ANALYSIS OF USABILITY AND ACCESSIBILITY FEATURES IN PUBLIC BUILDINGS: A CASE STUDY OF HOSPITALS IN AKURE, NIGERIA.

BY

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CERTIFICATION

This is to certify that this independent research work on **ANALYSIS OF USABILITY AND ACCESSIBILITY FEATURES IN PUBLIC BUILDINGS: A CASE STUDY OF HOSPITALS IN AKURE, NIGERIA.** was carried out by **OYEKUNLE IYINOLUWA TOLUWANIMI** (**ARC/18/7229**) under my supervisor as part of the award of the Bachelor of Technology (B. Tech) degree in Architecture, Federal University of Technology, Akure, Ondo State, Nigeria.

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ABSTRACT

Using hospitals in Akure, Nigeria, as a case study, this thesis investigates the usability and accessibility of public spaces. This study tries to determine how much inclusive, barrier-free access is incorporated into architectural designs and tackles the difficulties that people with impairments encounter when accessing hospital facilities.

Qualitative data were gathered through on-site visits and photographic documentation using three case study hospitals: Tim Unity Specialist Hospital, FUTA Health Center, and Ondo State Specialist Hospital. In order to evaluate the design intent, usefulness, and compliance with accessibility standards, these data were further examined through photo interviews with students and professionals in the field of architecture.

The results show notable differences in accessibility features, from poorly maintained facilities to insufficient ramps and signage. The study emphasises the gap between design requirements and user experience, focusing specifically on the demands of varied users, such as those with eyesight, mobility, or cognitive disabilities. Suggestions are made to enhance the layout and performance of Akure's medical facilities, encouraging social inclusion and enhancing the standard of living for people with disabilities.

CHAPTER 1

INTRODUCTION

A large part of the Nigerian population – individuals with disabilities – face daily challenges navigating the built environment. Living and going about in Nigeria has proven that public and private buildings mostly lack basic accessibility features, which makes it harder for people with disabilities to get a chance at social inclusion and participation. This reality calls for a change in design practices regarding both the usability and accessibility of the buildings we use every day.

This project, "Usability and accessibility in public buildings: A case study of hospitals in Akure, Nigeria." aims to understand the current state of usability and accessibility in public buildings in Akure, using hospitals as a case study. It shows how hospitals in Akure, one of the significant buildings used by people living with disabilities, practise accessible and universal design. It explores the potential of architectural designs, both interior and exterior, to create welcoming and functional spaces that meet the diverse needs of users with various disabilities in Nigeria.

1.1 Background to the Study

From traditional people to contemporary and modern youngsters to people of different ages, ethnic and educational backgrounds, interests and priorities, and activity levels, Nigeria has a wide demographic of people (Green, 2023). In many ways, just like in other countries, especially in third world countries, different demographics have different levels of priority and consideration from the different industries in the country.

The pattern has shown that more significant demographics get the most priority and attention. In different industries like health, business, politics, and others, it has been shown repeatedly that

the more extensive group is given more priority. Architecture and interior designs are usually based on the needs and interests of the average user (Yuen, 2013). This is a logical course of action. However, where does that leave the smaller percentage of users in the society? The people in the smaller group get less attention and, in turn, miss out on some of the best experiences. This is precisely why architectural designs barely solve the needs of the smaller demographics, which also include people living with disabilities.

In Akure, the late former governor of Ondo State, Rotimi Akeredolu, did a lot to bridge the gap between the bigger demographic of non-disabled people and the smaller percentage of people, which are people living with disabilities. However, in 2024, there are still apparent gaps in the city between persons with disabilities and persons without. These gaps vary by different factors, such as locations and organisations (CDInclusion, 2024).

Following the very first world report on Disability from 2011, due to the rapid spread of chronic diseases and ageing, more people are living with some form of disability. More specifically, 15% of the world's population is living with some form of disability, while 2-4% of this percentage experience severe difficulties in functioning (World Health Organization & World Bank, 2011)

As of 2020, the number of people living with disabilities in Nigeria was estimated at 25 million people. In a country with 208 million people in the same timeframe, this means that 1 in every eight people is living with one disability or the other in the country (Uduu, 2020). Due to the representation of disability in social and religious contexts, people living with disabilities in Nigeria have experienced discrimination in different forms. People living with disabilities in Nigeria receive minimal care and also experience discrimination within their families and society

in general. They are usually a target for abuse, neglect and mistreatment in society.(Abayomi et al., 2022).

Due to the neglect that diverse users experience in Akure, it is evident that several things need to work to their advantage, including public building designs. For these public buildings, both interior usability and exterior accessibility are crucial parts of what needs to work for people living with disabilities. The interior of a space is one of the things that make a building or structure conducive enough for a person to dwell in, no matter what they are. At the same time, accessibility goes beyond the interior of the building. As the initial point of engagement for all users, whether they are living with disabilities or not, the exterior of a building has to be comfortable, clear and free from all barriers and cater to people of all needs. Human needs, sustainability, and accessibility are essential influences on the design of an interior space, as well as how user-environmental interactions are managed. (Demikran and Afacan, 2018).

Inclusive spaces are spaces designed to ensure they are functional and inclusive to a broad and diverse range of people. This means the space provides a comfortable, accessible, and good user experience for everyone, regardless of age, ability, background, or needs. Usable spaces are designed with functionality and practicality in mind while catering to the occupants' needs, emphasising a balance between ergonomics, functionality and aesthetics.

Accessible spaces involve designing by incorporating accessibility features into the interior and exterior design of the building. These spaces are designed to be usable by everyone, regardless of their abilities. It involves designing for people of all ranges, from mobility impairments to sight and sensory sensitivities. This applies to all building types, public and private.

In public buildings like hospitals, expansions and building complexities are reasons why there is barely any accessibility feature in hospital designs. The constant change and expansion and complex building designs make navigating hospital buildings and their designs harder for people with disabilities (Ahmed et al., 2022). As a building that many people with disabilities use frequently due to their checkups and health-related visits, hospitals are a perfect way to analyse and understand the state of accessibility and usability in public buildings in Akure.

Accessibility here goes beyond creating special features in buildings and their interiors to make sure that people with disabilities and diverse users can use it. It is more about ensuring that the existing features are accessible to everybody without discrimination. As a result, this thesis highlights the current accessibility and useability of public buildings in Akure, Ondo state, with hospitals as a case study. It also discusses how to improve the experience of all the possible users of these public spaces.

1.2 Statement of Research Problem

Buildings, which are a form of shelter, are one of the primary needs of every user in the world. With buildings being a part of our daily lives across different parts, which include education, residence, career, health, and others, it is essential that a wide range of users, no matter the demography they fit in, are able to use the building for the exact purpose it was created while maintaining sustainability. Functional buildings are supposed to be efficient, have fewer environmental burdens, and protect and restore green systems while ensuring all the users enjoy a barrier-free environment and are at maximum well-being (Keerthirathma et al., 2010)

This is proof that there is a great need for diverse users to be considered when designing public buildings to ensure that the space is functional, accessible and usable enough for them to have

the best user experience. Because of the societal impression that people living with disabilities cannot be helped, a lot of architects and interior designers tend to neglect the needs of this group of users (Yuen, 2013).

The built environment, in general, is in need of much better accessibility for users with diverse needs. The design of a building is essential as a starting point to ensure that all people with diverse needs can live independently while improving accessibility (Keerthirathma et al., 2010). In Akure, the accessibility problem in the built environment is much worse. Observation has shown that in the urban centre of Akure, few organisations, such as banks, are trying to increase the living standards for people living with disabilities, including the public buildings they interact with (CDInclusion, 2024).

This study highlights what usability and accessibility mean in public buildings in Akure, using hospitals as a case study and analysing why these buildings are in certain states and how the design decisions made in the design and construction process affect the daily lives of people living with disabilities in Akure. It also aims to provide solutions and possible ways for these buildings' exterior and interior to be designed to fit the needs of people better and create a more accessible and usable space, which in turn becomes inclusive for all possible users.

There has been a lot of research surrounding the present state of accessibility in the built environment all over the country. In Abuja, for example, an estimated 75% of the public buildings are not freely accessible to people living with disabilities, specifically those with mobility issues, due to the improper design or absence of ramps (Anunobi et al., 2015). However, not much has been done regarding how both the exterior and interior design of a public building, especially hospitals, affects or impacts people with diverse needs, such as the feeling of

being included in the consideration for the built environment and also going about daily activities with no barriers or seclusion. There is not enough research about the need to design public building interiors for usability and exteriors for accessibility and how it should be done.

The invention of universal design serves the purpose of creating a conducive and accommodating for all diverse users, no matter what. More architects are looking to inculcate universal design into their designs and improve accessibility for people of all needs (Yuen, 2013). It is best also to prioritise interior design for usability in this case.

1.3 Research Questions

Multiple questions revolve around the goal of this research. This research seeks to answer the research questions as follows:

i. What is the current state of the accessibility and usability of public buildings in Akure?

ii. How do interior designs affect the perception of inclusivity in a building?

iii. What are the existing user experiences of the accessibility and usability features in different hospitals in Akure?

iv. What are the different design accessibility and usability requirements for hospitals in Akure?

1.4 Aim of the Study

This study aims to understand the current state of the usability and accessibility of the design of hospitals as public buildings in Akure, with a view to promoting accessible design practices that improve the quality of life and social inclusion for people living with disabilities in Akure.

1.5 Objectives of the study

The objective of this study includes the following:

i . Analyse and understand the current state of accessibility and usability in hospital designs in Akure.

ii. Identify the accessibility and usability challenges faced by people living with different disabilities in hospitals in Akure.

iii. Understand how public building designs can be improved and made more accessible and inclusive to users.

iv. Identify the barriers to the implementation of universal design features in hospitals and propose solutions to overcome them.

1.6 Justification for the Study

The design of public buildings and their interior spaces is usually done with no person with a disability in mind. There are so many barriers that influence the accessibility of these spaces. Before the Disability Law in Nigeria was passed, designing buildings and facilities to accommodate people with disabilities was not a priority. Because of this, multiple physical barriers restrict the usability and movement of people with disabilities in public, social and communal facilities (Anunobi et al., 2015). In Nigeria, barrier-free architectural design standards are very much behind those of developed countries in the world. Removing these barriers makes a better life for people with disabilities while making them feel included in social activities (Nimlyat et al., 2010).

Inclusivity and accessibility in the design of public buildings are an integral part of improving social inclusion for people living with disabilities. However, despite the provision of the National Building Code of 2006 and its provisions on accessibility to public and assembly buildings, there is still a feeble response to providing basic accessibility requirements for people with disabilities in public buildings (Ibem et al., 2017).

This study will address insufficient research regarding inclusive and accessible hospitals beyond mobility and sight-impaired users. This study will lead to analysing the needs of a diverse range of users with different disabilities while promoting social inclusions and improved living standards and quality for all users.

1.7 Scope of the Study

The project's scope goes over the current state of accessibility and usability of public buildings in Nigeria for people living with disabilities. This thesis focuses on using hospitals in Akure, Ondo state, as a case study. So, this study covers the following areas:

- The state accessibility and usability of interiors and exteriors of hospitals in Akure
- The effects of the current state of the accessibility of these designs on users with diverse needs
- The possible solutions that are cost-effective and functional for diverse users in Akure
- The primary focus is on users who are people with disabilities (PWDs) with different impairments, which include sight, mobility, hearing, and cognitive.

CHAPTER 2

LITERATURE REVIEW

2.1 Organization of Chapter

This chapter serves as a foreground to the existing research and elements that back the findings and procedure for this research process. This chapter shows an understanding of the research topic and how it comes into play in real life, with references and an understanding of previous works done in the same research field.

The chapter starts by providing a basic understanding of the research topic and the state of accessible and usable design in Akure, Ondo state. It proceeds to give a detailed explanation and description of the effect and impact of the current state of the design of public buildings, specifically hospitals, on people with different disabilities in Akure. A comparative analysis of the study alongside other research methods and papers is done during the writing.

In addition, this chapter goes over universal design and inclusive design in Akure and Nigeria in general while highlighting the research gaps and possible solutions.

2.2 Introduction

According to Nimlyat et al. (2010), people living with disabilities are consistently experiencing difficulties when using architectural and interior design spaces. Architectural spaces in Nigeria usually cater to the needs of non-disabled people, with little or no attention paid to the needs of people living with disabilities. It is speculated from this study that one of the reasons the built environment does not cater for diverse users and provide accessibility for them is that people do

not usually cater to the needs of people with disabilities. This means that the society usually segregates them and, in turn, just takes them out of the demographic to cater to.

People with disabilities are usually treated with pity, as others believe there is not enough that can be done to assist them, which is false. This has made architects and designers spend more time creating spaces and public buildings that segregate and exclude people with disabilities. According to Anunobi et al. (2015), research has shown that many people living with disabilities in Nigeria are living in poverty and require a better living experience through the provision and use of social facilities like schools and hospitals. However, these facilities are primarily present in places where accessibility is difficult or even nonexistent for people living with disabilities.

2.3 Literature Survey

The literature survey about the publications about the state of inclusive design and accessibility of public buildings in Akure utilised various databases to find research on inclusive and accessible design in Akure and Nigeria. Different scholarly journals obtained from extensive databases like Google Scholar were used for this survey. This involves in-depth research conducted by using Google Scholar.

To find the best materials to carry out this research, the following keywords and phrases were used to search: (1) Accessibility in architecture, (2) Inclusive design in Nigeria, (3) Inclusive interior design, (4) Design for people with disabilities, (5) Universal design, (6) Designing for accessibility, (7) Designing interiors for accessibility, (8) interior design for accessibility, (9) Designing inclusive spaces in Nigeria, (10) Accessibility in buildings in Akure, (11) People with disabilities in Akure, (12) Accessibility in hospital building designs. These different keywords and phrasing are what, in turn, brought about the literature to be reviewed.

2.4 Universal and Accessible Design Standards

In the design world, especially architecture, universal and accessible design are different but interconnected design elements. On the one hand, accessible design is a part of universal design that focuses specifically on removing the barriers people with disabilities face when using buildings anywhere and creating spaces they can use easily. Accessible design in buildings means that everyone, no matter their disability, gender or age, can gain access to a building and its parts (Kportufe, 2015). Inclusive design is usually synonymous with universal design. In the United States of America, it is referred to as “Universal Design”; in Great Britain, it is referred to as “Inclusive Design”; and in Europe, it is referred to as “Design for all” (Abdul Kadir et al., 2012). Taking into account and creating spaces for all people, regardless of their disability, so that they can use buildings comfortably (Makhbura, 2024).

On the other hand, universal design is more intense. In architecture, universal design involves designing spaces and buildings that can be used for anyone, regardless of age, ability or disability. This means universal design involves catering spaces that are adaptable, accessible and inclusive. According to Makhbura (2024), the term “Universal design” was first defined and used by Ronald Macem, an American architect who used a wheelchair, in 1985. According to CIO Council Operations (2017), he created seven principles to guide universal design, and they are as follows:

- Equitable Use: The design is useful and marketable to people with diverse abilities.
- Flexibility in Use: The design accommodates a wide range of individual preferences and abilities.

- Simple and Intuitive Use: The design is easy to understand, regardless of the user's experience, knowledge, language skills, or concentration level.
- Perceptible Information: The design communicates information effectively to users, regardless of their sensory abilities.
- Tolerance for Error: The design minimises the chance of unintentional errors and the consequences of errors.
- Low Physical Effort: The design can be used comfortably and efficiently with minimal force.
- Size and Space for Approach and Use: Appropriate size and space are provided for people of all sizes and abilities.

Universal design is not only for people with disabilities. It serves anyone and everyone, from parents with carries, people who use walkers, delivery staff, people with temporary disabilities, and others (Ediae et al., 2023). These form the standards for universal designs all over the world. Although no laws directly enforce universal designs, there are laws in different countries regarding accessible designs. In the United States of America, the Fair Housing Act compels house owners to provide people with disabilities living in their houses with the necessary housing modifications they need to live in the house. (Shahrom & Zainol, 2015).

In Sri Lanka, there is a “Protection of the Right of Persons with Disabilities Act, No.28 of 1996” that requires all new constructions from that year onwards to be designed in a way that people with disabilities can use the entrance comfortably (Keerthirathma et al., 2010).

In Ghana, the Disability Act 2005 compels all Public bodies to make their public buildings accessible to people with disabilities with ease. In Nigeria, the Discrimination Against Persons With Disabilities Prohibition Act of 2018 outlines that all public buildings should have accessibility like ramps, lifts, and facilities and should be usable for people with disabilities. The existing buildings also had a 5-year grace to be modified for accessibility, ending in January 2024 (National Commission for Persons with Disabilities (NCPWD), 2018).

2.5 State of Interior and Universal Design in Nigeria

Interior design is an integral part of a building's design and the user experience. As great as having an aesthetically pleasing and functional exterior design, having an interior design that does not work is counterproductive. Interior design is the act of enhancing the interior of a building to design a functional, aesthetically, and healthy environment for the users of the space. It is a multifaceted profession that combines creativity with technical knowledge. Interior designers have the role of considering architectural elements, building codes, space planning, and safety alongside their aesthetics.

In Nigeria, different laws guide the design of buildings for use by everyone the building is meant for. However, these laws are not followed religiously, especially in the context of different disabilities in the country.

For instance, Sholanke et al. (2020) evaluated the state of the accessibility and universal design of buildings at Covenant University concerning the vertical accessibility of high-rise buildings. The methodology used was qualitative research in which data was gathered through observations and pictures. After analysing the data gathered, the researchers realised that the most common vertical accessibility components in high-rise buildings are stairs, ramps and lifts. Certain

buildings, such as the Senate building, conformed with the Universal design requirement at the entrance as there were stairs and ramps. However, the ramps were uncomfortable and unsafe to use as they did not follow slope and dimension standards. This makes the building harder for people with mobility disabilities to access. The research also showed that this was similar across the significant high-rise buildings in the school. Some stairs also had open risers, which might be challenging for people with vision disabilities to use as their legs might slip through.

In addition, Ediae et al. (2023) researched how much attention is paid to universal design in recreation centres in Ogun State, Nigeria. These researchers conducted quantitative research through the use of surveys. More than half of the people in the sample area understand that people are living with disabilities and also that anyone should be able to use and experience a place with ease no matter their disabilities. This research also showed that people are aware that the design of recreational facilities in Ogun state, Nigeria, does not consider the basic rules of universal design and makes the facilities accessible for everyone, regardless of disability or ability.

Sholanke et al. (2019) also conducted research on the state and perception of universal design in public educational buildings- secondary schools in Akwa-Ibom. The research stemmed from an observation of the fact that most people living with disabilities are usually sidelined when it comes to accessibility provisions in public environments and buildings due to the ineffectiveness and lack of standards of these provisions. This study aims to understand the effectiveness of the accessibility elements in selected school buildings in Akwa-Ibom to meet the users' needs in order to make contributions to note the areas for improvement for access to these buildings no matter the mobility status of the user, in line with the principles of universal design.

The methodology of this research was a cross-sectional survey that went across three selected secondary schools in the study area. Quantitative research, using a structured questionnaire to gather data from 136 students from all three schools, was the method used for his research. The three schools were in three strata: federal, state and private secondary schools. The schools are Federal Science and Technical Girls College, Ukana Offot, Ministries of Education Special Education Centre for Children with Special Needs, Mbiabong Etoi and Noble International School, Atan Offot.

A percentage, 14%, of the 136 students that were respondents had a disability they were living with and required the aid of either a wheelchair, crutches, or a walking frame. The survey questions covered the ranking of the accessibility provisions in these schools, ranging from ramps to walkways, handrails, doors, stairs, floor surfaces, corridor sizes, and main entrances. The result from this survey showed that the ramps are the least effective of the accessibility elements in the buildings, and the main entrances are the most accessible. The state of rams in the school should be refocused and placed in the parts of the school where they are needed for people living with disabilities, thereby improving social inclusion for them, too (Sholanke et al., 2019).

2.6 Accessibility and Inclusivity in Public and Private Buildings

With the varying services offered in Nigeria across different industries, different kinds of buildings can be used by different users and people of different genders, abilities or disabilities, preferences, and many more. The inclusivity of the design of a building depends on the type of users and the purpose of the building. As much as inclusive design involves designing for all spectrums of people, specific needs need to be met. Accessible design in the built environment

has gone beyond just mobility conditions and now includes mental health conditions. This is because non-visible conditions and the designs they need deserve more attention too (Narenthiran et al., 2022).

For instance, Narenthiran et al. (2022) researched ways to reduce the physical barriers that people with disabilities face when using workspaces and how to design an inclusive workspace. Using both qualitative and quantitative research, the researchers tried to understand the issues people of all kinds face with workspaces. Research showed that the adaptations of workspaces to accommodate people with disabilities focus on mobility-related conditions only, as in the case of implementing ramps and lifts.

The research methodology was a survey. Sent out with a mix of open-ended and multiple-choice questions, which made it both qualitative and quantitative, this survey showed that interior design is integral to creating inclusive spaces for people. From ergonomic furniture, interior lighting, room decoration and Layout, the interior design of a building affects the inclusivity of a design and how effective people with different disability spectrums feel about its use. There are also other design factors, such as environmental lighting, thermal comfort and acoustics, that affect workspace performance, according to the survey.

Ahmed et al. (2022) also did research regarding visual accessibility and inclusive wayfinding designs in Nigerian hospital environments. This research aims to understand the barriers to accessibility to wayfinding in hospital buildings and the impact these barriers have on the users. This research methodology was also mixed using quantitative and qualitative research methods. Because hospitals grow and expand based on increased demand, it is essential to ensure efficient legibility of buildings, circulation and other elements for proper wayfinding. The research results

showed that the presence of both directions and destination signage in the hospital of the study area facilitated wayfinding. Ranging from text to pictographs, audio and tactile signages, it is essential for improving accessibility.

2.7 Universal Design Compliance of Nigerian Public Buildings

Public buildings are designed for use by people of all ages, genders, occupations, and abilities. By all standards, every public building should cater to every one according to the standards and rules of universal design in the world. In Nigeria, there are different buildings with different levels of universal design compliance, as research has shown. Studies have also shown that adopting universal designs in public buildings such as museums has multiple benefits, including providing comfort and increasing social interaction levels for people with disabilities (Ibem et al., 2017).

In a research work titled "*An Appraisal of Universal Design Compliance of Museum Buildings in Southwest Nigeria.",* Ibem et al. (2017) researched the state of accessibility and usability of public buildings in the southwest of Nigeria, using three Museums as a case study. These three museums were the Natural History Museum at Obafemi Awolowo University (OAU), Ile-Ife, Osun State; Badagry Heritage Museum, Badagry, Lagos State; and the National Museum, Onikan, Lagos State. In this work, the principles of universal design were cited to include three specific characteristics or design strategies: approachability, accessibility and usability.

Approachability is the accessibility journey between the building's immediate surroundings and the building itself. It involves the provision of a proper and accessible path from the street and car part through the building's public spaces to the building's entrances.

Accessibility starts from where approachability stops. It starts from the building's entry points to its spaces and facilities, where users, regardless of their level of ability, can carry out the activities they want and their needs are met.

Usability, lastly, is a reflection or mark of how well the building itself can satisfy the needs and goals of all its potential users. This means that all the users can use the building and its facilities effectively and efficiently. Usability aims to provide spaces and environments that people of all abilities and with disabilities can use without help or assistance.

In the context of designing for museums, Ibem et al. (2017) noted that approachability and accessibility are essential in designing a museum in the area of access routes to the building and the horizontal and vertical movement within the building. For the case studies of the buildings chosen for this research, the methods chosen involved collecting majorly qualitative data. The data collection method involved observations through site visits, archival records, online resources and documentary analysis.

Based on the research of all three buildings, the findings analysed the approachability, accessibility, and usability features of all the museums concerning the established standards for the universal design principles. From these case studies, Ibem et al. (2017) showed that a lot of the public museums in southwest Nigeria, which are a reflection of the majority of the public buildings in this same geo-political zone, have good approachability standards. Getting to these buildings from the streets and the public spaces around them is easy. However, the accessibility and usability of these buildings all fall short of the specified standards. Access is only for non-disabled persons because the vertical circulation in the building is mainly through stairs. The

usability was also done without users with disabilities in mind, as there are no wayfinding identifiers, no alternative language for those with hearing issues and many more.

This research has proven that many public buildings in Nigeria must meet universal design standards. One way to fix that is by making sure that architects and engineers pay more attention to these inadequacies and inform new and existing buildings to have the necessary elements to make the user experience seamless for all buildings.

Ahmed et al. (2014) also researched the current state of accessibility of buildings in select Nigerian university campuses. Although the provision of equal access to services and facilities for all possible uses should be a priority, in most cities and campuses, people living with disabilities struggle to access these facilities in the built environment. This research methodology involved using an audit checklist for the buildings to be reviewed and a descriptive survey by observing case studies of two universities, Ahmadu Bello University, Zaria (ABU) and Kano Science and Technology Wudil (KUST).

The accessibility checklist covered areas of interest for all students in each university. These areas, ten (10) in number, include Senate buildings/Central administrative block, Library, University Health centres/Hospital, Lecture theatres and rooms, Sports and recreation facilities, student hostel and banks. For observations, the following details were recorded: doorway width, the height of the threshold, the height of steps, the width of the route, gradient of ramps, doorways and width of walkways, emergency exits, alarm/lights, lifts, among others.

The data collected in this research showed that the accessibility provision in both buildings is relatively low, with ABU turning higher than KUST. According to this research, the accessibility to buildings and infrastructure is poor and inadequate. There are barely any features to help

people living with disabilities access infrastructures and facilities in these universities. The ramps are only found in healthcare facilities, mainly for ease of use of hospital stretchers, not for ease of access by people with disabilities.

The research reviewed in this section has shown that the current state of universal design compliance for public buildings in Nigeria, in general, is deplorable, as there is little to no provision for accessibility, approachability and usability for people living with disabilities in these buildings.

2.8 The current state of Barrier Free access to public buildings in Nigeria

The design of public buildings in Nigeria varies according to the activity conducted within them. As they are commissioned by the client, whether organisational, individual or governmental, the architect determines how the building will look, be accessed and function. However, the architect must pay attention to both the client's and possible users' needs. This is rare and is reflected in the design of public buildings in Nigeria. The barrier-free access to public buildings in Nigeria is in an unfavourable state as people living with disabilities have a hard time accessing these buildings.

In Anunobi et al. (2015) research titled *"An Assessment of Ramp Designs as Barrier-Free Accesses in Public Buildings in Abuja, Nigeria",* the state of accessibility of public buildings for people with mobility impairments, using ramps as a significant factor was analysed. This research occurred as a method of understanding the point of concern for the need for accessibility and to suggest the recommended changes.

This study aims to understand and determine the effectiveness of the ramp designs in different public buildings in the Federal Capital Territory Area of Abuja, Nigeria. Bringing the

technicalities involved in the ensign of the ramp elements to the forefront to guide their use in public buildings is one of the objectives of this research. The research also assists designers, interior designers, and architects in providing sustainable design options for accessibility to meet the needs of people living with disabilities today and in the future (Anunobi et al., 2015).

The study was carried out using an adaptive survey and observation using snapshots of the existing buildings to be reviewed. Measuring tapes were used to get the dimensions of the existing ramps. The data collected on the ramps included total vertical rising height, total horizontal running distance, location, characteristics of landing and handrails, slip resistance, materials used, curbs and compliance with codes. This data was then analysed using four categories: ramp, handrail, landing and entrance door.

Anunobi et al.'s (2015) research findings showed that all the studied buildings had ramps. However, the rams were only at the entrances, connecting the natural ground level to the ground floor, and there was no connection from the ground floor to the upper floors. Most of the buildings also did not have a specific parking space provision for people with disabilities. Only two of the buildings had elevators. However, that is because of the national law that requires a minimum of four floors to install an elevator in a building. Most of the buildings do not have up to four floors, so they cannot have elevators.

The research also showed that all the ramps are made of concrete, but they do not meet the recommended slopes and width standards for accessible movement. The surface of these ramps is also too smooth with materials like tile finish and porcelain, unlike the recommendation of hard and non-slip surfaces. The climb up these ramps is also long and stressful as they need landing areas between slopes for rest. For the handrails, about 45% had handrails on just one

side, either left or right, 10% had handrails on both sides, while the other 45% had no handrails at all. This research shows that the state of ramp accessibility to public buildings in Nigeria is terrible as none of the standards are paid attention to. The design and construction are done with no user with disabilities in mind.

In addition, Hamzat and Dada (2005) researched *"Wheelchair Accessibility of Public Buildings in Ibadan, Nigeria"*. This research studied the wheelchair accessibility of selected public buildings with different functions that people of different demographics frequently use. There must be an effort to incorporate wheelchair accessibility in the exterior and interior of public buildings to help wheelchair users fit in and function without assistance in any community they are in.

For this research, thirty-eight (38) public buildings were selected. They ranged from hospitals to schools, social and recreation centres and government ministries/agencies. The method used for this research was descriptive survey research that involved a one-time observation of the buildings selected. Measurements of certain features were also taken. These include width of routes, grade of ramps, threshold and step heights, ramp height and length, ramp slope lengths and doorway widths.

All these data collected were used to determine the accessibility of these buildings in Ibadan using Americans with Disabilities Act Accessibility Guidelines (ADAAG) as a guideline of the required and recommended dimensions. This research showed that only 7 out of the 38 buildings, 45.1% of the entrances and 19.4% of the routes were wheelchair accessible. The least accessible buildings were the social and recreation buildings, and the most accessible were the hospitals.

This goes on to show that several hospitals in Nigeria have a level of accessibility that could be reviewed and possibly improved. This research by Hamzat and Dada (2005) showed that the needs of wheelchair users were barely met in public buildings. It also was observed that the accessible entrances were not linked by accessible paths, which made them useless. The researchers showed that the Nigerian government needs to come into play, alongside designers and architects, to enforce laws that will improve the design for inclusivity for people with disabilities to access buildings, increasing equity for all users.

2.9 Accessibility in Hospital Designs.

Hospitals are one of the most important public buildings because they cater to the needs of people of all ages, abilities, disabilities, occupations, and genders. A hospital has one of the broadest range of users as everyone needs a check-up or treatment at some point. As a result, accessibility and usability in hospital designs are essential design considerations. Achieving universal design principles is supposed to be non-compromisable in hospital designs.

Ornstein et al. (2007) conducted research on the state of accessibility in large hospitals in Sao Paulo, Brazil, with the Orthopedics and Traumatology Institute (IOT) of the General Hospital of the University of Sao Paulo being the case study. Over the years, the building has expanded into annexes with its “T” floor plan. The methodology used in this research for daya collected was mixed methods. The research used walkthroughs, interviews, focus groups, photographic observations and records, and questionnaires as a combination of both quantitative and qualitative data.

The building was constructed in the 1950s and has some outdated accessibility features. The research conducted shows that despite the adaptation of some of the accessibility features in the

building, it still does not meet some of the standards specified. Research shows that the specific areas needing accessibility upgrades include the elevators (whose dimensions are not accurately sized), doorways, restrooms, ramps and parking spaces. There should also be proper signage and wayfinding characteristics to help people of all abilities and disabilities navigate and find their way around the building quickly (Ornstein et al., 2007).

Ahmed et al. (2022) also researched accessibility for visually impaired people and inclusive wayfinding design in hospitals in Nigeria. Visual accessibility is the legibility and intelligibility of space cues and identifiers that contribute to the ease of finding and using information from the environment to navigate the path around hospitals. Research has shown that hospitals lack visual clarity for navigation and access to the most crucial destination because of expansions over time due to demands and the complexity of the buildings. The research aimed to understand and analyse the impact of visual accessibility on wayfinding in hospitals and the possible barriers to the success of these elements.

The visual accessibility elements include signage, unit building entrances, proper lighting, marking and categorising spaces. The use of spaces connected using architectural and graphical techniques is another way to cater to a large group of people with different sensory abilities, language, status, literacy levels, and cerebral capacities.

The research was conducted at the University of Abuja Teaching Hospital (UATH) as the case study. With multiple sections, specific study units were marked out: General Outpatient Departments (GOPDs), a radiology unit, a theatre, a laboratory, wards, and the National Health Insurance Scheme (NHIS) Complex, which contains a pharmacy.

The data collection method used is the mixed method approach. The qualitative data was obtained through semi-structured interviews, and quantitative data was obtained using survey questionnaires. The survey had 98 respondents who answered questions about architectural wayfinding features. The interview had 24 participants who answered questions about the impact of the building entrances on wayfinding for accessibility and visibility.

The research showed that the users used signage as prominent landmarks at different decision points. The signage regarding texts and symbols where they were provided was clear and legible, reducing the complexity of directions. The most critical variables that enhance visual accessibility in the hospital and their ranking are signage, building entrance identification and properly lit circulation spaces, ranked first, second and third, respectively. According to the respondents, the building entrances were also visible and easily accessible. However, crowding around the circulation space is a significant problem, as most respondents see it as a barrier. Stairs, nodes and maps in these circulation spaces were hard to find because of the overcrowding and lack of directional signs. These destinations were also not visible from the main entrance, which complicated wayfinding. The recommendation from this research shows that it is essential for more architects to pay attention to the tiny details for visual accessibility with these elements. It should be taken a notch higher by providing inclusive wayfinding elements in terms of language, graphics, etc., that can cater to people of all demographics who will be using the building.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Research methodology refers to how a researcher designs a study to collect valid and reliable results that answer the research aims, questions and objectives. This research methodology covers the type of data to collect, the target audience or sampling area, how to collect the data and the data analysis methods. Defining the choices and proving that the chosen methods are the best is essential in the research methodology(Jansen & Warren, 2020).

Different research methodology approaches are grouped into two specific types: data in the form of numbers, which is termed quantitative research method, and data in the form of descriptions, which is termed qualitative research methods (Bouchrika, 2024).

As this thesis aims to understand the usability and accessibility of designs of hospitals in Akure as public buildings, the research methods to carry out the research are vital for the success of this project. The decision on the research methodologies to be used depends on the kind of project research to be used, and the decision is reflected in this thesis.

This chapter covers the research methodology used in this study, which includes the research design, data collection, and data analytics methods.

3.2 Scope and Area of Research

This study involves understanding the present state of inclusivity, usability and accessibility of public buildings, specifically hospitals, in Akure, Ondo state, Nigeria. This study focused solely on a selected number of hospitals with interior and exterior designs that reflect the presence or

absence of inclusive and accessible design in Nigeria. This data was gathered through case studies, observation data from site visits and photo interviews.

3.3 Research design

This research used a qualitative approach to investigate the usability and accessibility of public buildings in Akure, Nigeria, with a specific focus on hospitals. The study started with a case study of select hospitals in Akure, in which distinct criteria of status and amount of users will be chosen. This study used qualitative data collection methods to comprehensively understand the current situation and identify areas for improvement in these hospitals.

3.4 Data Collection Methods

3.4.1 Qualitative Data Collection

Qualitative data collection involved case studies of selected hospitals for which specific criteria will be selected. Then, observation of these hospitals was used to collect data, using photographs of the presence or absence of accessible features. These photos served as materials for photo interviews with various design stakeholders, including architecture students and architects. These interviews were conducted to understand their analysis and evaluation of the state of the pictures from the observation during the visit to the selected case study hospitals.

- **Case Studies of Selected Hospitals:**
    - **Sample size**: Three hospitals were selected based on preliminary research or existing knowledge of Akure hospitals. Ideally, these hospitals represent a range of accessibility levels (good, fair, poor). They were chosen based on their representation of the area. The three hospitals are **Ondo State Specialist**

Hospital, on Hospital Rd, Akure, Ondo State; **FUTA Health Centre**, Oduduwa Road, Ita Oniyan, FUTA, Ondo; and **Tim-Unity Specialist Hospital**, Oke-Orire Street, Oluwatuyi Rd, opposite FCMB, Akure, Ondo State.

- **Observation:** Data collection was obtained through observations. Site visits were conducted to observe and document the physical features of the hospitals that are relevant to usability and accessibility (entrance accessibility and signage). Photographs were also taken to capture the features visually.

- **Photo Interviews with Architecture students and Architects:**

  - **Sample group:** A sample of architecture students and architects actively practising architecture in different parts of Nigeria. The selection was 10 participants per group, making 20 in total.

  - **Data Collection:** Semi-structured photo interviews were conducted. The participants were shown photographs of various hospital features captured during the case study observations and asked questions about the design intent, usability considerations, and accessibility standards incorporated. This will provide insights into the design rationale and potential areas of disconnect between intended use and user experience and also get an idea of the designers' view on accessibility and usability features in public buildings.

3.5 Data Analysis Methods

3.5.1 Qualitative Data Analysis

- **Case Study Analysis (Thematic Analysis):**

- **Themes:** Analysis of observation data and photographs from case study hospitals to identify recurring themes related to accessibility features (presence/absence of ramps, accessible toilets, clear signage.). Examples of themes could be:
    - **Physical Barriers:** Identification and categorisation of the physical barriers encountered in the different hospitals chosen (e.g., narrow doorways, lack of grab bars).
    - **Navigation Challenges:** Exploring the user experience of wayfinding and navigation within the hospital environment.
    - **Accessibility Variations:** Analysing how the accessibility features vary across the different case study hospitals.

- **Photo Interview Analysis:**
    - **Coding:** Coding transcripts from photo interviews with architects and designers based on their evaluation of the hospital features presented in the photographs. This will reveal:
        - **Design Intent:** An analysis of how designers explain the purpose and rationale behind specific accessibility features.
        - **Accessibility Knowledge:** Assessing designers' understanding and application of accessibility standards in their designs.
        - **Disconnect Between Design and Use:** Identifying the potential gaps between the designers' intentions and the actual user experience of the features.

- **Comparative Analysis:** Comparative analysis was conducted to compare the findings from physical site visits with those from stakeholder interviews. It involves identifying similarities and differences between the observed accessibility features and the perceptions and experiences of stakeholders. Comparative analysis helps validate the findings and understand discrepancies between intended design and actual user experiences.

By using qualitative data analysis, the research can provide a holistic understanding of usability and accessibility in Akure hospitals. The qualitative analysis will offer rich insights into specific hospital environments and design rationale. This approach will reveal critical areas for improvement in hospital design to create more inclusive and user-friendly environments.

3.6 Ethical Considerations

Ethical guidelines will be strictly followed during the research process to ensure participants' rights, confidentiality, and well-being. Informed and explicit consent will be obtained from all participants before their involvement in the study, detailing participation's purpose, procedures, and potential risks and benefits. Confidentiality and anonymity will be strictly maintained by using unique identifiers for participants and securing all data in password-protected electronic files.

Additionally, participants will have the right to withdraw from the study at any time without repercussion. The research will also adhere to ethical principles of respect, integrity, and beneficence, prioritising the dignity and welfare of all individuals involved.

3.7 Summary

By combining different analysis methods, this research will comprehensively explore the research questions about accessible and usable public building design in Akure using hospitals as a case study. The findings will be presented clearly and organised, highlighting fundamental discoveries. This structured approach will help understand precisely how accessibility and usability can be improved for various users in Akure, Ondo State, Nigeria. The chosen analysis method works well with the data collection method, ensuring all the information is clear and used to answer research goals.

CHAPTER 4

DATA PRESENTATION AND DISCUSSIONS

4.1 Introduction

Public buildings are some of the most used buildings in places all over the world, including Akure in Ondo State. Healthcare buildings are used by a wider demography because they cater for people and users of all ages, genders, abilities and disabilities. As a result, the state of accessibility and usability of these buildings is very essential as everyone needs to be able to use healthcare buildings and facilities with no hindrances, no matter their level or type of disability.

This chapter assesses the state of accessibility and usability of these public health buildings. Its focus shifts from the theoretical methods and analysis done in the past chapters so far and intricately expatiates on the practical execution of the studies with the selected case studies- public health buildings.

The tools used for the exploration of the accessibility and usability of the case studies were first-hand visits to the selected case studies, a personal evaluation of the state of the accessibility and usability of these buildings, and photo interviews with a selected demographic status of architects and architecture undergraduate students to have an understanding of their evaluation of the state of accessibility and usability of these buildings. This chapter analyses the state of personal user experience alongside interpretation based on photo analysis of the sample demographic to understand how accessible and usable these selected case studies are for a wide range of users.

For this research, three case studies were selected based on different criteria: building operation tier, access to the building as a visitor, number of possible users, and proximity in the case study area. The three public health buildings chosen are Ondo State Specialist Hospital, FUTA Health Center and Tim Unity Specialist Hospital.

i. **Ondo State Specialist Hospital:** Situated on Hospital Road in Akure, Ondo state, it is a state-owned medical facility offering a wide range of medical services, which include surgery, general medicine, paediatrics, obstetrics and gynaecology, emergency healthcare, laboratory and pharmacies. It is easy to access and has multiple buildings with different features that denote both the presence and absence of consideration of accessibility and usability in the design.

ii. **FUTA Health Center**: Located at the Federal University of Technology, Akure, Ondo State, this is a recently constructed health facility designed to cater for all students and staff of FUTA. It offers various basic healthcare services for the university community, including general consultations, first aid, injury care, basic lab tests, pharmacy, and healthcare education. As a student of the university, the facility was very easy to access as it also has multiple buildings with connections around it.

iii. **Tim Unity Specialist Hospital:** A private-owned healthcare facility in Akure, Ondo state. It is a specialist hospital that offers services similar to the Ondo State Specialist Hospital and is pretty close. These services include multispeciality care, comprehensive eye care, laboratory services, and multi-speciality surgical and radiological services. Accessing this facility was more complicated as it is privately owned, and privacy is a very huge policy.

4.2 Methodological Overview

A combination of methodological approaches was used to understand the state of accessibility and usability of the specific case study buildings chosen. The methods selected combined both scholarly and immersive approaches alongside consultative approaches, viewing from the lens of professionals in the design industry.

The methodology involved onsite visits to the three selected case studies to achieve two goals, which include getting a major understanding of the accessibility and usability features while getting a feel of the general user experience of the spaces. To aid the consultation with design professionals and students, photos were taken of the prescient and absent accessibility and usability features.

Photo interviews were used as a research method to gather opinions and professional views on the accessibility features of these buildings and facilities. Interviews were conducted with both architecture students and professional architects, and visual documentation was presented to them while answering questions regarding their perception and understanding of the accessibility and usability of the building. This methodology aims to observe the buildings and their usage while actively gaining opinions and insights from professionals regarding these buildings.

4.3 Interview Questions

Based on the topic and research aim and objectives, the following questions were asked:

- Please briefly describe your experience in the field of architecture.
- What is your understanding of accessibility and usability in building design, particularly in healthcare settings?

- What is your initial impression of these photographs? What does it convey about the hospital's accessibility?
- Can you identify any potential design flaws or barriers to accessibility in the images for each hospital?
- How well do the features align with accessibility standards and guidelines?
- What are the potential user experiences in these hospitals based on the images?
- How do you think these spaces accommodate individuals with varying levels of physical ability?
- Are there any design elements that you find problematic in terms of usability?
- How would you redesign this space to improve accessibility and usability?
- How do these hospitals compare to each other in terms of accessibility?

4.4 Ondo State Specialist Hospital

4.4.1 Introduction

Ondo State Specialist Hospital is a secondary healthcare facility owned by the Ondo state government. Designed and built to cater to the needs of all the residents of Ondo state, the major focus has evolved into a modern healthcare institution with facilities and professionals with commendable skills. The hospital offers various services, including general surgery, obstetrics and gynaecology, paediatrics, internal medicine, cardiology, and more. Overall, the hospital plays a vital role in the healthcare system of Ondo State, providing essential medical care to residents and visitors alike.

4.4.2 Structure and Details of Ondo State Specialist Hospital

The Ondo State Specialist Hospital is a state-level healthcare facility that is designed to cater to people of different needs and ages. The building is made into clusters of bungalow buildings around. The different buildings the hospital has include:

- Surgery wards (male and female) buildings
- Male and female and children's ward buildings
- X-ray and test buildings
- Laboratory
- Eye center
- Health insurance building
- Pharmacy
- Emergency wards and centre

Some buildings, such as the wards and surgery buildings, are older, while others are much newer. However, there is a newer building in construction, which is a multi-storey building.

4.4.3 Merits and Demerits of Hospital Structure

4.4.3.1 Merits

The merits of this hospital structure for the Ondo State Specialist Hospital include:

- There are clear pathways and walkways all around the different buildings, connecting them to each other.
- There are clear and proper signs showing places to go
- The buildings all have bungalow structures, so accessibility is easier on all ends as there are no upper floors

- Newer buildings have well-maintained landscape
- There are adequate accessibility features like ramps and railings for all ramps.

4.4.3.2 Demerits

The demerits of this hospital structure for the Ondo State Specialist Hospital include:

- There is not adequate ventilation in some of the wards
- A lot of the old structures and facilities need maintenance
- Some buildings are too far off from each other, e.g., health insurance buildings are far from wards.
- There are no sitting areas around buildings.

4.4.4 Design and State of Accessibility and usability based on onsite visit

Based on the onsite visit, the research showed that the Ondo State Specialist is truly a state-level healthcare facility as it has a wide range of buildings catering to the different needs of different users of the building. The facility's site is a vast land with different buildings, which are finished and undergoing construction or renovation as necessary. There are different buildings that cater to different services and needs all around the hospital.

Upon entry, a large two-story building is being constructed, almost at the edge of completion. This is the new building for the hospital's healthcare services for its target demographics. However, it has yet to be open for use, so an evaluation was not made of this building. However, accessibility features like ramps were used at the main entrance of the building, although positioning might have been a problem.

Plate 1: The new building's entrance with ramps

Plate 2: The pedestrian entrance to the new hospital building

Before the construction of the new building, sighted upon entry into the state hospital, there are a set of buildings that housed the major healthcare facilities such as male and female wards, surgery rooms, laboratories, paediatric wards and rooms, theatres, x-ray rooms, etc. These buildings are situated in a straight line opposite each other, left and right, with ample space between each building next to each other. In the middle of buildings facing each other, there is a long walkway that serves as a pathway and connector to all these buildings. However, it is quite a distance from the entrance to the hospital gate. For each of these buildings, there are signs on the walkway that give directions to each of them, with their name and an arrow of direction showing where each building is as named.

Apart from these specific healthcare facilities, there are other buildings situated at different places, majorly walkable distances all over the site, including eyecare buildings, laboratories, health insurance buildings, ENT and physiotherapy buildings and pharmacies. These buildings require a little more direction but can be easily identified from a distance.

Some of the accessibility features present in these buildings include walkways directly connected to the road, ramps connecting the major walkway to buildings around it, and ramps from the road to the entrance of specific buildings.

Plate 3: A walkway with a ramp connected to the road

Plate 4: The entrance to the older building clusters and its ramp

4.4.5 Evaluation of accessibility and usability based on photo interviews.

A photo interview showing pictures of the different accessibility and wayfinding features of the building was conducted with architects and architecture students. This section will evaluate their answers based on the themes highlighted below.

4.4.5.1 Accessibility theme

As regards accessibility in this healthcare facility, all the respondents are of the opinion that the features work for the average person living with a disability. One of the architects believes that accessibility in this state facility has the most consideration due to the use of proper elements, such as ramps and railings in certain buildings. He also believes the high level of accessibility features here is due to the amount of funding such secondary healthcare facilities get from the government. There is also great compartmentalisation and catering to a large demographic.

Another respondent also believes the accessibility is top-notch, as the ramps are properly positioned and connected to the main roads. The only inconsistent buildings with a lack of accessibility features are buildings donated to the hospital by organisations. However, a major problem with the existing accessibility feature is the lack of maintenance, as many of them are worn out and require maintenance.

Plate 5: The entrance to the health insurance building

Plate 6:The walkway between buildings and their entrance points

Most of the respondents hold the sentiment and opinion that the Ondo State Specialist Hospital has a very good accessibility provision for people living with disabilities. However, one of the respondents believes that although it is good, there are better ways for it to go as it is just below the bare minimum, which should not be so for a secondary healthcare institution.

The recommendations for better accessibility from the respondents include adding railings to where ramps and stairs are, alongside positioning the ramps on the side of pedestrian entry of the entrance gate of the hospital. Consistent maintenance is also recommended, but in all, the accessibility of this healthcare facility was rated very highly.

4.4.5.2 Usability theme

For usability, mostly in terms of wayfinding, all respondents rated the Ondo State Specialist Hospital perfectly on wayfinding due to the strategic positionings of signs and directions for people of all ages and abilities to find their way around.

Plate 7:The walkway and the signs showing each building

Plate 8 TThe signage to the pharmacy in both English and Yoruba

One of the respondents believes that with the sign on the walkways of the hospital, it is easy for anyone who is ill or even just visiting to find their way around without asking too many questions. Another respondent also highlighted and praised the use of the native language, Yoruba, in some of these signs and pointers, making it more usable for a wider demographic audience.

Plate 9: The signage to ENT and physiotherapy building

Plate 10: The signs showing each building in the walkway

Recommendations for better wayfinding with this healthcare facility are clearer signs and options in braille and larger signs for people with low vision. Also, the signs on the walkway are recommended to be bolder and less far from the ground,

4.5 FUTA Health Centre

4.5.1 Introduction

The FUTA Health Centre is a primary healthcare facility located within the Federal University of Technology campus, Akure, Ondo State. It was established to serve the university community's needs, including its students, staff and faculty. As a result, it provides a range of basic medical services. As a primary healthcare facility, the Futa Health Centre offers essential medical care, such as general consultations, minor treatments, and preventive health services. Qualified healthcare professionals staff the centre. While it may not offer all the specialised services of a larger hospital, the Futa Health Centre plays a crucial role in promoting the health and well-being of the university's members.

Plate 11: The main entrance to the building

4.5.2 Structure and Details of FUTA Health Center

Like the Ondo State Specialist Hospital, the FUTA health centre has buildings built on the same bungalow level, with all the buildings built at different points and spaces on the site. The health centre caters to the university community. The different buildings and sections include the following:

- Medical records and reception
- Doctors' offices
- Patients room
- Wards
- Pharmacy
- Injection rooms

4.5.3 Merits and Demerits of Health Center Structure

4.5.3.1 Merits

The merits of this hospital structure for the FUTA Health Centre include:

- The buildings are all on the same level, making it accessible for people of all ages and abilities.
- For every change in level, there is a ramp instead of stairs.
- There are courtyards in every building, providing adequate lighting within corridors and pathways.
- There is adequate ventilation and lighting in every space in the building.

4.5.3.2 Demerits

The demerits of this hospital structure for the FUTA Health Centre include:

- The walkways are made of tiles, which are open to weather conditions due to the courtyard, making them slippery.
- The external walkways are open, with no canopy.
- There are too many changes in the level of the buildings.

4.5.4 Design and State of Accessibility and usability based on onsite visit

This FUTA health centre is a newly completed building as it is a new facility that was built within the last year. The design of this building also spans along a large spread of land. The healthcare facility consists of clusters of buildings lined at the front and clusters built at the back. All the buildings are bungalows as they do not go higher than one floor, which is the ground floor.

The buildings are built on sloppy land as the site topography is sloppy, and as a result, there are multiple changes in the level of the buildings. However, the connecting factor of these buildings is walkways in the form of ramps and concrete pad walkways. Many ramps are used all over these buildings as there are many level changes. The slopes of these ramps differ according to changes in level. The entire building is tiled in slightly slippery tiles alongside courtyards directly positioned beside the walkways.

Plates 12&13: The walkway ramps within the building

There are no signs showing directions across the multiple buildings in this healthcare facility. Getting around requires questions about directions. Also, the walkways between the buildings at the front and back could be clearer. The walkways also do not have any cover or canopy, making them open to harsh weather conditions.

Some of the accessibility features include ramps at the entrances and in walkways, alongside ramps in between buildings.

4.5.5 Evaluation of accessibility and usability based on photo interviews.

A photo interview showing pictures of the different accessibility and wayfinding features of the building was conducted with architects and architecture students. This section will evaluate their answers based on the themes highlighted below

4.5.5.1 Accessibility theme

The accessibility of this healthcare facility evoked mixed feelings from the respondents. On the one hand, a number of the respondents believe that the accessibility features of this facility, which include ramps off different lengths and slopes and walkways across and between buildings, are just okay, meeting the bare minimum requirements.

Plate 14: The pedestrian entrance to the building

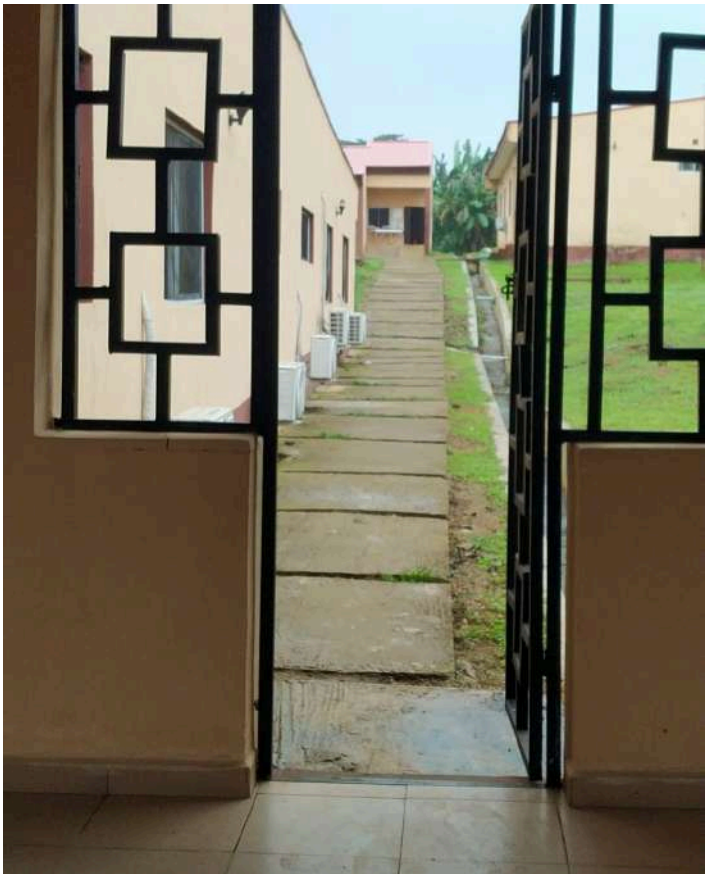

Plate 15: The walkway connecting the pharmacy and injection room

However, another half of the respondents believe that the only reason there are ramps is because the contractors tried to save money by avoiding backfilling on the sloppy terrain. As a result, the ramps' slopes are unsuitable for people with different disabilities to use. The absence of railing and slippery tiles is another disadvantage of the accessibility features mentioned in the building.

The ramps do not have railings and are susceptible to getting wet due to their proximity to the courtyards, attracting rainwater from winds during the rainy season. Also, a respondent pointed out that most of the external walkways do not have shades or canopy, leaving users to walk and move around in the open, especially during harsh weather conditions.

Plate 16: The ramp from the medical records room to the external walkway

Plate 17: The ramp for the pharmacy

While accessibility features are present, they are not in good condition, do not meet the architectural standard and will, in turn, cause more harm than good in the long run.

The recommendations for what could be different include using shades and canopies for eternal walkways, using nonslip tiles within the building, creating ramps with better slopes and possibly leaving the building at the same level, reducing the energy required for ill and people living with disabilities to move around.

4.5.5.2 Usability theme

Regarding usability and wayfinding in this healthcare facility, all respondents believe that wayfinding needs to be more present in this building. As the entire structure is scattered with buildings in different parts of the site, connected by walkways, it is essential for signs to point out which building is which. However, there are no such signs. According to one respondent, usability is very hard in this building. A sick person would not have enough strength to move all around and would be very confused and disoriented because there are no signs.

Plate 18: The secondary entrance to the building

Plate 19: The reception and its ramp

Other respondents also believe that the arrangement of the services could be more reasonable as they do not ease into each other. They are mostly from one point to the next and back to point one again, similar to a Brownian motion. Therefore, respondents perceive usability and wayfinding as nearly impossible.

Usability recommendations include creating a clear and understandable map at the entrance of the buildings and having signs at strategic places in English and vernacular languages for people to understand.

4.6 Tim Unity Specialist Hospital

4.6.1 Introduction

Tim Unity Specialist Hospital is a private healthcare facility in Akure, Ondo State. Established to provide specialised medical care, the hospital offers a range of services beyond those typically found at primary healthcare centres.

Plate 20: Signage directing users to the hospital

Tim Unity is a specialist hospital equipped with modern facilities and staffed by experienced medical professionals trained in various specialities. The hospital may offer general surgery, obstetrics and gynaecology, paediatrics, internal medicine, cardiology, orthopaedics, and more. While it may not have the same resources as a large teaching hospital, Tim Unity provides comprehensive healthcare services to the community.

4.6.2 Structure and Details of Tim Unity Specialist Hospital

The Tim Unity Specialist Hospital is a private hospital created to serve different people with needs. It is a one-story building that seems to be repurposed to a hospital. The different sections include:

- Gatehouse
- Laboratory
- Reception and records
- Doctors' office
- Ante-natal room
- Patient wards

4.6.3 Merits and Demerits of Hospital Structure

4.6.3.1 Merits

The merits of this hospital structure for the Tim Unity Specialist Hospital include:

- The hospital has ample parking space based on the number of people they have to cater to.
- There is proximity in spaces within the building
- There is equal level all around the building

4.6.3.2 Demerits

The demerits of this hospital structure for the Tim Unity Specialist Hospital include:

- Entry points into the building are not accessible
- The building doesn't seem to be properly lit or ventilated

4.6.4 Design and State of Accessibility and usability based on onsite visit

This hospital is a single-story building situated on a smaller site with ample parking space. As a specialist hospital, it caters to a smaller set of people as there are specific services to be offered. The design of this building has all the services located within the main building, with only the gatehouse and laboratory situated in an external part.

Plate 21: The signage and stairs for the building itself

Plate 22: The signage for the laboratory

The building is quite cramped as there is not much space to move around comfortably within the building. However, there is a consistent level across the building's ground floor. The first floor is only accessible by an external stair. There is a ramp at the entrance, alongside stairs, both without railings. Therefore, the hospital's design does not seem to be purpose-built, as it seems to be converted from a residential building to a hospital building.

4.6.5 Evaluation of accessibility and usability based on photo interviews.

A photo interview showing pictures of the different accessibility and wayfinding features of the building was conducted with architects and architecture students. This section will evaluate their answers based on the themes highlighted below

4.6.5.1 Accessibility theme

For the accessibility of this private hospital, there was a unanimous agreement and uniformity among the opinions of all respondents that the accessibility of this healthcare facility is on the bad side. With the design lacing the presence of accessibility features and bare;l meeting the required standard of a healthcare facility, the respondents believe that the bare minimum facilities used, such as ramps and railings, were created to satisfy all requirements. However, execution was poor, making it completely useless.

Plate 23: The entrance and parking lot of the building

Plate 24: The entrance ramp and stairs of the building

The recommendation for this is the incorporation of ramps that meet standards and designing hospitals with more space to ensure there is enough space to allow people of different mobility issues to move around conveniently.

4.6.5.2 Usability theme

For wayfinding and usability, most respondents believe that the reason the usability of this building is poor is because it was not purpose-built. There are barely enough signs and navigation space, making the usability levels hard for anyone, whether living with a disability or not.

Recommendations regarding usability for this facility are better design decisions and building a suitable facility on a suitable site.

4.7 Comparison of Case Studies

In comparison to each other, all respondents agree that the healthcare facility with the best accessibility and usability features is the Ondo State Specialist Hospital, and the least is the Tim Unity Specialist Hospital.

Features	**Ondo State Specialist Hospital**	**FUTA Health Center**	**Tim Unity Specialist Hospital**
Ramps	Adequate ramps, with some needing maintenance	Too many ramps with bad slopes	A single ramp with a bad slope
Stairs	There is no need for stairs due to ground-floor bungalow buildings	There is no need for stairs due to ground-floor bungalow buildings	Stairs are made of tiles, making them slippery when exposed
Railings	Adequate railings for ramps and stairs	No railings	Adequate railings except at the entrance
Tiles and floor finish	Adequate floor finish	Slippery tiles	Slippery tiles
Signage	Properly placed and legible signs and directions, with some of them in local languages.	Absence of signage of any form	Minimal signage for specific spaces within the hospital

Table 1: A comparison of accessibility and usability features of the three hospitals for the case study

4.8 Summary

Ondo State Specialist Hospital stands out as a well-designed and accessible healthcare facility. It offers a wide range of services, boasts modern infrastructure, and prioritises the needs of its patients. The hospital's commitment to accessibility is evident in its ramps, railings, and clear signage, ensuring everyone can access the care they need.

In contrast, the FUTA Health Centre faces challenges in accessibility and usability. The building's design and layout can confuse patients despite its newer facilities. The lack of clear signage and uneven walkways can hinder navigation, particularly for those with disabilities.

Tim Unity Specialist Hospital also falls short in terms of accessibility and usability. The building's cramped layout and limited accessibility features make navigating difficult for patients. Its conversion from a residential building further contributes to its shortcomings.

Overall, the Ondo State Specialist Hospital is a model for healthcare facilities regarding accessibility and usability. By prioritising these aspects, hospitals can ensure that all patients can receive the care they need regardless of their abilities.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The entirety of this study went through a journey to understand the context of accessibility and usability in public buildings in Akure. Starting from understanding the state of accessibility and evaluation according to existing literature, the study went on to conduct and analyse a case study of three specific hospitals in Akure. These three hospitals were selected based on three important criteria, which involve their tier status. The three hospitals selected are Ondo State Specialist Hospital, FUTA Health Center, and Tim Unity Specialist Hospital.

The findings of this research showed that usability and accessibility levels vary in different tiers of healthcare buildings. The case studies, based on site visits, showed that the Ondo State Specialist Hospital is the one with the most accessibility features. There are wayfinding signs, even some in indigenous languages and unclear and readable colours and designs. At the same time, there are accessible walkways and pathways with ramps. However, some of these accessibility features need maintenance due to long-term usage and wear and tear.

On the other hand, The FUTA Health Center, although the next of all three buildings, is not up to the standard of the specialist hospital. The accessibility only majorly included ramps, which are, however, steep and slippery. There are no way finders, which is especially rated poor because of the complicated structure and connection of the buildings. However, the building's accessibility in the context of floors is good, as all buildings are bungalows. The building has no upper floors. Lastly, the Tim Unity Specialist Hospital has the least accessibility and usability features. The

only merit of the design here is the wayfinding of specific spaces. Accessibility in terms of ramps, pathways and ease of movement is basically nonexistent for users living with a disability.

Additionally, the findings from the photo interviews were based on the information of the participants, and all participants highlighted the importance of the use of ramps and railings in the hospitals as one of the most important accessibility features present. They also highlighted the presence or absence of wayfinding signs and features in the hospitals, as the case may be.

These findings basically showed the current state of accessibility and usability in healthcare public buildings in Akure and how these features impact the lives and user experiences of people living in Akure while highlighting the major requirements for hospital designs regarding accessibility and usability. It is, however, important to note that the study was limited to accessible hospitals in Akure, especially the private hospitals. Further research is needed to explore accessibility and wayfinding issues in a wider range of public buildings outside of hospitals.

5.2 Recommendations

1. Incorporation of Universal Design: There should be more enforced regulations guiding the use of universal design principles in all new building constructions and also all renovation projects. This ensures that everyone, regardless of their ability, can use these buildings easily without requiring help from anyone. Examples include the use of automatic doors, curb cuts in walkways and accessible fixtures in the building. This ensures that people living with disabilities are catered to while enhancing the user experience for other visitors.

2. Use of Assistive Technology: Wayfinding goes beyond just signs, as there are people with sight impairments, too. Therefore, there should be a range of assistive technologies to support different individuals with different disabilities. These include Braille signage, audio announcements, textured maps, etc. This helps people living with disabilities navigate and participate in the environment with little to no help.

3. Visual cues: The consistent use of visual cues throughout the building improves the wayfinding experience for people of all abilities. Using easy-to-see and understand cues is important and can involve directional arrows, colour codes for different sections, and floor markers. This can help people, especially when these cues cater to a wider audience range than just the average human being.

4. Clear and Consistent Signage: Using legible, clear and consistent signage throughout the building is important to help people be less confused, easily navigate the building, and find their destination with no hassle. This includes providing visual and tactile cues for the building users. Another effective tip is the use of contrasting colours, symbols, and Braille language.

5. Barrier removal: This is most useful for existing buildings. This involves the removal of every physical barrier that impedes accessibility. This includes the removal of narrow doorways, stairs, uneven ramps, dysfunctional elevators, stairs and other features. This aims to create a solution and replacement that caters to individuals with mobility impairments. Removing these barriers makes it usable and inclusive for people of all ages and disabilities.

In conclusion, accessibility and wayfinding in public buildings in Akure are already at an average point but need special improvement, which includes enforcement of specific laws to include universal designs in buildings, creating signage and cues that cater to people of different disability types and removal of barriers that impede easy movement and user experience in these buildings.

REFERENCES

Abayomi, O. A., Abdulrahman, A., Sunday, A., Umar, M., Lawal, A., & Aminu, L. (2022, Jul-Dec). Outline Images Download Cite Share Favorites Permissions ORIGINAL ARTICLE Perception and attitude of school teachers toward children with disability in an urban community, Northwest Nigeria. *Journal of Medicine in the Tropics*. 10.4103/jomt.jomt_11_19

Abdul Kadir, S., Jamaludin, M., & Abdul Rahim, A. (2012). Building Managers' Perception in Regards to Accessibility and Universal Design Implementation in Public Buildings: Putrajaya case studies. *Procedia - Social and Behavioral Sciences*, *35*, 129-136.

Ahmed, A., Awad, Z. M., & Adam, M. (2014). Disabling Campuses: The development and outcomes of Nigerian Disability Polices. *OIDA International Journal of Sustainable Development*, *7*(10), 73-84.

Ahmed, S., Muhammad, I. B., Abdulrahman, M. E.-H., & Adebisi, G. O. (2022, 6 30). Visual Accessibility and Inclusive Wayfinding Design in Hospital Environment in NigeriaVisual Accessibility and Inclusive Wayfinding Design in Hospital Environment in Nigeria. *International Journal of Architecture and Planning*, *10*(1), 97-114. : 10.15320/ICONARP.2022.195

Anunobi, I. A., Adedayo, F. O., Ayuba, P., Oyetola, A. S., & Otijele, O. G. (2015). An Assessment of Ramp Designs as Barrier-Free Accesses in Public Buildings in Abuja, Nigeria. *Humanities and Social Sciences.*, *3*(2), 75-82. 10.11648/j.hss.20150302.12

Bouchrika, I. (2024, April 17). *How to Write Research Methodology in 2024: Overview, Tips, and Techniques*. Research.com. Retrieved April 28, 2024, from https://research.com/research/how-to-write-research-methodology

CDInclusion. (2024, February 22). *Review Disability Law, PWDS Engagement & Promote Right, Ondo PWDS Charged Govt*. Centre for Disability and Inclusion Africa. Retrieved May 10, 2024, from https://cdinclusionafrica.org/tag/ondo-state-disability-board/

CIO Council Operations. (2017, December 20). *Universal Design - What is it? | CIO.GOV*. CIO Council. Retrieved April 24, 2024, from https://www.cio.gov/2017/12/20/universal-design.html

Demikran, H., & Afacan, Y. (2018). Setting The Key Issues And A Prioritization Strategy For Designing Sustainable Interior Environments. *Journal of the Faculty of Architecture*, *35*(1), 201-219. 10.4305

Ediae, O. J., Babalola, O. D., Onakoya, A. O., Aderonmu, P. A., Sholanke, A. B., Olagunju, O., & Nduka-Kalu, C. (2023, April). Users Perception on Need for Universal Design in Recreation Centres in Ogun State, Nigeria. *International Journal of Research Publication and Reviews*, *4*(4), 2798-2812. https://doi.org/10.55248/gengpi.4.423.30401

Green, M. A. (2023, February 21). *Nigeria Has More Than 500 Languages, 300 Ethnic Groups... And Critically Important Elections.* Wilson Center. Retrieved April 17, 2024, from https://www.wilsoncenter.org/blog-post/nigeria-has-more-500-languages-300-ethnic-groups-and-critically-important-elections

Hamzat, T. K., & Dada, O. O. (2005). Wheelchair Accessibility of Public Buildings in Ibadan, Nigeria. *Asia Pacific Disability Rehabilitation Journal*, *16*(1), 115-124.

Ibem, E. O., Oni, O. O., Umoren, E., & Ejiga, J. (2017). An Appraisal of Universal Design Compliance of Museum Buildings in Southwest Nigeria. *International Journal of Applied Engineering Research*, *12*(23), 13731-13741. https://www.researchgate.net/profile/Olatunji-Oni/publication/322367113_An_Appraisal_of_Universal_Design_Compliance_of_Museum_Buildings_in_Southwest_Nigeria/links/5a56403ba6fdcc30f86d4bed/An-Appraisal-of-Universal-Design-Compliance-of-Museum-Buildings-in-S

Jansen, D., & Warren, K. (2020, June). *What Is Research Methodology? Definition + Examples*. Grad Coach. Retrieved April 28, 2024, from https://gradcoach.com/what-is-research-methodology/

Keerthirathma, W.A.D., Rodrigo, V.A.K., & Karunasena, G. (2010, December). Disability Access in Public Buildings. *International Research Conference on Sustainability in Built Environment*, 94-104. https://www.researchgate.net/profile/Gayani-Karunasena/publication/324496984_Disability_Access_in_Public_Buildings/links/5ad077e0aca2723a3347264c/Disability-Access-in-Public-Buildings.pdfhttps://www.researchgate.net/profile/Gayani-Karunasena/publication/32

Kportufe, G. S. (2015). Assessment on the Accessibility of Public Buildings and its Facilities to the Disabled in Ghana. *Civil and Environmental Research*, *7*(10), 76-83. Google Scholar.

Makhbura, M. (2024, Mrach). ARCHITECTURE FOR AN INCLUSIVE SOCIETY: CREATING ACCESSIBLE ENVIRONMENTS FOR PEOPLE WITH DISABILITIES, DESIGNING INCLUSIVE SPACES AND BUILDINGS. *International Scientific Journal*, *3*(3), 120-149. Google Scholar.

Narenthiran, O. P., Torero, J., & Woodrow, M. (2022). Inclusive Design of Workspaces: Mixed Methods Approach to Understanding Users. *Sustainability*, *14*(6), 3337. https://doi.org/10.3390/su14063337

National Commission for Persons with Disabilities (NCPWD). (2018). *UntitledDiscrimination Against Persons With Disabilities Prohibition Act of 2018*. National Commission for Persons with Disabilities (NCPWD). Retrieved April 25, 2024, from https://ncpwd.gov.ng/pdfs/6document.pdf

Nimlyat, P.S., Salihu, B., & Lekjep, R.S. (2010). Public Knowledge of the architectural and interior design space requirements of persons with disabilities. *International Journal of Sustainable Development*, *3*(6), 92-97. https://dspace.unijos.edu.ng/jspui/bitstream/123456789/3341/1/NPS%20public%20knowledge.pdf

Ornstein, S. W., Ono, R., Lopes, M. E., Monteiro, R. Z., Gill, A. A., & Machry, H. S. (2007, March). Health Care Architecture in Sao Paulo, Brazil: Evaluating Accessibility and Fire Safety in Large Hospitals. *Archnet- International Journal of Architectural Research*, *1*(1), 13-25. https://www.researchgate.net/profile/Anni-Gill/publication/26502795_Health_Care_Architecture_in_Sao_Paulo_Brazil_Evaluating_Accessibility_and_Fire_Safety_in_Large_Hos

pitals/links/0fcfd508183573241500000/Health-Care-Architecture-in-Sao-Paulo-Brazil-Evaluat

Shahrom, S. k., & Zainol, R. (2015, June). 33 Journal of Design and Built Environment Vol. 15 (1), June 2015 Shahrom, S. K., & Zainol, R.Universal design in housing for people with disabilities: A review. *Journal of design and built environment*, *15*(1), 33-42. http://mjs.um.edu.my/index.php/jdbe/article/view/5351/3136

Sholanke, A. B., Adelowo, I. E., & Gbotosho, J. O. (2020). Compliance of High-rise Buildings Vertical Accessibility Components with Universal Design Strategies: A Case Study of Covenant University, Ota, Nigeria. *Civil Engineering and Architecture*, *8*(5), 735-749. Research Gate. 10.13189/cea.2020.080501.

Sholanke, A. B., Opoko, A. P., Akpan, O. S., & Adigun, T. F. (2019). Universal Design of Selected Secondary Schools in Akwa-Ibom State, Nigeria: Students' Perception of Accessibility Provisions in Meeting their Needs. *ournal of Physics: Conference Series*, *1378*(4), 1-19. 10.1088/1742-6596/1378/4/042087

Uduu, O. (2020, January 20). *Over 25 Million Nigerians Excluded Due To Disability*. Dataphyte. Retrieved April 17, 2024, from https://www.dataphyte.com/latest-reports/governance/over-25-million-nigerians-excluded-due-to-disability/

World Health Organization & World Bank. (2011). *World Report on Disability*. World Health Organization. https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-r

ehabilitation/world-report-on-disability#:~:text=About%2015%25%20of%20the%20world's,a%20figure%20of%20around%2010%25.

Yuen, O. (2013). *Awareness of the Architectural and Interior Design Needs of Individuals with Physical Disabilities.* Kon. https://publications.kon.org/urc/v4/yeun.html