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Enhancing Institutional Coordination and Campus Identity in Caleb University through A Sustainable Green Campus Core And Spatial Hierarchy

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ABSTRACT

This study examines how Caleb University in Imota, Lagos State, might improve institutional coordination and fortify campus identity through the implementation of a sustainable green campus core and spatial hierarchy. The study looks at the current layout of the campus, emphasizing the connections between the academic, administrative, and social areas as well as the function of the central green areas in promoting interaction, mobility, and institutional unity. In addition to being actual places for instruction, university campuses are also spatial systems that influence identity formation, social interaction, and institutional coordination. The incorporation of sustainable design techniques into higher education settings has been more popular in recent years, especially with the creation of green campus infrastructures and logical spatial organization. The study assesses how hierarchical spatial arrangements improve readability, way finding, functional efficiency, and a greater sense of place by drawing on modern sustainable campus frameworks and spatial configuration concepts. It is anticipated that the results will show how a well-designed green campus core can enhance user experience and strengthen organizational cohesion by acting as both an ecological anchor and a symbolic institutional hub. The study ends with suggestions for spatial planning that are meant to bring sustainability objectives into line with campus identity development and institutional performance. By offering insights to institutions looking to enhance coordination, resilience, and identity through environmentally responsive spatial designs, this research adds to the expanding conversation on sustainable campus design in rising economies.

Keywords: *Sustainable campus, green campus core, spatial hierarchy, institutional coordination, campus identity, Caleb University*

INTRODUCTION

Background to the Study

In addition to serving as centers of academic activity, university campuses are intricate socio spatial settings that facilitate social interaction, identity development, and institutional coordination. A campus is a spatial organism that consists of a network of buildings, open areas, and circulation systems that influence how students, employees, and guests live their everyday lives. University surroundings spatial layout and design have an impact on social interactions, mobility patterns, and how people perceive campus identity and location (Soares, Yamu, & Weitkamp, 2020). In order to create a supportive environment that synchronizes institutional vision with user behavior and community participation, campus space planning and arrangement including the incorporation of green areas and spatial hierarchies are essential. Globally, higher education institutions are now more committed to sustainability in campus planning and development as well as teaching and research. In order to lessen ecological footprints and improve the standard of living for campus communities, a sustainable campus integrates environmental, social, and economic factors (Sugiarto, Lee, & Huruta, 2022). Green infrastructure, energy efficiency, waste management, and spatial techniques that support human well-being and environmental stewardship are common components of sustainable campus frameworks. It has been demonstrated that including green areas into campus architecture enhances users' thermal comfort, air quality, and cognitive health while also encouraging social interaction and a sense of community (Sadeq, Wan Ismail, & Abd. Manaf, 2025). Previous architectural appraisals in the region have highlighted the importance of movement efficiency and symbolic forms in public buildings, yet the

systematic inclusion of biodiversity as a planning tool remains an emerging frontier (Olaoye et al., 2021; Panlasigui et al., 2021).

The use of passive and biophilic design techniques has been emphasized as a crucial component of sustainable architecture and planning in Nigeria. According to recent studies, integrating climate-responsive design and nature-based solutions into built spaces greatly enhances thermal comfort, lowers energy use, and boosts occupant satisfaction (Kalu, Ogunnaike, & Eze, 2025). The application of biophilic urbanism offers a dual advantage. It mitigates the harsh realities of the urban heat island effect through green facade systems, and, it provides a psychological anchor for vulnerable populations (Afolabi et al., 2025; Andreucci et al., 2021). Universities are in a unique position to lead in sustainable spatial practices because they are significant landowners and powerful organizations that can connect environmental performance to institutional objectives like research quality and student welfare.

Caleb University is a respectable private university that prioritizes character development, academic performance, and innovation. It is situated in Imota, Lagos State, Nigeria. The campus, which is renowned for its calm and green surroundings, provides contemporary amenities and a favorable atmosphere for research, teaching, and learning (Caleb University, 2026). The creation of a Center for Sustainability and Environmental Safety and plans to integrate climate action into university operations are further examples of the institution's dedication to sustainability and environmental responsibility (Guardian Nigeria, 2025). Nevertheless, despite current initiatives, little is known about the campus's spatial articulation, particularly the connection between campus identity, institutional coordination, and central green areas.

In campus design, "spatial hierarchy" refers to the arrangement of areas based on their significance and purpose, frequently moving from social and public centers to more secluded or academic areas. A clear spatial hierarchy can facilitate efficient activity coordination throughout the campus, improve way finding, and strengthen institutional identity. On the other hand, disorganized spatial patterns can lead to weaker social cohesion, disjointed mobility, and an uncertain campus identity. Research from all around the world has shown that effective campus design uses all-encompassing tactics in which landscaping, green infrastructure, and spatial planning support sustainability objectives while reinforcing institutional values (Dong et al., 2023). The significance of combining landscape and physical form to improve environmental quality and social dynamics is further highlighted by research on sustainable and green campus planning. Strategically incorporating green spaces onto university campuses enhances users' sense of place and belonging while also benefiting the environment (Sadeq et al., 2025).

There is a growing need to align these sustainable construction methods with biophilic goals, even though traditional Nigerian architecture has frequently focused on material efficiency and cost-effectiveness, thereby, using technologies like interlocking stabilised soil blocks to manage the hardscape along side the soft scape (Ibitoye, 2025; Agboola, 2024). Good green campuses promote outdoor recreation, social interaction, and group stewardship of common areas. Additionally, research on spatial configuration show that by allowing for both formal and informal contacts, well thought out layouts can foster innovation, creativity, and team work among teachers and students (Soares et al., 2020). The integration of complete green infrastructure and spatial hierarchies that link institutional aims with environment-centered planning principles remains a challenge in poor nations such as Nigeria, despite the acknowledged advantages of sustainable campus development. These difficulties include a lack of localized planning frameworks, a lack of sustainable design integration in campus master plans, and inadequate institutional coordination mechanisms for physical environment management. Thus, Caleb University offers a compelling argument for promoting sustainable campus discourse in Nigeria by demonstrating how a sustainable green campus core and spatial hierarchy can improve institutional coordination and fortify campus identity.

Problem Statement

Despite Caleb University's stated strategic commitments to sustainability and environmental stewardship, it is unclear how the campus's spatial arrangement specifically, the incorporation of sustainable green cores and spatial hierarchy supports user engagement, institutional coordination, and the creation of a distinctive campus identity. It is vital to look into ways that spatial planning can be more

in line with institutional objectives because the lack of an integrated spatial strategy may result in disjointed circulation, underutilized landscape assets, and decreased organizational cohesion.

Aim of the Study

The main aim of this study is to *explore how the integration of a sustainable green campus core and spatial hierarchy can enhance institutional coordination and strengthen campus identity at Caleb University*.

Objectives

i. Examine the current spatial configuration and landscape features of Caleb University in relation to green spaces and core activity zones;
ii. Evaluate the role of spatial hierarchy in shaping institutional coordination among academic, administrative, and social functions;
iii. Assess the influence of a sustainable green campus core on campus identity, user satisfaction, and social engagement;
iv. Propose planning recommendations that integrate sustainability with institutional and spatial objectives.

Research Question

i. How does the current spatial configuration at Caleb University support or hinder institutional coordination and campus identity?
ii. In what ways can green campus cores and sustainable spatial planning improve connectivity, social engagement, and ecological quality?
iii. What spatial hierarchy model best aligns with the goals of institutional coordination and a strong campus identity?

Limitations of the Study

The possible absence of empirical spatial data for Caleb University, the use of secondary literature in cases where source data is scarce, and the difficulty of extrapolating design advice outside of comparable institutional contexts are some of the limitations. Furthermore, behavioral, cultural, and ecological aspects of sustainable campus design are multidisciplinary and might not all be adequately covered in the study's timeframe.

LITERATURE REVIEW

Comparative Insight

On university campuses, institutional identity, sustainability, and spatial structure all come together to create dynamic landscapes. According to Dong et al. (2023), the arrangement of campus spaces affects collaboration, circulation, operational effectiveness, and the symbolic manifestation of an institution's principles. Current studies highlight the interdependence of spatial hierarchy, institutional coordination, and sustainable green campus cores in determining campus identity and user experience (Sugiarto et al., 2022; Soares et al., 2020). One important factor influencing institutional coordination and user experience is spatial arrangement. Primary and secondary axes, nested courtyards, and functional zoning are examples of hierarchical designs that provide order that promotes mobility while communicating the institution's structure and logic (Xia, 2022). Clear spatial hierarchies have been shown to promote way finding, foster collaboration among heterogeneous teams, and decrease operational inefficiencies (Dong et al., 2023). Campus expansion happens gradually in many Nigerian colleges, which frequently leads to disjointed circulation and poor functional coherence (Wunubo et al., 2022). This implies that intentional spatial hierarchy planning is essential for both functional effectiveness and institutional identity strengthening, giving users an environment they can understand and navigate with ease.

Incorporating sustainable green campus cores into campus planning is becoming more and more important for modern higher education, since they serve ecological, social, and symbolic purposes (Sadeq et al., 2025). Green cores support biodiversity preservation, stormwater management, and urban heat

reduction from an ecological standpoint. Socially, they improve mental health and welfare by offering areas for casual education, leisure, and connection. Campus identity is reinforced by these areas, which serve as visual symbols of the institution's principles (Sugiarto et al., 2022). Campuses all across the world, like the Zernike Campus in the Netherlands, create collaborative learning, informal knowledge sharing, and innovation by connecting green courtyards and hubs (Soares et al., 2020). Chinese university campuses combine operational efficiency with symbolic representation by incorporating green plazas into core circulation networks to plan academic, administrative, and recreational activities (Dong et al., 2023). These illustrations demonstrate the symbolic and practical significance of green cores in organizing campus life. The potential of green spaces is frequently underutilized in Nigeria. According to study, green spaces are rarely incorporated into functional or symbolic hierarchies at Gombe State University, despite the fact that students value them for recreation and aesthetics (Wunubo et al., 2022). A gap in planning techniques, namely in connecting sustainability, circulation, and identity-building, is shown by the underutilization of green areas as key organizational elements.

Environmental quality, architectural expression, and spatial arrangement are all strongly related to campus identity. Coherent circulation, readable zoning, iconic structures, and integrated landscapes are all ways that identity is expressed (Sugiarto et al., 2022). By establishing emotional and cognitive anchors that promote a feeling of community among students, employees, and guests, well-positioned green cores strengthen this identity. According to Sadeq et al. (2025), well-integrated landscapes serve as visual symbols of the university's principles, encourage social interaction, and strengthen institutional memory. Deliberately incorporating green cores into the campus hierarchy could improve Caleb University's reputation while also having positive social and ecological effects. A comparison of local and international campuses shows how different strategies are used to incorporate institutional coordination, sustainability, and spatial hierarchy. In order to organize the surrounding academic and administrative tasks, institutions all around the world frequently place green cores as key hubs. For instance, central green hubs connected by primary and secondary movement axes are used on the Zernike Campus and Chinese university campuses to encourage social contact, accessibility, and teamwork (Dong et al., 2023; Soares et al., 2020). Through the creation of logical, readable, and symbolically rich surroundings, these spatial methods improve campus identity and operational efficiency.

Although there are green areas and sustainability programs at Caleb University, they are not yet properly utilized as key organizing components. Both planned and unplanned development can cause circulation to become disjointed and functional coherence to be diminished on campus. The effectiveness of green cores to improve campus identity and institutional coordination is restricted by their lack of systematic integration into hierarchical spatial design when compared to examples from other countries. However, the university's natural landscape resources and environmental activities offer a solid basis for incorporating these ideas in the future. According to the literature review and comparative examples, Caleb University has to take an integrated approach to improving campus identity and institutional cooperation. The creation of multipurpose green centers, distinct spatial hierarchies, and coordinated movement and functional zones are all examples of this. Implementing these tactics can boost social interaction, increase operational effectiveness, and strengthen the symbolic representation of the university's principles. Additionally, Caleb University is positioned alongside international best practices through physically appealing and environmentally conscious campus design, which also tackles the particular difficulties experienced by Nigerian universities.

RESEARCH METHODO

Study Area

The study area is Caleb University, located in Imota, Lagos State, Nigeria. As a private higher education institution, Caleb University has undergone significant growth in student population, academic programs, and campus facilities. Its development is guided by institutional policies aimed at fostering academic excellence, sustainability, and operational efficiency (Caleb University, n.d.; Guardian Nigeria, 2025). The campus comprises academic, administrative, and social zones, interspersed with green spaces that offer potential for central coordination and identity reinforcement. An understanding of the physical layout, existing green infrastructure, and administrative organization of Caleb University provides the foundation for evaluating the role of spatial hierarchy and sustainable green cores in supporting institutional operations.

Data Collection Method

Data collection for this study is entirely secondary and involves the systematic gathering of existing literature, institutional reports, policy documents, and prior research studies relevant to university campus planning, sustainability, and spatial organization. Scholarly articles addressing sustainable campus development, spatial hierarchy, and the functional role of green cores in both global and Nigerian contexts were reviewed. Key sources include research on campus renewal strategies (Dong et al., 2023), the impact of green spaces on social interaction and institutional identity (Sadeq et al., 2025; Wunubo et al., 2022), spatial configuration and collaboration in campus environments (Soares et al., 2020; Xia, 2022), and locally relevant passive and biophilic design strategies (Kalu et al., 2025; Sugiarto et al., 2022). Institutional sources, such as official Caleb University profiles and media reports, provided updated information about the campus layout, administrative reforms, and strategic objectives (Caleb University, n.d.; UniRank, 2026).

Method Of Data Analysis

The collected data was analyzed using a thematic content analysis approach, which involved identifying, categorizing, and synthesizing recurring patterns, principles, and findings related to spatial hierarchy, green infrastructure, and institutional coordination. This process enabled the researcher to compare and contrast global best practices with local campus realities, highlighting opportunities and constraints in the integration of green cores and functional spatial organization at Caleb University. The analysis focused on understanding how spatial arrangements and landscape elements can support effective circulation, functional coherence, social interaction, and symbolic representation of the university's identity. Interpretive synthesis was applied to develop conclusions regarding the relationship between green campus cores, hierarchical spatial organization, and institutional coordination, forming the basis for recommendations for the university's campus planning strategies.

Through this methodology, the study provides an evidence-based and contextually grounded understanding of how sustainable campus planning and spatial hierarchy can be leveraged to enhance institutional coordination and strengthen the campus identity of Caleb University, without relying on direct field surveys or primary data collection.

Findings Base on Research

The analysis of existing literature and comparative campus studies reveals that integrating sustainable green cores with clear spatial hierarchy significantly improves both the operational efficiency and institutional identity of universities. At Caleb University, the campus demonstrates potential for enhanced coordination through better organization of academic, administrative, and social functions. Spatial hierarchy provides a framework that guides movement, clarifies functional relationships, and establishes visual and cognitive order, which in turn supports institutional coordination (Dong et al., 2023; Xia, 2022). Green cores positioned at strategic nodes serve as multifunctional hubs, encouraging interaction, collaboration, and informal learning among students and staff (Soares et al., 2020).

Benefits Based On Research

One of the most prominent benefits of such integration is improved campus functionality. Clearly defined primary and secondary circulation routes minimize congestion and facilitate smooth movement between lecture halls, offices, and communal spaces. Green cores offer gathering spaces that support social engagement, recreational activities, and informal events, creating a more cohesive campus culture (Sadeq et al., 2025). These features not only enhance operational efficiency but also contribute to the symbolic representation of the university, projecting its commitment to sustainability and academic excellence. Environmental benefits are equally significant. Green cores help regulate microclimatic conditions by reducing heat accumulation, improving air quality, and providing natural drainage to manage storm water (Sadeq et al., 2025; Kalu et al., 2025). Incorporating native vegetation and passive landscape strategies supports biodiversity while offering educational and aesthetic value. Strategically placed vegetation also reduces energy demand for cooling buildings and creates healthier, more comfortable outdoor environments for campus users (Sugiarto et al., 2022). By reinforcing sustainability

principles, these environmental benefits strengthen the university's identity as a forward-looking institution committed to ecological stewardship.

Challenges and Opportunities

However, the implementation of sustainable and hierarchical design principles faces certain challenges. The campus currently exhibits incremental development patterns that sometimes fragment functional zones and circulation networks. Such fragmentation can limit accessibility, reduce the usability of green spaces, and compromise the potential social benefits of open areas (Wunubo et al., 2022). Maintenance demands, funding limitations, and the need to balance ecological, aesthetic, and operational priorities further complicate the effective integration of green cores and hierarchical layouts (UniRank, 2026). Without strategic planning, these challenges may hinder the full realization of the functional and symbolic benefits of a structured campus design.

Despite these challenges, numerous opportunities exist to enhance Caleb University's campus environment. Existing green areas can be repositioned and redesigned as central organizing hubs that unify the academic, administrative, and social zones. Applying biophilic and passive design principles can improve both the environmental performance and user experience of the campus (Kalu et al., 2025). Well-structured spatial hierarchies and multifunctional green cores provide platforms for events, collaboration, and informal learning while reinforcing the visual identity of the university. Comparative studies of international campuses demonstrate that when green cores are integrated with clear hierarchical planning, institutions achieve improved social interaction, operational efficiency, and recognizable identity (Dong et al., 2023; Soares et al., 2020). By adopting similar strategies, Caleb University can strengthen its internal coordination while enhancing its reputation as a sustainable, identity-conscious institution.

In summary, the study indicates that deliberate integration of sustainable green cores and spatial hierarchy can generate substantial benefits at Caleb University. These include improved institutional coordination, enriched campus life, environmental sustainability, and enhanced campus identity. While challenges exist in terms of fragmented layouts, maintenance, and resource allocation, they are counterbalanced by the opportunities offered through strategic planning, design innovation, and adoption of best practices from comparable campuses. Overall, a coordinated approach to spatial and environmental design can transform the campus into a more functional, sustainable, and identity-driven academic environment.

Conclusion

The study demonstrates that a well-structured green campus core combined with a clear spatial hierarchy can significantly enhance institutional coordination and strengthen the campus identity of Caleb University. Findings indicate that hierarchical spatial organization reduces circulation inefficiencies, promotes functional clarity, and facilitates collaboration between academic, administrative, and social functions. Simultaneously, green cores provide ecological, social, and symbolic benefits, serving as multifunctional hubs that encourage interaction, support well-being, and reinforce the visual and cultural identity of the institution. Integrating these elements provides a dual advantage: operational efficiency on the one hand and a distinctive, recognizable campus character on the other. Environmental analysis reveals that green cores mitigate heat, improve air quality, enhance storm water management, and support biodiversity, making them crucial not only for functionality but also for sustainability education. While challenges such as fragmented layouts, maintenance demands, and funding limitations exist, they are counterbalanced by opportunities to redesign and reposition green spaces, clarify spatial hierarchies, and align campus development with global best practices. Collectively, these interventions contribute to a more coherent, sustainable, and identity-rich campus environment that can serve as a model for other Nigerian universities seeking to balance growth with environmental stewardship and institutional branding (Dong et al., 2023; Sadeq et al., 2025; Xia, 2022).

RECOMMENDATION

Based on the findings, several recommendations are proposed to guide future development at Caleb University. First, the campus should prioritize the redesign and consolidation of green cores, positioning them as central organizing elements around which academic, administrative, and social zones

are structured. This will improve accessibility, promote informal learning, and strengthen institutional identity. Second, circulation networks and spatial hierarchies should be clearly defined to ensure efficient movement, reduce congestion, and enhance functional coherence across campus facilities. Third, the university should adopt sustainable and biophilic design strategies, integrating native vegetation, passive landscape techniques, and multifunctional outdoor spaces to maximize environmental benefits while reinforcing the campus's symbolic identity. Fourth, institutional policies and funding mechanisms should be aligned with long-term maintenance and development plans to ensure the continued performance and visual quality of green spaces. Finally, engagement with global best practices and case studies can guide the university in implementing innovative and contextually appropriate design solutions that balance operational efficiency, sustainability, and identity reinforcement (Soares et al., 2020; Kalu et al., 2025; Sugiarto et al., 2022).

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