Assessment of Open Spaces and Landscape Planning on Users' Social Interaction and Productivity in Caleb University

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ABSTRACT

Background: Campus open spaces are widely associated with enhanced well-being, social interaction, and academic productivity. However, empirical evidence within Nigerian universities remains limited and inconclusive.

Methods: This study assessed the relationship between landscape elements, social interaction, and perceived productivity at Caleb University, Lagos. A quantitative survey design was adopted. Using Yamane's formula, 333 respondents were selected from a population of 2,019 users; 308 valid responses were analyzed (93.3% response rate). Data were collected via structured questionnaires and analyzed using descriptive statistics and correlation analysis.

Results: Students reported positive perceptions of green areas, seating, and shaded walkways (mean > 3.0). Landscape features were associated with improved concentration (3.85), stress reduction (3.96), and motivation (3.93). However, indicators of structured academic interaction were weaker (2.21–3.52). Correlation results suggest that landscape elements have a limited direct statistical effect on productivity, while demographic factors—particularly age—and likely contextual variables such as maintenance quality and institutional culture may play a stronger role.

Conclusion: Campus open spaces at Caleb University contribute positively to well-being and informal interaction but demonstrate limited measurable influence on academic productivity. Landscape planning alone is insufficient to significantly improve productivity without complementary institutional and environmental support systems.

Keywords: Campus open space, Landscape planning, Social interaction, Productivity, University environment.

INTRODUCTION

The physical environment influences behavior, cognition, and social engagement (Bandura, 2006; Gifford, 2007). Within university settings, open spaces serve not only aesthetic functions but also social and psychological roles. Green areas, walkways, shaded seating, and gathering nodes may support relaxation, informal collaboration, and stress reduction (Kaplan & Kaplan, 1989; Berto, 2014). Although international studies suggest positive associations between natural environments and productivity, empirical evidence in Nigerian universities remains limited. Many campuses provide landscaped environments without clear evaluation of their functional impact on measurable academic outcomes. This study therefore investigates whether campus open spaces at Caleb University meaningfully influence students' social interaction and perceived productivity.

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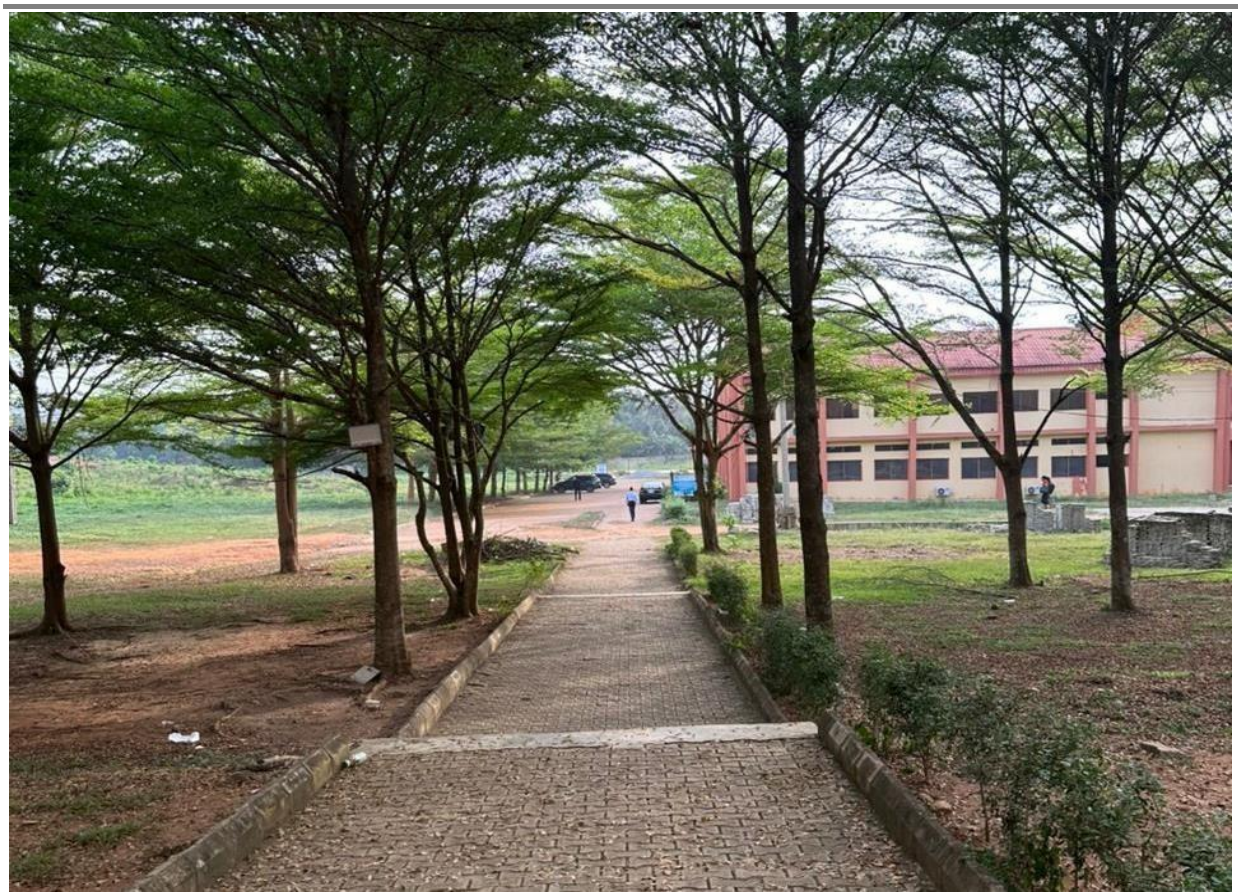

Figure 1.1: Image of Love Graden Landscape

Statement of the Problem

Landscape design significantly impacts human productivity and well-being (Heerwagen, 1998; Hensel, 2013; Iamtrakul & Chayphong, 2024; Canlı, 2024). However, many universities struggle to align design intentions with users' experiences. Students may perceive and use spaces differently, reducing their intended benefits (Canlı, 2024; Iamtrakul & Chayphong, 2024). Poor maintenance, underutilization, or absence of functional features such as shaded seating, accessible walkways, or resting areas can further limit usage (Olagoke & Emmanuel, 2024).

Additionally, there is limited research on Nigerian university students' perceptions of campus landscapes and how these influence productivity (Tudorie et al., 2020). This gap hinders the development of effective, user-centered landscape designs. Therefore, this study investigates the relationship between campus open spaces, landscape planning, students' **social interaction, and productivity at Caleb University.**

Research Aim and Objectives

The Aim of this study is:

to assess the effect of campus open spaces and landscape planning on students' social interactions and productivity at Caleb University.

Objectives:

1. Identify the demographic characteristics of the respondents.
2. Determine key landscape elements that influence social interaction and productivity.
3. Assess students' perceptions of campus open spaces.

4. Analyze the relationship between landscape elements, social interaction, and productivity.
5. Propose strategies to improve campus open spaces for better interaction and academic outcomes.

Research Questions

1. What are the demographic characteristics of the respondents?
2. Which landscape elements at Caleb University influence social interaction and productivity?
3. How do students' perceptions of these elements affect their productivity
4. What is the relationship between landscape elements, social interaction, and productivity?
5. What strategies can enhance campus open spaces to improve interaction and academic outcomes?

Significance of the Study

The findings are relevant to several stakeholders:

University administrators: Support informed decisions on landscape planning and maintenance. Students and staff: Highlight the importance of campus interaction in promoting productivity and well-being. Academia: Contributes to environmental psychology and landscape architecture literature, providing context-specific insights for Nigerian higher education.

Scope and Limitations

The study focuses on Caleb University students' perceptions of landscape elements such as green spaces, walkways, seating, and water features. Limitations include:

Context-specific results that may not generalize to other universities. Reliance on self-reported data, which may be biased. Focus on a snapshot of current perceptions without assessing long- term impacts.

Definition of Terms

- User perception: Interpretation of surroundings based on experience (Gifford, 2007).
- Landscape elements: Physical features of outdoor spaces (Thompson, 2009).
- Productivity: Efficiency in performing tasks (Harter, Schmidt, & Hayes, 2002).
- Campus environment: The overall physical and social university setting (Strange & Banning, 2015).
- Social engagement: Informal interactions facilitated by campus spaces (Tian et al., 2021).

LITERATURE REVIEW

Open spaces and landscape planning significantly shape the physical and social environment of universities. Well-designed open spaces promote students' social interaction, mental well- being, and academic productivity. This chapter reviews theoretical foundations, empirical studies, and key concepts on campus open spaces, landscape planning, and their impact on students' social and academic engagement.

Concept of Campus Open Spaces

Campus open spaces are primarily outdoor, unbuilt areas, including lawns, gardens, courtyards, plazas, walkways, and recreational zones (Carmona, 2010). They provide opportunities for informal gatherings, leisure, and recreation. Open spaces are categorized into two types of paces; Active spaces which facilitate movement,

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play, and sports. Passive spaces which support leisure, reflection, and social interaction. These spaces enhance peer interaction, academic discussions, and community participation. Chiesura (2004) states that "urban green space provides recreational benefits, social interactions, stress reduction, and psychological well- being," emphasizing their role in fostering student engagement.

Landscape Planning in Higher Education

Beyond aesthetic enhancement, landscape planning in higher education institutions also plays a strategic role in shaping movement patterns, spatial hierarchy, and environmental comfort on campus. Properly designed walkways, shaded corridors, transitional spaces, and green buffers help regulate circulation, reduce congestion, and create seamless connections between academic buildings and social nodes. Such spatial organization improves accessibility and inclusivity, ensuring that outdoor environments are usable by diverse groups of students and staff. Furthermore, sustainable landscape strategies, such as the integration of native vegetation, stormwater management systems, and climate-responsive shading devices contribute to environmental resilience while enhancing user comfort. When landscape planning intentionally integrates ecological performance with social functionality, campus open spaces become extensions of the learning environment rather than mere decorative features, thereby strengthening both academic engagement and overall user experience.

Figure 2.1: Image of Caleb University entrance landscape.

Campus Open Spaces and Social Interaction

Well-designed outdoor environments may enhance collaborative learning and social cohesion (Francis et al., 2012). However, social engagement depends not only on physical design but also on institutional culture and user behavior.

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Campus Open Spaces and Productivity

Attention Restoration Theory (Kaplan & Kaplan, 1989) suggests that exposure to natural environments restores cognitive capacity. While several studies report improved focus and reduced stress, the strength of direct academic performance outcomes remains debated.

Empirical Studies

Key findings include:

- Chiesura (2004): "Urban green space provides recreational benefits, social interactions, stress reduction, and psychological well-being."
- Francis et al. (2012): Landscaped, pedestrian-friendly areas enhance social interaction and reduce stress.
- Huang et al. (2019): Comfortable and safe outdoor spaces increase collaborative activity.
- Waterfronts, vegetation spaces, and courtyards optimize attention restoration (Attention Restoration Space on a University Campus, 2019).

Research Gaps

Few Nigerian-based empirical studies quantitatively assess the statistical strength of the relationship between landscape planning and productivity. This study addresses that gap within the Caleb University context.

Summary

This chapter highlighted how well-designed and accessible campus open spaces enhance social cohesion, reduce stress, and improve productivity. The literature gaps justify investigating Caleb University to provide context-specific insights for sustainable campus planning.

METHODOLOGY

Study Area

This study was conducted at Caleb University, located in Imota, Lagos State, Nigeria. The university campus integrates academic buildings with landscaped open spaces including green lawns, pedestrian walkways, shaded seating areas, and recreational zones. These spaces are designed to promote relaxation, social interaction, and cognitive focus. However, preliminary observation indicates that some areas remain underutilized due to maintenance concerns and limited functional support. The study therefore investigates how users perceive these landscape elements and how such perceptions influence social interaction and academic productivity.

Research Design and Approach

The study adopts a quantitative research design within a pragmatist philosophical framework. Pragmatism supports the use of empirical data to address real-world planning challenges while integrating subjective user experiences with measurable indicators (Creswell, 2014). A deductive approach was employed to test the hypothesis that perceptions of campus landscape elements significantly influence users' social interaction and productivity (Bryman, 2016). The quantitative method allows for statistical examination of relationships between variables and ensures objectivity in interpretation (Nardi, 2018).

Population and Sample Size

The study population comprised all users of Caleb University, totaling 2,019 individuals, including undergraduate students, postgraduate students, JUPEB students, academic staff, and non- academic staff.

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The sample size was determined using Yamane's (1967) formula at a 5% margin of error:

Where N = 2,019 and e = 0.05.

The calculated sample size was 333 respondents.

$$n = \frac{N}{1 + N\,(e)^2}$$

Data Collection Instrument

Data were collected using a structured questionnaire administered electronically via Google

Forms. The instrument consisted of two sections:

- Section A: Demographic information (age, gender, role, interaction frequency).
- Section B: Fifteen Likert-scale items (1 = Strongly Disagree to 5 = Strongly Agree) measuring perceptions of landscape functionality, accessibility, maintenance, social support, and productivity outcomes.

Operationalization of Variables

The independent variable was user perception of landscape elements, measured through indicators such as accessibility, seating adequacy, maintenance quality, and aesthetic appeal. The dependent variable was productivity, assessed through perceived concentration improvement, stress reduction, motivation, academic performance, and overall well-being.

Data Analysis

Descriptive statistics were used to analyze the data. Mean scores above 3.00 indicated positive perception, while scores below 3.00 indicated negative perception. Standard deviations were computed to assess variability. Data were analyzed using Microsoft Excel.

RESULTS AND DISCUSSION

Table 4.1: Questionnaire Response Rate

Questionnaires	**Frequency**	**Percentage (%)**
Number Filled	308	93
Number Not Filled	25	7
Grand Total	**333**	**100**

Table 4.2 Age of Respondent

Variable	**Frequency**	**Percentage**
18 - 24 years	219	71%
25 - 34 years	52	17%
35 - 44 years	31	10%
45 years and above	6	2%
Grand Total	**308**	**100%**

Table 4.3 Gender Distribution of Respondents

Variable	Frequency	Percentage
Female	162	53%
Male	146	47%
Grand Total	**308**	**100%**

Table 4.4 Position Held by Respondents

Variable	Frequency	Percentage
Student	269	87%
Academic Staff	29	9%
Non-Academic Staff	10	3%
Grand Total	**308**	**100%**

Table 4.5 Frequency of Interaction with Campus Landscape Elements

Variable	Frequency	Percentage
Daily	211	69%
Never	3	1%
Rarely	20	6%
Weekly	74	24%
Grand Total	**308**	**100%**

DISCUSSION OF FINDINGS

The findings were analyzed in relation to the study objectives and theoretical framework. Overall, results indicate that campus open spaces at Caleb University significantly influence students perceived productivity and well-being, while their impact on structured social interaction is moderate.

Demographic Context

Most respondents were between 18–24 years (71%), with 87% being students and 69% interacting daily with campus landscape elements. This strengthens the credibility of the findings, as responses reflect frequent and direct engagement with the physical environment. According to Environmental Psychology: Man, and His Physical Setting, repeated interaction with physical settings shapes cognitive and emotional responses, suggesting that participants' evaluations are experience-based.

Awareness and Utilization

Although awareness of campus open spaces recorded positive mean scores (above 3.00), frequency of use was lower (2.58), revealing an awareness–utilization gap. This indicates that while students recognize these spaces, they may not consistently use them for academic or social activities. This aligns with Stephen Kaplan and Rachel Kaplan in The Experience of Nature: A Psychological Perspective, who argue that environments must demonstrate "compatibility" with users' needs to achieve restorative benefits. Limited functional features may therefore restrict full engagement.

Social Interaction

Results on social interaction were mixed. While some items such as "Seating arrangements support social gatherings" (3.67) and "Open spaces build a sense of community" (3.52) were positive, others like "Landscape planning promotes group discussions" (2.21) were low.

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This suggests that interaction occurs informally rather than through intentional spatial design.

As discussed in Bowling Alone: The Collapse and Revival of American Community by Robert D. Putnam, social capital develops when environments actively support structured engagement. At Caleb University, open spaces appear to allow casual encounters but may not be optimized for collaborative academic interaction.

Productivity and Restoration

The strongest findings relate to productivity and stress reduction:

- Improved concentration (3.85)
- Reduced academic stress (3.96)
- Increased motivation (3.93)
- Positive academic performance impact (3.92)

These consistently high mean scores strongly support Attention Restoration Theory, which explains how natural environments restore mental energy. The results also align with Roger S. Ulrich's findings in View Through a Window May Influence Recovery that exposure to nature reduces stress.

Overall Satisfaction

Despite positive ratings for maintenance (3.88) and well-being outcomes, overall satisfaction with the landscape design was slightly below the benchmark (2.96). This indicates that while individual landscape components perform well, the overall spatial integration and functional planning may require improvement. As emphasized in Designing for Learning: Creating Campus Environments for Student Success, effective campus design must integrate aesthetic, social, and academic functions cohesively.

CONCLUSION

This study demonstrates that campus open spaces at Caleb University positively influence stress reduction, motivation, and general well-being. However, the statistical evidence suggests that landscape elements alone have limited direct impact on academic productivity.

Productivity appears to be shaped more strongly by demographic factors and contextual variables beyond physical design. Therefore, landscape planning should be viewed as a supportive, rather than primary, determinant of academic performance.

Limitations

This study has several limitations:

1. **Self-report bias:** Productivity and interaction were measured using perceived responses rather than objective academic performance indicators.
2. **Cross-sectional design:** Data were collected at a single time point, limiting causal interpretation.
3. **Student-dominant sample:** 87% of respondents were students, reducing representativeness of staff experiences.
4. **Unmeasured variables:** Maintenance quality, cultural norms, and academic workload were not statistically modeled.

Practical Implications

For Facilities Managers:

I. Prioritize maintenance quality over expansion of landscape features.

II. Introduce shaded study clusters with power supply to encourage academic use.

III. Improve spatial functionality rather than aesthetic enhancement alone.

For University Administrators:

I. Integrate outdoor spaces into structured academic programming.

II. Encourage supervised outdoor collaborative learning sessions.

III. Consider demographic usage patterns in spatial planning decisions.

RECOMMENDATIONS

I. Upgrade functional seating and shaded collaborative nodes.

II. Implement structured maintenance schedules.

III. Conduct longitudinal research incorporating academic performance data.

IV. Integrate behavioral observation into future studies.

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