Journal of Physics: Conference Series

PAPER • **OPEN ACCESS**

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To cite this article: A. B Sholanke *et al* 2019 *J. Phys.: Conf. Ser.* **1378** 042087

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UNIVERSAL DESIGN OF SELECTED SECONDARY SCHOOLS IN AKWA IBOM STATE, NIGERIA: STUDENTS' PERCEPTION OF ACCESSIBILITY PROVISIONS IN MEETING THEIR NEEDS

Sholanke A. B.[1], Opoko A. P.[1], Akpan O. S.[1] and Adigun T. F.[1]

,
[1]Department of Architecture, Covenant University, Ota, Ogun State, Nigeria.
Corresponding Author; anthony.sholanke@cu.edu.ng

Abstract
A building or environment is usually expected to be designed to meet the accessibility and usability needs of its potential user, which include both able-bodied persons and physically challenged. Universal design (UD) is a development strategy for planning and developing buildings and environments to be easily comprehended, accessible and usable to the highest degree possible by all individuals regardless of their age, size, ability or inability. It is however observed that the physically challenged are often side-lined with inadequate or inappropriate accessibility provisions in public environments, including schools in Nigeria. To this end, the study examined the effectiveness of accessibility provisions in meeting users' needs in selected secondary schools in Akwa Ibom State, Nigeria, with a view to making contributions on how to improve access to use such environments for users, irrespective of their mobility status in conformity with the ambition of UD ideology. The study was conducted in other to identify areas for further improvements based on users' perception, towards enhancing social inclusion in academic environments in Nigeria. The study was designed as a cross sectional survey research that spans across three selected secondary schools in the study area. The study employed quantitative research methods, using structured questionnaire to gather data from a sample size of 136 students across the three secondary schools. The data was analysed with the 2016 version of Microsoft Excel software. Descriptive approach with the use of tables was used to present the findings. The result indicates that the only accessibility provisions considered not effective in meeting users' needs are ramps. Among the key recommendations of the study is for locations where ramps are necessary, but not provided for in the schools, to be retrofitted with accessible ramps for the benefit of physically challenged users, towards improving social inclusion in the schools. The outcome of the study will be useful for providing direction to building professionals and policy makers towards making adequate and appropriate provisions for accessibility components that are effective for encouraging social inclusion in the development of educational environments.

Key Words: Universal Design, Accessibility, Secondary Schools, Akwa Ibom State and Nigeria.

1. Introduction
According to [3], a building or an environment should be designed to meet the diverse needs of its intended users. This has always been a challenge for architects, engineers and planners involved in the operation and development of public buildings. The need to fulfil the necessities, desires and goals of the general population with no type of isolation or access barrier to any

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social group in the society, has brought about the entrance of universal design (UD) concept into design fields. The targets of UD are accessibility, usability and enlarging the categories of users to include everyone or as many persons as possible. The UD ideology involves how to deal with planning and development of environments that demonstrates empathy for every single social group and does not believe in planning and building for an "average user", as researchers have argued that such user do not exist [9], [21]. In educational environments, issues like accessibility and inclusion have become important, especially in secondary schools where the primary aim is to create a conducive, accessible and usable environment for learning and social interaction.

Issues emerging from the general problem of the inaccessibility of the built environment to people with disabilities (PWDs) have prompted a change in design approaches aimed at narrow code compliance to design ideologies like UD, aimed at creating usable facilities and environments that accommodate the needs of everybody [17]. However, contrary to UD expectations, some studies in Nigeria have found that PWDs are not adequately provided for in public buildings [9], [12], [17], [20], [23].

[20] specifically noted that some public buildings in Nigeria, including academic buildings are not easily accessible to PWDs compared to the way they are for abled-bodied persons. The authors argued that such situation is a violation of the fundamental human right of persons living with one form of disability or another. Also, in Nigeria, [23] found that main facilities needed by PWDs were not provided in majority of the 257 public buildings they investigated, out of which 27 were educational buildings. The authors advanced that the none availability of some key facilities for the easy use of PWDs in several of the buildings, constitutes a participatory limitation for them in the society. In addition to the society being deprived of the talent and abilities of this user group, such scenario also constitutes a barrier in developing their capabilities. This is why every environment, especially academic environments, should be designed to be accessible and usable to the highest degree possible by everyone, irrespective of people's abilities or disabilities.

Generally, UD studies found in Nigeria are mainly objective investigations that centre around the extent to which existing situations conform with UD parameters such as the UD principles and accessible design standards [17], [18], [20], [9], [22], [12]. However, [19] advanced that since buildings and their environments are used or managed by humans, there is also a need for subjective studies to investigate users' perception of the effectiveness of existing accessibility and usability provisions of public environments in meeting their needs. Such studies are necessary to provide empirical data on the effectiveness of existing environments in meeting users' accessibility and usability needs, towards identifying areas for further improvements from the users' perception.

It is against this background that this study examined the effectiveness of accessibility provisions in meeting users' needs in selected secondary schools in Akwa Ibom State, Nigeria, with a view to making contributions on how to improve access to use such environments for users, irrespective of their mobility status in conformity with UD concept. The study was conducted in other to identify areas for further improvements, towards enhancing social inclusion in academic environments in Nigeria. Akwa Ibom State was chosen as the study area, because of the recent drive by the state government towards improving the standard of education

in the state for all categories of students. Such effort has brought about the policy of *"education for all"* and *"free, compulsory and qualitative education"* in the state. This implies that, educational environments are expected to be accessible and usable to students as well and other users regardless of their diverse needs, abilities or disabilities in the state, in line with the ambition of UD concept.

The scope of the study is limited to examining the perception of students on the effectiveness of minimum accessibility provisions in low-rise secondary school buildings in meeting their needs. The provisions are: main entrances, steps and staircases, ramps, handrails, doors, external walkways, internal corridors and floor surfaces. Data collection is restricted to students, because students usually form the largest population of users in academic environments. Though UD is concerned with both accessibility and usability for everyone, the study investigation focused mainly on accessibility provisions, because accessibility is fundamental to achieving usability. Where adequate accessibility components are not provided to easily reach facilities and services in public environments, it will be difficult if not impossible to achieve usability of the said facilities and services for many potential users.

The study contributes to knowledge by providing empirical data on the effectiveness of accessibility provision of selected secondary school environments in the study area in meeting users' needs, as well as identifying specific area that require improvements based on users' opinion, towards enhancing social inclusion in academic environments in Nigeria. The outcome of the study provides useful pointer to specific issues building professionals need to pay more attention to, towards improving accessibility of secondary schools in the study area for users. The study finds relevance in the global drive aimed at developing educational environments to achieve social inclusion in the development of the society. The fieldwork to gather data was conducted between November 2018 and March 2019. The paper is organised into six sections namely: introduction; overview of universal design paradigm and inclusive development strategies in learning environments; methodology; result and discussion; conclusion; and recommendations.

2. Overview of Universal Design Paradigm and Inclusive Development Strategies in Learning Environments

2.1 Universal Design Concept

The term "universal design" was first put to use by a United States architect Ronald L. Mace in the mid-1980s [7] to describe the concept of designing to meet the requirements of everyone, rather than the requirements of an average consumer who possibly does not exist [21]. This belief system has progressed into related ideas such as, design for all, inclusive design and lifespan design. UD is the planning and organisation of an environment such that it can be easily understood, accessible and usable to the greatest level possible by all individuals notwithstanding their age, size, ability or inability [11]. Every environment, building or product should be designed to meet the needs of anyone who wishes to use them and UD is a process that is used to achieve this by objectively targeting inclusiveness, equality and variety [3].

Over the years, efforts have been made towards equalising opportunities for PWDs in the development of the society in line with the UD ideology. Notable among such efforts is that of the Disability Rights Movement, that have made extensive progress in its push campaigning for

equal civil and environmental rights for people who have been prevented, based on physical disability or boundaries of size, in participating in social life on equal terms with others in the society. The People with Disabilities Act requires that, notwithstanding education, government projects and housing, public facilities, public transportation and media communications should be designed and operated so that individuals with disabilities can have unrestricted access to them like others [24].

It is necessary to understand the benefits of UD in order to properly apply it. UD has several advantages, one of which is the way it promotes good design, by considering the various needs and capacity of all throughout the design process, to create a usable, convenient, pleasurable and accessible environment for everybody. When client and designers have a clear understanding of its benefits, they are more willing to advance its usage. UD is beneficial to both individuals, business and the society as a whole. It is beneficial to every individual as it helps make situations in which individuals can grow older and yet still retain their independence [4]. It helps to develop a more equitable, participative, accessible, and inclusive environment for all age groups and abilities. UD looks at making items that will be valuable to the vastest scope of clients, which broadens the extent of its market and clients, thereby upgrading business sector reasonably [16]. A business that adopts UD has an advantage over its competitors and has a better public image. UD averts bad development and encourage developers and designers to convey sustainable solutions to better the society [19].

2.2 Principles of Universal Design

There are seven principles of UD developed by a group of architects, environmental design researchers, product designers and engineers in 1997. This group was led by late Ronald Mace, an internationally recognised architect and design pioneer in North Carolina State University in the United States of America [13]. The UD principles can be used in assessing existing designs and developments, directing the process of the design conception and educating both the users and the designers concerning the qualities of the environments and more useful items. The seven principles as provided by the Centre for Excellence in Universal Design CEUD [4] are examined as follows:

The first principle is “Equitable Use” implies that a design should be functional and sale-able to any client or group of users. The guidelines for achieving the principle are to give comparable strategies for use for all customers: identical at whatever point possible; equivalent when not, to avoid stigmatising or isolating any customer; and making provision for security, safety and protection correspondingly available to all customers. Principle two is termed “Flexibility in Use” which states that the design should entertain a broad variety of individual tendencies and abilities. Guidelines for achieving the principle are to give choice in methodologies for use; oblige left - or right-handed entrance and use; energise the client’s precision and exactness; and make the user space flexibility.

The third principle is “Simple and Intuitive Use” which stipulates that the operation of the design should be forthright and easily understood, giving little notice to the user's dialect aptitudes, understanding, current concentration level or information. The guidelines for achieving this principle are to eliminate useless intricacy; be reliable with user intuition and desires; oblige a broad range of proficiency and language skills; orchestrate data in concordance with its usefulness; and give effective inciting to successive activities. Principle four is known

as “Perceptible Information”. The principle states that important information should be conveyed viably to the customer through the design, despite encompassing conditions or the customer's tangible abilities. Its guidelines includes: utilising various modes (verbal, material, pictorial) for extraneous presentation of significant information; giving gratifying contrast between necessary information and its environment; amplifying “intelligibility” of primary data in every single tactile methodology; separating components in manners which can be depicted , that is, it should be made simple enough to give directions or guidelines; and giving similarity with variety of systems or gadgets utilised by individuals with tactile impediments.

The fifth principle is tagged “Tolerance for Error”. This addresses the issue of risks and the unfriendly consequences of incidental or unexpected results being reduced by the design. This can be achieved through organizing elements to reduce risks and inaccuracies, providing warnings of mistakes and risk, providing safety or defence features, constricting careless movement in areas of activities that need maximum vigilance. Principle six is known as “Low Physical Effort” which means that the design can be successfully and comfortably utilised with the least possible fatigue. The guidelines to achieve this principle are to let the user sustain a neutral body posture; use sensible working forces; reduce repetitive exercise; and minimize continuous physical energy.

Principle seven is labelled “Size and Space for Approach and Use”. This means that suitable space and size should be provided for approach, control, reach and utility, notwithstanding the user's versatility, body size or stance. This could be achieved through offering a sensible view-able sightline to essential elements for any standing or seated user; creating access to all elements convenient for any standing or seated user; and making distinction in hand and grip size; and providing enough space for individual assistance or for the effective usage of assistive gadgets.
In general, the principles of UD do not contain all the criteria for a good design. They are meant just for attaining universally usable designs. Other factors are absolutely critical. Other criteria such as aesthetics, cost, cultural suitability, gender and security are some of the issues that should also be considered to achieve a good design [11].

2.3 Strategies for Achieving Universal Design in Public and Learning Environments

According to Mace's [11] definitions of UD and the rundown provided by [13] National Disability Authority [13] on UD, there are three important concepts in UD which include: access, usability and communication. Any item or environment designed with the intents off accomplishing the most noteworthy execution feasible in these three areas can make certain to be universal in nature [15]. Access in the context of UD of building and environments mean approachability and accessibility. Approachability addresses the accessible journey between the immediate surroundings of the building and the building itself. It involves the provision of an accessible route from the street and carpark through the public areas of the building environment to the building. Accessibility extends from the building’s entry points to the spaces within the building (including vertical connections to the building) where users, including PWDs, would carry out required activities and functions [2], [15], [16].

Usability addresses how well the structure or environment can fulfil the requirements and objectives of its clients. It is the degree to which the clients adequately and proficiently utilise the structure and its facilities [15]. It can be found in the firmness and heights of entryway

handles, height of hand rails and height of switches [2], [5], [15]. The International Standard, (ISO 9241-11), provides guidance on usability and states that; usability is "*the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use*" [26].

Communication in buildings and environment design refers to how perceptible information is to the users of the building. Effective communication in public buildings can be very difficult to achieve considering the differences that exist in the sensory abilities of the users and also the intellectual or cognitive abilities of the users [15]. Way finding in buildings can be difficult for users with impaired sensory abilities if appropriate information is not relayed in a perceptible manner. For example, the use of tactile signs, contrasting floor finishes, audio-visuals communication, sign language and proper lighting will enable users with impaired sensory abilities perceive building information better [2], [15], [16].

Generally, everyone regardless of their ability or disability should be able to manoeuvre easily and unassisted within an accessible building and its environment to use spaces, facilities and services. [14]. This key requirement of an accessible environment is the bedrock upon which UD strategies for developing accessibility provisions is centred. School facilities usually have an outstanding effect on the users compared to other building types in the context of teaching and learning. Students in various age brackets are stimulated by the size of their environment, light, colour and even the navigational aspects of their schools. Children can react undesirably to hostile conditions and in order to avoid this, school environments should be designed to have favourable conditions without discrimination [2]. The physical form of the building must be made accessible to all that want to make use of the building, as its environment [16].

Accessible building entries are required by the 10% of the grown-up populace that experiences issues with stairs, yet they benefit everybody. Ramps, which are regularly utilised are not perfect for people with specific disabilities. Also lifts may breakdown, leaving numerous people unable to enter or leave a building. But through cautious plan and arrangement on sites, houses and school buildings can regularly be developed without steps at entryways, thereby improving access to ground floors. Whenever site and design limitations strife, level passages can be given through the creative utilisation of bridges to high ground, sky-walks, or exterior lift towers which can be shared by two buildings or more [11].

UD in schools seeks for flexibility in how spaces are used and how teachers can adjust their teaching techniques to accommodate all categories of students. The crucial areas in achieving accessibility in schools includes both the exterior and the interior environment. The exterior aspect addresses the user approach to the building which may include; parking spaces, drop-off points, dropped kerbs, ramps, signage, sidewalks and footpaths. The interior aspect addresses the building's interior entrances, vertical and horizontal circulation elements, restrooms, waiting areas, common areas, way finding and communication [2]. The guidelines for creating an inclusive school also focuses on the basic requirement of accessible routes, approachability, accessibility, usability and communication.

In designing accessible buildings, including schools, information regarding the anthropometric requirements of wheelchairs users are usually used to determine sizes of access routes, manoeuvring spaces and reach heights as illustrated in Figures 1, 2, 3, 4 and 5. It is assumed

that accessibility components a wheelchair user is able to conveniently use, all other user groups should be able to easily use.

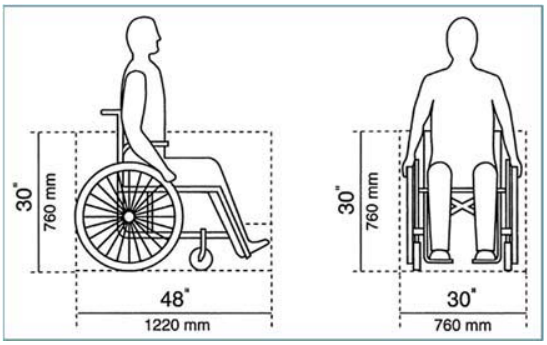

Figure 1: Dimensions for a wheelchair
Source: SunTran (2019).

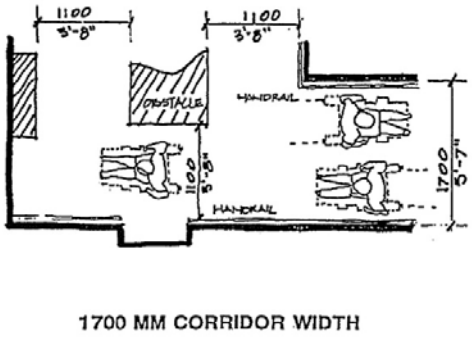

Figure 2: Corridor width for wheelchair users
Source: Keywordbasket (2019).

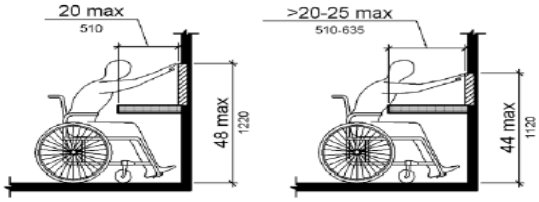

Figure 3: Unobstructed high forward reaches
Source: Department of Justice (2010).

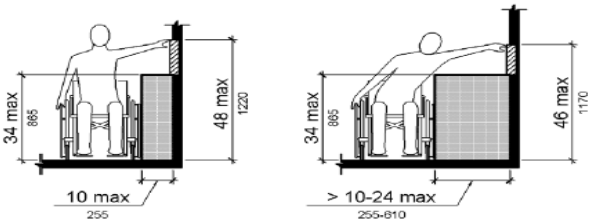

Figure 4: Unobstructed high side reaches
Source: Department of Justice (2010).

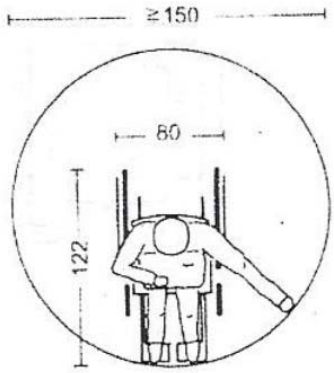

Figure 5: Wheelchair minimum turning space
Source: Neufert and Neufert (2012).

Accessible environment basics entail that every user should be able to safely and independently make use of accessible passageways. Where there is a change in level, option of choice should be made for users by providing both steps and ramp to connect the level so that everyone can be able to use the same route. Wheelchair users cannot make use of steps, but some other physically challenged users find it more convenient to make use of steps than ramps, hence the

need to make provision for both. Access routes widths should be reasonably wide to allow two or more people to pass side by side, including those who make use of mobility aids such as wheelchair and crutches users. It is important to ensure that in existing environments, persons who are physically challenged can make use of the same access routes as every other person [13].

In general, PWDs who make use of mobility aid such a wheelchair, walking frame or walking stick and the visually impaired, should to a reasonably extent be independent of outside assistance when making use of accessible environments and their facilities. This requirement also pertains to those with conditions that may naturally impair movement such as the aged and children [17].

3. Methodology

The study is a cross sectional survey research that adopted quantitative research approaches to gather, analyse and present data. Data was collected across three selected secondary schools in Akwa Ibom State, Nigeria. To select the sample frame of secondary schools used for the study, the study population of secondary schools in the study area where first grouped into their respective strata of federal, state and private, from where one school was randomly picked from each group for each group to be represented in the study. The sample frame of the secondary schools and students used for the study are as shown in Table 1.

Table 1: Sample Frame

SN	Sample Frame of Secondary School	Sample Frame of Students
1.	Federal Science and Technical Girls College, Ukana offot	1,216
2.	Ministries of Education Special Education Centre for Children with Special Needs, Mbiabong Etoi	685
3.	Noble International School, Atan Offot	825
	Total	2,726

The sample frame of students is two thousand seven hundred and twenty-six (2,726) as shown in Table 1. Due to the large number of students involved, a multistage sample technique was used to calculate a more manageable sample size for the study. Firstly, the statistical formula recommended by [1] was used to compute the total sample size of students from the sample frame. The formula is: $n = N/[1+N(b)^2]$, where n = required sample size, N = population size and b = maximum accepted error margin of 10%. However, the study adopted an error margin of 8% to allow for a more accurate result.

Students' Sample Size (n) = $2,726/[1+2,726(0.08)^2] = 148$

Secondly, to calculate the sample size of students for each of the secondary schools selected for the study, proportional sampling strategy was used as shown in Table 2.

Table 2: Students's Sample Size

SN	Sample Frame of Secondary School	Students Population	Proportional Sampling Strategy	Students' Sample Size

1.	Federal Science and Technical Girls College, Ukana offot	1,216	1,216/2,726 x 100% = 45%	45% of 148 = 67
2.	Ministries of Education Special Education centre for children with special needs, Mbiabong Etoi	685	685/2,726 x 100% = 25%	25% of 148 = 37
3.	Noble International School, Atan Offot	825	825/2,726 x 100% = 30%	30% of 148 = 44
	Total	2,726	100%	148

The total sample size of students is one hundred and forty-eight (148) which is proprotionately distributed across the three schools as shown in Table 2. The sample size of students in Federal Science and Technical Girls College (FSTGC), Ukana offot is sixty-seven (67), in Ministries of Education Special Education Centre for Children with Special Needs (MoESEC), Mbiabong Etoi it is thirty-seven (37) and in Noble International School (NIS), Atan Offot it is forty-four (44). The respondents in each school were randomly selected. A structured questionnire designed for the study was used to collect data from the respondents. The questionnaire was designed with two sections. The first section was used to gather data on the personal characteristics of the respondents, while the second section was used to collect data on the effectiveness of accessibility provisons in meeting the students' needs. The data were analysed with the aid of the 2016 version of Microsoft Excel software and the result presented descriptively with Tables.

4. Result and Discussion

4.1 Response Rate

A total of one hundred and forty-eight (148) questionnaires were distributed across the three schools as presented in Table 2. The total number of questionnaires administered and retrieved, as well as the response rate across the schools is shown in Table 3.

Table 3: Response Rate Across Selected Secondary Schools

SN	Secondary Schools	Questionnaire Administered	Questionnaires Retrieved	Response Rate
1.	Federal Science Technical Girls College, Ukana offot, Uyo	67	58	87%
2.	Ministries of Education Special Education Centre for Children with Special Needs, Uyo	37	36	97%
3.	Nobles International School, Uyo	44	42	95%
	Total	148	136	92%

Out of the one hundred and forty-eight (148) questionnaires distributed across the three secondary schools for the study, a total of one hundred and thirty-six (136) were retrieved, which amounts to a retrieval rate of 92%. FSTGC recorded the highest number of respondents of fifty-eight (58) which gives a retrieval rate of 87%. This is followed by NIS with forty-two (42)

respondents, which amounts to a retrieval rate of 95%. The number of respondents from MoESEC is thirty-six (36) students, which gives a retrieval rate of 97%.

Generally, the retrieval rates vary across the three secondary schools between 87% and 97%. In a study by Sholanke (2019) who investigated the compliance of academic buildings with UD parameters in selected universities in Ogun State, Nigeria, the researcher recorded a response rate of between 87% and 88% across three universities. Therefore, the response rate of between 87% and 97% achieved in this study is considered adequate.

4.2 Characteristics of Respondents

The perception of the students on the effectiveness of accessibility provisions in meeting their needs is a function of their institution, level of study, gender, age and physical ability. The data gathered on the characteristics of the respondents in this regard is shown in Table 4.

Table 4: Students' Characteristics

SN	Characteristics	Secondary School			Mean
		FSTGC (N)	MoESEC (N)	NIS (N)	N (%)
1.	Level of Study				
	i. Junior Secondary School	22	21	26	69 (51%)
	ii. Senior Secondary School	36	15	16	67 (49%)
2.	Gender				
	i. Male	-	20	20	40 (29%)
	ii. Female	58	16	22	96 (71%)
3.	Age Bracket				
	i. Below 10	-	3	-	3 (2%)
	ii. 10 – 15	38	28	34	100 (74%)
	iii. 16 – 20	20	5	8	33 (24%)
	iv. 21 – 25	-	-	-	-
	v. 26 and above	-	-	-	-
4.	Mobility Aid				
	i. Wheelchair	-	5	-	5 (4%)

ii.	Crutches	2	6	1	9 (6%)
iii.	Walking Frame	-	3	2	5 (4%)
iv.	None	56	22	39	117 (86%)

The data in Table 4 indicates that FSTGC had more senior students as respondents than junior students, while MoESEC and NIS had more junior students as respondents than senior students. Generally, a slightly higher number of junior students (51%) participated in the survey compared to senior students (49%). This implies that more junior students were available to take part in the study when the survey was conducted or that generally, there are more junior students than senior students in the schools. Majority (71%) of the respondents are female students. This is largely attributed to the fact that FTSGC is an all-female school where a high number of the respondents were drawn from. All the same, a fair distribution of gender was recorded in MoESEC and NIS.

Most (74%) of the respondents fall within the age bracket of 10 – 15 years, followed by 16 – 20 years, which amounts to 24% of the respondents. Very few (2%) were below the age of 10. This implies that the age range of the respondents across the schools are mainly between 10 and 20 years, which is the usual age range of many secondary school students in this age. Majority (86%) of the students have no need for mobility aid. Only few (14%) make use of one form of mobility aid or another. The availability of students who are physically challenged in the schools infer that the schools are most likely making special provisions to cater for this category of students, in line with the education for all policy of the government in the study area.

4.3 Effectiveness of Accessibility Provisions in Meeting Students' Needs

To evaluate the effectiveness of accessibility provisions in meeting the needs of the students, a 5-point Likert scale was used to measure users' perception. 4 and 5 mean score was assigned to positive feeling, 3 to neutral feeling and 1 and 2 to negative feeling. In other words, above 3 mean scores are considered "Effective", 3 "Averagely Effective" and below 3 "Ineffective" or "Not Provided at All". The result obtained is presented in Tables 5, 6, 7 and 8.

Table 5: Mean Ranking of Accessibility Provisions in FSTGC

SN	Accessibility Provisions	Mean	Ranking
1.	Main entrances	4.91	1st
2.	Steps and staircases	4.88	2nd
3.	Handrails	4.81	3rd
4.	Internal doors	4.81	3rd
5.	Main entrances doors	4.70	5th
6.	External walkways	4.63	6th
7.	Interior floor surfaces	4.53	7th

8.	Corridor sizes	4.47	8th
9.	External floor surfaces	4.26	9th
10.	Ramps	1.39	10th

Table 5 shows the ranking of the effectiveness of the accessibility provisions in meeting the students' needs obtained in FSTGC based on the mean scores recorded. The data shows that majority of the accessibility provisions in the school buildings were adjudged effective in meeting the students' needs, with the exception of ramps which was rated ineffective. This is attributed to the fact that ramps were observed not to be provided in the school. The ranking of the accessibility provisions based on their mean scores shows that the main entrances of the school buildings were ranked 1st, followed by steps and staircases ranked 2nd. Handrails and internal doors were both ranked joint 3rd, followed by main entrance doors, external walkways, interior floor surfaces, corridor sizes, external floor surfaces and ramps in 5th, 6th, 7th, 8th, 9th and 10th positions respectively.

Table 6: Mean Ranking of Accessibility Provisions in MoESEC

SN	Accessibility Provisions	Mean	Ranking
1.	Main entrances	4.81	1st
2.	Steps and staircases	4.69	2nd
3.	Main entrance doors	4.67	3rd
4.	External walkways	4.36	4th
5.	Interior floor surfaces	4.08	5th
6.	External floor surfaces	3.97	6th
7.	Ramps	3.92	7th
8.	Handrails	3.78	8th
9.	Internal doors	3.56	9th
10.	Corridor sizes	3.42	10th

Table 6 shows the ranking of the effectiveness of accessibility provisions in meeting the students' needs obtained in MoESEC based on their mean scores. The data shows that all the ten accessibility provisions investigated were considered effective judging by their mean scores. The main entrances were again ranked first, followed by steps and staircases ranked 2nd. Main entrance doors were ranked 3rd, external walkways 4th and interior floor surfaces 5th. In 6th, 7th, 8th, 9th and 10th positions respectively are: external floor surfaces, ramps, handrails, internal doors and corridor sizes. This result is a reflection of the fact that the MoESEC school was designed to accommodate students with physical disabilities, hence that explains why all the accessibility provisions investigated were adjudged effective by the students. Usually, accessibility provisions designed for the use of PWDs are usually easily usable for other user groups.

Table 7: Mean Ranking of Accessibility Provisions in NIS

SN	Accessibility Provisions	Mean	Ranking
1.	Interior floor surfaces	4.95	1st
2.	Main entrances	4.90	2nd
3.	External walkways	4.86	3rd
4.	Steps and staircases	4.83	4th
5.	Handrails	4.67	5th
6.	Internal doors	4.05	6th
7.	Corridor sizes	2.90	7th
8.	External floor surfaces	2.57	8th
9.	Main entrance doors	2.52	9th
10.	Ramps	1.33	10th

Table 7 is the data obtained in NIS which shows the ranking of the effectiveness of accessibility provisions in meeting the students' needs based on the mean scores recorded. The data shows that six of the provisions are adjudged effective while four are considered not effective. Out of the six adjudged effective, interior floor surfaces are ranked 1st, main entrances 2nd, external walkways 3rd, steps and staircases 4th, handrails 5th and internal doors 6th. The four considered ineffective and ranked 7th, 8th, 9th and 10th respectively are: corridor sizes, external floor surfaces, main entrance doors and ramps. Again, ramp is ranked last. This is most likely because no ramp was observed to be provided in the school. This implies that enough consideration was not given to the provision of appropriate accessibility components that will benefit the physically challenged in the design and construction of the school.

Table 8: Overall Mean Ranking Across the Selected Schools.

SN	Accessibility Provisions	Mean	Ranking
1.	Main entrances	4.88	1st
2.	Steps and staircases	4.81	2nd
3.	External walkways	4.63	3rd
4.	Interior floor surfaces	4.54	4th
5.	Handrails	4.49	5th
6.	Internal doors	4.24	6th
7.	Main entrance doors	4.01	7th
8.	Corridor sizes	3.70	8th
9.	External floor surfaces	3.66	9th

10.	Ramps	2.03	10th

Table 8 is a presentation of the average ranking of the effectiveness of the accessibility provisions in meeting the students' needs across the schools based on their mean scores. The data shows all, but one of the accessibility provisions are adjudged effective in meeting the students' needs across the schools. Only ramps recorded a mean score less than 3 to rank last and indicate that the students consider them ineffective in meeting their needs. This is mainly because ramps were observed not to be provided in two of the three schools. The ranking of the accessibility provisions across the three schools based on their mean scores shows that the main entrances were ranked 1st, followed by steps and staircases ranked 2nd. External walkways are ranked 3rd, interior floor surfaces 4th, handrails 5th, internal doors 6th, main entrance doors 7th, corridor sizes 8th and external walkways 9th.

4.4 Discussion

The result on the investigation carried out on the effectiveness of accessibility provisions of the three selected secondary schools in Akwa Ibom State, Nigeria in meeting users, needs, revealed that the respondents generally consider most of the accessibility provisions effective across the schools. Based on the analysed data, it is safe to infer that out of the three schools, the accessibility provisions of the Ministries of Education Special Education Centre for Children with Special Needs is the most compliant with UD parameters. In the school, all accessibility provisions were adjudged effective by the students to indicate that the provisions compliance level with UD expectation is high. On the other hand, it is not all the accessibility provisions of the Federal Science Technical Girls College, Ukana offot, Uyo and Nobles International School, Uyo, that were adjudged effective by the students. In both schools, ramps were said not to be effective, mainly because ramps were not provided in the schools. This implies that students with mobility impairments will find it challenging to navigate through areas where there are changes in level in both schools. In Nobles International School, Uyo, corridor sizes, external floor surfaces and main entrance doors were also considered not effective in addition to the ramps to indicate that the school is the least compliant with UD parameters judging from users' perspective.

The general implication of the outcome of the study is that though all the schools can be said to be reasonably compliant with UD parameters judging from the users angle, only in the Ministries of Education Special Education Centre for Children with Special Needs can all the accessibility provisions be said to be adequate for encouraging social inclusion in conformity with the ambition of UD and the policy of free, compulsory and qualitative education for all, being promoted by the government of Akwa Ibom State. Absence of ramps as alternative accessibility components to steps and staircases in two of the three schools investigated, implies that the two schools are not sufficiently provided for towards realising the targets of both UD and inclusive education in the study area. This situation is most likely to be a hindrance to fully achieving the target of the Akwa Ibom State government in making quality education available to everyone.

The outcome of the study is not fully consistent with the outcome of the case studies carried out by [5] that revealed how UD was achieved in several public building types, including educational buildings. However, the result to a large extent supports the findings of previous

studies in Nigeria that PWDs, particularly the physically challenged, are not adequately provided for in public buildings, compared to provisions made for abled-bodied persons [17], [20], [9], [22], [23], [12]. With specific reference to learning environments, this situation is considered a limitation for students who are physically challenged to having easy access to educational facilities needed for their academic development. Where schools are not easily accessible for PWDs, it is an obstacle to achieving social inclusion in learning environments and constitute a hindrance to realising the goal of inclusive education.

In addition, this scenario is a violation of the fundamental right PWDs have to access and use public facilities and environments on equal terms with abled-bodied persons. This is because many nations including Nigeria have enacted disability legislation to enhance social inclusion. The goal of the laws is to integrate PWDs back into social activities in the society. The laws usually make provisions that cover easy access and evacuation requirements for PWDs in public facilities. With the laws, it is generally illegal to discriminate against anyone on the basis of disability when making accessibility and usability provisions for users to gain access to use public environments and their facilities [17]. Hence, there is a need to correct the anomaly revealed by the result obtained in this study in order to better access for users, particularly the physically challenged.

5. Conclusion

This study investigated the effectiveness of minimum accessibility provisions required in low-rise academic buildings in meeting users' needs in three selected secondary schools in Akwa Ibom State, Nigeria. The findings show that the students consider most of the accessibility provisions of the schools effective in meeting their needs. The said provisions are: interior floor surfaces; main entrances; external walkways; steps and staircases; handrails; internal doors; corridor sizes; external floor surfaces; and main entrance doors. Ramps were adjudged effective only in one of the schools where ramps are provided at strategic locations. In two of the schools where ramps were not provided, the students of the said schools understandably are of the opinion that ramps are not effective in meeting their accessibility needs in both schools. In addition to the ramps, corridor sizes, external floor surfaces and main entrance doors were also said to be ineffective by the students in one of the two schools where ramps were not provided.

6. Recommendations

Based on the outcome of the study, the following recommendations are made: Firstly, the secondary schools where ramps were found not to be provided to make the students adjudged that ramps are ineffective in meeting their accessibility needs, should be retrofitted with accessible ramps to enhance social inclusion in the schools. Other areas (corridor sizes, external floor surfaces and main entrance doors) adjudged not effective in meeting the students' needs in one of the schools should also be checked and appropriately addressed by the school management.

Secondly, it is recommended that the management of the schools generally should ensure that appropriate accessibility components that can guarantee provision of equal opportunities for all categories of users are not only provided in their schools, but maintained in good condition at all times. Thirdly, building professionals, particularly architects, should pay more attention to ensuring that adequate accessibility provisions that are suitable for accommodate the needs of

all categories of users are not only designed for in schools in the study area, but developed as designed.

Lastly, legislative actions that will compel architects and building professions to make provisions for inclusive accessibility components in secondary schools in Akwa Ibom State, Nigeria is also necessary for ensuring that schools in the state are designed and developed to comply with UD requirements. To this end, future studies should be carried out to investigate the adequacy of UD provisions in the operational building development regulatory legislation for encouraging UD practice in the state. In addition, the focus of this study was mainly on accessibility provisions, future studies can include usability provisions of facilities. Also, the data collection for the study was restricted to students, further studies should investigate the perception of other users such as visitors, teachers and other staff to enable for a comparative analysis on a broader perspective. Hopefully, new leads may be discovered in such studies that will be beneficial towards enhancing social inclusion in the development of academic environments in Nigeria.

Acknowledgements
The authors wish to appreciate and acknowledge the management of Covenant University, Ota, Ogun State, Nigeria for providing the platform for carrying out this research and all those whose research materials where consulted and duly referenced in the course of developing this paper. The authors are also grateful to the management of the three secondary schools that constitute the sample frame for the study, for allowing their students to participate as respondents in the research.

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