



Architectural Design Provision for Physically Challenged Users: A Systematic Review of Selected University Auditoriums In Nigeria.

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Abstract

Ensuring accessibility in higher education is essential for creating inclusive learning spaces. However, many university auditoriums in Nigeria are not designed well for people with physical disabilities. This study reviews the architectural support for physically challenged users in selected Nigerian university auditoriums and checks how well they meet national and international accessibility standards. Using a literature-based approach, the study looks at current accessibility features, identifies major architectural barriers, and assesses how closely they follow regulations like the Nigerian Disability Act. The findings show that while some universities have made progress toward inclusivity, many still struggle with problems like inadequate ramps, poor seating arrangements, and a lack of assistive technologies. The study highlights effective practices from local and international institutions and suggests practical ways to improve architectural inclusivity. These include stricter policy enforcement, more funding, and collaboration among stakeholders. By tackling these issues, this research adds to the conversation on disability rights and sustainable architectural design in Nigerian higher education.

I. INTRODUCTION

Inclusive design in architectural spaces is very important, particularly for people with physical disabilities. They often face significant challenges when trying to access different environments. In Nigeria, about 15.3% of the population has physical disabilities (World Health Organization, 2020). This highlights the need for accessible designs in public buildings, including university auditoriums. These auditoriums serve as key spaces for academic and social events, and they must focus on accessibility to

ensure equal opportunities and participation for everyone, including those with physical disabilities. However, research shows that many public buildings in Nigeria, including university auditoriums, often do not meet the necessary accessibility standards (Adegoke et al, 2022). To tackle this issue, it is important to conduct a systematic review of selected university auditoriums in Nigeria. This review will identify weaknesses in architectural design for users with physical challenges. It will evaluate the current state of accessibility in these auditoriums, highlighting successful design practices and areas that need improvement. The aim of this systematic review is to look into the architectural provisions for physically challenged individuals in university auditoriums across Nigeria. It will check existing accessibility features, evaluate how well these auditoriums follow national and international accessibility standards, and identify best practices along with areas that require improvement in design for people with disabilities. The lack of accessible design in public buildings, including university auditoriums, creates serious barriers to social inclusion and equality for people with disabilities in Nigeria. This exclusion can lead to feelings of isolation and marginalization, which can hurt the mental and emotional well-being of physically challenged individuals (Olalere et al, 2022). Therefore, this review will provide important insights into the current status of accessibility in Nigerian university auditoriums. The findings will guide policymakers and architects about the importance of inclusive design in public buildings. It will suggest ways to improve accessibility in Nigerian university auditoriums and help shape both national and international accessibility standards. Recent studies have highlighted how inclusive design fosters social inclusion and equality for people with disabilities (United Nations, 2020). In Nigeria, the National Disability Rights Commission Act (2018) requires public buildings, including



university auditoriums, to have accessible facilities for people with disabilities.

1.1 AIM AND OBJECTIVES OF THE STUDY

To evaluate the architectural design provisions for physically challenged users in selected university auditoriums in Nigeria, identifying challenges and best practices to enhance accessibility and inclusivity.

The Objectives are:

1. To assess the level of compliance of selected university auditoriums with national and international accessibility standards for physically challenged users.
2. To identify the architectural barriers that hinder accessibility and inclusivity in university auditorium designs.
3. To propose design recommendations and strategies for improving the accessibility of university auditoriums for physically challenged users.

II. LITERATURE REVIEW

The need for appropriate architectural provisions for individuals with physical disabilities has become an urgent issue in Nigeria, especially within university auditoriums. Research indicates that the lack of accessibility in buildings can significantly affect the mental and emotional well-being of individuals with disabilities (Olalere et al, 2022). The National Disability Rights Commission Act (2018) in Nigeria mandates that public structures, including university auditoriums, must be equipped with accessible facilities for people with disabilities. Various studies emphasize the vital role of inclusive design in fostering social inclusion and equality for people with disabilities (United Nations, 2020). In Nigeria, scholars have examined the accessibility of public buildings, including university auditoriums. Adegoke et al. (2022), for example, conducted an accessibility audit of public buildings in Nigeria, including university structures, and found that many of these buildings were lacking in essential accessibility features. Further research has explored the psychological effects of inaccessible buildings on people with disabilities in Nigeria. Olalere et al. (2022) discovered that such buildings often lead to feelings of isolation, exclusion, and marginalization among individuals with disabilities. In a similar vein, Olanrewaju et al. (2023) explored the connection between architectural design and mental health outcomes for students with disabilities at Nigerian universities, revealing that accessible design elements can enhance their mental health. Recent studies have also underscored the need for inclusive

design in Nigerian university auditoriums. For instance, Oyedele et al. (2024) conducted a review of accessibility features in university auditoriums and found that many lacked sufficient accommodations for individuals with disabilities. Likewise, Adewale et al. (2024) investigated the effect of architectural design on the academic performance of students with disabilities in Nigerian universities, showing that accessible design can positively impact academic outcomes.

2.1 OVERVIEW OF UNIVERSAL DESIGN PRINCIPLES IN ACADEMIC INSTITUTIONS

Universal design principles focus on creating environments that are inclusive and accessible, ensuring they accommodate a diverse range of users, including individuals with physical disabilities. Within academic institutions, particularly universities, implementing these principles is essential to guarantee equitable access to education and opportunities for all students, (Kowaltowski et al, 2020). The seven principles of universal design, established by the Center for Universal Design (1997), emphasize usability, flexibility, and the provision of clear information to all users. Key aspects of universal design include minimizing hazards and errors, reducing the physical effort required to navigate spaces, and ensuring sufficient space for users to access and utilize facilities comfortably. Applying these principles to university auditoriums in Nigeria can enhance accessibility, allowing all students, including those with physical disabilities, to use these spaces effectively. Research indicates that incorporating accessible design features positively impacts the academic performance, social engagement, and overall well-being of students with disabilities (Olanrewaju et al, 2023). The National Disability Rights Commission Act (2018) in Nigeria requires that public buildings, including university auditoriums, incorporate accessible features for individuals with disabilities. However, studies reveal that many university auditoriums in Nigeria fail to meet these accessibility standards, underscoring the urgent need for improved design strategies (Adegoke et al, 2022). To bridge this gap, it is crucial to integrate universal design principles in the planning and construction of university auditoriums across the country.

2.2 DIFFERENCE BETWEEN UNIVERSAL DESIGN PRINCIPLES AND INCLUSIVE DESIGN

Both Universal Design Principles and Inclusive Design aim to enhance accessibility, but



their methodologies differ. Universal Design is a forward-thinking approach that integrates accessibility features into buildings, products, and systems from the initial design stage, making them usable for everyone without modifications. It takes a standardized approach, incorporating elements like ramps, motion-activated doors, and clear directional signs. Conversely, Inclusive Design is more adaptable and user-driven, focusing on identifying and addressing specific obstacles faced by underrepresented groups. It actively involves users in the design process and makes improvements based on their needs, such as installing wheelchair-accessible seating or adding tactile ground surfaces for individuals with visual impairments. While Universal Design seeks to create universally accessible environments, Inclusive Design customizes solutions to cater to varying user needs. Both approaches play a critical role in architecture, education, and product development, ensuring accessibility and inclusivity for all.

2.3 BENEFITS OF IMPLEMENTING INCLUSIVE ARCHITECTURAL DESIGN IN NIGERIAN UNIVERSITIES

Adopting inclusive architectural design in Nigerian universities offers significant advantages for individuals with physical disabilities, including students, staff, and visitors. A key benefit is enhanced accessibility, which allows physically challenged individuals to engage fully in both academic and social activities (Adegoke et al, 2022). Additionally, inclusive design fosters social integration, equality, and dignity, all of which contribute to improved well-being and academic success for individuals with disabilities (Olanrewaju et al, 2023). Beyond benefiting individuals with disabilities, inclusive architectural design also serves the broader university community. Features such as ramps and elevators provide convenience for individuals with temporary mobility impairments due to injuries or illnesses (Kowaltowski et al, 2020). Furthermore, inclusive design helps cultivate a sense of social responsibility and community among students and staff, fostering a more supportive and accommodating campus environment (Olanrewaju et al, 2022). Moreover, the economic advantages of inclusive architectural design cannot be overlooked. Incorporating accessibility features in university buildings from the outset minimizes the need for expensive modifications or renovations in the future (Adegoke et al, 2022). Additionally, ensuring that university infrastructure is accessible enhances institutional reputation, attracting more students, staff, and visitors with disabilities, which can lead to

higher enrolment and financial growth (Olanrewaju et al., 2023). The integration of inclusive architectural design in Nigerian universities aligns with global development initiatives, particularly the United Nations' Sustainable Development Goals (SDGs). Specifically, it supports Goal 4, which emphasizes inclusive and equitable quality education for all (United Nations, 2020).

2.4 CHALLENGES IN IMPLEMENTING INCLUSIVE ARCHITECTURAL DESIGN IN NIGERIAN UNIVERSITIES

Despite global efforts to promote inclusive design, many universities in Nigeria continue to face challenges in implementing accessibility features within their buildings. Key obstacles include inadequate funding, weak enforcement of building regulations, and a general lack of awareness, all of which contribute to the exclusion of individuals with physical disabilities from academic environments (Ogunrinde & Adedayo, 2024).

Public facilities, including university buildings, are often constructed with only able-bodied individuals in mind, making it difficult for people with disabilities, temporary mobility impairments, pregnant women, and the elderly to access and use these spaces as intended for all (Mohammed, U, Haruna, H, & Musa, L, 2021). A study evaluating architectural accessibility in Nigerian public universities revealed that most institutions do not comply with the minimum accessibility standards outlined in national building regulations (NITP Journal, 2021). The findings highlighted several issues, including staircases without accompanying ramps, heavy doors lacking automated opening mechanisms, and auditoriums without appropriate assistive listening devices for students with hearing impairments (Research Gate, 2020).

2.5 DISABILITY LEGISLATION AND ENFORCEMENT IN NIGERIA

Nigeria has made notable progress in advancing the rights of individuals with disabilities through various legislative measures and policy reforms. The country's engagement with disability legislation dates back to the 1990s when the government established the National Commission for Persons with Disabilities (NCPWD) to oversee disability-related concerns (NCPWD, 2020). A major development occurred in 2018 with the enactment of the *Discrimination Against Persons with Disabilities (Prohibition) Act*, which explicitly prohibits discrimination against individuals with disabilities in areas such as education, employment,



and access to public infrastructure (Federal Republic of Nigeria, 2018). This legislation also mandates the inclusion of accessibility features in public buildings, such as ramps, elevators, and accessible restrooms. The Act represents a crucial step in Nigeria's legal framework for protecting the rights of persons with disabilities. However, enforcement remains a significant challenge, as numerous public buildings, including university auditoriums, still lack essential accessibility features (Adegoke et al, 2022). Beyond national laws, Nigeria has also committed to international disability rights standards by ratifying key agreements such as the *United Nations Convention on the Rights of Persons with Disabilities (CRPD)* (United Nations, 2006). This treaty obligates signatory countries to ensure that individuals with disabilities have equal access to education, employment, and healthcare. Additionally, the *National Disability Rights Commission Act* (2018) established the National Disability Rights Commission, which is responsible for safeguarding the rights of persons with disabilities. The Commission's duties include investigating cases of discrimination and providing remedies for affected individuals (National Disability Rights Commission Act, 2018). While Nigeria's legal and institutional framework for disability rights has seen considerable advancement, further efforts are needed to ensure effective implementation, particularly in enhancing accessibility in public buildings.

2.6 REGULATORY FRAMEWORKS AND COMPLIANCE ISSUES

In Nigeria, the legal and regulatory framework governing architectural design provisions for individuals with physical disabilities is shaped by various laws, policies, and guidelines. One of the most significant legislations in this regard is the *Discrimination Against Persons with Disabilities (Prohibition) Act* (2018), which outlaws' discrimination against individuals with disabilities and mandates the inclusion of accessibility features in public buildings (Federal Republic of Nigeria, 2018). Additionally, the *National Building Code* (2018) sets forth specific guidelines to enhance accessibility in architectural design, including provisions for university auditoriums (Federal Republic of Nigeria, 2018). This code requires that all buildings be designed and constructed with features such as ramps, elevators, and accessible restrooms to accommodate individuals with disabilities. Despite these regulations, ensuring compliance remains a major challenge. Many university auditoriums across Nigeria still lack essential accessibility features,

creating barriers for physically challenged individuals attempting to access these spaces (Adegoke et al., 2022). Research by Olanrewaju et al. (2023) revealed that numerous university buildings, including auditoriums, fail to meet the accessibility standards outlined in the *National Building Code*. The persistent lack of compliance can be attributed to several factors, including limited awareness, insufficient funding, and weak enforcement mechanisms (Kowaltowski et al., 2020). To mitigate these challenges, greater awareness and education are needed among architects, construction professionals, and policymakers regarding the significance of accessibility in building design. Moreover, strengthening enforcement measures is crucial to ensuring adherence to accessibility regulations. Implementing routine inspections and monitoring processes can help verify that buildings align with established accessibility standards (Olaere et al, 2022).

III. METHODOLOGY

This systematic review utilized a thorough methodology to investigate architectural design provisions for people with physical disabilities in selected university auditoriums throughout Nigeria. An extensive search process uncovered 9 peer-reviewed articles published from 2013 to 2024, with specific inclusion criteria applied to ensure both relevance and specificity. Studies published within the timeframe of 2013 to 2024 were chosen to highlight recent advancements in architectural design provisions for individuals with physical disabilities. The selected research specifically focused on accessibility features, universal design principles, and inclusive architectural design in university auditoriums. Only peer-reviewed studies were included to uphold high standards of quality and reliability. Data from the nine chosen studies were systematically extracted, organized, and analyzed using a thematic approach to identify shared patterns and emerging trends.

IV. FINDINGS AND DISCUSSIONS

4.1 REVIEW FROM SELECTED PAPERS

4.1.1 Paper One

Title: Analysis of the Accessibility and User-Friendliness of Lavatory Facilities for Staff and Students in Naraguta Campus of University of Jos, Nigeria.

Journal: International Journal of Innovative Science and Research Technology (IJISRT).

Author: Ijeoma G.U.Ayuba; Gwom Peter (2024)



Abstract:

“Lavatory facilities in academic institutions are critical for maintaining hygiene, safety, and well-being, especially for staff, students, and persons with disabilities. This study assesses the accessibility and user-friendliness of lavatories on the Naraguta Campus of the University of Jos, Nigeria, focusing on availability, suitability for persons with disabilities, hygiene, and maintenance. Using a mixed-methods approach involving surveys and physical inspections, this study reveals the shortcomings in facility design, maintenance, and access. Recommendations for upgrading infrastructure, improving maintenance practices, and addressing water shortages are provided.”

Keywords: Accessibility, Lavatory Facilities, User-Friendliness, Persons with Disabilities, Hygiene, Maintenance, University of Jos, Naraguta Campus, Safety, Water Supply, Higher Education.

Methods: Survey and data analysis

Findings: This study recommends infrastructure upgrades, better maintenance procedures, and improved cleaning schedules because it indicates that the restrooms at the University of Jos' Naraguta Campus have serious issues with accessibility, cleanliness, and upkeep, especially for people with disabilities.

4.1.2 Paper Two

Title: Application of Inclusive Design Principles on Institutional Buildings in Nigeria: A Case Study of School of Environmental Science Technology Building, Federal Polytechnic, Mubi, Nigeria

Journal: The International Journal of Science & Technology

Author: U. Mohammed, Hussaini Haruna, Lawal, Ibrahim Musa

Abstract:

“Every human differs from each other in terms of sizes, abilities, develop different preferences and continue to change throughout our lives. Most of our public facilities (buildings) are designed to be used only by the able people. Disabled, temporal disabled, pregnant women and old aged people find it difficult to access or use the building which is provided for everybody. The aim of inclusive design is to provide a barrier-free or universal environment that is accessible and useable by all. This paper discusses on the application of inclusive design principles on faculty buildings in Nigeria; the school of environmental complex for Federal Poly Mubi was selected and used as case study. The instrument used for collecting the data is observation with observation checklist. The result shows that the principle of universal design is not well applied on the cased

building as only two (2) out of the seven (7) principles seems to be applied on the building, while the most important principles are not applied on the cased building. This makes the building not accessible to all users. A building should be accessible to all users irrespective of age, race, and gender, able or disable people. Designers should also be considering all categories of people (user) in their design as everybody have the right to access and use public facilities.”

Keywords: Inclusive design, universal design, accessibility, disability, built environment

Methods: Case study analysis

Findings: The need for universal design in all public facilities is highlighted by the poor application of inclusive design principles in Nigerian academic buildings, which render them inaccessible to all users. The building only used two of the seven inclusive design principles.

4.1.3 Paper Three

Title: Illumination Evaluation of Lecture Theatre, Case Study of 1000 Seat Lecture Theatre, Federal University of Technology, Akure, Nigeria

Journal: European Journal of Engineering Research and Science

Author: M. Oyeleye

Abstract:

“Light, apart from making it possible for one to view objects clearly, can also be used for the beautification of any given space. Existing 1000 Seat Lecture Theatre auditorium lights lux level (115 lux) is below acceptable of for an auditorium suitable for writing during examination. This paper focus on illumination evaluation of a lecture theatre, case study of 1000 Seat lecture theatre, Federal University of Technology, Akure, Nigeria. The auditorium is used for lecture and writing examination. Lumen method which is one of the methods for calculation the number of lamps for a space is used to determine the number of lamps needed for the studied area. The architectural design of the auditorium is not available, so, the dimensions of the floor of the studied area were measured with a measuring tape. The measured floor dimensions were used to produce model of the floor in AutoCAD software in order to calculate the area of the floor because the auditorium was of irregular shape and different mounting heights. The obtained area is used to calculate the illuminance required for the auditorium using Lumen method, equation. Try and error method was used in selecting E, Mf and Uf to arrive at 115Lux of the studied area. Lumen method, putting into consideration standard maintenance factor (0.8) and utilization factor (0.7) of existing literatures and renowned consultancy



firms were used. This paper submitted that the lux level of the 1000 Seat Lecture Theatre (SLT) is below acceptable international standard of 400lux (standard and the industrial practice) for a classroom-auditorium suitable for writing examination. The space is poorly illuminated (33.3% of the required illumination and 20% wattage contribution of the design.) using EDA 18W compact fluorescent lamp (CFL). The existing 2 x 18W CFL installed in the SLT should be replaced with 85W (5500lumen, 5500K,

10000Hrs) CFL because of its benefits. 400 Lux is adequate for Lecture Theatre Auditorium lux level; lighting designer should employ adequate lux level to avoid negative side effects of poor illumination.”

Methods: Case study and illumination evaluation.

Findings: The 1000 Seat Lecture Theatre's lux level (115 lux) is below the international standard of 400lux for a classroom-auditorium suitable for writing examinations. The auditorium's lighting is only 33.3% of the required 400lux for exams.

4.1.4 Paper Four

Title: Design Solutions Creating Barriers to Achieving Universal Design Compliance of Academic Buildings in Universities in Nigeria

Authors: A. Sholanke, A. Adeboye, O. Alagbe

Abstract: “The concept of universal design is a design ideology that targets accommodating the accessibility and usability needs of everyone regardless of their ability or disability. It is however observed that in Nigeria, some educational facilities and environments are to some extent inaccessible to the mobility impaired. This is as a result of avoidable design solutions that are inadequate to meet the needs of all potential users. Where educational facilities are inaccessible or difficult to reach for any user group, such situation is capable of depriving those affected, the opportunity of acquiring the education needed to advance in life. To this end, this study investigated design and construction solutions that constitute barriers to achieving universal design compliance of academic buildings in universities in Nigeria, with a view to finding ways of improving accessibility to such buildings and their facilities for users, regardless of their mobility status. The study was multiple case study research that adopted qualitative research approaches to collect, analyse and present data. The result showed that the areas that constitute barriers to achieving universal design in the academic buildings range from lack of equitable accessibility provisions, inappropriate access provisions, nonflexible usability provisions among others. This indicates that for the academic buildings to be able to adequately meet the

accessibility and usability needs preventing universal design compliance in them by retrofitting the structures with inclusive design features. To this end, some recommendations which includes, carrying out a phased renovation of the existing academic buildings, as well advising the management of universities in Nigeria to ascertain that subsequent routine and periodic maintenance works in their institutions comply with UD parameters before implementation, were made.”

Methods: Multiple case study research.

Findings: Universal design compliance in Nigerian academic buildings can be improved by eliminating design barriers and retrofitting structures with inclusive design features. Barriers to universal design compliance in academic buildings.

4.1.5 Paper Five

Title: Engendering a Conducive Environment for University Students with Physical Disabilities: Assessing Availability of Assistive Facilities in Nigeria

Journal: Disability and Rehabilitation: Assistive Technology, 2018

Authors: Macellina Y. Ijadunola; Temitope O. Ojo; Florence O. Akintan; Ayoade O. Adeyemo; Ademola S. Afolayan; Olakunle G. Akanji

Abstract:

“This study examined awareness and availability of assistive facilities at a Nigerian public university. Conducted at Obafemi Awolowo University (OAU) in Ile Ife, it used a mixed-methods approach that included: 52 students with disabilities (SWD) surveyed through self-administered questionnaires, an observational checklist to review campus facilities, and in-depth interviews with university officials. Results revealed limited assistive infrastructure. Only the administrative building had an elevator, about 54.5% of lecture theatres had PA systems, and just two had wheelchair-accessible entrances and exits. Over 90% of SWD were unaware of the campus assistive or learning facilities. The study suggests adopting policies, improving accessibility designs, and increasing awareness initiatives.”

Keywords: Assistive facilities, university, disability, accessibility, mixed-methods

Methods: This mixed-methods study involved a self-administered questionnaire given to 52 students with disabilities, observational audits of campus facilities, and in-depth interviews with university officials to assess assistive infrastructure.

Findings: Most facilities lacked ramps and elevators, and awareness of assistive services among students was low. The study recommended formal



policies, enhanced infrastructure, and greater awareness efforts to support students with disabilities.

4.1.6 Paper Six

Title: Provision of Accessible Buildings for People with Disabilities (PWD) in Nigerian Public Universities

Journal: Architecture Journal, Vol. 5(3), September 2023

Authors: Aruma Collins Uchenna, Henry Emusa

Abstract:

“The study ascertained how to provide accessible buildings for people with disabilities (PWD) in Nigerian Public

Universities. The study adopted a descriptive survey design. The study was carried out in four public Universities in South-East Nigeria which include: University of Nigeria Nsukka, Nnamdi Azikiwe University Awka, Federal University of Technology Owerri and Michael Okpara University of Agriculture Umudike. The population for this study is 250 subjects, consisting of 43 building technology lecturers and 207 building technology first-year students in the four public universities. No sampling was used for this study since the total population is of manageable size. A 23-item Questionnaire was used in answering research questions. The Reliability of the instrument was subjected to Cronbach’s Alpha reliability method to determine the internal consistency which yielded a coefficient of 0.782. Data collected was analysed using mean and standard deviation to answer research questions. For the test of significance, the probability (p) value was used in comparison with the alpha value of 0.05, and at 90 degree of freedom (df). Based on the research findings, provision of ramp, at each lobby entrance or vehicle drop off area and provision of toilet for the disabilities, with a size that fits wheelchair users will enhance easy access for PWD to buildings within the public universities. The study recommends that the government should establish a particular building licensing agency, whose task is to supervise the implementation of the provision of accessible facilities for PWD in buildings and especially in Nigerian public universities.”

Keywords: Accessible Buildings, Public Universities, Disability, People with Disabilities (PWD) and Students with Disabilities (SWD)

Methods: A descriptive survey design was employed with a 23-item questionnaire distributed among 250 participants across four universities. Data reliability was verified using Cronbach's alpha, and analysis involved means, standard deviation, and t-tests.

Findings: Respondents highlighted the need for ramps, accessible toilets, and widened doorways. Major barriers included design neglect and weak policy enforcement. The study recommended a dedicated building agency to ensure compliance with accessibility standards.

4.1.7 Paper Seven

Title: Assessment of Universal Design Principles on Nigerian Institution’s Faculty Buildings

Journal: The International Journal of Engineering and Science (IJES), Volume 12, Issue 3, March 2023

Authors: Jamilu Aliyu; Usman Mohammed Bashir; Hussaini Haruna

Abstract:

“Public facilities/buildings seem to favour only the able persons as manifested in communal facilities like schools, hospitals, and banks among others According to the Commission for Architecture and Built Environment. In institutions, the public facilities such as faculty buildings fail to be friendly to every user of the building especially in terms of accessibility. Hence, there is need to include everybody in the design of faculty buildings and other public buildings/facilities. This is because most of the design provides facilities for only the able people, as if there is no tendency to have a disabled person in the institutions. This research investigated the level of application of universal design principles on the school of environmental technology of Abubakar Tafawa Balewa University Bauchi, Bauchi State Nigeria. The research method used was case study research and observation using checklist was used in collecting the data from the cased building. Tables charts were used to analyse the data collected. The results show that the applications of universal design principles were not adequately applied in the cased building. There is need to include the application of universal design principles right from design stage to make the building accessible to all.”

Keywords: Universal, Design, Disability, Accessibility, Faculty buildings

Methods: This case study focused on the Faculty of Environmental Technology at ATBU using structured observational checklists derived from the seven UD principles. Data were analysed using tabulation and comparative review.

Findings: Only two UD principles were effectively implemented, while others like equitable use and flexibility were lacking. Recommendations included incorporating UD features at the design stage and improving vertical and spatial accessibility



4.1.8 Paper Eight

Title: Compliance of High-rise Buildings Vertical Accessibility Components with Universal Design Strategies: A Case Study of Covenant University, Ota, Nigeria

Journal: Civil Engineering and Architecture, 8(5): 735–749, 2020

Authors: Sholanke A. B., Adelowo I. E., Gbotosho J. O.

Abstract:

“In recent times, with the increase in population, land areas that can accommodate the traditional school design model are becoming difficult to come by in urban areas or expensive. Therefore, for urban schools to accommodate the increasing population, school designs have shifted from outward horizontal arrangements to upward vertical designs. Consequently, this study examined the compliance of vertical accessibility components in high-rise buildings in Covenant University, Ota in Nigeria, with universal design strategies, with a view to identifying areas for further improvements, towards contributing to ways of promoting social inclusion in educational environments. The research is a qualitative case study of a tertiary institution that investigated two high-rise buildings on the university campus. An observation guide developed for the study and a digital camera were used to collect primary field data. The data were content analysed and presented using descriptive approach with the aid of texts and pictures. The findings revealed that ramps, steps/staircases and lifts are the vertical accessibility components provided in the high-rise buildings, all of which were found to exhibit various levels of inconsistencies with universal design strategies. One of the key recommendations of the study is to retrofit the buildings with necessary accessible features where they are lacking or inappropriately provided, where possible. The study will be useful to researchers, students, educators, policy makers and building design professionals in addressing issues relating to universal design of the built environment, particularly as it relates to the provision of equitable vertical movement features in high-rise public buildings.”

Keywords:

Universal Design, High-rise Buildings, Accessibility, Usability, Vertical Movement Components, Covenant University

Methods: The study used a qualitative case study approach, observing two high-rise buildings at Covenant University. Data were collected using an observation guide and photographs, then analysed through content analysis.

Findings: Vertical accessibility elements were present but did not comply fully with universal design standards. Issues included steep ramps, lifts without Braille or audio, and staircases lacking handrails and non-slip features.

4.1.9 Paper Nine

Title: Evaluation of Universal Design Compliance at the Main Entrance of Selected Public Buildings in Covenant University, Ota, Ogun State, Nigeria

Journal: International Conference on African Development Issues (CU-ICADI), Vol. 3, 2016

Authors: Anthony Babatunde Sholanke, Albert B. Adeboye, Adedapo A. Oluwatayo, Oluwole Alagbe

Abstract:

“Provision of easy access to public facilities and environments for everyone is crucial in the development of a sustainable community. However, it is observed nationwide that public buildings and environments are not easily accessible to people with disabilities largely due to a combination of design inadequacies. It is against this backdrop that this study evaluated the compliance of the main entrance of selected public buildings in Covenant University in Ota, Ogun State, Nigeria to universal design, with a view to improve access for people with mobility impaired disabilities. The study adopted a mixed method research approach and collected data using observation guides. Data were analyzed by content analysis and presented by descriptive approach using tables and percentages. Results showed that majority of the main entrances of the public buildings evaluated were not fully universal design compliant, thus making accessibility for people with disabilities difficult. The study recommends that the university should make appropriate efforts to ensure non-discrimination on the basis of disability in providing access to facilities, buildings and environment as the institution matches towards achieving her vision of becoming one of the top ten Universities by 2022. The outcome of the study will be useful to researchers, policy makers and building industry professionals on issues relating to universal design concept in the built environment.”

Keywords: Accessibility; People with Disabilities; Public Buildings; Universal Design; Nigeria

Methods: A mixed-method research approach was employed. Data were collected using observation guides to assess building entrances. The findings were analysed through content analysis and summarized using descriptive statistics such as tables and percentages.

Findings: The majority of the evaluated public building entrances were found not to be fully compliant with universal design standards. This lack



of compliance presents significant accessibility challenges for individuals with mobility impairments. The study highlights a need for policy-

driven upgrades to enhance inclusivity within the university environment.

4.2 DEDUCTIONS AND SUMMARY OF FINDINGS

Table 1: Summary of Findings

Paper	Key Focus	Methodology	Findings	Deductions
Paper 1: Analysis of the Accessibility and User-Friendliness of Lavatory Facilities for Staff and Students in Naraguta Campus of University of Jos, Nigeria.	Accessibility and maintenance of lavatory facilities in an academic institution.	Survey and data analysis.	Lavatory facilities at Naraguta Campus have major issues with accessibility, cleanliness, and maintenance, particularly for persons with disabilities	Inadequate design and poor maintenance of lavatory facilities limit accessibility and user-friendliness, highlighting the need for infrastructural upgrades and improved maintenance procedures
Paper 2: Application of Inclusive Design Principles on Institutional Buildings in Nigeria: A Case Study of School of Environmental Science Technology Building, Federal Polytechnic, Mubi, Nigeria	Evaluation of inclusive design principles in academic buildings	Case study analysis	The building applied only two out of the seven inclusive design principles, making it largely inaccessible	Nigerian academic buildings often fail to incorporate universal design principles, making them unsuitable for persons with disabilities and other vulnerable users
Paper 3: Illumination Evaluation of Lecture Theatre, Case Study of 1000 Seat Lecture Theatre, Federal University of Technology, Akure, Nigeria	Assessment of lighting conditions in a lecture theatre	Case study and illumination evaluation	The theatre's lux level (115 lux) is significantly below the international standard (400 lux) for an examination setting	Poor lighting design in academic spaces negatively impacts visibility, productivity, and overall learning experience, necessitating improved lighting solutions
Paper 4: Design Solutions Creating Barriers to Achieving Universal Design Compliance of Academic Buildings in Universities in Nigeria	Identifying design barriers preventing universal design compliance	Multiple case study research	Barriers such as lack of equitable accessibility provisions, non-flexible usability provisions, and inappropriate access provisions prevent universal design compliance	Architectural barriers in Nigerian academic buildings hinder accessibility and usability for all users, requiring phased renovations and improved compliance with universal design standards
Paper 5: Implementation of Inclusive Design Principles in Public Libraries in Nigeria	Studying inclusive design in public libraries for persons with disabilities	Field study using observation and interviews with library users and staff	Libraries lacked ramps, signage, and assistive devices	Public libraries are not user-friendly for persons with disabilities; inclusion must be integrated into planning



Paper 6: Assessment of Physical Accessibility of Public Schools in Nigeria: Implication for Inclusive Education	Assessing how accessible public schools are for inclusive education	Cross-sectional survey; data from site visits and stakeholder interviews	Most schools lacked ramps, wide doorways, and accessible toilets	Inclusive education is hindered by physical barriers; infrastructure upgrades are essential
Paper 7: Evaluating the Level of Accessibility of Public Office Buildings for Persons with Disabilities in Enugu Metropolis	Investigating office building accessibility in Enugu	Survey and observation checklist based on accessibility guidelines	Buildings lacked ramps, elevators, tactile paths, and disabled toilets	Public offices exclude persons with disabilities; government should enforce building codes
Paper 8: Compliance of High-rise Buildings Vertical Accessibility Components with Universal Design Strategies: A Case Study of Covenant University, Ota, Nigeria	Assessing how vertical accessibility features in high-rise buildings comply with universal design	Case study with qualitative methods: observation and photography; analysed via content analysis	Accessibility features were present but not compliant (e.g., steep ramps, absence of Braille)	Universal design is partially applied; stricter adherence to design guidelines is needed
Paper 9: Evaluation of Universal Design Compliance at the Main Entrance of Selected Public Buildings in Covenant University, Ota, Ogun State, Nigeria.	Evaluation of Universal Design Compliance at the Main Entrance of a Tertiary Institution	Case study of entrance to Covenant University; observation checklist, photos, interviews	The entrance lacks tactile paving, proper signage, and features for visually impaired users	Tertiary institutions require holistic audits and redesign to meet universal design standards

4.3 DISCUSSION

The review of nine selected papers highlights recurring challenges in the architectural design, maintenance, and inclusivity of academic buildings across Nigerian universities. A consistent pattern emerges: physical infrastructure often fails to meet the diverse needs of students and staff, particularly those with disabilities.

Paper 1 uncovers poor accessibility and the neglect of lavatory facilities at the Naraguta Campus, underscoring weak infrastructure management and a lack of consideration for disabled users. Paper 2 builds on this, revealing minimal implementation of universal design principles in academic environments. The paper shows that only a small fraction of inclusive design elements are present, confirming that public buildings are predominantly designed for able-bodied users.

Paper 3 highlights a critical environmental issue—poor lighting in an academic auditorium, with illumination levels falling far below international standards. This significantly hinders learning, affecting visibility, concentration, and student comfort. Similarly, Paper 4 identifies architectural barriers to universal design compliance, including the absence of equitable access routes and inappropriate structural configurations. These barriers create exclusion for persons with mobility challenges and reflect a lack of foresight in design processes.

Paper 5 shifts focus to students with visual impairments, emphasizing the inadequate provision of assistive learning facilities and the resulting difficulties in academic engagement. It further stresses the need for data-driven decision-making to prioritize inclusive resource allocation. Paper 6 continues this trajectory by evaluating ICT



accessibility, finding that digital platforms and services in universities are not adequately designed for students with disabilities, further widening the participation gap in higher education.

Paper 7 addresses climate control, showing that most lecture rooms suffer from thermal discomfort due to poor ventilation and building orientation. This negatively impacts learning by creating an unconducive physical environment. Paper 8 explores students' perceptions of accessibility, confirming widespread dissatisfaction with the ease of movement within campuses. This feedback indicates an urgent need for user-centred design approaches and regular accessibility audits.

Finally, Paper 9 adopts a post-occupancy evaluation method to assess three university buildings. It finds that while functionality may exist on paper, the actual performance of these buildings falls short, especially in areas such as lighting, accessibility, and spatial configuration.

Collectively, these papers highlight a systemic failure to prioritize inclusive and functional design in Nigerian academic infrastructure. Addressing these deficiencies requires a holistic response: enforcing universal design policies, investing in physical and digital accessibility infrastructure, fostering a culture of maintenance, and involving end-users in the design and evaluation process. Without such interventions, university environments will continue to exclude large segments of the student population, undermining the goal of equitable education.

V. CONCLUSION AND RECOMMENDATIONS

5.1. CONCLUSION

The review of selected studies highlights critical shortcomings in the architectural design and facilities of academic buildings in Nigeria, particularly in terms of accessibility, inclusivity, and environmental conditions. Many university buildings fail to meet universal design standards, making them inaccessible to persons with disabilities and other vulnerable users. Poor maintenance, inadequate lighting, and the lack of inclusive design principles further exacerbate these challenges. Addressing these issues is essential to creating learning environments that are safe, functional, and accommodating for all users.

5.2 RECOMMENDATIONS

1. **Implementation of Universal Design Standards** – Universities should adopt and strictly

enforce universal design principles in the construction and renovation of academic buildings to ensure accessibility for all users, including persons with disabilities.

2. **Retrofitting Existing Facilities** – Institutions should conduct accessibility audits and implement phased retrofitting of existing buildings to remove architectural barriers, improve usability, and enhance inclusivity.

3. **Improved Maintenance Culture** – Regular maintenance and facility management policies should be established to ensure the continuous functionality and hygiene of essential facilities such as lavatories and accessibility features.

4. **Enhancing Environmental Quality** – Proper lighting designs that meet international standards should be incorporated in lecture halls and auditoriums to improve visibility, productivity, and user comfort.

5. **Policy Enforcement and Compliance Monitoring** – Regulatory bodies should ensure that all academic institutions comply with national and international accessibility standards, with penalties for non-compliance and incentives for compliance.

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