



ADEQUACY OF OGUN STATE BUILDING DEVELOPMENT REGULATORY LEGISLATION IN PROMOTING UNIVERSAL DESIGN PRACTICE IN NIGERIA

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ABSTRACT

Universal design (UD) is a design strategy that targets producing designs that are usable to everyone to the greatest possible extent, without having to result to adaptation or specialised design. The birth of UD in the field of architecture has brought about a paradigm shift from designing for a mystic average, to a more holistic design method that provides for the needs of everyone from the planning and design stage. Some studies have however found that in some societies, people with disabilities (PWDs) are generally marginalised in the development of the built environment as a result of accessibility and usability provisions not suitable for them. To this end, there is a need for building development legislation to have adequate provisions that can guarantee the promotion of UD practice. Consequently, this study investigated the UD related provisions in the building development regulatory legislation in Ogun State, Nigeria and examined their adequacy for promoting UD practice in Nigeria. This was done with a view to finding ways of improving social inclusion of PWDs in the main stream of the society in conformity with best global practice. The study is a document review that adopted qualitative research approaches to gather and analyse data. The result was presented using descriptive approach with the aid of a table for easy understanding. The result indicated that some UD related provisions exist in the development legislation in use in the study area. However, the said provisions were discovered not to be sufficient for the design and development of environments that are fully inclusive in nature as demanded by UD ideology, due to several inadequacies. The adequacy of the development legislation in promoting UD practice is adjudged to be substantially limited. Among the key recommendations of the study is a comprehensive review of the development Regulation to eliminate grey areas identified as possible hinderances that can prevent it from encouraging the promotion of UD practice in Nigeria.

Keywords: Universal Design, Accessibility, Usability, Building Development Legislation, Ogun State and Nigeria.

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1. INTRODUCTION

It is observed that in many societies across nations, public environments are not easily accessible for people with disabilities (PWDs) due to avoidable design shortfalls (Sholanke, Adeboye, Oluwatayo and Alagbe, 2016) [1]. In the past, architects were trained to design for an imaginary average which according to Mace, Graeme and Jaine (1985) [2] does not exist in actual sense. Designing to meet the needs of a mystical average is arguably considered a key contributing factor to the problem of inaccessibility of the built environment for the physically challenged. To address this issue, people are constantly looking for ways of improving access in public environments for everyone, particularly the physically challenged, to be able to easily use facilities. According to Froyen (2013) [3], throughout history, people have continuously made efforts to adjust and improve the physical environment to be more usable for all individuals.

Consequently, several design concepts have been developed to guide architects and designers towards the development of inclusive design solutions that meet specific needs of every user group. One of such design concepts is universal design (UD) which has its origin in the field of architecture (Sholanke *et al.*, 2016; McGuire, Scott and Shaw, 2006) [1] and [4]. The UD concept is acknowledged globally as a design strategy that make provisions that accommodates the expectations and needs of every possible user (Sholanke, Adeboye and Alagbe, 2019) [5]. According to the Center for Universal Design (CUD) (2008) [6], UD is a design approach whose goal is to develop not only environments, but products that can be used by everyone to the greatest possible extent, without resulting to adaptation or the use of specialised design.

The entrance of UD ideology into design fields, particularly the field of architecture, has brought about a paradigm shift from designing for a mystical average or to comply with just code requirements, which oftentimes are not suitable for achieving social inclusion, to a more holistic design approach that considers the needs of everyone right from the planning and design stage. According to Ostroff (2011) [7] approaches to design have shifted from narrow code compliance that meets the special needs of some, to a better inclusive design strategy that accommodates the needs of everybody. However, the development of the built environment is usually controlled by development regulations to achieve set minimum standards. Hence, it has become increasingly important for the said minimum standard to have adequate provisions that can facilitate development of inclusive environments that conforms with the UD ideals.

From the 20th century to the present-time, many countries have enacted development regulations as well as disability laws towards providing equal opportunities for every individual to operate and function as much as possible in the society. Notable among such development regulations are: The Building Regulations, 2015 used in the United Kingdom (UK) and Wales (The Building Regulations, 2015) [8] and Americans with Disability Act (ADA) Standards for Accessible Design, 2010 (Department of Justice, 2010) [9]. Some of the disability laws include: Discrimination Against Persons with Disabilities (Prohibition) Bill, 2018 recently enacted in Nigeria (MSN News, 2019) [10]; Accessibility for Manitobans Act, 2013 (Parliament of Manitoba, 2013) [11]; Equality Act, 2010 used in the UK (Act of Parliament of the United Kingdom, 2010) [12]; Accessibility for Ontarians with Disabilities Act, 2005 (Legislative

Assembly of Ontario, 2005) [13]; and Disability Discrimination Act, 1992 used in Australia (Howe, 1992) [14]. These laws are generally developed to discourage discrimination and reduce barriers against PWDs in several areas, including the built environment, education, transportation, health, customer service, employment, information and communication.

In countries where these equality laws exist, it is an offence to discriminate, segregate or stigmatise anyone on the basis of disability. With specific reference to the built environment, it implies that adequate accessibility and usability provisions are expected to be put in place in public buildings and environments for everyone to be able to use facilities regardless of their ability or inability. This infers that development legislation ought to have enough provisions that will compel designers to come up with design solutions that align with UD ideals, thereby enhancing social inclusion in the development of the built environment. It is however not certain whether development laws in Nigeria have enough provisions for promoting UD practice in the country. This is because no empirical study was found in this regard. UD related studies found in Nigeria are mostly investigations that evaluated the compliance of the built environment accessibility and usability provisions with UD expectations. Some of these studies include: Sholanke *et al.* (2019) [5]; Sholanke, Adeboye, Alagbe and Ugah (2018) [15]; Ibem, Oni, Umoren and Jiga (2017) [16]; Sholanke *et al.* (2016) [1]; Soyingbe, Ogundairo and Adenuga (2016) [17]; and Maclean (2014) [18]. The consensus reached by the studies is that PWDs are generally marginalised in the development of the built environment in Nigeria, as enough provisions are not made for them as it is usually made for able-bodied persons, to easily access and use facilities in public buildings. To address this issue, Sholanke *et al.* (2019) [5] posited that there is a need for further studies to assess the adequacy of development laws and regulations towards achieving environments that are inclusive in nature in Nigeria, as little or no study was found in this regard. The authors argued that this should be the first step towards achieving design solutions and developments that are inclusive in nature.

It is on this note, that this study examined the UD related provisions in the Ogun State building development regulatory legislation to determine their adequacy for promoting UD practice in Nigeria, with a view to finding ways of improving social inclusion of PWDs in the main stream of the society, in conformity with best global practice. To help achieve this aim, two objectives were developed. The first is to identify UD related provisions in the Ogun State building development regulatory legislation and the second is to determine the adequacy of the development legislation for encouraging the promotion of UD practice in the country. Ogun State is one of the six states in the southwestern part of Nigeria. The State was preferable as the study area because it recently took a giant step towards equalising opportunities in Nigeria by enacting a disability act developed to protect PWDs (Inclusive News Network, 2018) [19]. The law is aimed at eliminating all forms of discrimination against PWDs thereby equalising opportunities in every sphere of the society. The law was enacted to protect the vulnerable group, particularly PWDs against any form of violence, in order to encourage equality, equity and justice in the society (Ayansola, 2017) [20]. The purpose of the law is in line with the intent of UD ideology.

The scope of the study investigation was limited to the main building development regulatory legislation in operation in Ogun State, because the document is what is largely used to guide, control and regulate building developments in the study area. The study makes two distinct contributions to knowledge. The first is that it has empirically identified UD related provisions of the building development regulation used in the study area. The second is that it has empirically established the adequacy level of the development regulatory legal instrument for encouraging the promotion of UD practice in Nigeria. The study will be useful to building development practitioners, particularly architects towards the planning, design and

development of inclusive environments that can be accessed and used by everyone, regardless of their ability or inability, in conformity with best global practice. The study outcome will also be beneficial to building development law and policy makers, towards making provisions that take the accessibility and usability needs of every potential user group into consideration when formulating development laws and policies in their domain. In addition, the study findings are also useful for benchmarking the UD related provisions of the Ogun State Building Development Regulation with that of other states in Nigeria or other parts of the world. Students, educators and researchers will also find the study a useful material to work with and built upon. The paper is divided into six sections as follows: introduction; literature review; research methods; result, analysis and discussion; conclusion with recommendations; and acknowledgments.

2. LITERATURE REVIEW

2.1. Historical Perceptions and Modern-day Status of Disability

Disability is a broad term that means different things to different people. Those who have physical, sensory or mental impairments are generally classified as living with a disability (Inclusive Mobility, 2012) [21]. According to the United Nations (UN) (2006) [22], disability is an emerging notion resulting from the interface between people who have impairments and environmental or attitudinal hinderances that hampers them from fully participating effectively on equal level with others. The World Health Organisation (WHO) describes disability as a circumstantial variable that is dynamic with time and in relation to situations (Institute for Human Centered Design (IHCD), 2016) [23]. According to the WHO, disability is a general term for impairments (problems related with body function or structure), activities restrictions (problems faced in carrying out an action or a task) and participation limitations (problems encountered as a result of engaging in daily activities). It involves the interface between people who have health issues like depression or down-syndrome and environmental issues like harmful behaviour, inaccessible environments or limited social supports. Hence, disability is perceived as a complex phenomenon that mirrors the interface between body features of the physically challenged and societal features of where they operate (WHO, 2015) [24]. Consequently, to overcome the challenges faced by PWDs require interventions to eliminate both environmental and social barriers (WHO, 2016) [25].

Historically, the way societies perceive and treat PWDs is not the same nor static, but substantially differ from one culture to another. For instance, the Greek's perception of sick people is that they are inferior to the healthy. It is on record that in Plato's Republic, Plato approved that deformed descendants of both the elite and the common man be isolated from the rest of the population in some unknown mysterious locations. In the 16th century, some Christians like Luther and John Calvin were reported to have declared that people who are mentally retarded or living with other forms of disability were under the influence of evil spirits. Religious leaders of that time frequently subjected such people to both physical and psychological agony as a way of casting out the spirits from them (Munyi, 2012) [26]. Nevertheless, the emergence of the understanding that a disease is never a consequence for sinning or a shame, but an avenue for purification and grace is also credited to early Christian doctrine (Barker, Wright and Gonick, 1946) [27].

Lukoff and Cohen (1972) [28], reported that some cultures expel or maltreat the blind, while they are provided with special privileges by others. In a comparative analysis of the status of PWDs, Munyi (2012) [26] highlighted that Hanks and Hanks (1948) [29] discovered wide inconsistency in some cultures. The differences include being tagged outcasts or totally

rejected. In some communities they were viewed as liability economically and reluctantly allowed to be alive by their relatives. But in others, they are tolerated, accorded respect and provided with the opportunity to participate fully in their communities to their capability level.

In African societies, beliefs on how to treat PWDs vary. Historical records show that PWDs were often regarded as hopelessly helpless (Desta, 1995) [30]. According to Abosi and Ozoji (1985) [31], Africans in general, especially Nigerians attribute the roots of disabilities to juju (witchcraft), sex-linked issues, God or supernatural forces. In Nigeria, among the Igbo ethnic group in the Southeast, treatment of PWDs vary from pampering to outright rejection (Ojebiyi, Akanbi and Lawal, 2016; Munyi, 2012) [32] and [26]. The tradition of the Yoruba race in southwestern part of the country, forbids men who are physically deformed, such as amputees from being honoured with chieftaincy titles (Ojebiyi *et al.*, 2016) [32].

There is no doubt that past beliefs about disability is having some impact on the lives of several people all over the globe. Wright (1973) [33] reported that though several changes have occurred in both the status and treatment of PWDs worldwide, the remnants of culture, tradition or past beliefs still have some form of influence on modern-day perceptions of this group. According to Ademola-Olateju (2016) [34] broad prejudices against PWDs are still common in Nigeria. The author stated that such prejudices pollute various sectors of the society, be it public or private and determine the opinion and action of people towards them. He gave the expulsion of a female student from a university in Nigeria by the school authority based on her disability, which she has lived with all her life, as an example of such prejudice. He submitted that in general, Nigerians are woeful with regards to discriminating against PWDs.

Presently, the estimated number of PWDs in the world is one billion. This amounts to 15% of the population of the entire globe (World Bank Group, 2019; WHO, 2015) [35] and [25]. According to the WHO (2015) [25] World Report on Disability, between 110 million (2.2%) and 190 million (3.8%) persons who are 15 years and above have substantial problems in operating. The UN (2010) [36] estimated that 80% of PWDs reside in developing nations, including Nigeria. In Nigeria, it is projected that over 22 million persons are living with some form of disability (Obiakor and Eleweke, 2014; Eleweke, 2013) [37] and [38]. Lang and Upah (2008) [39] estimate of the percentage of PWDs in Nigeria is 20% of the country's population. With such a substantial number of the populace living with disabilities, Okoli (2010) [40] recommended that the potentials of PWDs should be harvested by the elimination of design barriers in the built environment, in order for this user group to be able to participate fully in the society and contribute their quota to societal development. Nevertheless, Amusat (2009) [41] found that the issue of disability is still largely tackled on charity and welfare basis in Nigeria. This situation is however expected to begin to improve as disability laws have emerged in the country.

Contemporarily, disability is not only regarded as a physical and psychological disadvantage in several countries, but a hinderance that can result to loss of both civic and fundamental human right. To this end, the General Assembly of the UN made thirteen declarations on the rights of PWDs in 1975, in order to guide against the exclusion, inequality and discrimination they encounter in the society. Some of the declarations of the UN is that PWDs have equal rights as every other person, in addition to having the inherent right to respect for their humanity. Regardless of the nature, severity or origin of their disabilities, they are said to have the same fundamental rights to enjoy a normal and life that is descent as much as possible as others in their age group. They are also entitled to design provisions that will enable them to be independent as much as possible. In addition, discrimination against anybody based on disability was declared an abuse of the person's innate self-worth and human dignity. The

UN affirmed that there is a need to protect and promote the human rights of PWDs, including the ones who need intensive care (UN, 1975) [42].

Consequently, several countries including Nigeria have enacted disability laws as earlier mentioned. Most of the disability laws cover the requirements for access, evacuation and the use of public facilities by PWDs. This means that in countries with disability laws, it is unlawful to discriminate against anyone based on disability, in the provision of public environments and amenities. Based on the current status of societal perception on disability in this modern-day, it is clear that the subject of disability has progressed beyond being tackled from a charity or welfare basis, but now globally acknowledged and treated as a civic and human right issue. There is therefore an increasing need to ascertain that existing developmental laws have enough provisions for encouraging the development of inclusive environments that accommodate the needs of everyone, including PWDs, in conformity with global trend, UD ideal and best global practice.

2.2. The Development of Universal Design Paradigm

The UD paradigm began gaining global recognition in design fields in the mid-1980s. The design concept as globally promoted in the last few decades has been acknowledged to have its roots in the field of architecture (McGuire *et al.*, 2006) [4]. The term “universal design” was first used by a USA architect and researcher, Ronald L. Mace to explain the idea of designing every environment and product such that they are appealing and can be used to the widest possible extent for every individual, regardless of ability, age or status. Mace was himself a wheelchair user that challenged the usual way of designing for an average user and laid the basis for an inclusive design strategy that targets everybody (Sholanke *et al.*, 2016) [1].

However, the birth of UD paradigm in design fields did not occur as an isolated occurrence. Several events have been identified as precipitating factors that brought about the emergence of UD in design fields. According to Dion (2004) [43], UD developed from a preceding barrier-free ideology, the wider accessibility movements, as well as assistive and adaptive technology. Ostroff (2007) [44] identified two main distinctive trends that can be linked to the emergence of the UD as legislation with provisions that caters for PWDs and the nonregulated market-driven responses to an aging population, mostly involving products. The CUD (2008) [6] and Story, Muller and Mace (1998) [45] traced the origin of UD to demographical changes, federal legislations, barrier-free movements, rehabilitation engineering, assistive technology and economic and social changes among the aged and PWDs in the 20th century.

Major social changes with respect to civil and human rights occurred in the 20th Century (National Disability Authority (NDA), 2012) [46]. At the early stage of the Century, old people and PWDs were in the minorities (CUD, 2008) [6]. During this period, many people began to live longer, largely due to improved sanitation, healthier living and medical discoveries that led to improved medicine and vaccines that virtually eliminated several killer ailments that previously had no known cure. This made more people to begin to experience old age as well as disability, because disability is naturally associated with old age. The two world wars also left behind a large population of war victims and veterans with disabilities. These demographic changes led to a higher population living with disability (Story *et al.*, 1998) [45].

As more people lived with disabilities, it became obvious that access to social, economic and political life was not easy for this user group compared to able-bodied people. This led to the emergence of disability rights movement inspired by the 1960s civil rights movement. The disability rights movement advocated for equality in the provision of access to economic, social and political activities. Their agitation eventually led to the emergence of equal rights and anti-discrimination laws targeted at providing PWDs equal opportunities with abled-bodied persons

to live an independent normal life. Agitations by veterans with disabilities and advocates for PWDs for the creation of opportunities in education and employment for PWDs gave birth to barrier-free movement in the 1950s. Efforts of the agitators brought about the development of standards for barrier-free buildings. As designers began to implement the standards, it became obvious that isolated accessible provisions were distinct as well as costlier and generally not aesthetically pleasant. It also became obvious that several environmental changes needed to cater for PWDs benefited everybody. The realisation that several of such provisions could be generally provided, hence became less costly, marketable and attractive laid the basis for the UD movement (CUD, 2008; Story *et al.*, 1998) [6] and [45].

Rehabilitation engineering and assistive technology began in the mid-20th century and played key roles in the development of UD. In the 1960s and 70s, rehabilitation engineering developed to a field that applied engineering research methodology and scientific principles to solve problems (Story *et al.*, 1998) [45]. Assistive technology has its roots in the medical field with durable medical equipment. The technology assists people to easily carry out tasks that would otherwise be impossible or difficult to accomplish (Mace, 1998) [47]. Though coming from histories and directions that slightly differ, assistive technology and UD have the same goal. The two fields meet at a boundary line. They both aim at reducing the behavioural and physical barriers between PWDs and those who do not have disabilities by developing products and environments that can enable PWDs to be more independent and fully participate in the mainstream of the society, alongside able-bodied people (CUD, 2008) [6].

The 1980 economic downturn negatively affected funding for rehabilitation engineering researches and elimination of barriers in the environment. At the same period, manufacturers of products began identifying the market-widening possibilities of products that are more accommodating (CUD, 2008) [6]. As the proportion of likely consumer markets increased, the range of the consumer base expanded to include variances in customs, culture, language, experiences and patterns of historic designs. These situations increased the need for designs that accommodate individual preferences and abilities (Story *et al.*, 1991) [45]. As cost that is reasonable is a key consideration in every design or production procedure, UD became a marketable strategy in this regard, because it meets the different needs of most consumers (CUD, 2008) [6].

Based on the above historical narrative on the development of the UD paradigm, it is clear that public acknowledgment of the plight of PWDs and the progress toward UD has developed mainly along three parallel activities as rightly pin pointed by Story *et al.* (1998) [45]. They include: legislation as a result of agitation by the disability rights movement; the barrier-free schemes to UD movement; and progress made in rehabilitation engineering and assistive technology. In addition, NDA (2012) [46] also identified some design approaches that have specific interest for both health and safety reasons as significant contributing factors to the development of the UD paradigm. The design strategies are, user-centred design approaches and human factor fields like ergonomics that consider users' needs right from the beginning of the design process. Sholanke *et al.* (2016) [45] supported this view with the assertions of Asiah, Mansor, Ismawi, Izawati and Mohd (2011) [48] and Mueller (1990) [49] that UD can also be regarded as planning using ergonomics, which involves considering the distinct needs of different individuals like the aged or children who are living with disability.

2.2.1. Definitions of Universal Design

Different definitions of UD have been developed since the concept gained global attention in the mid-1980s. The first and most generally acknowledged definition of UD was developed for the CUD in North Carolina State University in America, by Ronald Mace and a group of

professionals and researchers who specialise in environmental design. The Centre defined UD as “*the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaption or specialized design*” (CUD, 2008) [6]. According to the Centre, the purpose of UD is to “*simplify life for everyone by making products, communications and the built environment more usable by more people at little or no extra cost*” (Aslaksen, Bergh, Bringa and Heggem, 1997) [50]. Simply put, UD is human-centred design of everything with everyone in mind (IHCD, 2016).

Apart from the definition of UD developed by the CUD, several other definitions based on the Centre’s idea of UD have also been developed. One of such definition is that provided by Aslaken *et al.* (1997) [50]. The authors advanced that the links between the various physical components could gainfully be a more obvious part of the definition of UD and proposed an inclusion to extend the definition at the beginning of that developed by the CUD. They redefined UD as, “*the design “and composition” of “different” products and environments to be usable by all people, to the greatest extent possible, without the need for adaption or specialised design.* They also suggested that *to eliminate unnecessary use of technical aids*” should also probably be part of the definition (Aslaken *et al.*, 1997) [50].

Some other useful definitions of UD relating to that developed by the CUD include that of the IHCD (2016) [23]. The Centre defined UD as “*a framework for the design of places, things, information, communication and policy to be usable by the widest range of people operating in the widest range of situations without special or separate design*”. Steinfeld and Maisel (2012) [51] described UD as “*a design process that enables and empowers a diverse population by improving human performance, health and wellness and social participation*”. According to Ostroff (2011) [44], UD is “*an approach to design that honours human diversity, addressing the right for everyone, from childhood into the oldest years, to use all spaces, products and information in an independent, inclusive and equal way*”. The UN (2006) [22] defined UD as “*a design of products, environment, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design*”. The organisation also highlighted that UD should not exclude assistive devices for some group of PWDs that need them. According to the Government of Ireland (2005) [52] UD is “*an approach to design and construction aimed at making products and the built environment accessible and usable for everyone, especially PWDs, as well as the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or inability*”.

UD solutions often come with extra cost. This is possibly why the CUD included in its UD definition that UD solutions are achievable “at little or no extra cost”. It is however observed that the use of the word “little” in this context is ambiguous and this study propose to replace it with “at minimal justifiable cost”. Hence, based on the general understanding and various descriptive narratives provided about UD, UD can comprehensively be described as follows: “*the design (CUD, 2008) [6], composition (Government of Ireland, 2005; Aslaken et al., 1997) [52] and [50] and construction (Government of Ireland, 2005) [52] of different (Aslaken et al., 1997) [50] products, environments (CUD, 2008) [6], information, communication, policies (IHCD, 2016) [23], programmes, services (UN, 2006) [22] and processes, to be understood, accessible (Government of Ireland, 2005) [52] and usable by all people (CUD, 2008) [6], regardless of their age, size, ability or inability (Government of Ireland, 2005) [52], to the greatest (CUD, 2008) [6] independent (UN, 2006) [22] extent possible, without the need for adaption or specialised design, at no extra cost (CUD, 2008) [6] or at minimal justifiable cost*”.

2.2.2. The Principles of Universal Design

The UD definition developed by the CUD is accompanied by seven principles generally recognised as the UD principles or the seven principles of UD. Each principle was developed with a set of guidelines. The first principle is “*equitable use*”. This means, no user group should be stigmatised or is placed at a disadvantaged position when using the design. The second principle is tagged “*flexibility in use*”, meaning a wide variety of personal abilities and preferences are accommodated by the design. Principle three is “*simple and intuitive use*”, which means irrespective of users’ language, experience, knowledge or current level of concentration, the design is easy to use. Principle number four is “*perceptible information*”, that is, necessary information is effectively communicated to the user, irrespective of his or her sensory abilities or ambient condition. The fifth principle is labelled “*tolerance for error*”, which means that adverse effects of unintended or accidental actions are minimised by the design. The sixth principle is “*low physical effort*”, that is, the efficient and comfortable use of the design should be with minimum fatigue. Principle seven is tagged “*size and space for approach and use*”, meaning irrespective of user's body posture, size or mobility, suitable size and space should be made available for approach, reach, manipulation and use by users (Sholanke *et al.*, 2019; Sholanke, Adeboye, Alagbe and Ugah, 2018; Sholanke *et al.*, 2016; IHCD, 2016; CUD, 2008) [5], [15], [1], [23] and [6]. The principles are copyrighted to the CUD in North Carolina State University in America (Story *et al.*, 1998) [50].

The principles are useful as a part of a quality-assurance procedure from the inception to completion of a scheme. They can also be used to guide and influence the design development to cater for everybody, assess existing environments and products, as well as educate both clients/consumers and designers about the characteristics of designs that are better usable (Sholanke *et al.*, 2016; CUD, 2008) [1] and [6]. Aderonmu, Awoyera, Sholanke and Erebor (2017) [53] noted that to address a design issue of concern a comprehensive parametric process is needed to develop pragmatic solutions that can effectively deal with the problem. UD concept is a means to deliver such results, because its principles and guidelines were carefully crafted to have the basic elements needed to achieve pragmatic design solutions that address the accessibility and usability needs of every individual. Nevertheless, the principles do not include every criterion for a good design, but only for a design that is universally accessible and usable. In addition to the principles, other important criteria such as cost, aesthetics, environmental impact, social considerations, cultural relevance and other sustainable criteria, should also be considered.

2.2.3. Targets of Universal Design

UD strategy is hinged on the reality that abilities of people differ and this ought to be considered in the design, planning and development processes, including the eventual product or solution. Aslaksen *et al.* (1997) [52] advanced that the goal of UD is to develop solutions, principles and theories that will enable every individual to make use of the same physical solutions to the highest possible extent, be it products, buildings, environments or means of communication. Hence, the focal points of UD are: accessibility (making it accessible to use); usability (making it easier to use); and increasing the users range to include more people (Sholanke *et al.*, 2019) [5]. The core supporting ideologies on which UD operates are equality in status, equality in treatment and equality in merit. Some of its objectives are to: use key principles of UD to enhance liveability and quality of life for everybody; make all areas of day-to-day activities simple, by making a usable community available for everybody; lessen behavioural and physical barriers between PWDs and those who do not have disabilities; and make provisions that will make it possible for PWDs to fully take part in social life on equal basis with people who do not have disabilities (Sholanke *et al.*, 2016) [1].

2.2.4. Limitations of Universal Design

Though the ambition of the UD is to make provisions that can accommodate everyone, some UD advocates have acknowledged its limitations. Trost (2005) [54] contended that the impression that UD can break all borders is ludicrous and argued that experience in life and market realities contradict such notion. His opinion is shared by McGuire *et al.* (2006) [4] that supported their submission with the argument of Mace (1998) [47] who also acknowledged that it is unfortunate to use the word “universal” as nothing can indeed be universal. Mace maintained that no matter how considerably designed, there will always be individuals who will not be able to use the end product of the design. Nevertheless, Mace advocated that things should always be improved upon to make them more usable generally. This infers that the UD concept targets usability for everybody in theory, but provides for as many persons as possible in reality. To this end, NDA (2014) [46] posited that UD is a process and not an outcome. Hence, assumptions should not be made that a full universal solution is achievable for any given design, rather UD should be considered as a target by designers to continuously attempt to attain more usable outcomes.

3. RESEARCH METHODS

3.1. Research Design

As earlier mentioned, the study area is Ogun State in Nigeria which was purposively selected for the research. The State was preferable for the study among the 36 federating states of the country, because it has just recently enacted a disability law to equalise opportunities for PWDs in the country (Inclusive News Network, 2018) [55]. In this regard, it is considered necessary to ascertain that existing development laws are in conformity with this current reality. The study was designed as a qualitative research that used document analysis to extract data from building development legislation used in the study area. According to the Centre for Innovation in Research and Teaching (2018) [56], a qualitative research strategy can be used when the aim of a research problem centres around understanding, examining and describing a phenomenon. As the goal of the study was to examine the UD related provisions in the Ogun State building development regulatory act and determine their adequacy for promoting UD practice, the study was expected to identify, examine and describe an existing situation, thus, a qualitative research approach was deemed apt and adopted.

The study is naturally a case study research as the enquiry is limited to the building development legislation of a state in Nigeria. Yin (2009) [57] advanced that a case study research can be explanatory, exploratory or descriptive in nature. It is a preferred approach when the objective is to answer the “why” or “how” question, when the focus of the research is not historical, but on present issues and where the researcher has slight control of the events as demonstrated by this research. A case study can be used for a single or multiple sites investigation, giving the researchers the opportunity to explore and discover what is being investigated and the way to address them (Stewart, 2013) [58]. The study is a single case study research which allowed for an indebt examination at close range.

The data gathered for the research were strictly from secondary sources. The sources include: the current building development regulatory legislation used in the study area, relevant UD parameters such as published accessible design standards and the UD principles; accessible design standard provided in Neufert and Neufert (2012) [59] and Inclusive Mobility (2012) [60]; and existing building and environment development control acts considered adequate for achieving UD of the built environment. The development control regulatory documents are: The Building Regulation (2015) [61] used in the UK and Wales and the 2010 ADA Standards

for Accessible Design published by the Department of Justice (2010) [62], used in America. The type of data needed for the study are mainly information in existing documents which are basically qualitative in nature. Thus, document analysis technique was used to extract the needed data and content analysis was used to analyse them.

The principal assessment framework used for the study is a combination of the provisions of the seven principles of UD and generally recognised accessible design standard requirements. In addition, some provisions included in existing development regulations in some developed countries considered useful for achieving UD environments, but missing from the Regulation were also taken into consideration. In carrying out the assessment of the provisions of the development regulatory legislation to determine their adequacy for encouraging the promotion of UD practice in Nigeria, their UD related provisions were first identified based on what was found in literature as UD requirements. The provisions were then compared with the standards obtained from literature to determine if they are comprehensive enough for encouraging the promotion of UD practice in Nigeria. The result of the study investigation is presented using descriptive approach with the aid of a table for easy understanding. The data used for the study were gathered and analysed between February 2016 and February 2019.

4. RESULT, ANALYSIS AND DISCUSSION

Generally, all the states in Nigeria including the Federal Capital Territory (FCT), Abuja, rely on their various building and environment development regulations for guiding and controlling physical developments within their respective domains. The power to execute the legislation are vested in statutory establishments. Though Nigeria has a National Building Code (NBC) that was given birth to in 2006, the federating states including the FCT still largely rely on their various physical development legislation to regulate developments within their boundaries. This is because NBC is still a document undergoing the necessary processes needed for it to become a binding law in all the federating units, including Ogun State.

Currently in Ogun State, matters of physical development are statutorily vested and handled by the State Ministry of Urban and Regional Planning (URP). The current building regulation in use in the State is the Ogun State Building Plan Regulation (2010) [63]. The regulation is a product of the enactment of the Ogun State Urban and Regional Planning Law No. 20 (2005) [64]. In line with the objectives of this study, the documents were examined accordingly. The result of the content analysis carried out on the documents are presented as follows:

4.1. Result and Analysis on Objective One

The goal of the first objective of the study is to investigate UD provisions in the current building development regulatory legislation used in Ogun State, Nigeria. The study investigation revealed that no part of the Ogun State Urban and Regional Planning Law No. 20 (2005) [64] relates to UD. However, some provisions of the Ogun State Building Plan Regulation (2010) [63] relate to UD. The Regulation is a document formulated as a result of provisions of section 93 of the Planning Law which empowers the commissioner of the State Ministry of URP with the approval of the governor, to make regulations for the general execution of the purpose of the Law. The provision relating to UD in the Regulation are generally designed to create equal opportunities for PWDs, particularly the mobility impaired, to be able to easily access public environments to use facilities. The UD related provisions in the Regulation are presented in Table 1.

Adequacy of Ogun State Building Development Regulatory Legislation in Promoting Universal Design Practice in Nigeria

Table 1 Universal Design Related Provisions in the Ogun State Building Plan Regulation (2010)

SN	Item	Universal Design Related Provisions in the Regulation	Universal Design Requirements
(A)	General Requirements		
1	Carpark size	2500 mm by 4500 mm	2400 mm by 4800 mm
2	Staircase	Least width (1000 mm)	Least width (1000 mm)
		Uniform riser heights	Consistent riser heights
3	Accessibility and usability provisions	Adequate accessibility provisions should be made for PWDs to easily move around to use facilities	Adequate accessibility provisions free of barriers, should be made for everyone: users to be largely independent of outside assistance
(B)	Special Requirements for the Physically Challenged in Public Buildings		
4	Assumed wheelchair specs	Size (560 mm)	Size (760 mm)
		Least passage width (900 mm)	Least passage width (900 mm)
5	Institutional, public assembly or lecture hall buildings standards	Provide accessible routes to main seating areas	Equitable Use: (UD Principle One)
		Provide accessible toilet near halls	Equitable Use: (UD Principle One)
		Provide various seating/viewing choice for wheelchair users throughout main seating areas	Flexibility in Use: (UD Principle Two)
		Provide minimum of two wheelchair space for a hall of 100 capacity: four for halls of over 100 to 400 capacity	Equitable Use: (UD Principle One)
6	Entrance/Exit doors	Least width (900 mm)	Least width (900 mm)
		Threshold maximum height (12 mm)	Threshold maximum height (10 mm)
7	Windows, blinds and curtains	Heights of opening mechanisms of windows, blinds and curtains should be reachable for wheelchair users	Equitable Use: (UD Principle One)
		Provide unobstructed viewing zone for wheelchair users	Equitable Use: (UD Principle One)
8	Corridors connecting entrance	Least width (1500 mm)	Least width (1500 mm, but with passing space)
		Provide slope way with handrail where there is a change in level	Provided ramp with handrail alongside steps at the entrance of buildings or where there is a significant change in level
		Provide guiding floor materials at entrance landings adjoining to end of ramp	Equitable Use: (UD Principle One) and Tolerance for Error: (UD Principle Five)
		Maximum slope way gradient (1:12)	Maximum slope of a walking surface (1:20)
9	Ramps	Maximum ramp gradient (1:12)	Maximum ramp gradient (1:12)

SN	Item	Universal Design Related Provisions in the Regulation	Universal Design Requirements
		Least clear flat surface at foot and top of ramp (1500 mm)	Least clear flat surface at foot and top of ramp (1500 mm)
		Provide handrails to ramps	Provide handrails on both sides of ramp
10	Lifts	Provide at least one lift for wheelchair users	Provide a lift usable for wheelchair users as alternative to a very long ramp
		Least dimension (1800 mm by 1800 mm)	Adequate Size and Space for approach and use: (UD Principle Seven)
		Clear internal depth by width (1100 mm by 2000 mm)	Clear internal width by depth (1100 mm by 1400 mm)
		Least width of entrance door (900 mm)	Least width of entrance door (900 mm)
		Entrance door to close automatically	Low Physical Effort: (UD Principle Six)
		Maximum door closing speed (0.25 m/sec)	Maximum lift speed (0.15 m/sec)
		Lift to have handrail near control buttons	Lifts to have handrails
		Handrail height (800 – 1000 mm)	Handrail height (900 mm)
11	Toilets	Provide an accessible toilet in every set of toilets	Provide at least one accessible toilet in all sanitary facilities
		Least size (1500 mm by 1750 mm)	Least size (1500 mm by 2200 mm)
		Least door width (900 mm)	Least door width (900 mm)
		Door to swing out	Door to swing out
		Provide guiding blocks with textural difference near entrance door	Provide raised tactile sign that is 180 mm wide by 100 mm high
		Water Closet (WC) height (500 mm)	WC height (480 mm)
		Provide wash hand basin (WHB) near entrance for PWDs	Provide WHB to be reachable for users in seated position on WC
		Provide vertical/horizontal grab bars at suitable locations	Provide grab bars at consistent heights
		Grab bar distance from wall (50 mm)	Grab bar distance from wall (38 mm)
		Grab bar size (40 mm diameter)	Grab bar size (32 mm – 51 mm diameter)
		Nature of floors (Non-slippery)	Nature of floor (Firm, stable and non-slippery)

Source: Universal Design Principles, The Building Regulations (2015) [61], Neufert and Neufert (2012) [59], Inclusive Mobility (2012) [60], Department of Justice (2010) [62] and the Ogun State Building Plan Regulation (2010) [63].

Table 1 indicates that UD related provisions of the regulation are grouped under two categories namely: general requirements and special requirements for the physically challenged in public buildings. The analysis of the UD related provisions is presented as follows:

4.1.1. General Requirements

(i) Carpark Size: The minimum carpark size specified in section 22 of the Regulation is 2500 mm by 4500 mm. The minimum carpark width of 2500 mm is slightly higher than the 2400 mm stipulated in Inclusive Mobility (2012) [60] as the minimum width of a carpark. Though the 4500 mm specified in the Regulation as the minimum length of a carpark falls short of 4800 mm recommended in Inclusive Mobility (2012) [60], the difference is marginal. Hence, the carpark size stipulated in the regulation is adjudged fairly compliant with UD requirement.

(ii) Staircase: The minimum width of staircase specified in the regulation is 1000 mm. This corresponds with the minimum staircase width recommended in Inclusive Mobility (2012) [60]. This width will allow two people of average size to conveniently pass side by side.

(iii) Accessibility and Usability Provisions: The Regulation provided in section 35 that adequate accessibility should be made for PWDs to easily move around to use facilities. This conforms with the recommendation of Neufert and Neufert (2012) [59] that adequate accessibility provisions should be made for everyone free of barriers such that users can be largely independent of outside assistance.

4.1.2. Special Requirements for the Physically Challenged in Public Buildings

(i) Assumed Wheelchair Specs: Wheelchair generally come in different sizes. The assumed wheelchair size of 560 mm is provided in section 41 of the Regulation. Though this size is smaller than the 760 mm stipulated in ADA Standards for Accessible Design by the Department of Justice (2010) [62], the 900 mm specified in the Regulation as minimum allowable passage width for a wheelchair tallies with the provisions of Inclusive Mobility (2012) [60] and other accessible design standards. Hence, the assumed wheelchair widths are immaterial, because the allowable minimum wheelchair passage width specified generally, is adequate for most wheelchair sizes.

(ii) Institutional, Public Assembly or Lecture Hall Buildings: For institutional, public assembly or lecture hall buildings, section 37 of the Regulation stipulated that main seating locations are provided with accessible entry points, exits and aisles. Toilet facilities in them should be accessible and nearby. In assembly or lecture halls, seating for the physically challenged are required to be accessible from the main entry points and lobbies. Such seating areas are required to provide various seating/viewing choices throughout the main seating area for wheelchair users. For a seating capacity of up to 100 seats, at least two wheelchair spaces are specified to be provided. But when the capacity is between 100 to 400 seats, at least four wheelchair spaces are stipulated. The aforementioned provisions in the Regulation conform with the requirement of the first principle of UD which requires that designs should not stigmatise or position any user group at a disadvantage. The provisions are also in line with the requirement of the second principle which entails that designs should accommodate a wide range of individual preferences and abilities. Generally, the provisions are targeted at equalising opportunities for the physically challenged thereby expanding the range of users to include everyone or as many people as possible, in conformity with the ambition of the UD concept.

(iv) Entrance/Exit Doors: Clear minimum opening width of doors provided in section 42 of the Regulation is 900 mm. The doors are required not to have steps that will obstruct free flow movement of a wheelchair. To this end, the maximum allowable threshold height specified in the regulation is 12 mm. The door requirements are in line with what is provided in accessible design guidelines generally. Minimum clear door width stipulated in Inclusive Mobility (2012) [60] for accessible designs is 900 mm, while Department of Justice (2010) [62] stipulated a range of between 815 mm to 1000 mm. Though the maximum threshold height of 12 mm recommended in the Regulation is slightly higher than the maximum allowable of 10 mm stipulated in Inclusive Mobility (2012) [60], the difference is marginal and considered inconsequential.

(v) Windows, Curtains and Blinds: The Regulation stipulated that opening mechanisms of windows, blinds and curtains should be at accessible heights for wheelchair users. Windows are also required to provide viewing zones that are unobstructed for wheelchair users. These requirements are in agreement with the first UD principle that demands that designs should not stigmatise or place any user at a disadvantaged position.

(vi) Corridors Connecting Entrances: A minimum width of 1500 mm is specified in section 40 of the Regulation for corridors connecting entrance areas. Inclusive Mobility (2012) [60] stipulated the same width dimension as the acceptable minimum for a two-way corridor, provided passing spaces are provided at convenient intervals. The maximum gradient of a slope way connecting corridors on different levels and that of a ramp provided as 1:12 in the Regulation, tally with the maximum gradient for slopes and ramps stipulated in accessible design guides generally. The Regulation also specified that ramps and slope ways should be provided with handrails as generally stipulated in accessible design guidelines. According to The Building Regulation (2015) [61], both sides of ramps and steps connecting entrances of buildings should be provided with handrails. The Regulation also provided that guiding floor materials or sound emitting floor guides should be provided for the benefit of the visually impaired along corridors connecting entrance areas. This requirement conforms with the requirements of the first and fifth principle of UD, that is equitable use and tolerance for error respectively.

(vii) Ramps: Section 38 of the Regulation provided that the maximum gradient of a ramp should be 1:12. This tally with the maximum gradient of ramps stipulated for accessible designs generally. In addition, the Regulation demanded that ramps should be provided with a clear flat space of 1500 mm at both the bottom and top end of ramps which also tally with the recommendation of Neufert and Neufert (2012) [59]. Such space is needed for wheelchair users to pause and prevent them from losing control.

(viii) Lift: Provisions made in the Regulation in section 44 with regards to accessible lifts relating to UD are as follows: at least one lift should be provided for wheelchair users; such lift capacity should be 13 persons; the lift dimensions are required to have 1100 mm internal clear depth, 2000 mm clear interval width, 900 mm entrance door width and 800 mm to 900 mm high handrail, fixed adjacent to the control panel. The lift is required to close automatically with a closing speed of at least 5 seconds and not be more than 0.25 m/sec. Minimum lift lobby is stipulated as 1800 mm by 1800 mm.

Generally, the lift specifications stated in the Regulation are found to conform with the requirements of either a UD principle or an accessible design standard. According to Inclusive Mobility (2012) [60] a lift usable for users of wheelchair should be provided in place of a very long ramp. Such lift should have a clear internal width by depth of at least 1100 mm by 1400 mm which is a bit less than what is specified in the Regulation. The requirement that lift doors should close automatically stipulated in the Regulation does not only conform with accessible

design standard requirement generally, but satisfies the provision of the sixth principle of UD which demands that designs should be used with low physical effort. The minimum size of lift specified in the Regulation allows for adequate size and space for approach and use as demanded by the seventh principle of UD. According to The Building Regulations (2015) [61] a lift should have a door maximum closing speed of 0.25m/sec, a lift car maximum speed of 0.15 m/sec and a 900 mm high handrail. Accessible design standards generally require that minimum width of a lift door should be 900 mm. Lifts are also required to have handrails for both support and safety reasons as provided for by the Regulation.

(ix) Toilets: Generally, accessible toilet requirements in the Regulation conform with several accessible design standard provisions. According to section 45 of the Regulation, a special WC that is 500 mm high should be made available for the physically challenged in a set of toilets. The WC should be provided with a WHB positioned near the entrance. The Building Regulations (2015) and Neufert and Neufert (2010) [59] stipulated that a minimum of an accessible toilet should be included in every set of sanitary facilities. According to Inclusive Mobility (2012) [60] and Neufert and Neufert (2010) [59], a WC seat height should be 480 mm. This height though a bit lower than what is specified in the regulation, the difference is insignificant. According to The Building Regulations (2015) [61] and Inclusive Mobility (2012) [60], WHBs should be located so that they are accessible for users in seated position on WCs.

The regulation also provided that an accessible toilet size should not be less than 1500 mm by 1750 mm and that the swing of the door should be outwards with a clear opening width of at least 900 mm. The least width for an accessible toilet door specified in the regulation is the same with that recommended in most accessible design standards. The door is also required to open outwards as stated in the Regulation. But the minimum size of an accessible toilet specified by The Building Regulations (2015) [61] and Inclusive Mobility (2012) [60] is 1500 mm by 2200 mm. Though the allowable minimum toilet length stated in the Regulation, which is 1750 mm, is a bit smaller than 2200 mm, the difference is inconsequential. This is because the overall toilet space size recommended is still adequate for an average wheelchair user to manoeuvre in to use the toilet facilities.

The Regulation also stipulated that provision should be made for vertical and horizontal steel pipe grab bars that are 40 mm diameter in accessible toilets. The grab bars are required to be located at 50 mm away from the surface of the wall and placed at suitable locations in the toilet. These requirements of the Regulation follow the pattern recommended in accessible design standards generally. According to the Department of Justice (2010) [62], accessible toilets should be provided with grab bars at consistent heights. The range of the diameter of the grab bars is stipulated as 32 mm to 51 mm, while the distance between the wall surface and grab bars is specified as 38 mm. This distance is slightly smaller than what the Regulation specified. However, the difference is considered not significant.

In addition, the Regulation also provided that guiding blocks with textural difference should be provided close to the toilet entrance, while toilet floors are required to be non-slippery. The guiding blocks are useful for guiding the visually impaired towards the toilet. Likewise, Inclusive Mobility (2012) [60] recommended a raised tactile sign that is 180 mm wide by 100 mm which is also a way finding measure to benefit the visually impaired. Most floors, including toilet floors are required to be firm, stable and non-slippery, according to the Department of Justice (2010) [62]. Few exceptions are floors of animal sheds or farm lands.

The result of the investigation on the first objective indicates that some provisions of the Regulation relate with UD requirements as explained. The said provisions were discovered to be consistent with UD ideology and the provisions of some UD principles. Some of the UD

related provisions are also consistent with technical requirements in some generally acknowledged accessible design standards, as well as building development regulations useful for the development of inclusive environments used in some developed countries.

4.2. Result and Analysis on Objective Two

The target of the second objective of the study is to assess the adequacy of the current building development legislation in use in Ogun State, Nigeria for encouraging the promotion of UD practice in Nigeria. The data analysed in section 4.1 indicated that the Ogun State Urban and Regional Planning Law No. 20 (2005) [64], which is the current development law in use in the State, does not have any of its provisions relating to UD requirements. This infers that the Planning Law does not have any provision for encouraging the promotion of UD practice in Nigeria. Nevertheless, some of the provisions of the Ogun State Building Plan Regulation (2010) [63], which is a product of the Planning Law, were discovered to relate with UD requirements as presented in section 4.1. The adequacy of the said provisions of the Regulation in encouraging the promotion of UD practice in Nigeria is examined in the following section.

4.2.1. Adequacy of the Ogun State Urban and Regional Building Plan Regulation, 2010 for Promoting Universal Design Practice in Nigeria

The adequacy of the Ogun State Urban and Regional Building Plan Regulation (2010) [63] in encouraging the promotion of UD practice in Nigeria is largely dependent on the level of comprehensiveness and suitability of the provisions of the Regulation for achieving UD in all areas relating to the development of the built environment. The ambition of UD ideology is for everyone, irrespective of ability or disability, to be able to freely travel around unassisted within buildings and the environment to use spaces, services and facilities. For a development regulation to be adequate for encouraging the promotion of UD practice, the Regulation ought to have adequate accessibility and usability provisions that can enable the design and development of appropriate solutions that will satisfy the accessibility and usability needs of all users, notwithstanding their ability or inability. Hence, all necessary design guidelines required for designing and developing every relevant aspect of buildings and the environment that can impact on accessibility and usability for users, should be clearly and fully outlined in the Regulation without ambiguity. To this end, the UD related provisions of the Regulation was compared to requirements of known accessible design standards as earlier mentioned. The result of the analysis is presented as follows:

(i) Wheelchair Dimensions and User Requirements: The wheelchair UD related provisions in the Regulation are just the size and minimum allowable passage width for a wheelchair user. Other essential technical details needed to enable the development of environments usable for wheelchair users, such as minimum wheelchair user turning radius, manoeuvring space size, reach heights, toe, knee and ankle clearance requirements as provided in Inclusive Mobility (2012) [60] and ADA Standard for Accessible Designs by the Department of Justice (2010) [62], were not specified in the Regulation.

(ii) Carpark: The only carpark UD related requirement stipulated in the Regulation is mainly the minimum size. The Regulation did not make provisions for accessible carparks or drop-off points in public environments for PWDs as provided for by The Building Regulations (2015) [61], Inclusive Mobility (2012) [60] and ADA Standard for Accessible Designs by the Department of Justice (2010) [62]. The carpark requirements provided in these documents did not only stipulate standards for accessible parking size and drop-off points, but included other technical details such as maximum allowable slope gradient, nature of the parking area surface and how to determine the quantity of accessible carparks to provide in a public facility.

(iii) Entrance/Exit Doors: Entrance and exit doors UD related requirements provided in the Regulation covered areas such as minimum acceptable opening width, maximum acceptable threshold height and clear entrance/exit landing size. Other technical details such as door minimum acceptable opening handle type, opening lever length and diameter, clear opening height, maximum allowable opening force and colour requirements as stipulated in The Building Regulations (2015) [61] were not included. In addition, though the Regulation specified a minimum threshold size in line with UD requirement, it is not stated in the Regulation that where threshold heights are more than 5 mm, they should be bevelled for wheelchair users to easily pass through as stipulated in Inclusive Mobility (2012) [60].

(iv) Corridors/Walkways: The UD related provisions in the Regulations for corridors, walkways and movement areas in public buildings were just their minimum width requirement. Other necessary requirements needed to guide the design and development of UD compliant access routes such as, minimum clear heights, inclusion of dropped kerbs or raised road crossings and making provisions for resting places at every 50 m, as specified in Inclusive Mobility (2012) [60] were not provided for.

(v) Ground and Floor Surfaces: The Regulation only provided guideline for the design of toilet floor surfaces which is required to be non-slippery in line with accessible design standard requirement and provisions of the sixth principle of UD (tolerance for error). No provision was made for floor surfaces of other functional areas such as living areas, working environments or outdoor spaces. For instance, it is specified in accessible design standards generally that floor surfaces should be firm and stable in addition to them having a non-slippery surface. ADA Standards for Accessible Design by Department of Justice (2010) [62] also provided standards on how to address situations where floors are required to have openings to accommodate services. Standards were specifically specified for the maximum size of such openings. Also, Inclusive Mobility (2012) [60] recommended that the colour of wall surfaces should contrast with that of the floor to enable the edges of the floor to be clearly visible for the benefit of people who are visually impaired. None of such UD requirements were provided for in the Regulation.

(vi) Step and Stairways: The UD related requirement stipulated in the Regulation for steps and stairways are limited to their minimum width and uniformity of risers. Other technical details required to facilitate the design of steps and stairways that can be easily and safely used by more people like, design criteria for their handrails, step nosing, acceptable riser/thread dimensions, edges, landings and maximum number of steps in a flight, as specified in The Building Regulations (2015) [61], ADA Standards for Accessible Design by Department of Justice (2010) [62] and Inclusive Mobility (2012) [60], were not stipulated.

(vii) Ramps: Ramp UD related requirements provided for in the Regulation include: minimum gradient; minimum size of clear space needed at the top and bottom of ramps to enable wheelchair users manoeuvre; and provision of handrails along ramps and slope ways. Apart from the fact that details of the handrails are not specified in the Regulation, other necessary design criteria such as, maximum ramp length in a flight, acceptable landing dimensions and nature of ramp surface as recommended in The Building Regulations (2015) [61], ADA Standards for Accessible Design by Department of Justice (2010) [62] and Inclusive Mobility (2012), were not included.

(viii) Handrails: Though the Regulation specified that handrails should be provided along ramps or slope ways, the design criteria for such handrail or handrails generally was not stipulated in the Regulation. This is unlike The Building Regulations (2015) [61] and ADA Standards for Accessible Design by Department of Justice (2010) [62] that provided other

necessary handrail design requirements needed for achieving UD. Such criteria include: minimum/maximum height dimensions, shapes, sizes, texture, spacing of their balustrades, top and bottom ends extensions and acceptable clearance dimension from walls.

(ix) Sanitary Facilities: The sanitary UD related provisions made in the Regulation were limited to one accessible toilet in a set of toilets in public buildings. Provisions stipulated cover minimum door width, type and opening direction, nature of floor surface, minimum cubicle size, allowable WC height and the type, size and wall clearance of grab bars required to be located in such toilet. However, other technical details such as acceptable reach heights of WHB, hand dryer, sanitary towel rail, tissue paper holder and grab bar detail specifications as recommended in Inclusive Mobility (2012) [60] to enable mobility impaired persons use the toilet conveniently were not stated. Apart from toilet facilities requirements for the physically challenged that was somewhat provided for in the Regulation, toilet facilities requirements for other user groups such as children and able-bodied persons were not stated in the Regulation.

(x) Facilities Reach Dimensions: Generally, allowable reach heights or acceptable dimensions to reach facilities are specified in accessible design standards and some development regulations. For instance, Centre for Excellence in Universal Design (2012) [65] specified acceptable height range of fittings and fixtures from finished floor level. Development legislation such as The Building Regulations (2015) [61] and ADA Standards for Accessible Design by Department of Justice (2010) [62] also made provisions for allowable reach heights to use facilities. Such provisions were however not provided for in the Regulation.

(xi) Technical Illustrations: Generally, accessible design standards as well as some development regulations include useful technical illustrations that make clearer how to achieve the provisions of their requirements to avoid any form of ambiguity. Examples of such illustrations are shown in Figures 1 – 8. Such drawings were however not included in the Regulation. Including technical illustrations in the Regulation is considered necessary as it will provide a clear picture of what is required and how to achieve it.

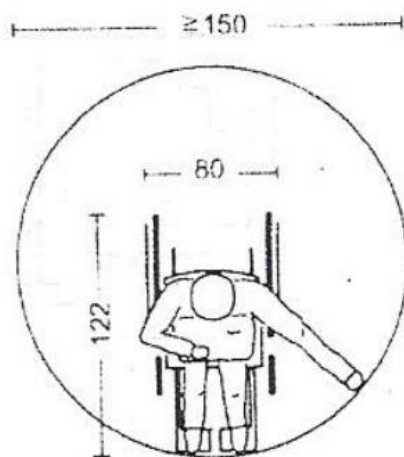
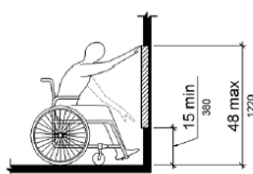


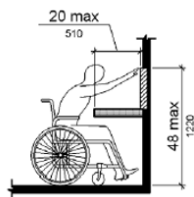
Figure 1 Wheelchair minimum turning space

Source: Neufert and Neufert (2012) [59].

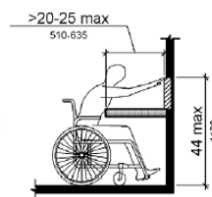
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(2) Unobstructed forward reach

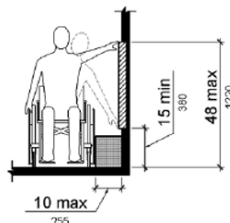


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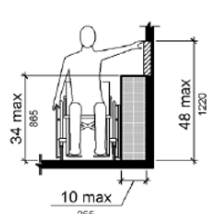


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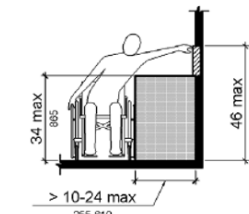
Unobstructed high forward reaches



(5) Unobstructed side reach



(6)



(7)

Unobstructed high side reaches

Figures 2, 3, 4, 5, 6 and 7 Reach Standards for Wheelchair Users

Source: Department of Justice (2010) [62].

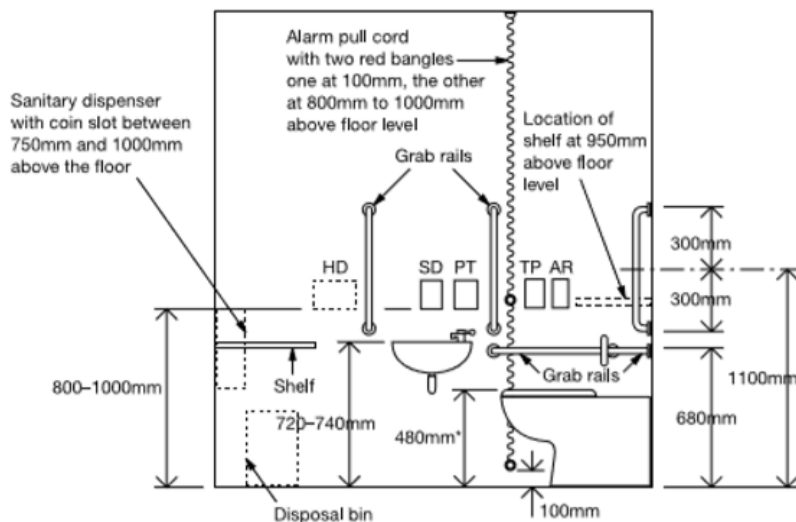


Figure 8 Unisex wheelchair-accessible toilet with corner WC

Source: The Building Regulations (2015) [61].

(xii) Conflicting Sections in the Regulation: Section 36 (3) of the Regulation indicated that the inclusion of a passenger lift is mandatory in buildings above 4-floors. Section 36 (8) also stated that it is only when a building is above 4-floors that it becomes compulsory to provide a passenger lift. This implies that it is not against the law to include a passenger lift in buildings that are not more than 4-floors, judging by the provisions of these two sections of the Regulation. These provisions however contradict the requirement of section 35 of the Regulation which stipulated that adequate accessibility provisions should be made in public facilities for PWDs to be able to easily move around to use facilities, as demanded by UD

requirements. Where a public building is designed to have between two to four floors and provided with just stairways as the only means of vertical movement for users, such situation would have satisfied the provisions of sections 36 (3) and 36 (8), but violated the requirement of section 35. This contradiction is considered a hinderance to fully achieving social inclusion with regards to the provision of adequate vertical movement accessibility components in low-rise buildings. It is possible to argue that in such low-rise buildings, a ramp could be incorporated as an alternative to a passenger lift to satisfy the requirement of section 35. However, there is no section of the Regulation that makes it compulsory to situate a ramp in such buildings. Moreover, the provision of ramps usually becomes less desirable when a building exceeds 2-floors. This is because the distance of travel to reach upper floors is usually longer with ramps and can be tiring for several people.

From the analysis carried out to address the second objective, it is clear from the examination of the UD related provisions of the Regulation that an attempt was made in the Regulation to align some of its requirements with UD parameters. This is most likely to have been done in conformity with best global practices of encouraging social inclusion in the development of the built environment. However, majority of the UD related provisions of the Regulation are not as detailed and comprehensive as those of tested accessible design standards and development legislation used for achieving social inclusion in the development of the built environment. Many provisions needed to be clearly stipulated in the Regulation to guarantee design solutions that are fully UD compliant, were not included. Also, provisions of some sections found to be contradictory in nature are considered a hinderance to encouraging achieving UD compliance with regard to the provision of suitable and adequate vertical access features that can satisfy the accessibility needs of every user. Based on these findings, the Regulation can to some extent inspire designs that comply with UD requirements in certain areas as explained, but not adequate for encouraging the promotion of UD practice in all areas relating to the design and development of inclusive environments that are fully UD compliant in Nigeria.

4.3. Discussion

The study investigation carried out to address the first objective revealed that the current building regulation in used in the study area is the Ogun State Building Plan Regulation (2010) [63]. The Regulation was developed to satisfy the provision of section 93 of the Ogun State Urban and Regional Planning Law No. 20 (2005) [64], which empowered the commissioner in charge of urban and regional planning matters in the State with the approval of the governor, to make regulations for carrying out the purpose of the Law. No section of the Law relates to UD, but some sections of the Regulation were discovered to relate to some UD requirements. The sections were grouped under general requirements and special requirements for the physically challenged in public buildings as shown in Table 1 and analysed in section 4.1. The UD related provisions in the Regulation were found to be consistent with the requirements of some of the seven principles of UD. The said principles are: one (equitable use); two (flexibility in use); five (tolerance for error); six (low physical effort); and seven (adequate size and space for approach and use). The UD related sections were also found to conform with known accessible design standard requirements such as those stipulated in Neufert and Neufert (2012) [59] and Inclusive Mobility (2012) [60]. Likewise, the UD related provisions were also found to comply with some of the requirements in some existing development regulatory legislation such as those of The Building Regulation (2015) [61] used in UK and Wales and ADA Standards for Accessible Design by the Department of Justice (2010) [62] used in America. This means that the physical development regulatory legislation in use in the study area have some provisions that conform with standard requirements of tested best practice design

guidelines useful for achieving social inclusion in the development of the built environment, in line with UD ideology.

The data analysis carried out to address the second objective indicated that the law that gave birth to the physical development regulation in use in the study area does not have any of its provisions relating to UD parameters, but some provisions of the Regulation relate to UD requirements. To determine the adequacy of the UD related provisions for encouraging UD practice in Nigeria, the said provisions were compared with UD provisions of established accessible design standards and tested development regulations used in some countries for achieving inclusive environments as earlier mentioned. The result of the analysis showed that the provisions are not as detailed and comprehensive as those of the said documents used as guidelines to evaluate them. Several UD requirements necessary to be stipulated in the Regulation to facilitate the design and development of inclusive environments were not included. The analysis also identified few contradictory sections in the Regulation considered as possible situations that can hinder achieving UD in the provision of vertical movement accessibility features in low-rise public buildings.

Based on this result, the UD related provisions in the Regulation are adjudged average. The Regulation can be useful for achieving UD in some areas, but not adequate for realising the ambition of UD in all areas relating to the design and development of environments that are fully UD compliant. Hence, the development legislation in use in Ogun State, Nigeria can be used to promote UD practice in the study area to some extent, but not adequate for encouraging the promotion of UD practice in all areas pertaining to the development of inclusive built environments that are fully UD compliant in Nigeria. The implication of this result is that the said development legislation as presently structured, cannot guarantee the realisation of the intent of UD in Nigeria to the fullest. Thus, the adequacy of the development legislation in promoting UD practice in Nigeria is considerably limited.

5. CONCLUSION AND RECOMMENDATIONS

The study investigated the UD related provisions in the current building development regulatory legislation in use in Ogun State, Nigeria and their adequacy for encouraging the promotion of UD practice in the country. The study found that the main building development legislation in use in the study area are the Ogun State Urban and Regional Planning Law (2005) and the Ogun State Building Plan Regulation (2010). Though none of the provisions of the Planning Law relates to UD requirements, some provisions of the Regulation relate to some UD criteria. However, the said provisions were found not to be adequate for encouraging designs and developments that are fully inclusive in nature due to several inadequacies. The study concluded that the regulation can to some extent inspire designs that comply with UD requirements in certain areas, but not adequate for encouraging the promotion of UD practice in all areas.

The result of the study provides explanation to why some studies have found that several public buildings in Nigeria are inadequately equipped to meet the accessibility and usability needs of PWDs (Sholanke *et al.*, 2019; Sholanke *et al.*, 2018; Ibem *et al.*, 2017; Sholanke *et al.*, 2016; Soyngbe *et al.*, 2016; and Maclean, 2014) [5], [15], [16], [1] and [17]. Where development regulatory legal instruments do not have adequate provisions to facilitate designs and developments that can reasonably guarantee social inclusion, the implication is that some user groups might not be able to fully develop their potentials in the society for national and personal development. This situation amounts to a violation of the civic and fundamental right that such persons have to reasonable access to use public facilities as stipulated in various civic and human rights charter.

The general implication of the result of the study is that PWDs are most likely to continue to be segregated and discriminated against through design solutions not suited for them in the development of public environments in the study area. This is largely because adequate provisions were not made in the development legislation for addressing all aspects relating to the design of appropriate accessibility and usability features that will meet the needs of all user groups, particularly PWDs. This can however be prevented if development regulatory instruments put in place by the law have adequate provisions that can guarantee the design and development of inclusive environments.

Consequently, the study recommends that both the planning Law and development Regulation in use in Ogun State, Nigeria should be reviewed to remove all grey areas identified as possible hinderances that can prevent them from encouraging the promotion of UD practice in Nigeria. The review should also include all necessary provisions needed in the regulatory instruments towards encouraging designs and developments that can fully enhance social inclusion in conformity with best global practice and demonstrated by UD ideology. The review is considered necessary at this time, because a disability bill that makes it unlawful to discriminate against PWDs in the society, has just been recently signed into law in the study area. Where existing development legislation cannot reasonably guarantee designs and development of inclusive environments, it will be difficult for the society as a whole to fully realise the benefit of the intent of the disability legislation.

The study investigation was limited to the main development legislation in operation in Ogun State, Nigeria. Future studies could investigate the adequacy of the UD related provisions of development laws used in other states in Nigeria, including Abuja, the FCT, in promoting UD practice in the country. Likewise, the adequacy of the UD related provisions of the National Building Code of the country can also be examined.

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