definitely	40.9	62.2	33.9	95.5	49.1
	Yes, maybe	33.0	26.7	25.4	4.5	26.2
	No	26.1	11.1	40.7	0	24.7

Information on the willingness to adopt energy-saving behaviors varied across campuses. While 49.1% of students responded "Yes, definitely" to adopting such habits, 26.2% were hesitant, and 24.8% were unwilling. Badagry exhibited the highest commitment, with 95.5% confirming their readiness and no rejections. This aligns with [42] report, which emphasizes that behavioral adoption is strengthened not only by individual intent but also by structural enablers like prominent sustainability signage, effective reward systems, and visible administrative endorsement.

3.5. Prioritization of Green Technologies for a Carbon-Neutral LASU Campus

Table 5 elucidates student perspectives on the prioritization of green technologies essential for achieving carbon neutrality at Lagos State University (LASU). The results reveal a strong consensus favoring smart building technology, while interest in solar street lighting and broader renewable energy solutions remained comparatively low. Overall, 74.8% of students across all campuses identified smart buildings as the top priority. Research by [43] indicates that such smart infrastructure not only reduces operational costs in Nigerian tertiary institutions but also visibly reinforces institutional commitment to sustainability, while, [44] highlights that inadequate maintenance can lead to declining trust in the long-term effectiveness of such installations. [45] also emphasize that inconsistent funding, misaligned policies, and gaps in technical expertise often impede the effective integration of renewable energy in Nigerian universities, potentially contributing to student scepticism or indifference. The results presented in Table 5 offer a valuable opportunity for LASU to align student priorities with its institutional sustainability strategies.

Table 5. Prioritization Green Technology for Carbon-Neutral Campus

Variables	Categories	Campuses				Campuses Aggregate (%)
		Ojo %	Ikeja %	Epe %	Badagry (%)	
Type of green technology to prioritize carbon carbon-neutral campus	Smart building	71.6	71.1	72.9	100.0	74.8
	Solar streetlight	26.1	24.4	27.1	0	23.4
	Renewable Energy	2.3	4.5	0	0	1.8

3.6. Willingness to Participate in Future Sustainability and Energy-Efficient Initiatives

Table 6 illustrates the stated willingness of LASU students to engage in future sustainability initiatives. The results indicate a strong overall propensity for involvement, with 32.7% of students indicating they are "very likely" to participate and 36.9% stating they are "likely" to do so. This enthusiasm likely stems from a combination of increasing global environmental awareness among youth and LASU's historical efforts to promote sustainability.

Table 6. Likelihood to Participate in Future Sustainability and Energy-Efficient Initiatives

Variables	Categories	Campuses				Campuses Aggregate (%)
		Ojo %	Ikeja %	Epe %	Badagry (%)	
Likelihood to participate in future sustainability and energy-efficient initiatives	Very Likely	33.0	22.2	35.6	45.5	32.7
	Likely	39.8	44.4	39.0	4.5	36.9
	Neutral	21.6	26.7	13.6	0	18.2
	Unlikely	5.7	6.7	11.9	50.0	12.2

3.7. Correlation between Awareness of Sustainability Initiatives, Adoption of Energy-Savings Behaviour, and Participation in Future Programmes

Table 7 presents the Pearson correlation analysis exploring the relationship between students' awareness of sustainability initiatives and two critical behavioral outcomes: their engagement in energy-saving practices and their willingness to participate in future energy-efficient programs.

The analysis revealed statistically significant positive correlations for both behavioral aspects. Specifically, students' awareness of sustainability initiatives demonstrated a positive and significant relationship with their likelihood of adopting energy-saving behaviors ($r=0.224$, $p<0.05$) and their willingness to participate in future energy-efficient programs ($r=0.174$, $p<0.05$). This indicates that students possessing a higher level of awareness regarding campus sustainability efforts are modestly more inclined to adopt energy-conscious habits, such as switching off unused electronic devices, optimizing air conditioning usage, or prioritizing natural lighting where feasible. Similarly, the positive correlation between awareness and students' propensity to engage in future sustainability programs suggests that heightened awareness can contribute to a modest increase in student participation and active involvement.

These findings support the study by [46], which found that university students in southwestern Nigeria with higher environmental awareness were more likely to participate in recycling and waste management efforts. Furthermore, these results align with [47] observations, which highlight sustainability awareness as a fundamental driver of behavioral change among young individuals, particularly when reinforced by clear and accessible environmental programs.

The implications of these findings are critical: while awareness alone may not directly translate into widespread behavioral change or active participation, it serves as an essential foundational element. Consequently, institutions like LASU should not exclusively focus on awareness campaigns but must also concurrently establish structured opportunities, provide tangible incentives, and develop supportive infrastructure to facilitate the transition from awareness to concrete action.

Table 7. Correlation between Awareness of Sustainability Initiatives, Likelihood to Adopt Energy-Saving Behaviour and Participate in Future Energy-Efficient Programmes

Climate variables	Awareness	Probability
	r-values	values
Adoption of energy-saving behaviour	0.224*	0.001
Participate in energy-saving programmes	0.174*	0.011

3.8. Campus-Based Variations in Students' Participation in Sustainable Programmes and Adoption of Energy-Saving Behaviours

Table 8 presents the results of a One-Way Analysis of Variance (ANOVA) examining the variation in students' adoption of energy-saving behaviors and their willingness to participate in future sustainability initiatives across LASU's different campuses. The analysis revealed a statistically significant variation in students' engagement in energy-saving behaviors ($F=10.841$, $p=0.000$). This finding indicates that campus-specific elements exert a meaningful influence on students' energy-conscious practices.

The between-groups sum of squares (19.494) and mean square (6.498) further underscore the notable variability in energy-saving behaviors among campuses. This suggests

that campus location plays a significant role in shaping students' engagement with these practices. These results corroborate the findings from Table 4, which previously indicated that campuses such as Badagry consistently exhibited higher levels of energy-conscious behavior compared to others. Several factors may contribute to these observed inter-campus variations, including the differential availability of sustainability-focused infrastructure, varying levels of administrative commitment to energy efficiency, and disparities in the visibility of campus-specific sustainability initiatives.

Table 8. ANOVA Result of the Variation in Students' Participation in Sustainable Programmes, and Adoption of Energy-Saving Behaviours across Campuses

Variables	Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Adoption of energy-saving behavior on Campus	Between Groups	19.494	3	6.498	10.841*	0.000
	Within Groups	125.871	210	.599		
	Total	145.364	213			
Likely to participate in future sustainability energy-efficient initiatives	Between Groups	5.924	3	1.975	2.023 ns	0.112
	Within Groups	205.015	210	.976		
	Total	210.939	213			

*Significant at 0.o05 level (2-tailed); ns = Not significant at 0.05 level (2-tailed)

Likewise, [48] reported that localized sustainability programs, accessibility to essential resources, and the enforcement of administrative policies are key determinants of students' commitment to energy conservation. This finding also aligns with previous research, such as [49], which identified campus infrastructure, particularly the presence of energy-efficient facilities, as a crucial factor shaping students' energy-saving behaviors. Furthermore, it supports the study by [50], who demonstrated the importance of campus culture and administrative support for sustainability initiatives in determining student engagement. These findings buttress the notion that a well-structured, campus-specific approach can significantly influence sustainability-related behaviors.

In addition, the absence of statistically significant variation in students' likelihood of participating in future sustainability initiatives across campuses ($F=2.023$, $p=0.112$) suggests that individual differences among students, rather than campus-specific factors, play a dominant role in shaping this behavioral outcome. This aligns with the study by [51], who found that students' motivations and levels of sustainability awareness are stronger determinants of their willingness to engage in future programs than institutional variations.

4. Conclusions & Recommendations

This study reveals varying levels of sustainability awareness and engagement among LASU students and staff members, with notable disparities across its campuses. Badagry campus emerges as the most proactive in terms of sustainability awareness, perceived visibility, and expressed willingness to participate in green initiatives. Conversely, Epe and

Ikeja campuses exhibit higher degrees of neutrality or uncertainty, suggesting the need for targeted strategies to boost engagement in these locations.

A key priority for students and staff members is smart building technologies, with overwhelming support for energy-efficient infrastructure that integrates automation to improve sustainability outcomes. This preference highlights the demand for tangible and scalable solutions that directly enhance campus operations. However, awareness of broader renewable energy solutions remains limited, despite students and staff members demonstrating strong energy-saving behaviors. Their readiness to adopt such habits suggests that enhanced educational initiatives could help bridge the existing gap in understanding comprehensive carbon-reduction strategies.

To address these disparities, LASU should focus on inclusive, campus-specific sustainability strategies, ensuring that students and staff across all locations have equitable access to opportunities and resources. Strengthening communication efforts, increasing the visibility of sustainability programs, and actively involving students in decision-making processes will be critical steps toward fostering a more environmentally responsible and carbon-neutral university.

Based on the findings of this study, the following recommendations are appropriate to strengthen LASU's sustainability program (a) develop a unified, university-wide sustainability strategy with campus-specific tailoring in order to address significant variations in awareness, visibility, and commitment across campuses, unified strategies can set overarching goals while allowing for localized initiatives that cater to each campus's unique characteristics and challenges, (b) Enhance Communication and Visibility of Sustainability Initiatives so that Visibility of green spaces, waste management programs, energy-saving devices, and solar installations can reinforce institutional commitment and foster a sense of shared responsibility, (c) Integrate Sustainability Education into Academic Curricula so that integrating sustainability into coursework can bridge the gap between general awareness and detailed knowledge of specific programs, fostering a deeper understanding and appreciation of green technologies like renewable energy, (d) Prioritize and Invest in Smart Building Technologies where the university is encouraged to allocate resources for the implementation and upgrade of smart building technologies (e.g., motion-sensor lighting, smart HVAC systems, energy monitoring platforms) across all campuses, prioritizing Ojo, Ikeja, and Epe where perceived effectiveness of energy initiatives is moderate, (e) Increase Awareness and Practical Understanding of Renewable Energy so that the university may develop specific educational modules, workshops, and campus tours focusing on renewable energy technologies (e.g., solar panels, microgrids) and their practical applications. Where feasible, install visible renewable energy demonstration projects on campuses, (f) Foster Participatory Governance and Student Engagement where there is a need to create and empower student-led sustainability committees or task forces on each campus, providing them with resources and platforms to initiate, manage, and monitor sustainability projects. Involve students in decision-making processes related to campus greening, (g) Implement Incentives and Recognition for Sustainable Behaviors where there is a need to introduce incentive programs such as eco-competitions, green dormitory certifications, academic credits for sustainability projects, and certificates of participation for students who actively engage in energy-saving behaviors and sustainability initiatives, and (h) Strengthen Campus-Specific Infrastructure and Resource Accessibility where there is a need to conduct a campus-by-campus audit of sustainability infrastructure (e.g., recycling bins, water refill stations,

energy-efficient fixtures) and address disparities, particularly in Epe (highest "not visible" ratings for initiatives) and areas with lower perceived effectiveness.

By implementing these recommendations, LASU can leverage existing student interest and address identified gaps, thereby strengthening its sustainability program and advancing its commitment towards a more energy-conscious and carbon-neutral university environment

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Authors Contribution

All authors contributed substantially to the work. **F.O.O.** conceived the research idea, designed the methodology, carried out data collection, and contributed to the manuscript writing. **I.I.O.** contributed to the manuscript writing and proof-reading. **A.A.A** conducted the data analysis, interpretation, manuscript writing, and critical revision. All authors reviewed and approved the final version of the manuscript.

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