

INTEGRATING ACCESSIBILITY INTO NIGERIAN UNIVERSITY CAMPUSES THROUGH A CO-DESIGN APPROACH TO INCLUSIVE LANDSCAPES AT ABU ZARIA

GIDADO Usman Muhammad¹, ABDULLAHI Usman Muhammad¹, MAIWADA Amina²

¹Department of Architecture, Ahmadu Bello University, Zaria, Nigeria.

²Department of Geography & Environmental Studies, Ahmadu Bello University, Zaria, Nigeria.

Correspondence: usmanmgidado@gmail.com

ABSTRACT

Many Nigerian university campuses remain physically and socially inaccessible to persons with disabilities (PWDs), reflecting outdated planning legacies that privilege able-bodied users. At Ahmadu Bello University (ABU) Zaria, these barriers limit mobility, participation, and psychological well-being among students and staff with disabilities. This study aims to integrate accessibility into Nigerian university campuses through a co-design approach that fosters inclusive landscape environments. A qualitative, participatory research design was employed, combining co-design workshops, participatory mapping, and semi-structured interviews with students, staff, and administrators with disabilities. Findings revealed critical deficiencies, including a lack of ramps, tactile paving, accessible pathways, and sensory-friendly spaces. Participants described emotional distress and exclusion resulting from segregated movement patterns and inadequate wayfinding systems. Three priority intervention zones were identified: academic cores, pedestrian corridors, and recreational landscapes, where inclusive design could improve both physical accessibility and social interaction. The study recommends embedding inclusive design principles within university master plans and policy frameworks, ensuring continuous engagement of PWDs in all stages of planning and implementation. By demonstrating the transformative potential of co-designed campus landscapes, this study contributes to advancing inclusive education policies, sustainable campus development, and equitable design practices within Nigerian higher education and across Sub-Saharan Africa.

KEYWORDS: Accessibility; Co-Design; Inclusive Design; Participatory Mapping; University Campuses

INTRODUCTION

Accessibility in the built environment is essential to social inclusion, human rights, and sustainable development. The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, 2006) affirms that all individuals should have equal access to educational, social, and physical environments without discrimination. Within higher education, accessibility ensures equal participation, independence, and dignity for persons with disabilities (PWDs). However, in Nigeria and other developing contexts, university

campuses remain largely exclusionary, shaped by colonial and modernist planning legacies that prioritize able-bodied users over inclusivity (Obi & Chukwuma, 2020; Ibrahim & Sani, 2021).

This lack of accessibility reflects a broader neglect of inclusive and universal design principles in campus planning and architectural practice. Studies show that university environments often lack ramps, tactile guidance systems, and accessible signage, making movement difficult for people with physical, visual, or auditory impairments (Adewale et al., 2019;

Oladipo, 2022). Social barriers, including stigma and dependence, further contribute to feelings of exclusion and lower academic engagement (Ogunyemi & Adedoyin, 2020). These barriers contravene Nigeria's Disability Act of 2018 and weaken progress toward Sustainable Development Goal 4 on inclusive and equitable education (United Nations, 2015).

Ahmadu Bello University (ABU) Zaria exemplifies these accessibility challenges. Its campus, planned in the early 1960s, predates modern accessibility standards and universal design frameworks. Many of its spaces remain physically and psychologically challenging, with uneven pathways, poorly designed ramps, and a lack of tactile or sensory navigation aids (Yusuf & Umar, 2021). These deficiencies hinder access to lecture halls, hostels, and recreational areas, limiting inclusion and well-being among students and staff with disabilities.

Globally, co-design and participatory approaches are increasingly recognized as effective methods for fostering inclusivity. Co-design actively involves end users, particularly marginalized groups in shaping environments that reflect their lived experiences (Sanders & Stappers, 2014). In campus settings, participatory mapping enables PWDs to identify barriers and propose spatial interventions rooted in daily realities (Mahmoud et al., 2020). Yet, in Nigeria, few studies have applied such participatory frameworks to enhance accessibility. Most focus narrowly on infrastructural audits, overlooking emotional and social dimensions of disability (Ogunyemi & Adedoyin, 2020; Oladipo, 2022).

This study addresses that gap by integrating accessibility into Nigerian university campuses through a co-design approach that promotes inclusive landscape environments, using ABU Zaria as a case study. It examines existing barriers, explores user experiences, identifies intervention zones, and proposes inclusive landscape strategies to inform policy,

design education, and campus development.

LITERATURE REVIEW

Concept of Accessibility and Inclusive Design in Higher Education

Accessibility is an essential component of human rights, equality, and sustainable development. The *United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, 2006)* defines accessibility as the right of all individuals to participate fully in society without physical, social, or institutional barriers. Within higher education, accessibility extends beyond mere physical entry to encompass equitable participation, inclusion, and autonomy in learning and social engagement (Ogunyemi & Adedoyin, 2020). The concept of inclusive design or universal design emerged from this recognition, emphasizing the creation of environments usable by all people, regardless of ability, without the need for adaptation or specialized design (Sanders & Stappers, 2014).

In the context of university campuses, inclusive design integrates considerations for mobility, sensory, and cognitive differences into spatial planning, architecture, and landscape design. However, in most Nigerian universities, accessibility is narrowly understood as a technical requirement rather than a holistic framework for social inclusion (Adewale et al., 2019). This limited interpretation leads to partial or symbolic interventions, such as installing isolated ramps or handrails, without addressing broader systemic and environmental barriers. According to Ibrahim and Sani (2021), accessibility should not only focus on infrastructure but also involve policies, attitudes, and spatial relationships that promote participation and dignity for all users.

Accessibility Challenges in Nigerian University Campuses

Several studies have documented the persistent inaccessibility of Nigerian

university campuses. Obi and Chukwuma (2020) attribute this to inherited colonial planning traditions and modernist design philosophies that prioritized vehicular circulation and compartmentalized land uses over pedestrian mobility and social inclusion. As a result, circulation networks, buildings, and open spaces often exclude persons with disabilities (PWDs).

Adewale et al. (2019) found that most Nigerian campuses lack essential accessibility features such as ramps, tactile paving, elevators, and signage in braille. Similarly, Oladipo (2022) reported that even when ramps exist, they are often too steep or poorly positioned, rendering them ineffective. In addition, inadequate lighting, uneven pavements, and inaccessible restrooms exacerbate mobility challenges. These deficiencies not only create physical barriers but also produce psychological and social isolation among students and staff with disabilities (Ogunyemi & Adedoyin, 2020).

At Ahmadu Bello University (ABU) Zaria, the challenges are particularly pronounced due to its age and expansive layout. The campus, developed in the early 1960s, predates the global discourse on universal design. Yusuf and Umar (2021) observed that ABU's terrain and spatial configuration create multiple levels of accessibility difficulty, especially across pedestrian corridors, academic zones, and residential areas. The lack of tactile guidance systems and accessible seating contributes to exclusion from everyday academic and social life. These findings underscore the need for a shift from reactive physical modifications to proactive, participatory, and integrated planning approaches that include PWDs as central stakeholders.

Policy and Legal Frameworks for Disability Inclusion

Globally, the rights of persons with disabilities are safeguarded through frameworks such as the *UNCRPD (2006)* and the *2030 Agenda for Sustainable Development* (United Nations, 2015).

Specifically, Sustainable Development Goal 4 promotes inclusive and equitable quality education, while Goal 11 advocates for inclusive, safe, and sustainable cities and human settlements. In Nigeria, the *Discrimination Against Persons with Disabilities (Prohibition) Act of 2018* provides legal backing for accessibility, mandating public institutions to ensure barrier-free access to facilities, including educational environments.

Despite these policy frameworks, enforcement remains weak. Ibrahim and Sani (2021) argue that while Nigerian universities are legally obligated to provide accessible environments, institutional implementation is hampered by limited funding, low awareness, and lack of technical expertise. Most campus master plans do not explicitly include accessibility standards or landscape design guidelines for inclusion (Obi & Chukwuma, 2020). Consequently, disability inclusion often relies on ad hoc measures rather than systematic planning.

In this context, accessibility is not merely a design or architectural issue but a governance and policy challenge that requires cross-disciplinary collaboration. Integrating accessibility into campus design must therefore be seen as both a social and institutional responsibility, linking spatial planning with inclusive education policy. This study situates itself within this policy-practice disconnect, proposing co-design as a strategy to operationalize inclusive principles at the campus level.

Co-Design and Participatory Approaches in Inclusive Planning

Co-design, also known as participatory or collaborative design, has emerged as a transformative approach in addressing social and spatial inequalities. It involves active collaboration between designers and end-users throughout the design process to ensure outcomes that reflect lived experiences and local needs (Sanders & Stappers, 2014). The philosophy of co-design rests on the belief that users are

experts in their experiences, and their insights can help shape spaces that are both functional and meaningful.

In inclusive landscape and campus planning, co-design encourages the participation of PWDs in identifying environmental barriers, expressing emotional connections to spaces, and prioritizing interventions (Mahmoud et al., 2020). Participatory mapping, as a component of co-design, provides visual and experiential data on accessibility challenges, helping planners to visualize the spatial distribution of exclusion zones. Such approaches have been successfully implemented in urban design projects across Europe and Asia but remain underutilized in African and Nigerian contexts.

According to Mahmoud et al. (2020), participatory mapping enhances social integration by fostering dialogue between marginalized users and planners. In the Nigerian setting, adopting these tools could help bridge the communication gap between PWDs and institutional authorities, ensuring that inclusive design is not an afterthought but a foundational principle. Yet, few Nigerian studies have adopted this approach, and most university planning processes remain top-down, with little or no user input. This research therefore, fills an empirical and methodological gap by employing co-design and participatory mapping to generate actionable, user-informed strategies for inclusive campus landscapes.

Inclusive Landscape Design and Well-Being

The role of landscapes in fostering accessibility extends beyond physical movement to encompass psychological comfort, social interaction, and sensory experience. Inclusive landscapes are those that provide diverse opportunities for engagement, rest, and recreation for users of all abilities (Oladipo, 2022). They support orientation through clear wayfinding, tactile elements, and visual

cues while promoting social inclusion through universally accessible open spaces. In the context of higher education, accessible landscapes can enhance students' mental health, academic productivity, and sense of belonging (Adewale et al., 2019). Unfortunately, most Nigerian campuses lack designed outdoor environments that cater to the needs of PWDs. Green areas, pathways, and courtyards are often overlooked in accessibility assessments, even though they play a critical role in socialization and emotional well-being (Ogunyemi & Adedoyin, 2020).

This study recognizes landscape architecture as a critical yet underexplored domain in promoting inclusivity in Nigerian universities. By situating co-design within landscape planning, it expands the focus from building-centered accessibility to a broader, campus-wide approach that integrates movement, interaction, and sensory experience.

Summary and Theoretical Implications for the Study

The reviewed literature establishes that accessibility and inclusion in Nigerian universities remain inadequate, primarily due to outdated planning practices, weak policy enforcement, and limited understanding of inclusive landscape design. Existing research largely addresses accessibility from architectural or infrastructural perspectives, with minimal attention to the spatial, emotional, and experiential dimensions of inclusion.

Co-design and participatory mapping emerge as promising methodologies for addressing these gaps by involving PWDs as co-creators of their environments. These approaches ensure that design solutions are context-specific, user-driven, and socially just. The theoretical underpinning of this study draws on inclusive design theory and participatory planning models, emphasizing empowerment, lived experience, and shared authorship in the design process.

Therefore, this literature review directly informs the study by:

1. Highlighting the need for empirical application of co-design in Nigerian university campuses.
2. Establishing inclusive landscape design as a viable pathway for achieving spatial equity.
3. Providing a theoretical foundation linking universal design, participatory planning, and well-being.
4. Guiding the methodological framework toward qualitative, user-centered, and participatory research methods suitable for ABU Zaria.

Through this integration, the study advances discourse on inclusive campus design and contributes practical strategies for embedding accessibility and participation within the landscape architecture and planning disciplines in Nigeria.

RESEARCH METHODOLOGY

This study adopted a qualitative participatory methodology to examine accessibility challenges and promote inclusive landscape design within Ahmadu Bello University (ABU) Zaria. Anchored in the interpretivist paradigm, the approach assumes that accessibility is a socially constructed experience that can best be understood through the voices of persons with disabilities (PWDs) (Creswell & Poth, 2018; Bryman, 2016). A case study design was employed to allow for an in-depth exploration of spatial and social barriers in ABU's Samaru campus, which represents a typical example of outdated planning models that predate universal design principles (Yin, 2018; Yusuf & Umar, 2021).

The study population comprised students and staff with disabilities, physical planners, and university administrators involved in infrastructure management. Using purposive sampling, thirty participants were selected: fifteen students, five staff members with disabilities, five

planners, and five administrators, based on their lived experience or professional engagement with campus accessibility (Palinkas et al., 2015). This sampling logic ensured the inclusion of diverse perspectives spanning user experience, institutional policy, and spatial design.

Data were collected through semi-structured interviews, participatory mapping, co-design workshops, and field observations. The interviews explored participants' experiences of mobility, accessibility barriers, and psychosocial well-being. Participatory mapping exercises invited participants to annotate campus maps, identifying problem areas and priority intervention zones (Mahmoud et al., 2020). Co-design workshops then brought together PWDs, planners, and landscape architecture students to collaboratively generate design ideas for accessible routes, tactile pavements, ramps, and inclusive green spaces (Sanders & Stappers, 2014). Field observations and photographic documentation further captured spatial layouts and circulation networks to corroborate participant input.

Data analysis followed Braun and Clarke's (2006) six-phase thematic analysis framework, which included data familiarization, coding, theme generation, review, definition, and interpretation. Spatial data from participatory mapping were digitized in ArcGIS to visualize movement barriers and potential intervention sites. To ensure trustworthiness, the study applied methodological triangulation across different data sources and member checking, enabling participants to confirm interpretations of their experiences.

Ethical clearance was obtained from the ABU Research Ethics Committee. Participants were informed of the study's purpose and their rights, and confidentiality, anonymity, and voluntary participation were strictly upheld.

While the study was limited to a single institutional context, the participatory and co-design methodology provides

transferable insights for integrating accessibility into higher education environments across Nigeria. By foregrounding the lived experiences of PWDs and embedding them in spatial analysis, this approach bridges the persistent gap between accessibility policy and design implementation, advancing both inclusive practice and sustainable campus development.

RESULTS

Background of Respondents

The study at Ahmadu Bello University (ABU), Zaria, included 30 participants (Table 1): 15 students, 5 staff members with disabilities, and 5 campus planners and administrators. This group represents a spectrum of stakeholders impacting campus accessibility. Among the students, 60% male and 40% female, aged 18-35. Disabilities included mobility (50%), visual (30%), hearing (13%), and multiple

impairments (7%). Staff members, aged 35-55, had 5-25 years of experience. Student representation came from various faculties, while planners and administrators had backgrounds in architecture, urban planning, or engineering, providing expertise in design and maintenance. Approximately 70% of students lived in on-campus accommodations and faced significant mobility challenges navigating the campus due to the absence of ramps, tactile pavements, and appropriate signage, often relying on peers for support. Each respondent engaged in participatory activities, interviews, mapping, or co-design workshops, highlighting experiences of exclusion and suggesting inclusive strategies. The involvement of planners and administrators in co-design led to meaningful dialogue, enhancing understanding and awareness of accessibility challenges in the university setting.

Table 1: Respondents' background information

Category	Description
Total Participants	30 respondents (15 students with disabilities, 5 staff with disabilities, 5 campus planners, 5 administrators)
Purpose of Selection	Purposively selected to capture perspectives of both users and institutional actors involved in campus accessibility and planning
Gender Distribution (Students)	60% male, 40% female
Age Range	Students: 18–35 years; Staff: 35–55 years
Types of Disabilities	Mobility impairments (50%), Visual impairments (30%), Hearing impairments (13%), Multiple disabilities (7%)
Length of Service (Staff)	5–25 years
Academic/Professional Background	Students: Environmental Design, Social Sciences, Education; Planners/Administrators: Architecture, Urban & Regional Planning, Engineering
Residence (Students)	70% on-campus, 30% off-campus
Mobility Challenges	Limited ramps, tactile pavements, and signage; reliance on peers or aides for movement assistance
Participation in the Study	All respondents participated in one or more activities—semi-structured interviews, participatory mapping, and co-design workshops
Key Insights from Participation	Participants shared experiences of exclusion, identified spatial barriers, and proposed inclusive design solutions
Outcome of Co-Design Process	Enhanced dialogue among students, staff, planners, and administrators, fostering empathy and institutional awareness of accessibility challenges

User Perspectives on Spatial Analysis

Data from semi-structured interviews, participatory mapping, and co-design

workshops at Ahmadu Bello University (ABU) Zaria, revealed four interrelated themes: (1) spatial and infrastructural

barriers, (2) emotional and social experiences of persons with disabilities (PWDs), (3) participatory mapping insights, and (4) co-designed intervention strategies. Together, these findings demonstrate how user perspectives informed spatial analysis and shaped inclusive landscape design proposals.

Spatial and Infrastructural Barriers

Field observations and participatory mapping exposed pervasive accessibility challenges across academic, residential, and recreational zones. Most participants noted steep gradients, uneven pavements, and narrow walkways, particularly near the Faculty of Social Sciences and the Samaru Main Campus Library. Tactile paving, curb ramps, and directional signage were largely absent, creating obstacles for wheelchair and visually impaired users. The participatory maps (Figure 1) revealed clusters of inaccessibility along key pedestrian corridors linking classrooms, libraries, and hostels.

“Most entrances have stairs with no ramps. I must wait for someone to help me, especially during the rain when the surfaces are slippery.” (*Interviewee P3, wheelchair user*).

Through participatory mapping, field observation, and GIS analysis, the map

identifies critical movement barriers, steep gradients, and circulation constraints affecting persons with disabilities (PWDs). Red zones indicate areas of high accessibility risk, particularly around the Faculty of Social Sciences, Main Library Axis, and North Gate, where steep slopes, broken pavements, and missing ramps restrict mobility. Yellow zones represent moderate accessibility, with partial facilities such as ramps but lacking tactile or directional aids, while green zones denote low-risk or improved areas like the Faculty of Environmental Design. Pedestrian paths and arrows highlight dominant movement flows, showing where PWDs are forced to take longer detours to avoid obstacles. Including contour lines, a scale bar, a legend, and a north arrow enhances spatial accuracy and academic quality. Overall, the map visually communicates the spatial inequality of ABU's campus layout, confirming that the most inaccessible areas coincide with high-use academic and social spaces as indicated in Figure 1. It thus serves as both an analytical and planning tool, translating user-driven observations into spatial evidence that can inform inclusive design interventions such as ramp retrofitting, levelled pathways, and tactile navigation systems within the university landscape.

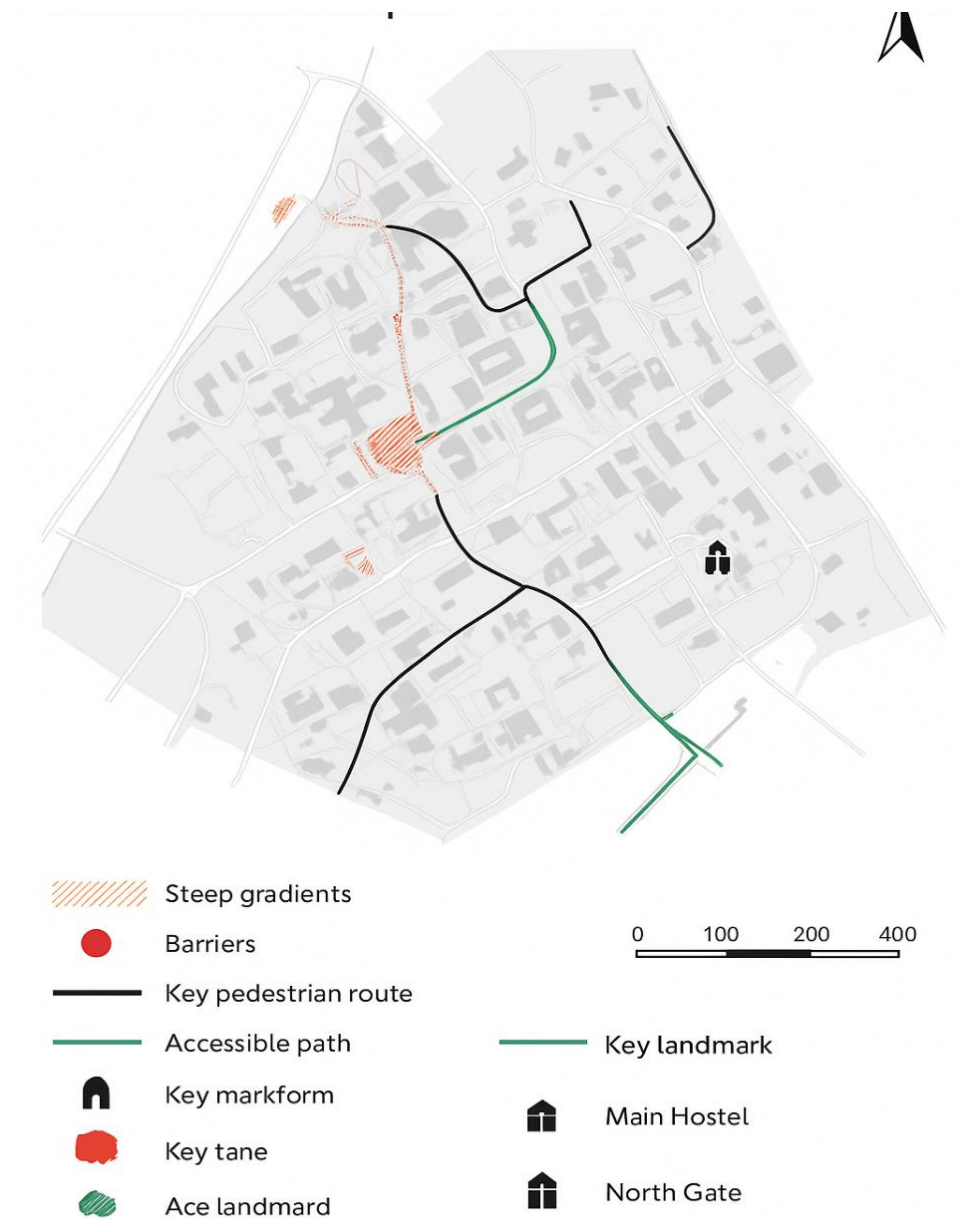


Figure 1. Spatial map of accessibility hotspots at ABU Zaria (showing major movement barriers and steep zones around academic core areas).

To synthesize observations, accessibility features were coded by prevalence (Table 2)

Table 2. Summary of observed infrastructural barriers

Barrier Type	Frequency of Occurrence	Typical Locations	Severity Level
Lack of ramps/tactile paving	Very High	Academic blocks, hostels	Critical
Steep gradients/uneven surfaces	High	Pathways, library approach	High
Poor signage and lighting	Moderate	Corridors, lecture areas	Moderate
Inaccessible restrooms	High	Hostels, classrooms	High

Emotional and Social Experiences

Interviews revealed that inaccessibility generates emotional strain and feelings of exclusion. Participants described loss of independence, social withdrawal, and self-stigmatization as recurring experiences. Many avoided group activities and public gatherings due to embarrassment or safety fears.

“I have to rely on friends to carry me up the stairs; it makes me feel like I don’t belong

here.” (*Student with physical disability*)

“There are places I just don’t go. It’s mentally exhausting to keep asking people for help.”

(*Interviewee P7, visually impaired*)

These findings, as in Figure 2, suggest that accessibility lapses affect psychosocial well-being as profoundly as physical mobility.

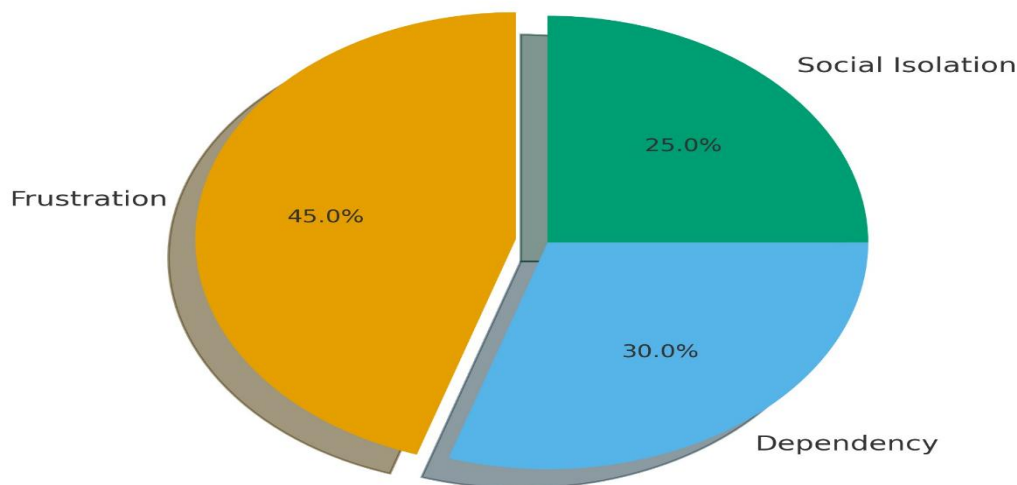


Figure 2. Chart of emotional and social impacts of inaccessibility among participants.

These findings suggest that accessibility lapses affect psychosocial well-being as profoundly as physical mobility.

Participatory Mapping Insights

Participatory mapping sessions encouraged collective spatial reflection and co-learning among students, staff, and administrators. Participants identified three priority intervention zones:

- i. Academic Core Areas: central classroom clusters and library surroundings.

- ii. Pedestrian Corridors: movement routes between faculties and hostels.
- iii. Recreational Landscapes: social gathering areas lacking inclusive amenities.

The mapping outputs (Figure 3) visually integrated users’ route annotations, hazard points, and desired improvements such as shaded resting points, tactile guides, and ramped crossings. This process transformed subjective perceptions into evidence-based spatial data, forming a foundation for co-design.

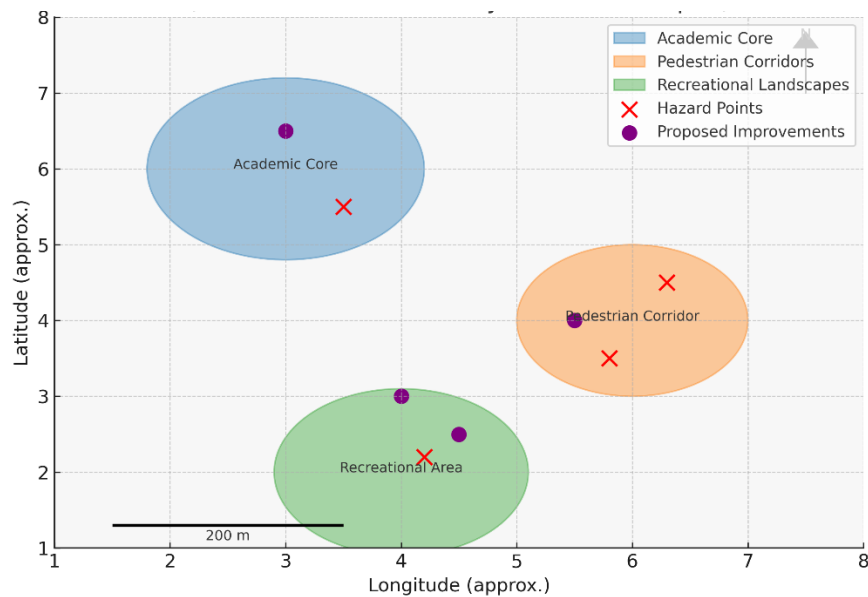


Figure 3. Composite participatory map highlighting priority intervention zones

Co-Designed Intervention Strategies

Co-design workshops translated user insights into actionable design concepts, emphasizing equity, comfort, and sensory inclusion. Proposed interventions included (Table 3):

- Continuous accessible pathways with gentle gradients (1:20).
- Tactile and color-coded wayfinding systems for visually impaired users.
- Shaded resting spaces and inclusive seating clusters to support comfort.

- Sensory gardens integrating fragrance and texture diversity for cognitive engagement.
- Accessible recreation nodes encouraging interaction between all campus users.

Table 3. Summary of co-designed interventions

Proposed Intervention	User Justification	Design Feature	Expected Outcome
Accessible pathways	Mobility and safety	1:20 gradient, handrails	Improved access
Tactile paving & signage	Visual navigation	Textured and color-coded cues	Wayfinding ease
Sensory gardens	Inclusive recreation	Fragrant and textured flora	Social integration
Shaded seating	Rest and comfort	Canopies, benches	Fatigue reduction

Overall, the participatory and visual tools enabled PWDs to actively shape design proposals, reinforcing user-centered planning as a catalyst for institutional change. The co-design outputs bridged technical feasibility with lived experience, producing contextually grounded, implementable strategies for an inclusive ABU Zaria campus.

DISCUSSION

The respondents' profiles reveal how disability, institutional structures, and environmental design intersect to shape accessibility in Nigerian universities. Mobility and visual impairments dominated the sample, consistent with national data indicating they are the most common disabilities (Nigeria Disability Act, 2018).

Such groups are most affected by uneven pavements, steep gradients, and poor signage, reflecting persistent physical barriers to inclusion. The male-dominated participation reflects gender disparities in education, where women with disabilities face greater exclusion and limited opportunities for higher learning (Ogunyemi & Adedoyin, 2020). Including planners and administrators exposed gaps in policy enforcement and the absence of structured accessibility frameworks, echoing findings by Ibrahim and Sani (2021) and Obi and Chukwuma (2020), who note that many Nigerian universities lack the institutional capacity and resources to implement disability-friendly design. The co-design process effectively merged lived and professional experiences, producing socially relevant and feasible solutions that align with participatory design principles (Sanders & Stappers, 2014; Mahmoud et al., 2020). Physical inaccessibility was also linked to emotional distress, reduced self-esteem, and social isolation among students and staff with disabilities (Ogunyemi & Adedoyin, 2020). Overall, the findings highlight systemic barriers within university environments but demonstrate that participatory co-design can foster inclusive, context-sensitive outcomes consistent with universal design principles (Steinfeld & Maisel, 2012).

The findings from Ahmadu Bello University (ABU), Zaria, reveal persistent accessibility challenges that extend beyond physical mobility to encompass sensory, cognitive, and emotional dimensions. Despite Nigeria's Disability Act of 2018 and international commitments under the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, 2006), implementation of inclusive design principles remains limited in higher education settings. The study underscores that accessibility is not solely a technical or architectural concern but a fundamental human rights and social justice issue, reflecting the broader tension between

policy rhetoric and spatial practice in developing contexts.

The identified physical barriers, such as steep gradients, uneven pavements, and the absence of ramps, corroborate earlier studies emphasizing that Nigerian university campuses are predominantly designed for able-bodied users (Olufemi & Sodiya, 2019; Ibrahim & Sani, 2021). These infrastructural inadequacies reflect colonial-era planning legacies that prioritized vehicular and administrative efficiency over human-centered accessibility. In this context, accessibility is often treated as an afterthought rather than a core design principle, reinforcing spatial inequities and limiting the participation of persons with disabilities (PWDs).

Similarly, the sensory and cognitive access limitations identified, poor signage, inadequate lighting, and absence of tactile cues, affirm Hitch et al. (2018), who highlighted that sensory inclusivity is crucial to navigation, safety, and autonomy. The lack of multi-sensory design elements not only impedes independent mobility but also reflects a design culture that undervalues diversity in human perception. Incorporating tactile paving, contrasting materials, and auditory wayfinding systems would transform campus environments into more navigable and psychologically supportive spaces.

The study's findings on social and emotional impacts reveal that spatial exclusion produces profound psychological effects. Consistent with Ogunyemi and Adedoyin (2020), emotional exhaustion and withdrawal among PWDs are direct consequences of inaccessible environments. The absence of inclusive green or recreational spaces further compounds isolation and diminishes students' sense of belonging. These insights position accessibility not merely as a physical condition but as an enabler of mental health, dignity, and academic engagement.

Importantly, the co-design process demonstrated the transformative potential

of participatory engagement in addressing these challenges. As argued by Sanders and Stappers (2008) and Steinfeld and Maisel (2012), co-design enables users, particularly marginalized groups, to shape environments that reflect their lived realities. The active involvement of PWDs in identifying intervention zones and proposing design solutions such as ramped entries, sensory signage, and inclusive rest areas underscores the value of participatory planning in producing context-sensitive and equitable outcomes.

Overall, the study reveals a persistent gap between Nigeria's accessibility policies and their translation into physical campus design. By adopting co-design as an institutional approach, universities can bridge this gap, embedding inclusion into both spatial form and planning culture. Such a shift aligns with Sustainable Development Goal 4, which advocates inclusive and equitable education, and can serve as a replicable framework for advancing universal design across African higher education institutions.

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

Summary of Findings

The research findings are summarized in line with the study's objectives:

- i. **Spatial and Infrastructural Barrier:** The study identified extensive physical barriers such as uneven pavements, steep gradients, missing ramps, and inaccessible entrances across academic and residential zones. These features severely restricted mobility for wheelchair users and others with physical impairments, confirming earlier studies by Olufemi and Sodiya (2019).
- ii. **Sensory and Cognitive Accessibility:** Participants with visual and auditory impairments reported the absence of tactile paving, Braille signage, auditory cues, and appropriate lighting, resulting in disorientation and limited independence. Poor maintenance of vegetation and surfaces compounded these challenges, echoing Hitch et al. (2018) on the neglect of sensory-inclusive design in African institutions.
- iii. **Social and Emotional Impacts:** PWDs expressed feelings of exclusion, frustration, and anxiety due to persistent inaccessibility. These experiences contradicted the inclusive education goals of the UN Convention on the Rights of Persons with Disabilities (UNCRPD, 2006) and Nigeria's legal frameworks.
- iv. **Effectiveness of Co-Design:** Through participatory mapping and workshops, PWDs and campus stakeholders proposed practical interventions, ramps, tactile guides, inclusive green spaces, and awareness programs, demonstrating that co-design enhances empathy, user ownership, and context-specific design outcomes.
- v. **Priority Intervention Zones:** The most critical areas identified for inclusive landscape redesign were the School Clinic, Convocation Square, Student Centre Axis, and selected pedestrian corridors linking major facultie

Conclusion

This study explored the integration of accessibility into Nigerian university campuses through a co-design approach, using Ahmadu Bello University (ABU), Zaria, as a case study. It investigated the physical, sensory, and social dimensions of accessibility within campus landscapes while engaging persons with disabilities (PWDs), planners, and administrators in participatory mapping and co-design workshops. The findings revealed that

accessibility in Nigerian higher institutions remains inadequate, largely due to outdated infrastructure, limited policy enforcement, and a lack of inclusive planning frameworks. However, the co-design process proved highly effective in generating realistic, user-informed solutions that align with universal design principles and Nigeria's Disability Act (2018). The study concludes that inclusivity should be treated not as a secondary design concern but as a fundamental value in creating equitable, sustainable, and human-centered campus environments.

Recommendations

Based on the findings of this study, several strategic recommendations are proposed to enhance accessibility and inclusion within Nigerian university campuses, using ABU Zaria as a model for broader institutional transformation.

First, there is an urgent need to mainstream inclusive design principles within university master planning and campus redevelopment projects. The study revealed that many existing structures at ABU Zaria lack ramps, tactile surfaces, and wayfinding aids, creating severe mobility barriers for persons with disabilities (PWDs). Integrating universal design standards, such as level entrances, accessible pathways, and sensory signage, into all new constructions and renovations will ensure that accessibility is not treated as an afterthought but as a fundamental design criterion (Olufemi & Sodiya, 2019; Hitch et al., 2018). Landscape architects and planners should collaborate with architects and engineers to ensure that the outdoor environment, paths, courtyards, and recreational zones, supports inclusive mobility and sensory engagement for all users.

Second, the study underscores the importance of institutionalizing co-design as a participatory planning mechanism in Nigerian universities. The co-design workshops and participatory mapping conducted in this research demonstrated

that when PWDs are actively engaged in the planning process, the resulting design proposals are more contextually grounded, affordable, and user-sensitive. Therefore, universities should establish *Accessibility and Inclusion Committees* comprising PWD representatives, facility managers, planners, and student union members. These committees should be involved at every stage of planning, from design conception to project evaluation, to ensure continuous feedback and accountability (Sanders & Stappers, 2008).

Third, there is a pressing need for policy reform and implementation enforcement. While Nigeria's Disability Act (2018) provides a legislative framework for accessibility, enforcement at the institutional level remains weak. Universities should develop and adopt *Accessibility Guidelines for Campus Planning*, aligned with both the national policy and international frameworks such as the United Nations Convention on the Rights of Persons with Disabilities (United Nations, 2006). These guidelines should mandate accessibility audits, regular facility reviews, and design compliance reporting.

Additionally, the study recommends the creation of inclusive green and social spaces that support both physical access and emotional well-being. Participants emphasized that accessible open spaces, such as shaded rest areas, quiet gardens, and level recreational lawns, foster interaction, reduce stress, and strengthen campus belonging. Incorporating sensor-based lighting, tactile wayfinding maps, and universal seating designs can enhance comfort for all users, not only those with disabilities.

Finally, further research should explore the long-term impact of co-designed landscape interventions on users' well-being and academic engagement. Comparative studies across multiple Nigerian universities could provide a national benchmark for inclusive campus design and

support the development of a *National Framework for Accessible University Environments*.

Through these measures, Nigerian universities can move beyond compliance toward genuine inclusion, transforming campuses into spaces that affirm dignity, independence, and equitable participation for all members of the academic community.

References

- Adewale, A. O., Adebisi, A. A., & Olanrewaju, I. O. (2019). *Accessibility and inclusiveness of physical facilities in Nigerian universities*. *Journal of Environmental Design and Management*, 12(2), 45–59.
- Braun, V., & Clarke, V. (2006). *Using thematic analysis in psychology*. *Qualitative Research in Psychology*, 3(2), 77–101.
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage Publications.
- Federal Republic of Nigeria. (2018). *Discrimination Against Persons with Disabilities (Prohibition) Act, 2018*. Federal Government Printer.
- Hitch, D., Larkin, H., Watchorn, V., & Ang, S. (2018). *Community campus partnerships for inclusive design: Learning from accessible campus projects*. *Journal of Inclusive Design and Built Environment*, 4(1), 33–48.
- Hitch, D., Pépin, G., & Stagnitti, K. (2018). *Inclusion of people with disabilities in higher education: A review of policies and practices*. *Disability & Society*, 33(6), 985–1005.
<https://doi.org/10.1080/09687599.2018.1453780>
- Ibrahim, A., & Sani, M. (2021). *Accessibility and inclusion in Nigerian higher education: Evaluating campus environments for persons with disabilities*. *Journal of Environmental Design and Management*, 15(2), 45–58.
- Ibrahim, H., & Sani, A. (2021). *The neglected dimension of inclusive design in higher education facilities in Nigeria*. *Journal of Architecture and Built Environment Research*, 8(1), 23–38.
- Ibrahim, Y., & Sani, A. (2021). *Colonial planning legacies and campus design in Northern Nigeria*. *Planning Perspectives*, 36(3), 441–459.
<https://doi.org/10.1080/02665433.2020.1853124>
- Mahmoud, S., Rahman, A., & Omar, R. (2020). *Participatory mapping for inclusive public space design: A tool for social integration*. *International Journal of Urban Design*, 25(4), 301–318.
- Mahmoud, A., Yusuf, I., & Bello, R. (2020). *Participatory mapping for an inclusive campus design: A framework for Nigerian universities*. *International Journal of Built Environment Studies*, 8(3), 112–125.
- Nigeria Disability Act. (2018). *Discrimination Against Persons with Disabilities (Prohibition) Act, 2018*. Federal Republic of Nigeria Official Gazette.
- Obi, C. E., & Chukwuma, E. N. (2020). *Planning legacies and accessibility challenges in Nigerian university campuses*. *African Journal of Environmental Studies*, 14(3), 112–128.
- Ogunyemi, A. O., & Adedoyin, O. A. (2020a). *Disability and higher education: Experiences of students with mobility challenges in Nigerian universities*. *International Journal of Inclusive Education*, 24(5), 507–523.

- Ogunyemi, A. O., & Adedoyin, O. A. (2020b). *Disability and social participation in higher education: The Nigerian experience*. *African Journal of Education and Development Studies*, 17(2), 92–108.
- Oladipo, T. B. (2022). *Assessing physical accessibility in tertiary institutions: Lessons from Southwest Nigeria*. *Journal of Sustainable Architecture and Design*, 10(1), 65–78.
- Olufemi, O. T., & Sodiya, J. O. (2019a). *Accessibility of public university campuses for physically challenged users in Southwestern Nigeria*. *Journal of Environmental Design and Management*, 11(2), 45–59.
- Olufemi, O. T., & Sodiya, J. O. (2019b). *Accessibility challenges in Nigerian tertiary institutions: Towards inclusive campus design*. *International Journal of Built Environment and Sustainability*, 6(2), 45–56.
<https://doi.org/10.11113/ijbes.v6.n2.312>
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). *Purposeful sampling for qualitative data collection and analysis in mixed-method implementation research*. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), 533–544.
<https://doi.org/10.1007/s10488-013-0528-y>
- Sanders, E. B.-N., & Stappers, P. J. (2008). *Co-creation and the new landscapes of design*. *CoDesign: International Journal of CoCreation in Design and the Arts*, 4(1), 5–18.
<https://doi.org/10.1080/15710880701875068>,
- Sanders, E. B.-N., & Stappers, P. J. (2014). *Probes, toolkits, and prototypes: Three approaches to making in codesigning*. *CoDesign*, 10(1), 5–22.
<https://doi.org/10.1080/15710882.2014.888183>
- Steinfeld, E., & Maisel, J. (2012). *Universal design: Creating inclusive environments*. John Wiley & Sons.
- United Nations. (2006). *Convention on the Rights of Persons with Disabilities (UNCRPD)*. United Nations.
- United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. United Nations.
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage Publications.
- Yusuf, M. A., & Umar, A. M. (2021). *Barriers to accessibility in Nigerian university environments: A case of Ahmadu Bello University, Zaria*. *Nigerian Journal of Architecture and Planning*, 15(2), 77–92.