RE-CONSTITUTING GHANAIAN PUBLIC UNIVERSITY LIBRARIES TO CONFORM TO UNIVERSAL DESIGN PRINCIPLES TO ACCOMMODATE STUDENTS WITH DISABILITIES

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A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in the Department of Library and Information Science, University of the Western Cape, South Africa

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October 2023

DECLARATION

I certify that *Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities* has not been submitted before for any degree in any other university, and I have acknowledged all the sources used as a complete reference.
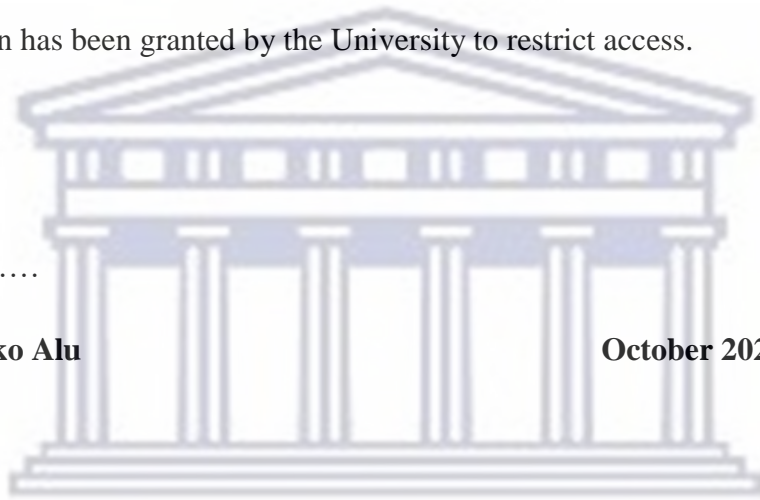
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ABSTRACT

Ten Ghanaian public university libraries were investigated to determine if they conform to universal design principles to accommodate students with disabilities. The study employed a multiple case study design and was underpinned by the Social Model of Disability and the International Federation of Libraries Associations and Institutions checklist for access to libraries for persons with disabilities. A mixed methods approach was adopted employing online questionnaires, and in-depth interviews to gather data from university librarians, heads of the physical development office, heads of disability units, and students with visual, mobile and hearing impairments. Data were further verified by observation and document analysis. Data were analysed thematically.

Findings revealed that most of the university libraries were not universally designed to accommodate the needs of students with disabilities which impacted negatively on information access, participation, and academic performance of these students. Seven of the university libraries did not have a disability policy to guide the provision of facilities, services, and resources to persons with disabilities. All libraries lacked websites and online public access catalogues fully accessible to all students as well as inadequate resources in alternative formats and assistive technology thus not supplying equal access to resources and facilities or promoting inclusion of students with disabilities.

The study recommends the redesign of university libraries' websites according to the Web Accessibility Content Guidelines, and the installation of JAWS software in the Online Public Access Catalogues. Adequate budget allocation should be made for redesigning libraries to conform to universal design principles to accommodate users, especially those with disabilities, and the organisation of disability-targeted training for library staff.

KEYWORDS

University libraries

Academic libraries

Universal design

Students with disabilities

Students visually impaired

Students mobile impaired

Students hearing impaired

Social model of disability

LIST OF ACRONYMS AND ABBREVIATIONS

CCTV   Closed Circuit Television

CRPD   Convention on the Rights of Persons with Disabilities

DAISY   Digital Accessible Information System

EFA   Education for All

IFLA   International Federation of Libraries Associations and Institutions

JAWS   Job Access with Speech

OPAC   Online Public Access Catalogue

SMD   Social Model of Disability

SPSS   Statistical Package for the Social Sciences

SWDs   Students with Disabilities

UWC   University of the Western Cape

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CHAPTER 1

INTRODUCTION

1.0   Introduction

Academic libraries are repositories of information resources for users in tertiary institutions. This makes libraries the heart of universities for teaching, learning, and research (Nawe, 2004). Research has revealed that the frequent use of library resources increases student academic performance and success (Association of College and Research Libraries (ACRL), 2016). Therefore, academic libraries should deliver information services and resources that are accessible and usable to various users, including those with disabilities. Academic libraries can rely on the principles of Universal Design to better serve their users as the universal design philosophy is to accommodate both the physically disabled and non-disabled alike.

Library staff must be conversant with universal design principles for them to nurture the right attitudes and perceptions about library patrons with disabilities to create a conducive atmosphere for such patrons. Herriott (2006) emphasises that library services quality and satisfaction should also be measured by users, especially students with disabilities. Similarly, librarians' knowledge of universal design principles is crucial for the establishment of accessible library systems and services for persons with disabilities. Above all, it is imperative for the enactment of a policy that will change the ecosystems in libraries to embrace universal design principles to fully accommodate all students irrespective of their abilities.

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1.1   Background and motivation

Selwyn Goldsmith's work, *Designing for the Disabled* (Goldsmith, 1963) initiated the concept of free access to buildings for persons with disabilities. His work was further developed by some experts (architects, product designers, engineers, and environmental design researchers) who published the seven principles of universal design in 1997 (Centre for Universal Design, 1997; 2008b) as a template for the design of structures, environs, products, and communications to accommodate people with disabilities. Focusing on libraries, Irvall and Nielsen (2005) developed a checklist for libraries to provide access to persons with disabilities. The checklist serves as a working tool for various types of libraries and addresses physical access into libraries, navigation inside the library, facilities, and services to accommodate the needs of various disabilities. More recently Nall (2015) related universal design principles to academic libraries. For students with mobile impairments, the library building should be designed for easy navigation with accessible routes and for retrieving library materials. Clear and easy-to-read signage with exact and appropriate fonts, icons, colours, and sizes is needed especially for students with print and visual disabilities (Bostick & Eigenbrodt, 2017). Library reference services should be delivered in various communication modes, usually in-person assistance, text and video chat, phoning, and emailing (Nall, 2015).

Globally, there is heightened interest in supporting widening accessibility and participation for persons with disabilities in higher education. This is inspired in part by the United Nations Convention on the Rights of Persons with Disabilities (CRPD) adopted in 2006, which aims to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity (CRPD, 2011). This convention shapes the global understanding and responses towards

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disability including making higher education more accessible for persons with disabilities (Adera & Asimeng-Boahene, 2011).

As a result, countries, especially those that belong to the Global North, have reformed their higher education sector to allow access for persons with disabilities resulting in a significant rise in the enrolment of such students (Adams & Brown, 2006). According to Koshy and Seymour (2015), the percentage of admitted students with a disability at Australian universities increased from 4.4% in 2007 to 5.8% in 2014. Similarly, physically impaired students' enrollment in United Kingdom universities increased drastically (Ebersold, 2008). Little data exists on students with disabilities in countries in the Global South, especially Ghana (Braun & Naami, 2019).

According to Ghana Statistical Service (2021), about 8% of the Ghanaian population have some form of disability prevalent among females (8.8%) as compared to males (6.7%). The highest prevalence among all six domains (seeing, hearing, mobility, remembering, self care, communicating) is visual impairment (4.0%) and the least (1.0%) is those with communication difficulties (Ghana Statistical Service, 2021).

Ghana has signed the CRPD, promulgated the Persons with Disability Act (2006) to enhance the rights of persons with disabilities (Government of Ghana, 2006), and has an Education Strategic Plan to echo its commitment toward "Education for All" (EFA) (Government of Ghana, 2018). With such a legal instrument and educational policy in place, the government of Ghana prohibits discrimination against individuals with disabilities. The EFA policy requires all universities within Ghana to have inclusive environments including universally designed libraries for persons with non-severe or mild disabilities by the year 2030 (Government of Ghana, 2018). The Ghanaian higher education sector records an increased admission rates (1,370 per 100,000 inhabitants including students with disabilities) and high governmental expenditures with 13% of total costs on education devoted to higher education (Darvas et al.,

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2017). Overall, the rollout of the recent free senior high education policy is expected to increase the number of students enrolling in higher education from 90,000 in 2018 to 145,000 by 2020 (Kamran, Liang & Trines, 2019). With the increased number of student enrolment, an increase in students with disabilities is expected and the question arises as to how Ghanaian higher education institutions are accessible to these students. Little research (Adom et al, 2023; Deku, 2017) has been done looking at the needs of people with disabilities based on universal design principles. Universal design incorporates the needs of all users, including people with disabilities, to make the space, service, or resources (Russell & Huang, 2009) accessible to everyone regardless of who they are (Burgshahler, 2018a) and without the need for adaptation or specialised design (United Nations, 2009).

1.2   The research sites

The study targeted ten of the twenty-four (24) Ghanaian public universities selected based on their practice of inclusive education, have a significant number of students with disabilities (Addai-Wireko, 2019), have disabilities offices, have library facilities, and model best practices for affiliate institutions. The ten public universities are scattered throughout the country. Those in the south consist of the University of Ghana, the University of Professional Studies, the Ghana Institute of Management and Public Administration, and the University of Education, Winneba while University for Development Studies is in the Northern part. To the west is the University of Cape Coast and the University of Mines and Technology. To the east is the University of Health and Allied Sciences while the University of Energy and Natural Resources and Kwame Nkrumah University of Science and Technology are in the Central part of the country. The various universities cover the entire country, and this will help to reveal the practice of universal design principles among higher institutions to accommodate differently

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abled students in their libraries. Figute 1.1 shows Ghana's sixteen regions with the locations of the university libraries targeted for this study.
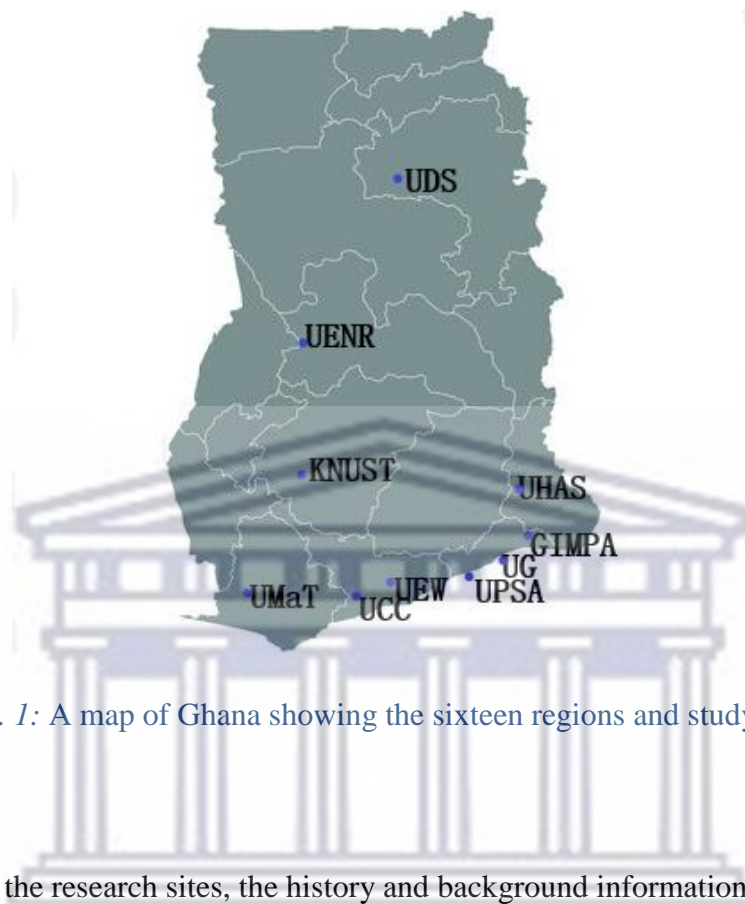
Figure 1. 1: A map of Ghana showing the sixteen regions and study locations

To contextualize the research sites, the history and background information of the universities are discussed in the following section.

1.2.1 *University of Ghana (UG)*

In the past, the University of Ghana was called the University College of the Gold Coast. It was established in 1948 upon the recommendation of the Asquith Commission in the then-British colonies (University of Ghana, 2022). After its establishment, the University College of the Gold Coast was admitted to the "Scheme of Special Relationship extended by the University of London to certain English and overseas University Colleges". The University College was later converted into a university through a legislative instrument that clothed it with the power to award its own degrees in the 1960-61 academic year by the Government of

http://etd.uwc.ac.za/

Ghana. Striving as a research-intensive university, the University of Ghana is the premier University founded to provide and promote quality higher education, cutting-edge research, knowledge creation, and dissemination for national development (University of Ghana, 2022). The university is operated via a central administration which includes a collegiate system namely the College of Basic and Applied Sciences, College of Education, College of Health Sciences, and College of Humanities. The university is also known for its various research institutions and centres for learning and research. The University of Ghana is in the Capital city with a student population above 61,000 (University of Ghana, 2022).

1.2.2 *Kwame Nkrumah University of Science and Technology (KNUST)*

The University of Science and Technology succeeded the Kumasi College of Technology which was founded in October 1951. The College gained the status of a full-fledged University in August 1961 by an Act of Parliament. In 1998, another Act of Parliament, Act 559, renamed the university to Kwame Nkrumah University of Science and Technology, Kumasi. The university provides an environment that promotes high-quality research, teaching, entrepreneurship training, and service to all relevant stakeholders. The university focuses on "Change in the training of highly skilled 21st-century entrepreneurial graduates for social, economic and technological advancements" (Kwame Nkrumah University of Science and Technology, 2022) as well as aspects of science, engineering, and mathematics for the industrial development of Ghana and Africa. The University has six colleges that operate a 3-Tier academic/administrative system. These colleges are made up of faculties and departments. The university currently has undergraduate and postgraduate students from all over the world with a student population of 85,000 (Kwame Nkrumah University of Science and Technology, 2022).

1.2.3 University of Cape Coast (UCC)

In October 1962, the University of Cape Coast was established as a university college and placed under the care of the University of Ghana. The college gained full and independent status as a university with the authority to award degrees, diplomas, and certificates by an Act of Parliament in October 1971 - The University of Cape Coast Act, 1971 (Act 390) and later the University of Cape Coast Law, 1992 (PNDC Law 278) (University of Cape Coast, 2022). The mandate of the university is to "train graduate professional teachers for Ghana's second cycle institutions and the Ministry of Education to meet the manpower needs of the country's accelerated education programme" as well as the ministries and industries in the country (University of Cape Coast, 2022). The university has five (5) colleges, seven (7) faculties, and 12 schools. The university currently has undergraduate and postgraduate students from all over the world with a student population of approximately 78,485 (University of Cape Coast, 2022).

1.2.4 University of Education, Winneba (UEW)

In September 1992, the University of Education, Winneba (UEW) was founded under PNDC Law 322 as a University College. It was on till May 2004 that the University College was upgraded to a full University status through the enactment of the University of Education Act, Act 672.

The mandate of the "University is to produce professional educators to spearhead a new national vision of education aimed at redirecting Ghana's efforts along the path of rapid economic and social development" (University of Education Winneba, 2022). The university had seven colleges in different towns that awarded a diploma to students. These "Colleges were the School of Ghana Languages, Ajumako; the College of Special Education, Akwapim-Mampong; the Advanced Technical Training College, Kumasi; the St. Andrews Agricultural Training College, Mampong-Ashanti; and the Advanced Teacher Training College, the

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Specialist Training College and the National Academy of Music, all at Winneba". Now, the College of Languages Education, located at Ajumako, and the Winneba Campus are currently the two campuses the University of Education operates from. The university has four (4) schools and six (6) faculties (University of Education Winneba, 2022). The university currently has an undergraduate and postgraduate student population of about 69,000 which consists of regular and distance education students as of 2022.

1.2.5   University for Development Studies (UDS)

The University for Development Studies (UDS) was established by PNDC Law 279 in May 1992. The university seeks to promote the equitable socio-economic transformation of societies via practically oriented, teaching, research, and field-based training aimed to accelerate national development through poverty reduction (University for Development Studies, 2022). The university currently has eight (8) schools, seven (7) faculties, three (3) institutes, and four (4) centres. The university presently runs a multi-campus system: namely Tamale campus, Nyankpala campus, Tamale City campus, Tamale North campus, and Eastern campus, Yendi. The current student population stands at about 31,000 (University for Development Studies, 2022).

1.2.6   University of Professional Studies, Accra (UPSA)

The University of Professional Studies, Accra (UPSA), formerly called the Institute of Professional Studies (IPS) was established in 1965 as a private business professional institution. The institution went through massive restructuring until September 2008 when the institute was made a full-fledged university with the authority to award its own degrees, diplomas, and certificates for its accredited programmes. Afterward, the name of the institution was changed from Institute of Professional Studies to University of Professional Studies in 2012 through the University of Professional Studies Act 2012, Act 850 (University of

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Professional Studies Accra, 2022). The University has the mandate to provide academic and professional education. The university presently has six (6) schools and four (4) faculties. It currently has a student population of more than 20,000.

1.2.7   *University of Mines and Technology (UMaT)*

The University of Mines and Technology (UMaT) began as the Tarkwa Technical Institute (TTI) in 1952. The institution has experienced massive reorganisation over the years to where it is today. Until its current name, the institution was called the Western University College of KNUST, Tarkwa in 2001. The institution gained full and independent status as a university with the authority to award degrees, diplomas, and certificates by an Act of Parliament in November 2004 - University of Mines and Technology, Act 2004 (Act 677) (University of Mines and Technology, 2022). The university seeks to provide higher education in all aspects of mining and petroleum engineering and technology and related disciplines via effective teaching and learning, knowledge creation and dissemination as well as technology transfer via active collaboration with industry and to offer professional services through extension activities to the mining and allied industries.

The university has three (3) schools, three (3) faculties, and Art to Engineering. The current student population of the university stands at approximately 5,300 (University of Mines and Technology, 2022).

1.2.8   *University of Health and Allied Sciences (UHAS)*

In December 2011, the University of Health and Allied Sciences was founded by an Act of Parliament, (Act 828). The University has the mandate to provide quality higher education in areas of health sciences through innovative teaching, research, and dissemination of knowledge to meet the needs and aspirations of Ghanaian people (University of Health and Allied Sciences, 2022). The university provides clinical and skill services to improve the health status

and quality of life of Ghanaians. It has 21 undergraduate and postgraduate programmes that are offered in eight (8) schools and two (2) institutes. The university currently has a student population of more than 3,752 (University of Health and Allied Sciences, 2022).

1.2.9 *University of Energy and Natural Resources (UENR)*

In December 2011, the University of Energy and Natural Sciences was founded by an Act of Parliament. The university seeks to develop the human resources, skills, and technology required to resolve critical energy and natural resources challenges in Ghana (University of Energy and Natural Resources, 2022). The university also embarks on interdisciplinary research and outreach programmes in science, engineering, and related fields. The university has two campuses and currently operates under eight (8) schools. The current student population of the university is approximately 14,000 (University of Energy and Natural Resources, 2022).

1.2.10 *Ghana Institute of Management and Public Administration (GIMPA)*

Ghana Institute of Management and Public Administration formerly called the Institute of Public Administration was established in 1961 to train public servants with administrative and professional competence to plan and administer services to the public sector, private sector, and non-governmental organisations (Ghana Institute of Management and Public Administration, 2022). The institute provides education and training among others in the areas of leadership, public administration, and management. GIMPA is a full-fledged university-level public institution that is recognised in Ghana, Africa, and beyond. The institute currently has one (1) faculty and five (5) schools. The university has a student population of about 3,893 (Ghana Institute of Management and Public Administration, 2022).

1.3   Problem statement

In 2020, the number of students enrolled in tertiary education in Ghana was slightly over 547,000 compared to the previous year of just over 496,000 students (Sasu, 2022). As student enrolment increases at Ghanaian public universities, there is a probability of an increase in the number of students with disabilities in higher institutions. Despite Global Accessibility News' (2013) claim that the University of Ghana alone has over 2,000 students with disabilities, the total number of students with disabilities in higher education institutions in Ghana appears according to Braun and Naami (2019) to be unknown. Although advocacy on creating avenues for access and success in tertiary education for all persons has existed for a long while (Swanzy, Langa & Ansah, 2019), studies across Africa including Ghana have shown little attention to the education and provision of resources and facilities to persons with disabilities in higher education institutions (Obim & Akpokurerie, 2022; Akoto, 2021; Eneya, Mostert & Ocholla, 2020; Kaunda & Chiwina, 2019). There are only a "handful disability friendly systems and facilities on campuses in the Ghanaian higher education space" (Osei-Tutu, 2021, p. 23). There has been little conscious effort to reframe university campuses, structures, and facilities to make them more accessible and accommodating for students with disabilities. This was acknowledged by the University of Ghana (2016, 2017) as well as Global Accessibility News (2017). This situation has resulted in students with disabilities having difficulties in accessing resources, affecting their full participation in studying (Addae-Wireko, 2019; Tudzi et al., 2017) and their successful completion of university education. It also violates the social justice of people with disability and the Inclusive Education Policy which mandates higher education institutions to adhere to universal design for principles (Government of Ghana, 2015), and to create inclusive university environments for all students to participate and succeed in higher education (Mensah, Campbell-Evans & Main, 2022).

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To eliminate the barriers that prevent the inclusion and participation of students with disabilities in tertiary education, there is a need to adhere to universal designs and social inclusiveness on university campuses (Ashigbi et al., 2017). If universal design principles are used in creating university libraries, they would be accessible to people with disabilities, create learning opportunities, supply equal participation, and achieve the goal of making library services accessible to anyone, anywhere, at any time. This would encourage multiple means of engagement, representation, and action or expression in university libraries. But the extent to which Ghanaian public university libraries are accessible to students with disabilities is still unknown. This study seeks to examine how Ghanaian public university libraries conform to universal design principles to increase participation and accommodate persons with disabilities in university education.

1.4   Objectives of the study

Based on the preceding problem statement, the objectives of this study were to:

i.   Examine the physical access for persons with disabilities into and within Ghanaian public university libraries.

ii.   Ascertain facilities and services offered to render information services to students with disabilities.

iii.   Capture the library experiences of students with disabilities.

iv.   Offer guidelines for redesigning buildings and services to accommodate students with disabilities.

1.5   Research questions

From the research objectives, the following research questions were derived:

i.   Are Ghanaian public university libraries designed to meet the needs of students with disabilities?

ii. What facilities and services are offered to render information services to students with disabilities?

iii. How do students with disabilities experience library services and information?

iv. How can Ghanaian public university libraries be redesigned to accommodate students with special needs?

1.6   Literature review

The purpose of a literature review is to obtain an understanding of the research in question and the debates relevant to the topic of the current study. It provides an overview of the particular topic, explains relevant concepts, identifies areas already researched to prevent duplication, identifies gaps in research on the topic, and demonstrates how this research study fits in with the existing, larger field of study (Rozas & Klein 2010). Academic libraries have been focusing on students with physical impairments for many years resulting in research on various aspects thereof.

Students with visual and hearing impairments need resources in alternative formats. Studies by Baumgartner, Rohrbach and Schönhagen (2023), Chijioke, Chigozie and Igbokwe (2020), Day and Fleischmann (2020), Kaunda and Chizwina (2019), as well as Majinge and Stilwell (2014b), drew attention to the limited availability and accessibility of such resources as well as problematic interaction with websites and other online contents (Ahmed & Naveed, 2020; Dodamani & Dodamani, 2019).

Various assistive technology, tools, software and applications together with ICTs were developed to facilitate access to learning resources and equal opportunities for differently-abled students (Kiruki & Mutula, 2023; Yadav & Singh, 2022; Kiruki & Mutula, 2021; Atanga et al., 2020; Matalala, 2020; Vuegen, Peeters & Van Hees, 2020; Abu Alghayth, 2019). Lack of

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training for both students and librarians (Obim & Akpokurerie, 2022; Coetzee, 2016), as well as communication issues for especially students with hearing impairments (Saar & Arthur-Okor, 2013; Epp, 2006), were identified as barriers to fully utilising these technologies. Recent studies by Addai-Wireko (2019) as well as Aghauche, Udem and Aghauche (2021) concluded that although some adaptive technologies and information resources in alternative formats were found, the environment of academic libraries was still not conducive for independent use by students with disabilities.

Ndiweni, Machimbidza and Mutula (2022) identified factors influencing library use, while Addai-Wireko, Nukpe and Frimpong (2020) as well as Bodaghi and Zainab (2013a) examined the perspectives of architect experts on accessibility requirements for students with disabilities. Many studies concluded that university environments presented barriers of varying degrees and types (Ashigbi et al., 2017; Chiwandire & Vincent, 2017; Phukubje & Ngoepe, 2017).

In addition to these barriers in library facilities, negative attitudes and behaviour of library staff toward persons with disabilities as reflected amongst others in the pervasive use of language (Pionke, 2017) resulted as indicated by Baffoe (2013) and Oud (2019) in lack of awareness of disability issues, prevented students with disabilities becoming independent library users and created isolation and stigmatisation.

One way of accommodating students with disabilities in academic libraries is the provision of user-centred spaces or carrels (Bodaghi & Zainab, 2013b) where they can interact with the collections, ICTs and special services or assistants (O'Donnell & Anderson 2022; Sobol, 2020; Calvert, 2014). Foxwell (2023) as well as Patrick and Hollenbeck (2021), however, opined that the library design should provide accessibility, engage participation by creating equitable experiences, and facilitate empowered success through flow experiences.

Advocacy articles like those of Samson (2011), as well as Schulz and Fuglerud (2012), counteracted some of these negative attitudes (discrimination, stigmatisation, exclusion) by suggesting raising awareness of and best practices for academic libraries for serving students with disabilities. Chakrabortya and Jana (2021) as well as Ifijeh and Yusuf (2020) attributed shrinking budgets as the reason for most academic libraries and universities not accommodating students with disabilities fully.

From these studies, it is noted that the literature is populated with case studies and surveys that focused mostly on a single disability and interventions by libraries to better assist that singular disability. Limited studies on integrating them effectively into libraries through the universal design of buildings, services, and information as witnessed in the works of Majinge and Stilwell (2014a) and Samson (2011). The majority of studies surveyed librarians, library schools, and library directors and failed to present the views of key decision-makers like university development officers and the disability unit. This assertion is supported by the University of Oxford (2020) that Disability unit officers have specific roles amongst others, development, innovation, people, libraries, planning, and resources. In addition, they advocate for equality and diversity. Their roles gain authority through influence and depend on academic experience and credibility (Chatelain-Ponroy et al., 2018). Equally, Imrie and Hall (2003) opined that the "policies, practices and values of professionals involved in property development, design and construction processes" is partly the sources of exclusion of people with disabilities from many facets of the built environment.

To fully comprehend the current study, there is a need to assess what has been done by others in previous studies that would shape the gap that this study seeks to fill. This is discussed in

detail in Chapter 3 where relevant research-based studies on the universal design of academic libraries to accommodate students with disabilities will be critically discussed.

1.7   Theoretical and conceptual framework

This study employed the Social Model of Disability (SMD) as well as the checklist by Irvall and Nielsen (2005) to provide the theoretical framework to guide the research, interpretation of the data, and answer the research questions. The social model of disability was propounded in the 1970s by activists for the physically impaired. It was given recognition through the work of Barnes (1991), Oliver (1990) and Finkelstein (1980) who shifted the focus from impairments to environments creating barriers. Their ideas were later echoed by Baffoe (2013) as well as Kumbier and Starkey (2016) who termed disability a socially constructed experience with barriers limiting persons with disabilities to access opportunities, privileges, and resources in society.

The social model views disability in terms of "environmental, structural and attitudinal barriers infringing upon the rights and lives of persons with disability and which tend to hinder their inclusion and progress in many areas of life including education" (French & Swain, 2013). Swain, Griffiths and French (2006) identified three types of social barriers, namely *institutional* or *organisational* barriers (underlying norms, policies, practices, and procedures), *environmental barriers* (physical barriers), and *attitudinal barriers* (attitudes and behaviour toward people with disability). Figure 1.2 presents the researcher's summary of the model.
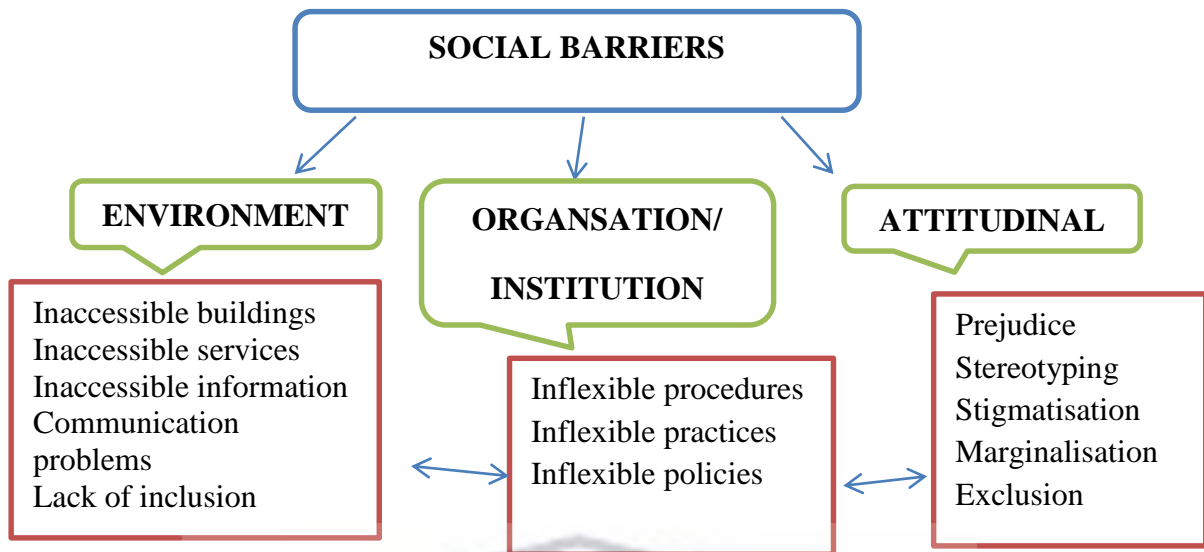
Figure 1. 2: *Social Model of Disability*

The social model of disability has been used extensively in disability studies in the academic sphere but evoked conceptual debates. Shakespeare and Watson (2002) praised the effectiveness and simplicity of the SMD but warned against blaming society for impairments. In contrast, People with Disability Australia (2018) opined that the model is not in denial of the reality of impairment and its effect on the individual, but challenges the structural, attitudinal, communication, and social environment to accommodate disability as an expected circumstance of one's diversity. Beaudry (2016) focused on exclusion indicating that it is caused by the social failure of inclusivity and ethical orientation. The social model of disability is underpinned by the Minority Group (Sociopolitical) Model, Social Justice (Ableist or Disability Oppression) Model, Disability Justice, and Interactionist Model of Disability which all seek to create inclusive environments for persons with disabilities.

Thornton and Downs (2010) applied SMD in their study of the universal design of university disability offices and recommended revising policies and procedures for change. Kumbier and

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Starkey (2016) studied disability justice and libraries, and based on the SMD, advocated for an understanding of access that responds to pragmatic needs and guides professional practices and ethics. Eneya and Mostert (2019) determined the applicability of the SMD with Wilson's information behaviour model for effective and efficient service provision in academic libraries to students with disabilities.

The IFLA checklist (Irvall & Nielsen, 2005) focusing on access to libraries for persons with disabilities and the more recent seven principles of universal design for library buildings (Bostick & Eigenbrodt, 2017) were used to create a checklist as a practical observation tool to "assess existing levels of accessibility and usability of buildings, services, materials and programs" and to identify barriers to information access (Eneya & Mostert, 2019).

Chapter 2 of this study presents a more detailed discussion of the theoretical underpinning and other related theories that are relevant to the current study in providing inclusive accommodations for students with disabilities.

1.8 Research methodology and design

A research design is a blueprint for conducting a study that maximises control over factors that could interfere with the validity of the findings. It helps the researcher to plan the study to obtain the intended results (Burns & Grove, 2001) and for interpreting the findings (Baškarada, 2014).

1.8.1 Paradigm/philosophy

This research study is aligned with the pragmatist paradigm. This worldview arises out of actions, situations, and consequences rather than antecedent conditions as in post-positivism

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(Creswell & Creswell, 2018). As a philosophical underpinning for mixed methods studies, Morgan (2007) and Tashakkori and Teddlie (2010) convey the importance of focusing attention on the research problem and then using pluralistic approaches to derive knowledge about the problem.

1.8.2   Research method

A multiple case study was used as the research method. A case study investigates a real-life, contemporary bounded system (a case) or multiple bound systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information, and reports a case description and case themes (Creswell, 2013). The unit of analysis in the case study might be multiple units or cases (Creswell, 2014) as in this study where ten different cases (public university libraries) were used and cross-case conclusions were drawn.

1.8.3   Population and sample

According to Alvi (2016), a target population for a research investigation is all the participants who meet the specific criterion stated. It is usually a group to which a researcher would like the results of the study to be generalisable. The population for this study would firstly comprise the ten public university librarians, heads of development officers, and heads of disability units in each of the public universities – thus a group of thirty. This group is considered appropriate as a population for the study because they constitute the people responsible for library and university policies and because they are 'information rich' (Patton, 2002) and in the best position to provide the researcher with the data needed to respond to the research question of this study. The second population was all the students with disabilities in these ten public universities. The input of students with disabilities was deemed important as they are the ones experiencing barriers in accessing libraries and their services as well as providing an

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opportunity to make their "voices heard through traditional academic discourse" (Booth, 2018) and self-advocating (Townson et al., 2004).

1.8.4   Data gathering tools

To achieve triangulation and fulfil the requirement of mixed methods in multiple case study, a combination of data-gathering methods to study the same phenomenon (Denzin, 1970) was employed. By triangulating data, the researcher attempted to provide a "confluence of evidence that breeds credibility" (Roe, 2018). This resulted in well-validated and substantiated findings. By scrutinising data gathered through different approaches, the researcher corroborated findings across data sets and thus reduced the impact of possible biases that would exist in a single method. A questionnaire, interviews, observation, and document analysis were used as data-gathering tools.

1.9   Scope of the study

The researcher surveyed ten (10) Ghanaian public universities to ascertain whether they conform to universal design. Due to financial and time constraints, other Ghanaian universities or higher education institutions (ten Technical Universities, seven (7) Public Specialised/Professional Tertiary Education Institutions, 101 Private Tertiary Education Institutions, 46 Colleges of education, four (4) Colleges of Agriculture, 43 Nursing/Midwifery Colleges (Ghana Tertiary Education Commission, 2020a) did not form part of the multiple case study. The study covered 485 students with disabilities (hearing, visual, mobile), ten (10) University Librarians, ten (10) Heads of Development Offices, ten (10) Heads of Disability Units, and examine the practices of accessibility, inclusion, and universal design in public university libraries. The universities strategic plans, library strategic plans and disability policy documents regarding accessibility and universal design were reviewed while

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observations were carried out with a checklist to determine the accessibility, usability, resources, facilities and services to students with disabilities of the ten (10) libraries. The Social model of Disability, Minority Group Model of Disability, Human Rights Model of Disability, Social Justice Model of Disability, relational model of disability and social relational model of disability were discussed. The study therefore did not attempt to generalise the findings for Ghana or academic libraries in general.

1.10   Significance of the study

With the intense financial pressures faced by Ghanaian public universities, the management of the universities may consider it prudent to focus on the survival of their institutions rather than social justice. This study may serve as an intervention to hopefully awaken social justice consciousness, create enabling university libraries and return a social justice imperative to higher education institutions. It is also envisaged that if all students with disabilities can access and utilise academic libraries and services, the money spent on libraries, services, and collections would be more efficient. The findings of this study may encourage Ghanaian public universities to redesign their libraries to consider students with disabilities and as such motivate more persons with disabilities to pursue and complete university education in Ghana. However, it can be said that the universal design of university libraries is yet to receive adequate attention in the Ghanaian education sector. Universally designed library issues in Ghanaian public universities have been given little examination and are severely under-represented in both domestic and international scholarship. The study would fill a gap in the knowledge of universally designed policies and practices of Ghanaian university librarians.

1.11   Delimitations of the study

This study is limited to ten Ghanaian public university libraries and does not include libraries that are in colleges of education, midwifery and nursing training colleges, technical universities, or other private universities. This creation of boundaries is likely to deny the current study from learning from experiences of other public universities as well as foreign and private higher institutions providing education services to students with disabilities in Ghana. The study was delimited to university librarians, heads of development offices, heads of disability units because they initial policies and are "information rich" to provide relevant information to help the purpose of the study. The researcher further restricted the study to students with disabilities. The term "students with disabilities" does have diverse meanings, so, the current study restricted the boundaries of this thesis only to physical disabilities (visual, mobile and hearing) because of their increase in population across the public universities and their ability to provide relevant information to answer the research questions. Other forms of disabilities such as learning, cerebral palsy, albinism, and health impairments were not included in the research. The main reason for this exclusion was the fact that their numbers combined were few and may not affect the aim of the study. The questionnaires and interviews data were collected in the year 2022.

1.12   Limitations of the study

The researcher had some financial challenges traveling to the research sites which are scattered throughout the country, from north to south, east to west, and central part of Ghana. This resulted in a delay in the time of the data collection period. Another challenge was obtaining the list of students with disabilities from some universities. Although the researcher wrote to university registrars to request the list of students with disabilities, some universities had no record of students with disabilities although these students were in these universities.

Contacting students with disabilities was therefore difficult. The researcher resorted to the help of leaders of the Students Representative Council to locate students with disabilities or groups of disabled students not known to the university authorities.

The study was undertaken at ten Ghanaian public university libraries. Thus, generalising the results to other similar higher education institutions is limited. Secondly, the results showed the views of only 10 university librarians, 10 heads of development officers, and 10 heads of disability units at the ten public universities. Hence, the views of these people might not reveal the perceptions of similar university librarians or unit staff members. Thirdly, the subjective nature of interviews is another limitation. The researcher had to rely on whether respondents were self-motivated to participate in the interviews.

The participants of the study responded to the questionnaire on their own accord, however the researcher anticipated that the respondents with visual impairment would have a problem with the web-based nature of the questionnaire, and alternative measures would be taken to accommodate them. The tendency of some participants not to reveal disability status, or fatigue due to the lengthy nature of the instrument caused higher drop-out rate which may limit the results.

1.13   Ethical consideration

Ethical considerations arise for all research involving human participants (Yin, 2014). Prior to the study, the researcher sought ethical clearance for the study from the University of the Western Cape (Appendix A) and permission to conduct the research from the ten Ghanaian public university libraries (Appendices B and G). The researcher duly sought the informed

consent of all the participants in the research by fully informing them of what would be expected of them and that there would be no risks involved (Appendices C, D, E, and F). Anonymity and confidentiality were ensured as the study would not mention personal names. Voluntary participation was sought. The study at all times adhered to the University of Western Cape's ethics policies.

1.14   Definition of concepts

The definitions of the following concepts are provided for this study:

1.14.1 Disability

Disability is perceived as the functional limitations of an individual to accomplish physical or mental activities within what is supposed to be at the level of the person. In this sense, disability is the restrictions from the physical, visual, environmental, and cognitive elements that hinder the individual's ability to function in a normal way (Baffoe, 2013).

According to Michailakis (2003), disability is the result of the interaction between one's physical impairments and how the environment is constructed. Disability arises as the result of the structural, environmental, and attitudinal barriers that the library environment raises toward people with disabilities. It is the effect of the relationship between the persons with disability and the library space, resources, and services that hinder inclusion and integration.

1.14.2 Universal design

Universal design is a concept that requires all environments, communications, and products, to the greatest extent possible, should be accessible and accommodating to every individual regardless of their abilities (Centre for Universal Design, 2008a). Universal Design in libraries

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provides an approach to solving the accessibility needs of users at the development stage, to integrate universal accessibility and construct functional products (Rose & Meyer, 2002; Rose et al., 2006). Thus, designing library facilities and services with accessibility requirements to accommodate every user from the start is more cost-effective than making future adaptations to the structure (Hitchcock et al., 2002). Universal design seeks to embrace the tenets of equity, social justice, and diversity which promotes quality education regardless of the differences, disabilities, or dispositions of the library users. Therefore, a more normalised life, a concerned library community, and high academic expectations for diverse users are the products of universal design.

1.14.3   Academic libraries

Curzon and Quinonez-Skinner (2009) state that libraries attached to higher education institutions such as colleges or universities are called academic libraries. They serve and support the goals of every higher educational institution. Academic libraries exist to provide faculty and students with information resources to support teaching, learning, and research. Therefore, they enhance the research status of universities (Brush & Jiras, 2019).

In recent times, libraries have been transformed by Information and Communication Technology (ICT). As a result, it has compelled academic libraries to focus less on physical materials and more on e-resources. Academic libraries have advanced from physical collection management and library services to support teaching, learning, and research by transforming resources and services into digital formats (Choi & Rasmussen, 2009). They facilitate access to digital resources, e-databases, e-books, and e-journals. Online reference services, research help, and library services are usually offered by academic libraries to their diverse user populations (ACRL, 2018). Some academic libraries have been remodelled to accommodate

persons with disabilities by offering collaborative, inclusive platforms and other academic services that promote equal access and participation.

1.14.4 Students with disabilities

Students with disabilities in this study refer to students with mobile, hearing, or visual impairments that are restricted from participating in daily life activities including accessing spaces, resources, and services in higher institutions. According to Ficarra and Chapin (2019), students with disabilities are persons who need more individualised and individual supports which is complemented by other minor and related supports. It refers to a student(s) who have conditions that adversely affect their access to or participation in education.

1.15   Chapter outline

The study was organised into eight chapters as follows**:**

Chapter 1 provides background to the study, statement of the problem, the purpose of the study, objectives of the study, scope of the study, the significance of the study, conceptual framework as well as ethical considerations and ends with a description of chapters of the study.

Chapter 2 is devoted to the theoretical framework employed for the research.

Chapter 3 deals with a literature review of the study on universal design in higher education, universal design for learning, universal design in libraries, challenges, and benefits of universal design in libraries, the nature of Ghanaian public university libraries, effects of the design of university libraries on students with disabilities. The chapter ends with how university libraries would be redesigned to conform to universal design.

Chapter 4 discusses the research design and methodology.

Chapter 5 presents the quantitative data collected.

Chapter 6 presents the qualitative data collected.

Chapter 7 contains interpretations of the findings.

Chapter 8 answers the research questions to draw a conclusion and make recommendations.

1.16   Chapter appraisal

This chapter provides the introduction to this research study, with special emphasis on the background of the study and the motivation thereof. The statement of the problem, objectives of the study, research questions as well as a synopsis of the research design and methodology were provided. The chapter also captured the theoretical and conceptual framework that underpinned the study. The ethical considerations, significance, and limitations of the study were highlighted. The chapter outline provided a summary of the entire study. The subsequent chapter presents the theoretical grounding for the study in detail.

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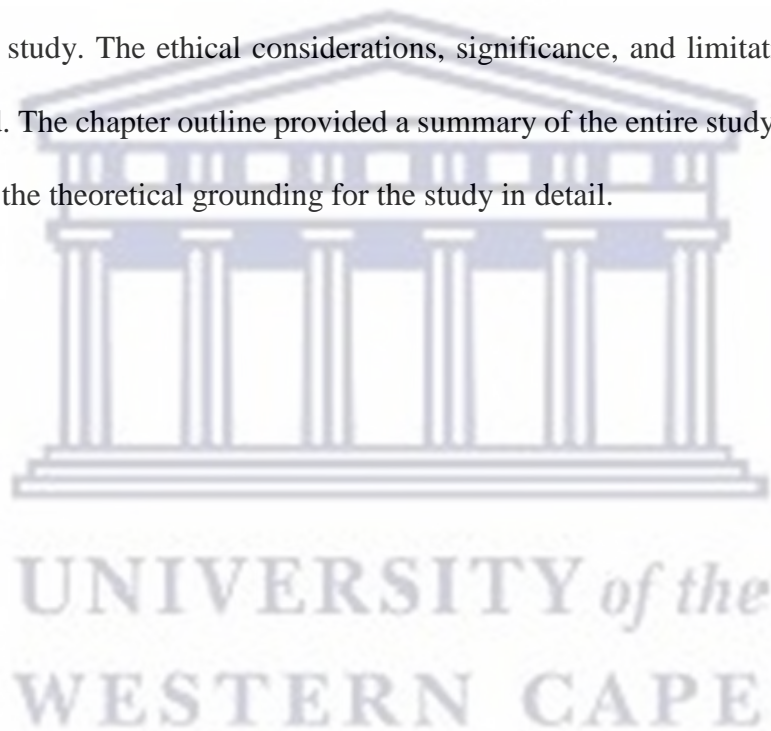
CHAPTER 2

THEORETICAL GROUNDING

2.0   Introduction

This chapter discusses the theory that framed the current research study. According to Collins & Stockton, 2018, p.2), a theory is a "big idea that organises many other ideas with a high degree of explanatory power". Saldan and Omasta (2018, p. 257) asserted that a theory is seen as a "social life that holds transferable applications to other settings, context, populations, and possibly time period". A theory offers guidance to a researcher to "make sense of what methods will help answer the research questions" (Collins & Stockton, 2018, p. 2).

A research study can be strengthened by a balanced and centred application of the theoretical framework as a lens through which the literature and data in the study are viewed as well as how the study will process new knowledge (Collins & Stockton, 2018). A theoretical framework usually provides the foundation for underpinning or the parameters of a research study as well as explaining the way things work. It serves as an anchor that guides the study and assists in soliciting responses to the research questions formulated, identifying potential validity threats to the study conclusions as well as providing a useful interpretation of the data gathered (Osanloo & Grant, 2016). More importantly, a theory can be applied in at least three primary ways in research. A theory as a research paradigm and method (Glesne, 2011), forming as a result of data collection (Jaccard & Jacoby, 2010), and as a framework to guide the study (Anfara & Mertz, 2015; Collins & Stockton, 2018).

This study adopted the social model of disability to provide the theoretical framework to guide this study. To address salient issues, the social model and the concept of universal design complement each other in this study. For the study and analysis of disability concerns, the

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social model is an important theoretical framework that seeks to eliminate all forms of barriers in society that restrict the accommodation of individuals with disabilities.

The IFLA checklist for access to libraries for persons with disabilities was also employed in this study (Irvall & Nielsen, 2005). The checklist is a valuable tool to determine adequate and inadequate accessibility of facilities, resources, and services in libraries. The checklist ensures that everything useful and important to students with disabilities are assessed. It allows for systematic coverage of what is significant as well as the comparison of the different findings. The checklist ensures that the observation done is reliable, valid, and practical.

2.1   The social model of disability (SMD)

The psychiatrist R. D. Laing coined the term medical model in his "The politics of the family and other essays" in 1971. The medical model sees disability as a deficit caused by an illness or an injury that needs to be cured (Retief & Letšosa, 2018; Sulaimani & Daghustani, 2022). It regards disability as a "personal tragedy" (Sulaimani & Daghustani, 2022). The medical model which regards the limitations encountered by persons with disabilities as resulting predominantly from their impairments was deeply embedded in the fabric of society leading to the systematic exclusion of persons with disabilities from the mainstream of educational, social and economic life as a result of structural powers that provided more extreme discriminatory practices (Union of the Physically Impaired Against Segregation, 1976). There was evidence of widespread prejudice and oppression of persons with disabilities in the 1960s and 1970s, but several factors led to policy change. These include the higher rate of civilians and military war victims, the increase in elderly individuals as a result of medical advancements, and the unavailability of support outside and within institutions accounted for the formation of several disability groups (UPIAS, 1976). In the 1900s in Britain, the Union of the Physically Impaired Against Segregation (1976) fought for the liberation of persons with disabilities. They regarded

disability as an object of society, and states that 'if society did not create dependency, then disability would disappear'.

In reaction to the medical model, the term 'social model of disability' was developed by Oliver (1990). This term accounted for the new paradigm shift in perspective of disability which was directed at a person's impairment to societal restrictions that impede full participation and access of individuals with disabilities. To give a voice to individuals with disabilities, the social model challenged the resultant marginalisation and stigmatisation in society (Oliver, 1990).

According to the social model, disability is different from an impairment, and that impairment is recognised as a characteristic that may be resulting from disease, injury, or genetic composition (Eneya & Mostert, 2019). Whereas disability in the social model is considered a socially constructed phenomenon (Baffoe, 2013; Retief & Letšosa, 2018; Eneya & Mostert, 2019). The social model contends that individuals are disabled by society which is arranged for non-disabled people, with no recognition for persons with a disability but their exclusion (Oliver, 1990). In other words, it is not the difference in people that disable them but the influence of society's attitudes and structures that disabled individuals with impairment (Purtell, 2013). Specifically, it is the restriction of the ability of people with disabilities to function normally as a result of the barriers, structures, and actions that are created in society. People with disabilities are restricted from resources and access to opportunities due to the barriers that are erected in society. Hence, the environmental and attitudinal barriers exclude them from the mainstream of society (Baffoe, 2013). Therefore, the social model aims to change society and its related limitations to enable equal participation and the accommodation of persons with disabilities in every possible respect.

The failure of society to respond to the needs of individuals with disabilities is the main challenge - not persons' impairments. If those barriers are eliminated, then individuals with

disabilities can function at progressive levels in society. Persons with disability are extremely discriminated against due to societal attitudes and cultures which constructs barriers for them as they are always labeled as nobody and incapable (Eneya & Mostert, 2019). The social model view is not in denial of impairment and its related effects on the individual, but challenges society's failure to accommodate impairment as social diversity (People with Disability Australia, 2018).

The social model of disability was defined more than once, but in the final text of the United Nations Conventions on the Rights of Persons with Disabilities Convention (CRPD) (United Nations, 2006) it is defined as a model which views disability as effects from an interaction that exist between individuals with impairments and environmental and attitudinal barriers that prevent their effective and full participation in the society on an equal basis with non-disabled people (Lawson & Beckett, 2021).

In defining disability, it was agreed that any definition of disability should embrace the perspective of the social model of disability (Conventions on the Rights of Persons with Disabilities, 2006).

2.2 The impact of the social model of disability

The model has impacted internationally in shaping social policies and the lives of individuals with disabilities (Retief & Letšosa, 2018). How disability is understood in recent times is the result of the model's impact. The model played a crucial role in the drafting of the United Nations CRDP (United Nations, 2006). Traustadóttir (2009) reported that the model offered the 'knowledge base which informed' the CRDP while Kayess and French (2008) asserted that, it had an 'enormous impact on the treaty'. It is also recognised as an instrument to demand legal reform (Degener, 2016).

2.2.1   The social model of disability as a reference framework

To formulate policies and offer best practices, the social model of disability is a mechanism that offers insights into the disabling tendencies of contemporary society. As mentioned, several ideas associated with the model influence some decisions taken during the drafting process of the CRPD (United Nations, 2006).

As a new paradigm, the social model shifts the attention of society away from the functional limitations of people and rather focuses on the challenges imposed by barriers, attitudes, and cultures (Barnes, 2012). The social model is also associated with human rights and has a rights-based approach that recognises that the violations of an individual's rights result from the restrictions that are placed by the physical and social environment. The model indicates that individuals with a disability hold the right to live their lives to the same extent as the non-disabled. To protect the rights of persons with disabilities, many nations internationally have recognised the social model in the establishment of their policies (Doyle, 2008).

2.2.2   The social model of disability supports inclusion and equity

The social model is also a reference point to debate against segregation and exclusion of individuals based on their disability or impairment. Emphasis is placed on the right to education in stating that an education system should offer choices of opportunities equal to those of others for persons with disabilities. This view is supported by the Centre for Studies in Inclusive Education (UK), stating that the social model of disability should reflect fully in the CRPD and that governments should focus on eliminating barriers that impede persons with disabilities from full participation in education (Centre for Studies in Inclusive Education, 2006). Therefore, to promote inclusion and active lives of persons with disabilities, outdated procedures and policies that are barriers to people with disabilities should be eliminated.

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Lawson and Beckett (2021) asserted that the social model functions to reveal where policy reforms are required as well as providing the orientation needed for reform and constructing social change through basic guiding principles.

Rehabilitation should reflect the social model rather than the medical model of disability. There should not be any attention to medicalise all facets of the lives of persons with a disability to the neglect of creating services and supports that promote inclusion and independent living in society (Lawson & Beckett, 2021; International Disability Caucus, 2006). The social perspective of rehabilitation allows individuals with disabilities to cope with daily activities and to facilitate the acquisition of new skills and knowledge, focusing more on education than health.

2.2.3   *SMD brings about the recognition and elimination of barriers within institutions*

Besides the above-stated influence of the social model, within higher education institutions, the introduction of the social model perspective also resulted in the recognition and elimination of environmental barriers (Howell, 2005) as well as social and attitudinal barriers that restrict equal participation within education setting (Lourens, 2015). In the past, medical thinking was the practice in universities making these campuses inaccessible to persons with disabilities (Lawson & Beckett, 2021). The International Disability Caucus (2006) noted that many institutions resorted to the use of the medical model of "mental illness" to approach disabilities resulting in individuals being excluded from educational institutions and the protections that need to be accorded to them. Equally, library information resources and services were beyond the reach of students with disabilities. However, the social model perspective has introduced a new shift in the understanding of education which requires a change in policies, procedures, practices, and attitudes (Swart & Pettipher, 2011) to accommodate people with impairments.

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The development of Disability Equality Training courses presented by people with impairments was because of the instrumental perspective offered by the social model. These courses intended for practitioners and professionals generated potential solutions to environmental and social barriers in some institutions (Gillespie-Sells & Campbell, 1991).

In the 1990s, the social model placed persons with impairments at the centre of the research process, making it a new method of conducting disability research. This presented an opportunity for scholars with impairments, and they conducted several research studies focusing on a wide range of disability issues (Barnes, 2012).

The social model has established fulfillment for people with disabilities in institutions as it challenges marginalisation and discrimination while supporting individuals with disabilities to occupy their legal position in institutions through civil rights and political activism (Owens, 2015). People with disabilities now have the privilege to gather and challenge their experiences of oppression via political activism (Oliver, 1990). Therefore, the CRPD stressed that the human rights of people with disabilities, including those who need critical support, should be promoted and protected in educational institutions (United Nations, 2006).

An individual's views on how society and institutions should be designed coupled with what other individuals can accomplish are influenced by the thinking of the social model of disability (Foundation for People with Learning Disabilities, 2021). Despite institution's view of people with impairments, applying the social model removed limits to what an individual can achieve if they are provided with the needed support.

2.2.4   *The social model of disability and legal issues*

The social model thinking is instrumental for international and national disability policy making. For example, the United Kingdom government adopted formally the social model

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definition of disability which is now clearly apparent in both the public and the private sectors across the UK (Shakespeare, 2006; Barnes & Mercer, 2010). In 2003, the social model of disability was also endorsed in the European Union's policy Action Plan (Commission of the European Communities, 2003). The World Health Organisation's Disability and Rehabilitation Team incorporated social model insights into Rethinking Care from persons with disabilities' Perspectives (World Health Organisation, 2001).

In the Ghanaian setting, the social model is echoed in the National Disability Act, Act 715 of 2000 which was later assented to the Persons with Disability Act, Act 715 (Government of Ghana, 2006). The latter act enforces all public places, including university libraries to be available, accessible, and usable to persons with impairments within ten years. The model also serves as the foundation for political organisations and demands the enablement of individuals with disabilities (Ghana Statistical Service, 2014).

2.3   Criticism of the social model of disability

As the social model of disability influenced various facets of society, some scholars have also outlined some weaknesses of the model. Some scholars argued that the painful truths of impairment have been ignored by the social model. Shakespeare and Watson (2002) argued that persons with disabilities or individuals with impairment cannot pretend or disregard their knowledge and lived experience. Owens (2015) echoes this by stating that the variety of lived experiences of impairment is ignored by the social model. Other studies do not accept the social model's separation between disability and impairment, and describe it as unrealistic and not sustainable (Shakespeare & Watson, 1997). This view is shared by Beaudry (2016) who claimed that the disconnection of impairment and disability sever relevant dimensions of

persons with disabilities' lives and that some individuals experience disability as a person rather than a social challenge. Shakespeare and Watson (1997) conclude that it is difficult to declare for certain where impairment ends and disability begins, and the distinction appears to be at the surface.

However, the social model is not in denial of the fact that some illnesses may have disabling effects needing medical attention but the challenge is the failure to differentiate between an individual's impairment and his or her disability by medical professionals (Oliver, 2009). Morris (2002) had the same view indicating that the division between impairment and disabling barriers by the social model enables individuals with disabilities to point exactly to the things that deny them their human rights and the appropriate steps to be taken to address the challenges.

The fact that the social model has over-emphasised disability as a social diversity, does not necessarily replace the medical model of disability (Watson, 2004). This perspective is embraced by Lourens (2015) who claims that there is a lot of emphasis on barrier elimination and that disability is "over-socialised" by the social model. The author further stated that attitudinal change cannot lead to an impairment disappearing and that the features of an individual's disability will still be evident despite the redesign of society. The impact of impairment would still be experienced largely by individuals.

Another claim is that the social model has underestimated the significance of impairment (Anastasiou and Kauffman, 2013). This notion is shared by Shakespeare (2014) who contends that the social model has "neglected" or "dismissed" the reality of impairment. However, according to Beaudry (2016), the claims raised by these authors do not essentially support the dichotomy criticism but rather support "Denying impairment Criticism".

Thomas (1999) as well as Shakespeare and Watson (2002) claim that individual experiences resulting from gender, race, and class have been neglected by the social model as it focuses on external standpoints. Similarly, Goggin (2008) argued that an impaired body or mind is also prone to race, age, class, and gender. However, the social model is not incapable based on the assertion that some divisions have been excluded, but rather the fact that the model is not used by analysts in those divisions.

Another critique leveled against the social model of disability is the fact that neuro-divergent labels are excluded by the model. This has led to autistic research being populated with the medical model resulting in strict treatment, and language used to label autistic individuals (Woods, 2017). Woods suggests decoupling autism studies from the genetic effects of social issues and services by applying the social model to include neuro-divergent labels enabling autistic persons to discover the impact resulting from living largely in a neuro-type society.

2.4 Application of the social model of disability and universal design in university libraries

The social model of disability is useful to this study as it addresses challenges encountered by people with impairments, and promotes the redesign of spaces, information resources, and services in academic libraries to meet the needs of a wide range of users. When the social model of disability and universal design principles are applied in libraries, it promotes equity, inclusion, integration, social justice, human rights, and the full participation of diverse patrons. To empower and achieve access, participation, and equity for students with impairments as well as to contest discrimination, international policies and practices incorporating the social model need to be in place (M'Rithaa, 2006; Barnes, 2015).

Both the social model and universal design recognised the importance of independence and therefore focus on eliminating all forms of barriers in the academic library to offer equal access

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and opportunities for all diverse users. Robertson (2012) argues that libraries should offer resources and information services in suitable formats compatible with assistive technology devices.

2.4.1   Application to the library environments, resources, and services

The social model of disability and universal design recognised that a disabling environment is an instrument that impedes access and participation of people with disabilities in libraries. The elimination of all barriers restricting access to information resources and services is the aim of both social model and universal design. As the library is an integral part of a university and society at large, it should provide access to the library space, information, and website for students with disabilities (Eneya & Mostert, 2019). The location of the library, available transport, parking areas, and routes leading to the library – including ramps and elevators - should be accessible to users with a disability (Doshi et al., 2014; Ruby, 2017; Sohn, 2019; Hope, 2020; De Picker, 2020). The library website must be accessible, compatible with assertive technology (Trewin, 2011), easy to navigate, and must provide a frustration-free experience (Irish, 2020). Appropriate wayfinding assistance such as pictograms and symbols as well as assistive and communication devices should be available for patrons with disabilities (Gibson, 2009; Lattner, 2016). The reference desk, furniture, seating arrangements, spaces, and shelves must be accessible and usable by students with a disability. Thus, the social model advocates for all barriers hindering access to be removed to enhance independent use by all library patrons.

2.4.2   Application to policies, procedures, and practices of libraries

Ellcessor (2010) posits that if libraries do not accommodate the requirements of users with disabilities, then they will experience a disability in the library. Academic libraries should note that the individual's differences are recognised by the social model obligating the removal of

barriers preventing full participation. Thus, the integration of a rights-based approach to disability will facilitate the establishment of laws, procedures, practices, and policies that support the universal design of libraries to accommodate all users. The social model and universal design played a critical role in influencing social policy and disability issues (Retief & Letšosa, 2018), by addressing language and related terms used to discuss and label individuals with impairments (Bickenbach & Wasserman, 2006), enhancing the independence of persons with disabilities (Bickenbach & Wasserman, 2006; Croft, 2010) and framed suitable policies by governments (Croft, 2010).

Libraries need to supply not just physical access, but practices, procedures, and policies must contribute to the accessibility and usability of the information resources and services ensuring no exclusion of any library user (Department of Justice, 2010).

2.4.3   Application related to staff attitudes and behaviour

Causin et al. (2010), Trewin (2011) as well as Poria, Reichel and Brandt (2011) called for disability awareness training for library staff to prevent discriminatory practices. In a bid to comprehend why and how discrimination transpires, infringement of human rights, and exclusion of students with impairments from access to resources and services, Albert and Hurst (2004) concluded that the social model serves as an analytical framework. This assertion is supported by Kallen (2004) who asserted that the social model demonstrated the experience of injustice and inequality of individuals encountering discrimination. In line with the social model, the disability rights movement as well as human rights thinking, the academic library has a social responsibility not to ignore students with disabilities when services are developed and offered, to redefine societal attitudes to prevent the exclusion of individuals and not to

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leave any user behind regardless of their abilities (George & Duquette, 2006; Whyte & Ingstad, 2007).

Similarly, by recognising individuals with disabilities as equal members of higher education institutions and society, the social model of disability and universal design perspective appreciates the valuable contributions of persons with disabilities to develop both economically and socially. A similar view is shared by Metts (2004) who declared that disability strategies, practices, and policies increase the functionality of individuals with disabilities which increases the economic contributions of persons with disabilities. The only hindrance is society's structural, cultural, and attitudinal obstacles that impede individuals with disabilities from achieving their potential. Therefore, in terms of access to education, employment, libraries, and health among others, the social model of disability and universal design promote equity, equal rights, social justice, and opportunities for persons with disabilities.

In view of the social model and universal design in higher education institutions, university libraries should ensure to eradicate all barriers that prevent inclusion and equity and create a space that facilitates equal information access in both the physical and digital libraries. To accomplish this, libraries should redesign their information resources and services to accommodate and support students with disabilities to complete university education.

The universal design principles can be applied to major elements of the library to improve access for students with disabilities. Below is a conceptual model that demonstrates the principles of universal design under the umbrella of the social model of disability (Figure 2.1). This is a novel approach to show the relationship between the universal design principles and key aspects of a library.
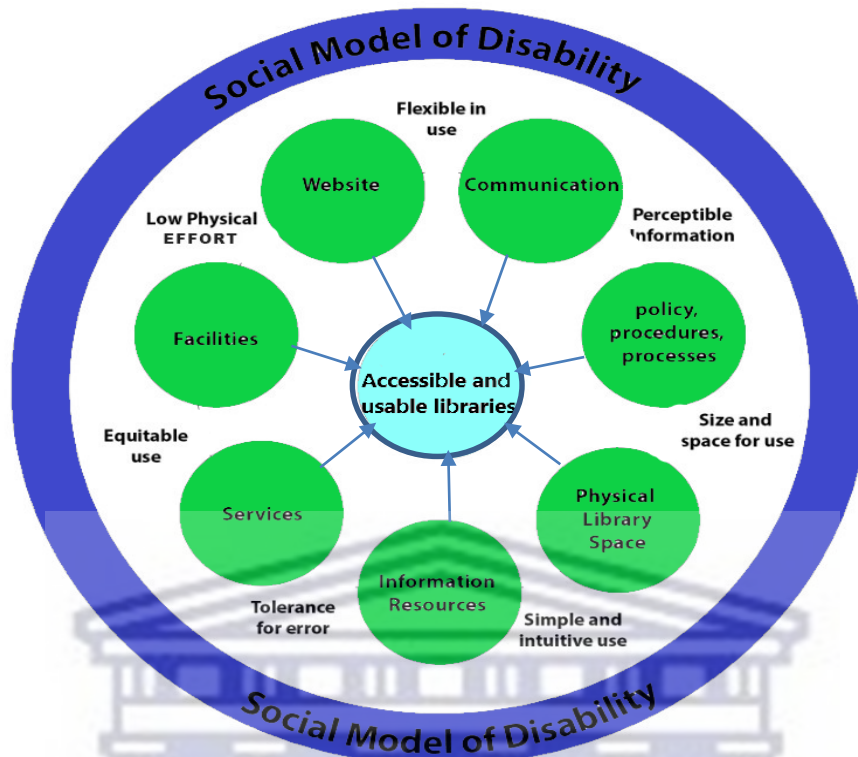
Figure 2. 1: Conceptual model that frames the universal design principles and key elements of a library under the umbrella of the social model of disability (adapted as a conceptual model from Story et al., 1998)

2.5 Advocacy of social model and universal design

The social model of disability and universal design have much in common. Below are some of the ideas advocated for by these two concepts:

2.5.1 Accessibility and participation

Both the social model of disability and universal design are shaped by the accessibility of environments, products, and communications to promote the full participation of persons with disabilities. As the social model is about the elimination of barriers that impede access for persons with disabilities (Akoto 2021), universal design is about designing for all and making barrier-free environments for access and use by a wide range of users including persons with

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disabilities (Burgstahler, 2021). They both serve as guidelines to request lawful reform of policies, procedures, and practices in the library for the provision of appropriate information resources and services to everyone regardless of their abilities (Wilcher (2018). Accessibility to academic libraries is vital for the participation of students with disabilities.

2.5.2   Inclusion and equity

Concerning inclusion and equity, both the social model and the concept of universal design support the argument that it is the way the society is designed that imposes exclusion and oppression of persons with disabilities. Both promote the perspective of having systems, environments, and services which are inclusive that meet the needs of individuals with disabilities, and as well provide equal opportunities for choices equivalent to those of others. A recent study by Kauffman and Anderson (2020) has related how libraries are striving to accomplish social justice, inclusion, and diversity through their technical services. Kauffman and Anderson have shown how technical services staff can remove prevailing structures of inequity by shifting attention to providing access to information and resources for underrepresented users.

The statement that equal rights should be offered to individuals with disabilities on an equal basis is embraced by the social model and the philosophy of universal design. Therefore, not providing facilities that are accessible to persons with disabilities is an infringement of their rights (Albert & Hurst, 2004).

2.5.3   Independence and social change

The social model and universal design both operate to bring together people with a wide range of abilities by eradicating societal structures, practices, and attitudes that promote exclusion

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and isolation. They both fight for the independent living of persons with disabilities, the promotion of social change, and the enhancement of social justice for people with impairments.

2.6   Related models to the social model of disability

This section reviewed the literature on models that are related to the social model of disability. Some of these models which also advocate for the independence and participation of persons with disabilities are discussed below.

2.6.1   Minority group model of disability

The Minority Group Model of Disability is also referred to as the sociopolitical model of disability. It bears close affinity to or an expansion of the social model. The disability rights movement promoted the minority group model (Smart & Smart, 2006) in their quest for equity and full social participation in society. The movement identified discrimination, oppression, exclusion, and other forms of social barriers imposed by society that are debilitating to people with disabilities.

The movement further believed that persons with impairments had no voice in decisions that affected their daily lives, and advocated for more control of all decisions regarding how they are viewed and treated by medical professionals (Lutz & Bowers, 2007). Another concern raised by disability rights activists is the fact that disability research is conducted by non-disabled academics who are often biased and had no knowledge of the problems encountered by people with disabilities (Longmore, 2003). Rather disabled scholars who understand the predicaments associated with a disability should take the leading role in researching disability (Longmore, 2003).

In light of these concerns, the minority group model seeks to remove the "burden of disability" by acknowledging disability as a cause by society (Lutz & Bowers, 2007). The model is

observed as the catalyst that creates a change in public policy through the reinforcement of laws to fight discrimination against persons with disabilities (Hahn, 1985). The model asserts that discrimination, oppression, and exclusion are commonalities that persons with disabilities experience just like other minority groups based on gender and race (Scotch, 2009). Thus, physical beauty and individual independence are used to oppress persons with disabilities by nondisabled people.

The minority group thinking views disability and impairment as two separate concepts within the model (Nielsen, 2012). The model asserts that the individuals' environment is the source of the restrictions of persons with disabilities, not their bodies. So, how disability is regarded and treated is influenced by the social setting (Nielsen, 2012), as such making disability the product of a disabling environment (Hahn, 1991). Again, societal attitudes are considered an influential environmental factor debilitating to persons with disabilities. This assertion is echoed by Hahn (1991) in three proposition: (1) individuals with disabilities encounter barriers as a result of negative societal attitudes, (2) the various facets of the environment are driven by public policy (3) the establishment of public policy is influenced by social attitudes.

The minority group model is instrumental to the enactment of disability rights legislation (Drum, 2009). It also addresses the rights of individuals with disabilities through appropriate public policy formation which progresses the society's value for diversity, equality, and fair treatment of persons with disabilities.

Nonetheless, the minority group model is not without some criticisms. The model has a narrow view of public policy as a methodology to combat discrimination against disability (Imrie, 1997). There is also a point of debate about its lack of consideration for the influence of the individual's body (Drum, 2009). The model also disregards some relevant elements such as

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family, individual, and cultural variables that affect an individual's independent living and productivity. These weaknesses make the model "oversimplified" (Batavia & Schriner, 2001).

2.6.2 Human rights model of disability

The Human Rights Model of Disability was developed as a result of the position of the right-based approach perspective (Degener, 2016). The model is in line with the United Nations Universal Declaration of Human Rights adopted in 1948 (Berghs et al., 2016). The power imbalances in society restraining the ability of persons with disabilities to fully participate in life activities raise a concern for the protection of the human rights of diverse populations. Socio-political movements like civil rights, disability rights, and children's rights usually informed the model's content (Berghs et al., 2016). Globally, there has been a great concern for people with disabilities and an expanded commitment to legislation on disability antidiscrimination (United Nations, 2007). Although the 1992 Constitution of Ghana guarantees people with disabilities equal rights, equality, and non-discrimination (Government of Ghana, 1992), Ghana has also enacted various legislation such as the Children's Act 1998, Act 560 (Government of Ghana, 1998), Labour Act 2003, Act 651 (Government of Ghana, 2003b), the Persons with Disability Act of 2006, Act 715 (Government of Ghana, 2006) to promote, protect and ensure human rights and basic freedoms of people with disabilities. These laws advocate for appropriate facilities and reasonable accommodation for persons with disabilities especially in the built environment, transport, communication, and services.

There is an increasing critique of the inaccessible nature of the built environments as a devastating factor to individuals with disabilities in higher education institutions including libraries. Schindler (2015) attributed the reduced opportunity and autonomy of individuals with disabilities to the power of the built environment and its discriminatory capability over people's lives. This is evident from the planning and design process which segregates and excludes

persons with disabilities (Schindler, 2015). Degener (2016) asserts that the inaccessibility of the built environment and related services is a human rights concern.

More importantly, the Human Rights Model has gained recognition, especially in the United Nations Convention on the Rights of Persons with Disabilities adopted in 2006. Albert and Hurst (2004) noted that "human rights are fundamental, universal and indivisible principles by which every human being can claim justice, fairness, and equality". That is why the model is referenced explicitly and implicitly in the Convention demanding every built environment to be accessible and usable by all individuals regardless of their abilities (Jackson, 2018; Lawson & Beckett, 2021). Social inclusion and nondiscrimination are engendered by the rights-based approach to barrier removal (Berghs et al., 2016). However, the only problems envisioned are the lack of enforcement and the misinterpretation that may result in inappropriate modification of environments (Berghs et al., 2016). Besides this, there is the temptation to limit individuals' rights to personal protection and safeguarding instead of creating enabling environments (Berghs et al., 2016).

Furthermore, the Social Model of Disability and the Human Rights Model of Disability both strive to promote and protect the rights of persons with disabilities while challenging the inaccessibility of the built environment, transport, and services. They both resist the exclusionary systems and practices that affect persons with disabilities. However, there are some differences between them. The human rights model is a model of disability policy whereas the social model relies on social factors to understand disability (Degener, 2017; Lawson & Beckett, 2021). While the social model does not emphasise identity politics, the human rights model pays attention to cultural identification and minority (Degener, 2017).

2.6.3   Social justice model of disability

The Social Justice Model of Disability bears close affinity to the social model of disability. The social justice model revolves around concepts that originated from the social justice movement (Bell, 2013). This model contains concepts namely, liberation, social justice, oppression, discriminatory institutional structures, and cultural practices (Griffin, Peters & Smith, 2007). The years of struggle for social justice and personal growth for people with disabilities are not just a political issue but also a lived experience (Fovet, 2018). The important idea of social justice which has been, and must always be, is one that challenges the reform of institutions and practices to reflect greater fairness (Miller, 2001). The concern of persons with disabilities is to change society to promote fair treatment and equal rights. Johnson (2006) maintains that the major source of discrimination is the structures and systems established by society. This view is shared by Hugemark and Roman (2002) who stated that discrimination is a systemic issue because individuals' actions of exclusion may be supported by society's established systems or structures. The norms, practices, and policies constructed by institutions, especially libraries can create barriers for individuals with disabilities. Thus, discriminatory practices and policies exist because disability is viewed negatively.

Also, the effects resulting from how people with disabilities are regarded and treated in society may emanate from cultural practices, which are expressed as values, norms, and beliefs. It may also include independence, beauty, and normality which may inform how an individual with disabilities will be viewed and treated in various dimensions in society.

The Social Justice Model of Disability also has three main unique components. These are privilege and oppression, diversity and intersectionality, and its purposefully educational goal. Equally, Bell (2013) posits that four qualities of oppression are experienced by people with disabilities, namely, pervasive, restrictive, hierarchical, and internalized. Similarly, Hardiman,

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Jackson and Griffin (2013) asserted that oppression has three dimensions: application, consciousness, and context which determine the extents to which persons with disabilities are oppressed and excluded from full participation in society.

Moreover, there are four goals connected to the social justice model; namely, the removal of ableism, equity and respect, the formation of a positive disability identity, and the redefinition of normal (Evans et al., 2017). The removal of ableism is about the redesign of the social and physical environment to accommodate persons with disabilities (Griffin et al., 2007). Achieving this goal in academic libraries requires the application of universal design principles as a strategy for the built environment, facilities, resources, and services. The 'equity and respect goal' is about respecting diversity or differences. This is achieved through the equitable deployment of resources to all members of society for mutual benefit. Also, the creation of awareness of diversity and inclusive programmes can contribute to accomplishing this goal (Evans et al., 2017). The goal of positive identity among persons with disabilities is achieved through the creation of an inclusive environment and the promotion of attitudes that make them feel belonging. For instance, the equal opportunity to participate in various activities and take on leadership roles. This allows for the acknowledgment of differences and a sense of belonging which results in a positive disability identity (Evans et al., 2017). The social justice model echoes the view that individuals are disabled as a result of social, environmental, and economic barriers but psychological "conditions" permits persons with disabilities to redefine themselves as capable and strong individuals (Rauscher & McClintock, 1997).

Another goal is the reconstruction of normalcy so that the differences among individuals are no longer considered abnormal (Griffin et al., 2007). Some individuals should not be considered normal and privileged while others are seen as incapable and inadequate (Campbell,

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2009). So what is regarded as normal needs to be extended so that diversity or differences are recognised and respected (Rauscher & McClintock, 1997).

2.6.4   *Relational model of disability*

Nirje (1994) advocated strongly for the deinstitutionalisation and recognition of the human condition as a diversity. The author holds the view that individuals with disabilities, ordinary life as well as access to the built environment work together. Nirje's study presented the notion of social inclusion of individuals with disabilities within society which includes educational institutions and libraries. Given the great concern for people and environment interaction, the Nordic Relational Model of Disability was developed in the early 2000s. This is another model that shares similarities with the social model of disability. According to the Nordic Relational Model, disability is recognised as a person-environment discrepancy, relative, and situational (Goodley, 2011; Lid, 2013; Carling-Jenkins, 2014). Tøssebro (2004) shared the view that disability occurs when the functional demands of the environment and a person's ability are mismatched. The model understands disability as a phenomenon constructed leaving a relative interactionist perspective (Gustavsson, 2004).   Gustavsson further noted that without examining the interaction between a person and the situation, it is difficult to comprehend the processes creating disability, and thus discrimination and exclusion. The Nordic Relational Model of Disability and the social model of disability both include environment and disability factors and focus on the interaction between persons with disabilities and the environment.

2.6.5   *Social Relational Model of Disability*

Another model that stands close in similarity to the social model is the Social-relational Model of Disability. In the Social-relational Model according to Thomas (2007), disability is an experience of socialised impairment. The model recognises that individuals can have direct and immediate effects resulting from the impairment. That is reduced function and socially

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engendered preventions that result from structural and attitudinal barriers (Goodley, 2013). By understanding that disability is an experience of limitations, the model can assist to recognise the interaction of the individual and the influences of society on participation (Martin, 2013). According to the Social-relational Model, the experience of disability can occur in four social contexts (Goodley, 2013; Thomas, 2004). Firstly, physical impairment can restrict an individual from daily physical and societal engagements. Secondly, negative experiences resulting from cultural perspectives of disability can cause restrictions. For instance, disability is perceived as unfortunate because of negative societal attitudes. Thirdly, the experience of structural disablism may also restrict individuals with disabilities. For example, when persons with disabilities are excluded from services and opportunities because of inaccessible buildings. Lastly, self-imposed restrictions result from frequent experiences of negative interactions with the built and social setting (Thomas, 2004) which may cause individuals to limit themselves because of damaged self-esteem and confidence.

The Social Model of Disability and the Social-relational Model of Disability both recognise that individuals experience disability because of restrictions that are placed by negative cultural practices and attitudes and the inaccessibility of the built environment. These exclude persons with a disability from opportunities and services.

2.7 Chapter appraisal

This current study applied the Social Model of Disability to examine academic libraries of higher institutions in Ghana and how they conform to universal design principles to accommodate students with disabilities. The application of the social model to the Ghanaian public university libraries makes this study sensitive as the model was created and used by scholars from the Global North. The social model of disability has had a tremendous influence

on policy formation for persons with disabilities both nationally and internationally to create an inclusive society, considering the needs of persons with disabilities. As a result of the social model, disability is now recognised across the world and in policy spheres as a human rights issue. To explore and address inclusivity, integration, social justice, and universal design issues in the global society, social model insights have offered a practical and theoretical framework. That is why it is necessary to embrace the social model because of its relevance to disability studies, persons with disabilities, and society at large.

The Social Model of Disability and the concept of universal design coexist in significant respects, and they have the principles of providing inclusive and barrier-free environments for persons with disabilities. The next chapter focuses on the review of related literature.
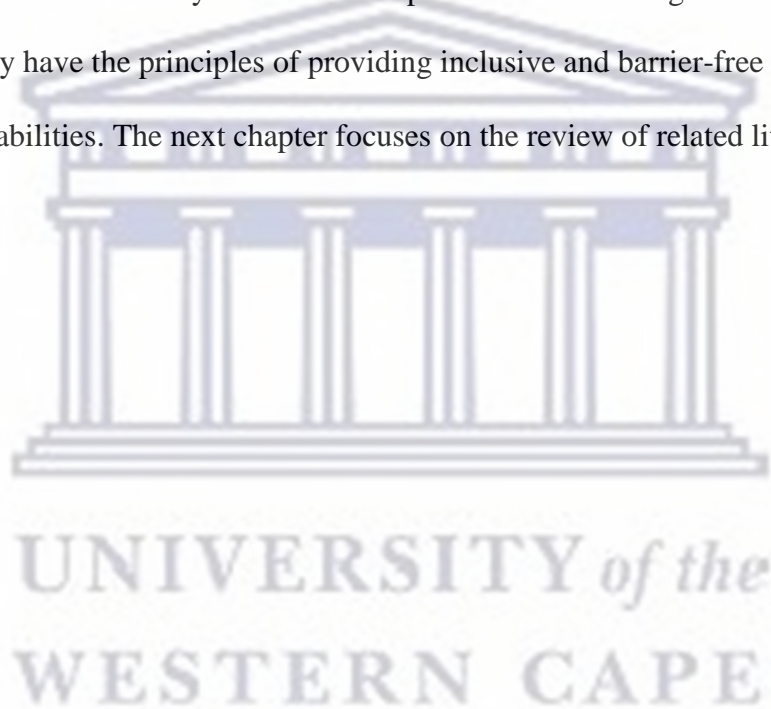
CHAPTER 3

LITERATURE REVIEW

3.0   Introduction

The chapter comprises two parts, namely 1) disability and barriers of persons with disabilities and 2) universal design principles in university libraries. The first part discusses disability, models of disability, types of disabilities, barriers to persons with disabilities, and the situation of disability in Ghana. Students with disabilities are mostly excluded from accessing and using facilities, assistive devices, materials, and services in university or academic libraries (Addai-Wireko et al. 2020). This trend affects full participation and independent university life for persons with disabilities.

Also discussed are student diversity in higher educational institutions from a general perspective, universal design, criticism of the universal design, universal design principles in libraries considering the physical access outside and within the library, library facilities, services, and experiences of students with disabilities. The impact of ICTs and adaptive devices on students with disabilities are discussed. The guidelines for redesigning library information resources and services for persons with disabilities are reviewed to ascertain the situation of accessibility, inclusivity, and usability of information resources and services for students with disabilities in academic libraries in higher institutions.

3.1   Persons with disabilities

Persons with disabilities are individuals identified with some form of physical or mental impartment that restrict them to execute in one or more major daily actions (Kalonde, 2019). These individuals or students are identified, assessed, and determined to be eligible for special education services (Hayes & Bulat, 2017).

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The word 'disability' has been in a conceptual debate in many scholarly research and disability studies (Francis & Silvers, 2016; Wasserman et al., 2016). Many scholars have diverse views and interpretations of the term 'disability' because disability is a complex interconnected bio-medical phenomenon that exists in every facet of society (Cooke, 2020; Dukpa & Kamenopoulou, 2018). While some researchers recognise disability as a social issue, others understand it as a personal matter (Ntombela, 2020). According to Shakespeare (2014), disability is the exclusion or restriction of people with disabilities from social activities. It is caused by social institutions that fail to accommodate people with impairments. Disability can be viewed as the problems and obstacles that an individual with impairment encounters when relating to the environment. Additionally, disability denotes limited opportunities both socially and economically, because of the long-term impairments resulting in the denial of the rights of people with disabilities to participate in society. It can also be considered as an inability or as a reflection of the limitations of rights and authority which are legally imposed. This highlights the point that disability can be socially constructed, environmental, contextual, and attitudinal. Traditionally, some disability models examine disability from different perspectives, namely the medical disability model, the social disability model, and the right-base model of disability (Ntombela, 2020; Retief & Letšosa, 2018).

According to Retief and Letšosa (2018), the medical model views disability in the context of a physical, medical-examined deficit that limits an individual. The authors stated that the model presents disability as individual-centred, and impairment focused which stops people with impairments from experiencing normal activities. It excludes persons with disabilities from external influences such as societal activities. Ntombela (2020) is of the view that the medical model recognises the limitations encountered by people with disabilities as resulting from their impairments and supports the correction of the medical condition. Disability is a condition that limits individuals from using some part of their body to execute a task. This suggests that

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persons with disabilities are defined by their impairment which results in disempowerment, oppression, and the reinforcement of their exclusion from society (Ntombela, 2020). Thus, legitimising the exclusion of people with disabilities from major areas of social life. Although the medical model is suitable for the examination and early cure of diseases, it does not consider other aspects that affect individuals with disabilities during their life span. The cultural and social facets of disability are ignored by the model. Similarly, the model appears to isolate and segregate society for people with disabilities and does not recognise the equal rights of people with disabilities to participate in society regardless of their disabilities. The model would have been useful if it had considered social inclusion.

The social model, on the other hand, understands disability in the context of a relation between an individual's conditions and the way society is constructed (Ntombela, 2020). Disability is constructed socially by the actions of society in creating obstacles and/or barriers, and environments that restrict people with disabilities in society to function 'normally' (Awais & Ameen, 2015). The model suggests that disability is socially produced rather than a medical phenomenon (Retief & Letšosa, 2018). As disability is socially constructed, the model shows that deliberate segregation from the social environments causes disability. It further reveals that the focus of the model shifts attention to the environmental, structural, and attitudinal effects prevailing in society. However, Mutanga and Walker (2015) argued that the social model appears to ignore the need to understand the challenges of people with disabilities, as these challenges do not only emerge from the social environment but also economic and political spheres. Ntombela (2020) makes a very valid point that the barriers set by society need to be changed. This implies the design and practices in higher education institutions and academic libraries need to be changed to accommodate students with disabilities. This calls attention to the application of universal design in higher education institutions, especially academic libraries to remove the disabling effects and allow access and full participation for

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people with disabilities. This idea supports the social model which equally seeks to eliminate social and environmental barriers which hinder the inclusion of persons with disabilities.

A shift from the medical and the social model is the 'Right-base Model of disability' which seeks to fulfill the human rights aspect of people with disabilities (Degener, 2017). The model focuses on equal rights for opportunities and sharing in society for people with disabilities. It seeks to empower persons with disabilities to fully participate in society (Ntombela, 2020). The rights-based model emphasises two major elements- empowerment and accountability. As empowerment deals with the inclusion of persons with disabilities as active stakeholders in society, accountability refers to the responsibility of various structures and institutions to enforce these rights. What this means is that the model is committed to the rights of people with disabilities in equalising access to social and economic opportunities by instituting policies and laws that ensure the elimination of barriers created by society (Department of Social Development of South Africa, 2016). More importantly, the model makes institutions such as universities accountable to execute these rights, thereby compelling libraries to make provisions to accommodate students with disabilities. This responsibility by institutions highlights the thinking that every individual has the right to equitable access to education and resources as well as full participation in all facets of society. This further suggests that public university libraries need to redesign their environments, resources, and services and change their practices to consider students with disabilities. This change will fulfill the rights to equitable access to resources and services, and as such may motivate more persons with disabilities to pursue and complete university education. This model is useful because it recognises the individual first before the disability and seeks to address the social justice concerns of persons with disabilities.

3.2   Types and characteristics of disability

This section reviews the literature on the types and characteristics of visual, mobility and hearing disabilities. An examination of the various lists of students with disabilities in the ten public universities provided to the researcher, revealed that students are persuing various programmes with the following types of disabilities:

- mobility disability,

- hearing impairment,

- visual impairment, and

- cerebral palsy.

This study therefore focused on the visual, mobile and hearing disabilities because of their increase in population across the universities, and they would be the right constituents to provide relevant information to answer the research questions.

3.2.1   Visual impairments

The recent prevalence of visual impairment is on the rise and has been seen as a major health issue. Recent data estimates that over 253 million people are visually impaired globally (Addo et al., 2021). In 2019, the World Health Organisation reported that approximately 26.3 million of the population in Africa have a type of visual impairment. It was also observed that approximately 15.3% of the blind population in the world live in Africa (World Health Organisation, 2019). Meanwhile, the increase in visual impairment and blindness in Ghana reports as 17.1% and 1.2% respectively (Tetteh et al., 2020). Globally, the primary causal factors for visual impairment and blindness are attributed to cataracts (26%) and uncorrected refractive error (49%) (Addo et al., 2021). Visually impaired according to Hodapp (2014) refers to an individual who is blind or partially sighted or has a physical disability that makes it

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impossible for them to move their eyes. Based on this definition, visually impaired persons include those who do not have any light perception with both eyes, persons with color blindness, cataract, tunnel vision, and peripheral vision resulting in the functional limitation of the vision system (Mandal, 2019). This implies they cannot perform responsibilities demanding adequate visual activity. This suggests that they would be challenged in reading a normal font-size book or executing any visual activity.

A study conducted by Mboshi (2018) in Cameroon on teaching students with visual impairment indicated that visually impaired students require access to equitable quality education the same way as their peers, but may encounter physical, emotional, social, and learning problems. The author noted that students who are visually impaired experience learning difficulties because of the inability to use their vision to process information. The implication is that they would need to depend on alternative formats of information resources and assistive technology like Braille to be able to execute daily demanding activities. The finding of King and Coetzee (2018) on the information behaviour of students with visual impairment concluded that assistive technologies were used to find websites, journal articles, and e-books as alternative information sources to meet their information needs. The conclusions by King and Coetzee (2018) are reiterated by Aghauche, Udem and Aghauche (2021) who recommend the provision of information resources in alternative formats to support the visually impaired.

Court et al. (2014) pointed out that people with visual impairment have a higher incidence of depression which is a result of difficulties with daily activities, and many blind people feel isolated. These findings suggest that students with visual impairments would usually have academic and social challenges due to the depression and isolation they experience. As many higher education institutions are usually designed for sighted people, the visually impaired are forced to devise their ways, approaches, and aids to adjust to campus life. The negative

experience of the visually impaired demands universities including libraries to reconsider designing spaces, resources, and services to accommodate all students with disabilities. Mutula and Majinge (2016) examined visual impairment students in academic libraries. The authors revealed that visually impaired students require information for assignments and research. Their study, like King and Coetzee (2018) further indicated that assistive technologies play a significant role to facilitate information access for visually impaired students in academic libraries. The study concluded by highlighting inaccessible library buildings and the unavailability of information resources in large print and Braille as the challenges to accessing information by students with visual impairments.

Overcoming these challenges requires a strong push for the implementation of key laws and policies toward inclusive education and participation for all students regardless of their abilities (Foreman & Arthur-Kelly, 2014). Elements such as positive school culture, behaviour management, and the display of curriculum and resources in accessible format may help to promote inclusion and a safe learning environment for students with disabilities.

3.2.2 *Hearing impairments*

Hearing is how individuals acquire information about the world in an auditory format. Any individual who hears nothing regardless of the volume of the sound may be described as hearing impaired or deaf. Deaf is a condition of hearing loss that causes an individual not to be able to respond to various auditory stimuli through the sense of hearing (Utami, Budi & Nurhastuti, 2020). Hearing impairment can be considered as a complete or partial inability to hear sounds (Felman, 2018). There are four levels in which an individual could experience hearing impairment, namely, mild, moderate, severe, and profound. Some hearing impaired

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may have difficulties understanding speech and may need a hearing aid or need to depend on sign language and lip-read to communicate with others.

Mroz (2022) identified three types of hearing impairments. The first one is conductive which may result in a complete loss of hearing loud sounds. The second type is called sensorineural where an individual with this type of condition loses the ability to differentiate sounds. The third type is mixed hearing loss which occurs because of a trauma sustained or hearing loss gradually over time. Hearing impairment could occur before birth or after birth, through injury, illness, or old age.

Hearing disability affects the effective function of the individual including their education and daily activities. Hearing-impaired students encounter difficulties in learning due to the limited reception of information sources via hearing. To overcome this problem, hearing-impaired students will need to maximise their visual abilities. This implies that they rely on visual aspects or activities to improve their learning (Utami et al., 2020).

Onsinyo (2018) revealed that the university libraries surveyed in Kenya had no sufficient hearing aids required by hearing-impaired students, and concluded that the plights of students with disabilities were not at the heart of these libraries. This situation calls for the attention of higher education institutions, especially libraries to offer appropriate resources and services including assistive technologies to accommodate and facilitate the academic life of hearing-impaired students. The training of library staff in disability awareness programmes, and sign language is crucial for better service and communication with users with disabilities. More importantly, libraries should adopt a universal design concept and social model to address barriers to the inclusion and participation of students with disabilities.

3.2.3   Mobility impairments

The International Risk Management Institute (2021) defined mobility or physical impairment as a disorder or condition that affects a body part(s) that largely restricts the normal life functions of an individual. This impairment usually results due to damage to or incorrect working of a part of the body. This suggests that mobility impairment may be regarded as a deficiency of normal activity, action, or behaviour. Mobility impairments may occur at birth or as a result of an accident or disease like amputations, arthritis, cerebral palsy, and spinal cord injuries (Cosden et al., 2018).

Physically impaired people find it difficult to access buildings and facilities and are usually not regarded as equal members of society who require the same opportunities as the abled ones. The study by Ekwelem (2013) discovered that adjustable tables, keyboard trays, lifts, automatic doors, and digital handrails on steps for the physically impaired were not available in the university libraries surveyed indicating that these libraries did not consider the needs of students with mobility impairments. To better serve students with mobility challenges, the concept of universal design needs to be implemented to provide the required environments, products, and services to facilitate full participation.

3.3   Barriers to persons with disabilities

This section discusses the barriers that hinder the inclusion and full participation of persons with disabilities.

3.3.1   Environment/Physical barriers

There have been research studies that focus on students with disabilities in university libraries because of the growing number of students with disabilities enrolled in higher education institutions (Cunnah, 2015). Libraries internationally have been advocating for inclusive environments and the provision of information resources in accessible formats for persons with disabilities. A study conducted by Marwiyah (2019) on social inclusion for older people via library services in Indonesia revealed that the library has the responsibility of providing information access to individuals regardless of religion, disability and age.

Libraries in Africa, especially Ghana, are dedicated to making their libraries inclusive and more accessible to students with disabilities. This claim contradicts the study by Odame et al. (2021) on visually impaired students' experiences in Ghanaian universities who found that students with visual impairments have difficulties accessing programmes, encounter inaccessible environments, lack learning resources, and experience negative attitudes toward disability. Opoku and Nketsia (2021) noted inaccessible and non-inclusive schools as challenges to persons with disabilities. This suggests that many higher education institutions including libraries in Ghana are yet to make their environments, programmes, services, and resources universally designed to accommodate students with disabilities.

The study by Day and Fleischmann (2020) on serving the needs of students with disabilities at the University of Texas suggests the pursuit of solutions to make information resources and services available to all people rather than focus on disability in the context of a problem needed to be solved. A study on the lived experiences of mobility-impaired students conducted at Addis Ababa University in Ethiopia by Keinen (2018) discovered inaccessibility of facilities, discomfort at the library, and dependence on peers to mitigate the difficulties experienced. The

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study by Ndiweni, Machimbidza and Mutula (2022) on factors influencing library use by students with disabilities in Zimbabwe reported great effort to provide inclusive library services to students with disabilities but highlighted physical inaccessibility, lack of infrastructure to support adaptive technologies use, inadequate information resources and adequately trained staff to handle users with disabilities as challenges.

In contrast, people with disabilities do not need assistance at all at libraries that are universally designed because they would be able to access the library environment and participate independently (Rapley, 2013). This point suggests that a well-designed library facilitates the independence of people with disabilities. When libraries make their facilities, services, buildings, and resources accessible to students with disabilities, independent access is ensured. Based on this evidence, it is not the impairments that exclude and isolate people with disabilities but the inaccessible environment.

The study by Coate (2014) which investigated the impact of environmental barriers on persons with disabilities in the United States of America confirmed that almost all the mobility-impaired participants mentioned physical barriers as the main cause of their isolation and exclusion from participation. Coate (2014) enumerated narrow doorways, washrooms, uneven ground, and sidewalks as some of the prominent barriers that impeded the functioning and access to library services for people with disabilities. This assertion is supported by the study by Ashigbi et al. (2013) at the University of Ghana which stated that all the sanitary accommodations surveyed had 66.7% accessibility deficiencies that restricted the free movement of people with disabilities and that the accessibility, reach-ability, usability, and safety to students with disabilities were poor.

One of the limitations of the above studies is that they all investigated a single disability. The studies by Coate (2014), and Keinen (2018) would have been more useful if they had considered other disabilities like visual and hearing impairments. When it comes to the accessibility of libraries, they should be universally designed so that they can accommodate all users regardless of their abilities. However, these studies focused on the accessibility barriers that persons with disabilities encountered. Considering the challenges that students with disabilities often endure, universal design is needed to ensure the environment, facilities, information resources, and services accommodate both patrons with and without disabilities. This is needed because students with disabilities are equal members of the university community, and they deserve to be treated like others.

3.3.2 Information and Communication Technology (ICT) barriers

ICTs are a driving force of some activities in society. This has accounted for the increased use of ICTs in the operations of academic libraries. The performance of some daily activities of people with disabilities is often influenced by technology. Evidence shows that the liberation of individuals with disabilities from social, instructional, and physical barriers is a result of developments in technology (Foley & Ferri, 2012). Technology has the potential to eliminate barriers that impede access for students with disabilities. Conversely, technology can occasionally be an obstacle that prevents people with disabilities from having access to society (Seale, 2018). It may cause challenges when their design leads to inaccessible services, resources, and opportunities. This statement suggests that technological barriers occur when technology cannot be accessed by persons with disabilities. It also indicates that when technology fails to address barriers to equity and accessibility, it inhibits opportunities.

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Alsalem and Doush (2018) examined the accessibility requirements of libraries, websites, and laboratories through staff in these sections at Jordanian higher education institutions. Their findings showed that students with disabilities enrolled in higher institutions encountered problems with accessibility in the computer laboratories, lecture halls, libraries, and websites. Their study further indicated that the status of accessibility was not consonant with equal access nor met the needs of students with disabilities. The study by Alsalem and Doush (2018) failed to recognise the voice of students with disabilities on the accessibility needs of laboratories, websites, and libraries. This is in contrast to the view of Pazey (2020) that when students with disabilities are consulted to share their perspectives and insights about how they learn and the support systems required, the students gain the sense that their voices matter.

Similarly, Thomson (2019) indicated a lack of computer accessibility including keyboards, trackballs, large monitors, screen readers, screen magnification, touch screens, captioning mirrors, and speech recognition programmes as some of the technological barriers for students with disabilities. A study on utilisation of assistive technology for effective school library service delivery to students with disabilities in Nigeria reported inadequate availability of adaptive technologies for effective library services delivery to students with disabilities except for the low utilisation of Braille technology and hearing aids (Obim & Akpokurerie, 2022). What this means is that technological barriers can result from inadequate assistive technologies that hinder the academic activities of students with disabilities. Barriers may also arise from formal and mechanistic processes which restrict access and participation.

Consequently, libraries need to adopt universal design as a strategy to overcome the numerous accessibility challenges by involving people with disabilities in the design, development, and implementation process. The concept of universal design in libraries improves information services and access for students with disabilities. As Seale (2018, p. 4) contends that "the

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potential that ICTs hold to expand the accessibility and inclusivity of higher education for students with disabilities would be influenced by the personnel that design, develop, use and support them".

3.3.3 *Institutional barriers*

Recent years have witnessed an increased debate on the need for diversity and equity within the library for people with disabilities. Many scholars have highlighted the underlying institutional issues and barriers within the library that create difficulties for people with disabilities (Foxhall, Hodge & Stapleton, 2020; Oud, 2019). People with disabilities are excluded from society based on institutional rules, procedures, and policies that limit their expectations. The study by Peacock and Vecchione (2020) on best practices, procedures and policies reported that both the universities and the libraries studied lacked a policy that promoted the acquisition of accessible materials. The study recommended the establishment and implementation of policies and procedures to meet the needs of students with disabilities. Similarly, the studies by Dodamani and Dodamani (2019) and Eneya et al. (2020) revealed the lack of a disability policy for library services to students with disabilities in higher education. Osadebe et al. (2019) also found that library policies as well as technical and personnel issues affect library services for students with visual impairment in selected universities in Nigeria. The study recommends conducting regular user-satisfaction surveys by the university libraries to ensure their services accommodate the needs of students with disabilities.

Dirth and Branscombe (2017) indicate that the awareness of structural discrimination by policymakers has proven to promote pro-minority policies. This implies that the understanding of the experiences of minority groups (persons with disabilities) by policymakers and stakeholders may result in awareness of structural discrimination, and consequently the elimination of these barriers. The implication is that policies that promote inclusion and

accessibility for people with disabilities would be enacted while those policies, practices, strategies, and legislations that discriminate against people with disabilities would be eliminated. Ultimately, this review concludes with the need to enforce existing laws and regulations that guarantee equal participation. These laws and regulations would demand for all buildings, programmes, activities, and services to be accessible to persons with disabilities. Additionally, applying universal design principles to the design of spaces, resources, and services has proven to promote learning for diverse students (Gordon, Meyer & Rose, 2016).

3.3.4   *Social Barriers*

Social barriers are related to the lack of conditions such as employment, education, income and safety among others that can contribute to decreased functioning among people with disabilities (Stokes et al., 2019). Social barriers also undermine and exclude people with disabilities from society. Evidence from an American study by Houtenville and Boege (2019) in 2017 showed that only 35.5% of people with disabilities were gainfully employed. Similarly, Braun and Naami (2019, p. 2) suggested that "many people with disabilities are poor, lack education, and are unemployed", and move to the street in pursuit of bread for their daily living (Opoku et al., 2017). Hayes and Bulat (2017) study on disabilities inclusive education systems and policies guide for low and middle-income countries demonstrated that the exclusion of individuals with disabilities results in lower employment that impacts them and their families. The study established that increased education of differently-abled students results in improved health and increased participation. This trend indicates that the equal rights of people with disabilities are still not guaranteed as their living conditions continue to worsen (Graham et al., 2014).

When it comes to employment and related social issues, people tend to focus on non-disabled people while disregarding the competencies of persons with disabilities. For instance, libraries tend to focus on designing and providing facilities and resources for their abled patrons while

neglecting the needs of students with disabilities. As students with disabilities are part of the university community, their needs, inclusion, and participation must be regarded. To overcome the social barriers in academic libraries, the social model of disability should be adopted to remove all barriers to accessibility.

3.3.5 Attitudinal Barriers

The negative attitudes toward people with disabilities are another contributing barrier that restricts the widening of participation for people with disabilities in society. Students with disabilities face many kinds of attitudinal barriers including inferiority, pity, fear, charity, denial, ridicule, negative and demeaning behaviour patterns, stereotypes, stigma, prejudice, ignorance, and backlash (Rohwerder, 2018). All these attitudes and behaviours affect the inclusion and full participation of students with disabilities (Nario-Redmond, 2019). Research demonstrates that the discriminatory attitudes that people with disabilities experience cut across other fields. Krahn et al. (2015) study on people with disabilities and healthcare, noted some imbalances in the provision of healthcare services to persons with disabilities. Ultimately, their study recommended the implementation of policies to resolve healthcare services inequalities to improve access for persons with disabilities. These health inequalities which may be a result of negative and discriminatory attitudes cause serious social difficulties for individuals with disabilities (Olivier, Sterkenburg & Van Rensburg, 2019).

In the field of education, the study by Freer (2021) on the breaking down of attitudinal barriers indicated that poor attitudes towards disability affected the interactions between disabled and other students resulting in social exclusion. Similarly, the findings of Grischow et al. (2019) indicated that negative attitudes toward disability are the contributing cause to the stigma of persons with disabilities. Thus, the resultant effects are economic, political, and social exclusion. The study recommended a change in public attitudes and the designing of disability

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interventions to overcome this barrier. A study by Freer (2021) advocated that students' attitudes relating to disability could be enhanced through educational interventions, while Sahu and Sahu (2015) recommended acquaintance as the remedy to overcome attitudinal barriers.

The challenges mentioned above suggest that students with disabilities can face negative and discriminatory attitudes in academic libraries. This occurs when libraries design their resources and services to accommodate only abled ones. The use of language by library staff that is inappropriate for disabled users forms part of the attitudinal barriers that they face in the libraries.

Based on the evidence, negative and discriminatory attitudes both present social and psychological problems for persons with disabilities. This further results in health implications for persons with disabilities. Besides this, negative attitudes also affect the inclusion and full participation of people with disabilities within society. The evidence also indicates that where negative attitudes exist, there is exclusion and infringement of basic human and civil rights of people with disabilities. This review concludes that the social model would be pivotal in overcoming these negative attitudes towards persons with disabilities. Within the social model perspective, attitudinal barriers are not only disabling but prevent equitable access and full participation of persons with disabilities within society (Bridger, 2020). Therefore, a change of attitude would influence the creation of reasonable accommodation for persons with diverse abilities in libraries.

3.4 Situation of disability and libraries in Ghana

In Ghana, disability is recognised as a social justice and human rights issue that affects development due to its potential attachment to marginalisation, discrimination, restrictions, stigmatisation, and poverty (Tudzi et al., 2017b; Government of Ghana, 2018). In this view, various legislation and policies have been enacted, which are set to promote accessibility and

participation and enhance the living conditions of people with disabilities (Graham et al., 2014). Regardless of these policy directions, people with disabilities are bedeviled with institutional, environmental, structural, and attitudinal challenges that exclude them from having equal opportunities and access to income-generating activities, education and health (Tinta, Steyn & Vermaas, 2020). In Ghana, the Persons with Disability Act (Act 715)(Government of Ghana, 2006), the Ghana National Disability Policy(Government of Ghana, 2000), and the Constitution of the Republic of Ghana (Government of Ghana, 1992) promote the rights of persons with disabilities. All these initiatives are to create an enabling environment for accessibility, integration, empowerment, and full participation of persons with disabilities in national discourse (United Nations, 2019). Both public and private educational institutions are expected to create reasonable accommodations for students with disabilities to fully participate and have equal access to facilities and services without any restrictions (Government of Ghana, 2006).

In Ghana, students with disabilities are faced with various barriers to participation and accessibility that exclude them from all facets of education including libraries (Mantey, 2017; Opoku et al., 2019; Opoku et al., 2018). These barriers are more grievous in tertiary institutions (Odame et al., 2019). A critical observation revealed that university libraries in Ghana are pronounced inadequate and not having the requisite facilities and information resources to support people with disabilities in learning and research. This is based on the record of inaccessible buildings, systems, communication, and reading materials (Braun & Naami, 2019; Odame et al., 2021; Tudzi, Bugri & Danso, 2017a). More importantly, environmental, structural, attitudinal and the poor availability of assistive technologies have restricted equal access and full participation of people with disabilities within Ghanaian university libraries. In the university ecosystem, libraries have the mandate in providing information resources to

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people with disabilities for academic success. However, university libraries have witnessed inadequate funding and staff training, which has imparted negatively on service provision for students with disabilities (Osman & Kwafoa, 2020). Additionally, a growing number of studies conducted in Ghana focused on various approaches to analysing the accessibility and experiences of students with disabilities in higher education (Ayoung, Baada & Baayel, 2021; Odame et al., 2021; Tudzi et al., 2020; Addai-Wireko, 2019; Braun & Naami, 2019; Kwaku et al., 2017; Tudzi et al., 2017b; Armah & Kwantwi-Barima, 2016) but there seems to be none that adopted the principles of universal design to address the accessibility issues to accommodate and wide participation for students with disabilities. Therefore, university libraries must apply the principles of universal design which requires all environments, communications, and products to the greatest extent possible, to be accessible, usable and accommodating to every individual regardless of their abilities. This study may encourage Ghanaian public universities to redesign their libraries to consider students with disabilities and as such motivate more persons with disabilities to pursue and complete university education in Ghana.

3.5   Diversity of students in higher education institutions

For the past decade in Ghana, the population of university students are considered more diverse across tertiary institutions in the country. For instance, disability status, learning styles, experiences, ethnicity, gender, and age are various means by which individuals differ, and this has now expanded the word diversity (Gawronski, 2014). Regarding information collected by the Ghana Tertiary Education Commission (GTEC), 2018-2019 student enrollment into public universities, by level, gender and programme was 264,994 (Ghana Tertiary Education Commission, 2020b). This number included both part-time and full-time enrolled students.

The majority of the students stay on university campuses, while others commute from home. The number of students with disabilities was not reported (Ghana Tertiary Education Communication, 2020b). Although the number of students with disabilities is not known, increased enrollment statistically increases the expected number of undergraduate students with disabilities admitted into these higher institutions (Moriña, 2017) indicating that students with disabilities enrollment in higher institutions has increased over the past years in Ghana. This rapid growth may have been influenced by legislation and policies which are targeted to protect the rights of students with disabilities and guarantee equal access to education and full participation just like their peers within tertiary educational institutions (Ocran, 2019). This phenomenon of the increase of students with disabilities might also be influenced by statements and regulations aimed at promoting inclusion as well as the free senior high school policy.

Reacting to the legislation and policies, various higher education institutions have established disability offices and provided new technologies to support the needs of students with disabilities. But the current efforts seem to be inadequate to safeguard the right to quality education based on inclusive education principles for all students. Many studies (Wilson et al., 2016; Thomas, 2016; Moriña, 2017) suggested that these efforts are not sufficient to ensure access to education and inclusion for a diverse population.

To guarantee that students with disabilities are assured of equitable opportunities and inclusion, it is crucial to integrate universal design principles into university and academic libraries policies and practices founded on the social model of disability. Universal design ensures that university services, resources, environments, buildings, and communications are accessible and usable to everyone to the greatest extent possible regardless of their abilities. The social model seeks to remove barriers that impede access and inclusion of students with disabilities in universities.

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3.5.1 Inclusive Practices

In recent years, due to the increase in student diversity in higher institutions, there is a growing awareness among stakeholders and educators about inclusive practices. Sigstad, Buli-Holmberg and Morken (2022, p. 1011) defines inclusive practices as "an ongoing process of respecting and responding to individual needs and opportunities for equal participation, belongingness, and accessibility within the learning community". Inclusive practice is about employing different steps towards equity, engaging all students' participation in creating their learning environment and fostering belongingness. Globally Inclusive practice has been considered a way to guarantee equal educational rights and participation in society for individuals with disabilities (Aldabas, 2021; Haug, 2017). Within higher education institutions the application of the principles of inclusive practices has proven to produce benefits for all students, participation in the learning process, and education for all. Inclusive space provides equitable opportunities and quality learning for diverse students (Cinarbaş, 2016). Within higher education institutions where inclusive practices are encouraged, it impacts the social and academic success of students especially students with disabilities (Moriña, 2017). This suggests that inclusive practices promote environments that accommodate a wide range of diverse students, not just those with disabilities. This further indicates that inclusive practices do not physically integrate students with disabilities but promote positive social, emotional, and academic outcomes for all students in mainstream education (Mieghem et al., 2020; Hehir et al., 2016). Considering the rapid increase in the number of students with disabilities in tertiary education, there is a need to promote inclusive practices that would change the prevailing procedures and processes within tertiary education. This points to the need for the appropriate design of policies, actions, and strategies that contribute to ensuring the successful completion of higher education by diverse populations.

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3.5.2   *Accessibility in higher education*

There is a general concern that the responsibility of universities including their libraries is to provide inclusive and accessible environments and learning resources to respond to the needs of diverse students. Moriña (2017) asserted that inclusivity is one of the indicators of a quality university or any academic library. Across the globe, accessibility practices and students with disabilities have been described as an ongoing concern in tertiary institutions (Miranda, 2014) because access is significant for the inclusion of students with disabilities (Cinarbas & Hos, 2020). Within universities and libraries, accessibility means accommodating every student regardless of their abilities. Accessibility is associated with the buildings, resources, and services provided by higher education institutions including libraries. However, the accessibility of universities has always posed some challenges for students with disabilities.

The design of buildings in universities especially libraries can restrict access to facilities and services (Cinarbas & Hos, 2020) and may infringe on the rights of students with disabilities. This may further create a barrier against inclusive education (Cinarbaş, 2016). This suggests that when students with disabilities are not able to access services and facilities, they would have a problem adapting to the educational environment. As a result, academic achievement and attendance of persons with disabilities might be low. If effective measures are not taken it leads to a high rate of dropout of students with disabilities due to not being able to cope with the accessibility challenges within the university environment. A way to facilitate social inclusion and a more accommodating environment for all students is to eliminate all accessibility barriers that restrict students with disabilities.

Cinarbaş (2016) asserted that the availability and accessibility of resources and materials promote teaching, learning, and research in universities. The author argued that the lack of access to resources from the library to support the curriculum and teaching impedes the

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learning of students with disabilities in universities. Collins, Azmat and Rentschler (2019) advocated for the need to provide flexibility and variety in teaching and learning, providing quality access to information resources, buildings, and communication networks. This makes university education inclusive for the benefit of students with disabilities. This suggests that higher institutions including libraries should provide resources to accommodate the demands of students with disabilities. Students with disabilities, therefore, need accommodations, quality services, and information resources that support their education without discrimination (Hayes & Bulat 2017). Mandated accommodations and related services are usually not able to address the diverse requests presented by the multiplicity of differences among students (Paton, 2017). To support effective experiences of students with disabilities, requires the elimination of accessibility barriers that affect learning and participation.

But the surest means to resolve the challenging demands of diverse students, and to guarantee the equity of accessibility and participation for students with disabilities in higher institutions, is to adopt approaches that support and improve student success irrespective of their abilities. The study by West, Novak and Mueller (2016) on inclusive instructional practices of university faculty, argued for the adoption of a universal design framework in tertiary education to address the growing student diversity. The study pointed out that universal design ensures that all products, environments, communications, and buildings are accessible to all people, to the greatest extent possible, regardless of their disabilities. Universal design is recognised as one of the "scientifically valid frameworks for guiding educational practice" (West et al., 2016). This shows that universal design best addresses the needs of student diversity, especially those with disabilities to reduce the barriers to accessibility and increase the full participation of people with disabilities in society.

Ultimately, universal design has the potential to transform accessibility in higher education institutions including academic libraries as well as promoting inclusive education and the

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concept of disability (Wilson, 2017). Universal design has been reported to provide both academic and social benefits to all students, especially those with disabilities.

University campuses have gradually been recognised as diverse environments. Higher institutions, especially universities must consider accommodating students with disabilities from various backgrounds, cultures, languages, ages, and gender. As the demand for equity of access and inclusion for students with disabilities increases, higher institutions must examine methods to best address the demands of a changing student population.

3.6   Universal design

Universal Design has gained greater recognition in libraries over the past decade. Universal design has its roots in the design field of architecture and commercial products and information technology (Burgstahler, 2021). Universal design originated from architect Ronald Mace, who founded the Centre for Universal Design at North Carolina State University (Weeber, 2021). The term Universal Design was defined by Ron Mace as "the design of products and environments to be usable to the greatest extent possible by people of all ages and abilities" (Burgstahler, 2021, p. 1). Another definition by Spina (2021) stated that it is the designing of environments, buildings, services, interiors, and communication to be usable by all individuals to the greatest extent possible. These definitions indicate clearly how broad the concept is and largely applies to so many fields and aspects of buildings, products, and interiors of design work. The main goal is to produce designs that are accessible and usable by all individuals to the greatest extent possible. Universal Design has been characterised and also known as "Design for All", "Accessible Design", "Universal Access", "Inclusive Design" and "Barrier-Free Design" (Nygaard, 2018, p. 3). As developed countries like the USA passed the Americans with Disabilities Act in 1990, similar legislation passed in Ghana is the Persons with Disabilities Act 2006. These Acts demand retrofitting of public buildings including

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libraries for accessibility including the addition of ramps, elevators, wider doorways, and automatic doors to public buildings (Gawronski, 2014). However, these retrofits created problems and were considered unattractive and costly (Gawronski, 2014, Hayes & Bulat, 2017), and were not adequately addressing the design issues and barriers to access and use that existed. Conversely, to create accessible environments and usable products for all, universal design is considered a better strategy that addresses the needs of users at the development stage (Burgstahler, 2021).

Universal design seeks to serve a multitude of diverse patrons with only one design without the need for separate accommodations. For instance, people pushing or pulling luggage had challenges accessing certain public spaces but the introduction of automatic doors which were initially designed for wheelchair users to improve access were eventually found to be usable and helpful for all. Universal design as an approach calls attention to inclusion and designing to meet the demands of many patrons irrespective of their specific needs (Deku, 2017; Spina, 2021; Adom et al., 2023). This suggests that the concept of universal design should not be attributed to access to buildings but should be extended to information resources and services in libraries. This idea may create conditions that enable every individual to participate and succeed. Thus, universal design creates environments that do not stigmatise individuals but enables everyone to navigate, manipulate, participate fully, and appreciate society (Verma, 2021; Adom, 2022).

Moreover, the concept of universal design benefits every individual and promotes improved accessibility and usability for all users (American Psychological Association, 2019). This implies that the design of new environments, communications, and buildings that are accessible turns to accommodate every individual.

Equally, Chrzanowska (2020) discussed how universal design could serve as a tool to create an insightful reaction to the social effects caused by COVID-19. Chrzanowska (2020) found that universal design supports the health and well-being of persons with disabilities by eliminating barriers that exclude them from having access to health care and participating in social life activities. Universal design facilitated equality and improved quality service for all patients, promoting the use of technologies and approaches to facility planning for accessibility (UNDP, 2019). This concept of universal design in the medical field has led to the designing of apparatus that are administered for better assessment and treatment of patients. For example, portable amplified communication devices at hospitals and treatment centres are an example of universally designed health equipment. When the principles of universal design are introduced to buildings can solve various issues people with disabilities face during the pandemic (Chrzanowska, 2020).

Berget (2020) examined the influence of universal design on public libraries and found that universal design served as the basis for equal access to health information and possibly minimise the health disparities of patrons with disabilities. Berget (2020) asserted that the implementation of the universal design concept led to the development of services that are available and accessible to all patrons. This suggests that the application of universal design to libraries eliminates barriers that exclude patrons with disabilities from a range of health information resources. It also reveals how the concept helps libraries to avoid health disabilities that may cause unequal access to information.

Based upon these benefits, libraries adopted the philosophy of universal design to provide equal access and opportunities to all students regardless of abilities. This demonstrates the point that universal design minimises the environmental demands on people with various levels of

ability. It further suggests that the facilitation of human experience and performance can be supported by universal design.

3.6.1 Universal Design Principles

A university library is an integral part of the university system and plays a vital function in ensuring that students and faculty have access to appropriate and needed information resources both print and electronic forms for teaching, learning, and research. Libraries are expected to design their resources and environment in a way that is accessible and meets the needs of potential users with a wide variety of characteristics including students with disabilities.

This suggests that the library's goal of making its information resources and services accessible to students with disabilities often benefits others. In the quest for libraries in making these resources accessible, equitable, inclusive, and usable by everyone, the principles of universal design can be employed. This assertion is confirmed by Spina (2017a) who stated that in the designing of new spaces, the provision of appropriate signage, and the reconstruction of various programmes in a library, the principles can serve as an effective guide. Below are the universal design principles and guidelines for applications:

Principle 1: *Equitable use.* The design needs to be useful and marketable to individuals with diverse abilities and offer similar use for diverse people. In other words, the library spaces and facilities should be appealing to diverse populations and avoid segregating or stigmatising any users. Most importantly, it should provide privacy, security, and safety for all users. The library should be organised in a way that is useful to multiple people with diverse needs or abilities to access and participate. For instance, the library website should be designed to be accessible and usable to everyone especially individuals who are blind and using screen reader devices (Burgstahler, 2021; Spina, 2021). Figure 3.1 allows equal access for both people with or without disabilities.

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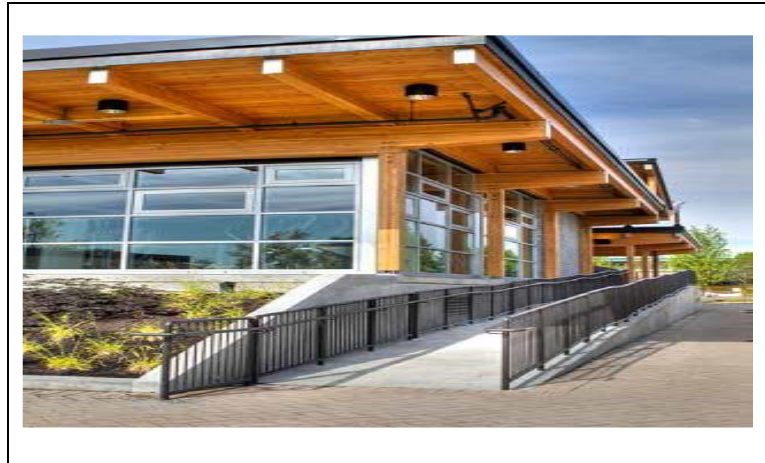
Figure 3. 1: Principle 1: Equitable Use

Principle 2: *Flexibility in use.* The library should accommodate a wide range of individual preferences and user abilities. It should give options in the techniques of its use while facilitating accuracy and precision. It should as well accommodate adaptability to the user's pace as well as provide access and use for both right and left-handed. This means that the library resources and services should accommodate user preferences and abilities. For instance, a library should allow users to either choose to read or listen to the contents of a material, and provide alternative formats of a document, either in print or electronic form. Again, a computer table in the library can be easily adjusted to suit different user needs (Burgstahler, 2021; Spina, 2021). Figure 3.2 below allows for access and both left-or-right-handed use.

Figure 3. 2: Principle 2: Flexibility of Use

Principle 3: *Simple and intuitive.* The library design and information resources should be organised understandably and easy to use, irrespective of the individual's experience, skill set,

or concentration level. The design should be able to work in the expected ways. It should not be unnecessarily complex and needs to be consistent with user expectations as well as provide vital information and effective feedback. Therefore, the physical library spaces, communications as well as systems should be well laid out and easy to navigate irrespective of the experience of the user. For instance, the control buttons on elevators in the library should indicate numbers and symbols that are simple and easy to understand (Attakora-Amaniampong, Appau & Kanton Osumanu, 2021; Burgstahler, 2021; Spina, 2021). Figure 3.3 below shows a wayfinding sign which is easy to understand.
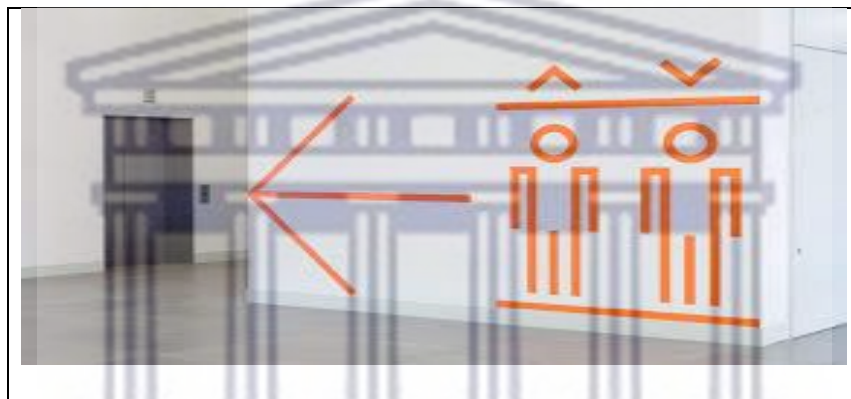
Figure 3. 3: Principle 3: Simple and intuitive

Principle 4: *Perceptible information*. The library design should communicate information effectively, irrespective of the space, conditions, or the user's sensory abilities. The design should offer multiple modes of output. The design should be legible as well as use different approaches (pictorial, verbal, tactile). It should be easy to give directions or instructions and be compatible with various techniques and devices. The library should provide a range of aids to assist in the communication of information. For instance, the library should have an emergency alarm system with visual, aural, and kinesthetic characteristics. Also, a video presentation projected during an information literacy programme for library users should include appropriate captions for the hearing impaired (Burgstahler, 2021; Spina, 2021). Figure 3.4 shows a keyboard with a Braille component for visually impaired users.

*Figure 3. 4***:** Principle 4: Perceptible information

Principle 5: *Tolerance for error*. The design should be able to minimise hazards and any unintended actions. In other words, the library design and installation of equipment should make it difficult for users to make a mistake; but if users do, the error should not result in harm to the individual or product. Materials should be arranged logically by the most used and most accessible. Any harmful elements should be eliminated while safety features and warnings are indicated. Librarians should be alert to the demands of patrons and prepared to offer additional support. For instance, a library software programme provides guidance when the student makes an inappropriate selection. Similarly, an "undo" feature in computer software tolerates mistakes without penalty (Burgstahler, 2021; Spina, 2021). Figure 3.5 shows the use of equipment that minimises harm and unintended actions.
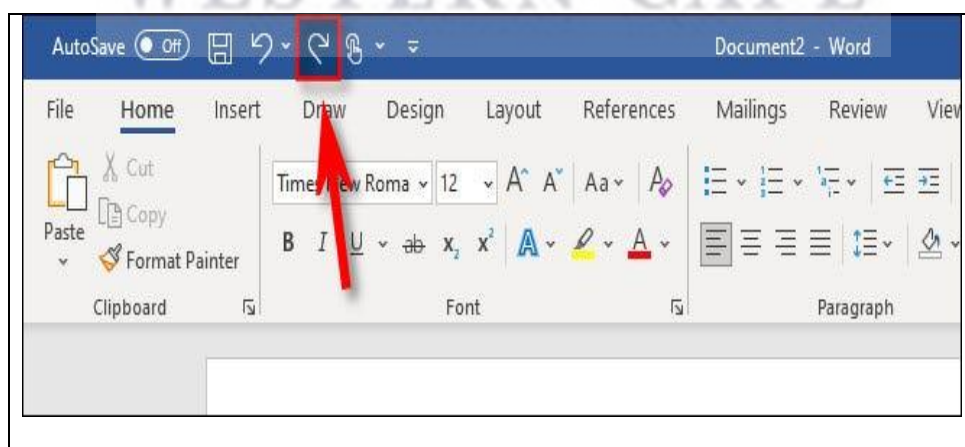
Figure 3. 5: Principle 5: Tolerance for error

Principle 6: *Low physical effort*. The use of library resources and facilities should be achieved with minimum effort. In other words, the design should minimise strain and overexertion. It should be efficient, comfortable, and minimise repetition and any forced uses. The library users do not have to seek out support and assistance, but the aids should be designated and available. For instance, the library doors should open automatically for people without much physical effort. Also, software with on-screen control buttons should be large enough for users with limited fine motor skills to easily select (Burgstahler, 2021; Spina, 2021). Figure 3.6 shows a door handle that requires less physical effort to open.

*Figure 3. 6***:** Principle 6: Low physical effort

Principle 7: *Size and space for approach and use*. The library should be designed with consideration for the appropriate size and space for its use, irrespective of the mobility or body size of the user. In other words, the library layout and facilities should accommodate variations in individual body sizes and ranges of motion. Its facilities should facilitate appropriate sight levels for reaching and accommodating varied hand grips. There should be enough space for the use of assistive technology and extra assistance. The library should be well lay-out for easy access and use without hindrance. For instance, the library should have reading space and adjustable tables that are usable by right-handed or left-handed users with varied physical disabilities (Burgstahler, 2021; Spina, 2021). Figure 3.7 shows sufficient space and size for approach and use.

Figure 3. 7: Size and space for approach and use

Ultimately, universal design principles are useful and practical to apply to all sections of the library. Again, not only do these principles improve access, equity, inclusivity, and full participation for people with disabilities but often help everyone (De Picker, 2020). Similarly, Spina (2017b) posits that these principles as a whole with continual improvement in user feedback can help to make environments, programmes, communications, and services accessible to everyone. When this is achieved, it further promotes the utilisation of information resources and services of libraries to the greatest extent possible.

3.6.2   Universal design as a process

The process of universal design involves a critical view and analysis of every aspect of the application. This is considered from the onset to the end of the whole process. Since universal design is a new concept, many researchers have varied views of the process. The Centre for Excellence in Universal Design (2020) suggested that universal design can be implemented successfully by the following steps: (a) specify measurable accessibility targets, (b) specify how the service is going to be tested for compliance, (c) plan for maintenance and expansion, (d) follow an inclusive, user-centred design process, and (e) test with real users. This suggests that accessibility increases the participation of diverse users established based on the principles

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of universal design. Whereas Burgshahler (2015) suggests that, the process of universal design should follow these steps: (a) identify the service (s) or product, (b) define the diverse users of the service or product, (c) involve end-users at all phases of the application, (d) adopt inclusive guidelines or standards, (e) apply guidelines or standards to all subparts and every operation of the application, (f) plan for accommodations, (g) train and support all stakeholders, and (h) evaluate the outcomes for impact and make modifications based on feedback. These highlight that the process of universal design demands the critical participation of diverse users during the development, implementation, and evaluation of any product, service, or environment (Burgshahler, 2015). This statement is supported by Shinohara et al. (2018) study which concluded that the change and improvement in design practice may be influenced by working with multiple stakeholders with and without disabilities. To achieve the best products and service design, and to ensure that the final product is accessible and usable for the broadest possible groups of users, Spina (2017b) echoed the need to involve users with disabilities in the design process. This is significant because there is a sense of collaboration to the point that the process of designing is not a product created for us but a collaborative effort. Besides this, creating accessible and usable products and services that meet the needs of everyone may demand the adoption of a participatory approach to design conceptualisation, planning, development, and implementation.

3.6.3 Criticism of the universal design

Universal design has not been without criticism, although it strives for the overall improvement of society. Universal design promotes accessibility and usability, but usability changes with time as happens to technology and society. But where there are changes, universal design should be introduced or provided to raise the standard for retrofits to accomplish the experiences of users (Butvin, 2023).

The critics further argued that universal design is a challenge to the preservation of cultural resources like historical structures (Chiwandire & Vincent, 2019; Maisel & Ranahan, 2017) and that modifying a structure can defeat the purpose of its authentic preservation. Another challenge to universal design's implementation is the presumed expensive aspect of it. However, Butvin (2023) contends that universal design can be implemented in the early stages while ensuring maximum affordability.

Another notion about universal design is the fact that it has emphasised design for disability (Maisel & Ranahan, 2017; Spina, 2021). However, the simple nature of the principles of universal design makes it practical for any space, when considering its potential for accessibility, integration, inclusion, and suitability (Spina, 2017b). More importantly, a range of individuals benefits from the ease of accessibility and usability, not specific users because it is open to everyone.

Others argued that the universal design concept results in a one-size-fits-all solution that does not take into account the actual needs of patrons with disabilities and other unique needs (Spina, 2021). The critics further claimed that universal design principles only focus on function and do not consider affordability or participation (Bringolf, 2008). It further has contradictory language and lacks measurable guidelines (Steinfeld, 2008).

Moreover, every design is always anticipated to cover all users but there would always be an insignificant number of individuals for whom a particular design may not work. Universal design is a concept that seeks to integrate components that make the individual design more universally usable. Universal design is inclusive and not customised to a specific individual (Spina, 2017a).

These criticisms stated above have led to the slow adoption of universal design in developing countries such as Ghanaian libraries. These criticisms are important because they offer

individuals and institutions the opportunity to make an informed decision on how to apply these principles in effective ways to minimise these stated drawbacks. The overall view is that good and aesthetic designs are not enough, they must be inclusive and functional. The bid for better accessibility, usability, participation, and integration cannot be abandoned. Even though society may change, and designs may turn out to be outdated, the simple accessibility, usability, and inclusivity characteristics grounded in the principles are unending and reliably significant.

3.6.4 Universal design in libraries

As stated, the enrollment numbers of students with disabilities in higher education are increasing and impacting academic libraries. The function of every library is to deliver innovative and equitable information resources and services to meet the demands of all users, because "all persons have a right to information regardless of disability" (Abodunrin & Olutoyosi, 2020, p. 147: Banik & Banik, 2021, p. 65). The decisions concerning inclusivity, accessibility, and usability occur in all parts of the library, from the outside and interior layout to instructional design. A research study indicated that libraries that meet all legal and accessibility standards sometimes fail to meet inclusivity when implemented (Spina, 2021). Academic libraries need to have a goal that supports access to buildings, information resources, and services for all users (Blummer & Kenton, 2017) to drive the maximum benefit needed (Acheampong et al., 2020).

This suggests the need for best practices with disability in mind to have more comprehensive and inclusive library services and resources that meet all user demands. To better accommodate and serve the user population including students with disabilities, academic libraries can learn

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from the principles of universal design. The concept of universal design is about the provision of inclusive environments and learning opportunities for everyone to access and participate, regardless of the individual's abilities. Universal design goes beyond accessibility laws to finding solutions to make libraries accommodate the varying needs, interests, and preferences of diverse users. Using the universal design principles and the social model as the foundation, university design principles in university libraries can provide access to library and information resources for all users by providing an enabling user-friendly and barrier free environment or "enabling access through the use of assistive technology brings overall development in accessibility and benefits to everyone" (Banik & Banik, 2021, p. 69).

The International Federation of Library Associations and Institutions (IFLA) developed a checklist of access to libraries for persons with disabilities which can be used as an instrument for auditing accessibility levels of library buildings, resources, programmes, and services (Irvall & Nielsen, 2005). The established goal of the IFLA checklist is to give direction and guidance to libraries (Kiruki, 2018). The checklist has three categories, namely physical access which addresses accessibility issues into and within the library buildings, media formats to address the demands of students with disabilities, access to facilities and services, communication, and staff disability awareness training among others (Irvall & Nielsen, 2005).

This access to libraries for persons with disabilities checklist advanced by IFLA serves as a framework to underpin this current study as it has been used in other research studies. The study by Kiruki (2018) on people with disabilities and information service provision in libraries in Kenya, employed the IFLA checklist to improve accessibility in university libraries for students with disabilities. Additionally, the study by Phukubje and Ngoepe (2017) in South Africa and the study by Njoroge (2013) in Kenya both adopted the IFLA checklist for access

to libraries for persons with disabilities to assess the accessibility of buildings, services, and resources in academic libraries for students with disabilities.

However, a study conducted by Burgshahler (2018b) proposed a checklist for making libraries accommodating, accessible, and usable. The author settled on the following areas: (a) Physical environments and products, (b) Information resources and technology, (c) Library Staff willingness to work with all patrons, and (d) Events sponsored by the organisation. All these checklists serve as practical tools for best practices in all libraries.

But in this study, the IFLA checklist for access to libraries for persons with disabilities was adopted with the principles of universal design to offer an approach for creating a more accessible, inclusive, and usable environment for varied patrons. The principles of universal design and the social model of disability would fill the gap in the IFLA checklist for access for persons with disabilities which failed to address the lack of disability policies in libraries which affects library and information services delivery to students with disabilities. The IFLA checklist with the principles of universal design addressed the following research questions: Are university libraries in Ghana designed to meet the needs of students with disabilities? What services and facilities are offered to render a specialised service to students with disabilities? How do students with disabilities experience library services and information? How can public university libraries in Ghana be redesigned to accommodate students with special needs?

3.6.4.1 *Universal design of physical spaces for students with disabilities*

To ensure that the library environment is welcoming, comfortable, accessible, attractive, usable, and functional, universal design can be applied to physical spaces. The principles of

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universal design should be incorporated as requirements into the design process at the development stage.

The atmosphere, entrances, furniture, fixtures, and safety among others should be considered. In the quest for libraries to provide appropriate buildings and environments should ensure that there are no building design barriers that pose challenges (Khakali, 2021). Librarians need to ensure that the external environment of the library is safe for people with disabilities accessing the building. They should ensure that designated parking areas for persons with disabilities are marked with the symbol of access and the parking area is near the main entrance with a clear and easy-to-read signposting, not many steps at the entrance of the library building, automatic doors, and suitable ramps are provided with handrails (Oloruntoyin, Akinbogun & Akinbogun, 2021; Ashigbi et al., 2017). Additionally, make sure paths are properly lit and accessible phones at the entrance for persons with disabilities especially those with hearing impairments (Spina, 2017b). To significantly minimise accidents, and provide an inclusive environment that can be easily navigated, Sholanke, Adeboye and Alagbe (2019) asserted that the entrances, exits, spaces, and other way-finding areas should be inclusive, usable, easily and safely accessible. This demonstrates that the ability to move from the parking location to the physical environment within the library should both be safe and accessible. The main intention is to promote access and independence for all patrons regardless of their abilities.

Furthermore, the principles of universal design can also be applied to the interior design of any library by providing a framework that addresses accessibility, usability, and flexibility issues. This influences design choices and features. Within the library, these principles can ensure that doors and corridors within the library are wide and spacious enough to allow access to a wheelchair (Spina, 2021). Librarians should also ensure that glass doors, stairs, steps, and elevators are marked with a contrasting color including pictograms as a warning sign to the

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visually impaired, and equally direct other users. This addresses the different needs of how people effectively use space. For instance, to effectively meet the intended purpose, a graphic sign that indicates someone walking up the stairs or in a wheelchair should be posted. More importantly, easy navigation of floors without obstacles will greatly help the visually impaired and those on wheelchairs to move independently and safely throughout the library building (Sholanke et al., 2019).

Signage and floor plans should be posted, and all sections in the library and spaces arranged logically with shelves reachable from a wheelchair (Spina, 2021). Zhao, Lin and Zhang (2019) added the need for access to reading rooms and toilet facilities for persons with disabilities and that the washroom should be well-furnished with a door wide and spacious enough for a wheelchair user, and with handles, a flushing lever, hand dispenser, washbasin, and a mirror at an appropriate height reachable for persons in a wheelchair. The author contended that wheelchair users and other patrons with physical disabilities need adjustable desktop computers and equipment that provide opportunities for comfortable use.

Academic libraries that apply universal design principles to the design of spaces, equalise opportunities for students with disabilities. The study by Christoffersen (2020) on the use of library space by the 21st century students, found that the quality of the library environment and designed spaces contributed to patronage. The study by Roberson, Barefield and Griffith (2022) at the University of Georgia recommended the incorporation of universal design and accommodations for inclusive libraries. They viewed inclusion as a continuing action rather than a fixed state.

Different study areas in the library solve the differences in learning styles. Remy, et al. (2014) found that the provision of inclusive (universal design) services for patrons with disabilities tends to benefit all learning styles. This suggests that universally designed services tend to

accommodate the learning styles of students and as well facilitate access to information for independent learning, research, and participation.

In universally designing library spaces ensure that:

- There is physical access and safety within the environment which is inclusive for persons with various abilities.

- The parking spaces, pathways, and entrances are accessible to wheelchair users and clearly identified.

- There is a clear and easy-to-read signpost leading to the library building.

- There is the installation of ramps with handrails on both sides.

- Deaf users have access to an entry phone.

- The library provides an adequate workspace for both left- and right-handed patrons.

- Automatic doors are installed at the entrance gate for easy access to students with disabilities.

- The stairs and steps are marked with a contrasting colour.

- There is a yellow or tactile line leading to the Braille library, disability washroom, and other areas where possible.

- There are clear signs to guide and direct students with disabilities, especially those with visual disabilities.

- The floor of the library is non-slippery.

- All floors or levels of the library have accessible routes as well as procedures to help students with mobility impairments retrieve materials from inaccessible locations.

- There are no thresholds at door entrances higher than 20mm.

- Shelves are reachable from a wheelchair.

- Cables and plug installations do not obstruct students with visual and mobility impairments.

- The arrangement of shelves, tables, and chairs does not obstruct patrons with disabilities.

- Lifts have auditory, visual, and tactile signals with control buttons accessible to students with disabilities.

- The corridors are wide, flat, and safe for students with mobility and visual impairments.

- There are appropriate signage and large print directional signs provided in the library.

- Shelf identification is provided in large print and Braille formats.

- Study areas are accessible to students with disabilities or private study areas are provided for users with disabilities.

- The library lighting is adjustable for students with disabilities.

- There is an appropriate toilet facility provided with accessories that are disability friendly and usable.

- Adjustable tables and chairs are provided.

3.6.4.2 *Universal design of facilities and services for disabled students*

Other areas that needs to be universally designed to be accessible to users in the library are the facilities and services that are offered to users. The principles of universal design can be applied to the facilities and services of the library to promote independent use by patrons across a range of disabilities.

The circulation and reference desks should be at multiple heights for users. An induction loop device for the hearing impaired should also be installed. Nall (2015) stressed that reference services such as in-person help, appointments, text and video conversation, and phone or email among others should be provided in multiple communication forms as possible. A study on increasing accessibility to academic library services with Alt Text, colour contrast, captioning and transcripts revealed improved accessibility of library video tutorials by both disabled and

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non-disabled users (Pope & Creed-Dikeogu, 2022). The study by Cross (2020) at Tri-County Technical College discovered that the social construct of disability is partly determined by the design of facilities in libraries. The study suggested that the acceptance of universal design in library technology should shift from the social construct of disability.

Information resources should be organised in appropriate and alternative formats. Ideally, various formats of information resources and services that are available in the library should be accessible to users with a range of disabilities. The study by Adebayo, Zubair and Ogunsola (2018) on equitable school library services for disabled students in Nigeria indicated the use of media resources such as audiobooks, music and pictograms to achieve maximum satisfaction. A study on physically challenged undergraduates' satisfaction with library and information services at Kwara State Higher Institutions reflected that students with disabilities had the same information needs, but that information services were not available and accessible to them (Akolade et al, 2015). A study by King and Coetzee (2018) asserted that the majority of the blind and visually impaired patrons preferred the Internet to access information and digital resources such as audiobooks and DAISY books which are preferred. But care must be taken to ensure that users of any library's online resources are not challenged by the complexity of the content presented through the Internet. Similarly, Chaputula and Mapulanga (2017) indicated that talking books and audio recordings have a playback facility and as well present content that is easy to comprehend. This suggests that blind and visually impaired patrons need to have access and use digital resources that are transcribed into alternative formats that meet their needs (Kaunda & Chizwina, 2019). Therefore, information materials that are accessible in Braille and large print are valued by blind and visually impaired people. When the library incorporates universal design principles from the onset of the design process (Pionke, 2017) to meet the needs of diverse users, it has the potential to offer accessible and usable information resources and services. This tends to increase the potential market, patronage, and usage by

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patrons. A study by Sobol (2020) in Canada reflected that the redesign of the library improved the visibility of research support and addressed inclusivity via design and staffing practices. Similarly, Odunola and Tella (2019) noted that universally designed information resources in different formats including the skills of users, and the information system of libraries may measure the extent of patronage.

Alabi and Mutula (2020) demonstrated that improved information access for a wide range of users with disabilities was a result of alternative formats offered by academic libraries. For instance, texting and voice-to-text technology offer alternative means of communication. This indicates that the dependency on a few reading and printed information resources has been overcome. The study by Adebayo et al. (2018) in Nigeria suggested that text-to-speech software and scanning tool should be installed on computer systems to convert text to audio format for visually impaired students. A study by Foxwell (2023) on accessibility, libraries and disabilities in the digital age, also reflected how text-to-speech technology reads out loud written content, thereby removing accessibility barriers for visually impaired users, learning disabilities or preference for audio learning. This has a great potential for users with disabilities to independently seek a variety of electronic information and the ability to make choices of the materials to read. To make facilities and services universally accessible and usable, it is important to ensure that:

- There are restrooms provided in the library and accessible to students with disabilities, especially wheelchair users.

- Reference desks are accessible to students with disabilities, especially wheelchair users.

- An induction loop system is installed to aid the communication for hearing-impaired persons.

- There is a Braille library available for students with visual impairments.

- The library provides alternative formats of resources in Braille, large print, and accessible electronic formats.

- There are talking books, talking newspapers, and audiobooks available to students with visual impairments.

- Reference and circulation services are accessible to students with disabilities by phone and email.

- Technical services such as embossment, printing, and scanning among others are provided.

- Research assistants are available to students with visual impairments.

- The online catalogue workstation is accessible from a wheelchair.

- The online catalogue should be compatible with students devices such as JAWS

3.6.4.3   *Universal design of IT for students with disabilities*

Information technology has the potential to close the gap in education between students with disabilities and their able-bodied counterparts. This is attainable when university libraries are universally designed with appropriate assistive technology and devices to accommodate students with disabilities.

The use of appropriate assistive technologies in libraries improves (1) the discovery of and accessibility to information resources, (2) the quality of the library experience, and (3) the retrieval of information. Assistive technologies include Braille embossers, screen magnification, scanners, screen readers, speech synthesisers, tape recordings, voice composers, book scanners with optical character recognition software, text-to-speech software, Braille translators, Braille printers, adaptive keyboards (Addai-Wireko, 2019; Kaunda & Chizwina, 2019). The study by Babarinde and Onifade (2020) at Oyo State School for the Blind in Nigeria suggested that information services and resources such as Braille books, language books, large

print books, Braille machines, tactile signs, audio tape, audio magazines, CCTV, magnifying glass and assistive technology among others should be provided to visually impaired students. A study on the needs and requirements of visually impaired students of the University of Delhi also reported the provision of Braille books, big screen computers with assistive technologies, recorded audiobooks, infrastructure facilities, helpers and writers to students with visual impairments (Mahawariya, 2019). In contrast, the study by Dodamani and Dodamani (2019) on the provision of assistive technology for students with visual impairments in university libraries in India discovered that the majority of the libraries had inadequate provision of screen magnifiers, screen readers, scanning and reading appliance (SARA), DAISY, optical character recognition (OCR) scanner among others for visually impaired students. The study by Ayiah (2017) on the provision of assistive technologies in academic libraries to visually impaired students in Ghana reported difficulties such as the unavailability of adaptive technologies, absence of disability professional librarians, and non-existence of alternative services restricted to the visually impaired students' access to relevant information for academic work. Equally, research conducted by Sanaman and Kumar (2015) on user's perspective towards assistive technology available in the National Capital Region Libraries of India intimated the need for adaptive technology to work in the digital age. However, the study depicted a lack of assistive technology facilities in the libraries surveyed, and as a result, the majority of patrons were not satisfied with available assistive technology facilities.

But these devices when made available in libraries would enhance the accessibility of information in electronic and online forms. Zhao et al. (2019) are of the view that users with disabilities can learn without barriers if only libraries are equipped with computers and the needed adaptive equipment. Another study conducted by Copeland, Cross and Thompson (2020) which discussed the design of an academic library computer workstation applying universal design principles, noted the social, economic, and environmental benefits offered by

universal design. Similarly, Onoyeyan (2019) and Tripathi and Shukla (2014) reported that adaptive equipment offered by libraries provides users with multiple means of retrieving information and providing equitable content access via myriads of media, including web-based materials, electronic journals, databases, digital catalogues, and indexes.

The Internet and virtual access have presented new opportunities for the dissemination of information, and have transformed information access in the physical library (Odunola & Tella, 2019). As a result, a library website has transformed library catalogues, databases, and research tools into portals that facilitate access to different information services and resources. The library website is fundamental to the dissemination of a variety of library resources and information and needs to be designed with certain guidelines to make it accommodating for everyone. To support this, Guder (2014) listed the following as some of the guidelines to consider in the design of a library website: aesthetics, adaptability, accessibility, supportiveness, and safety. It should facilitate easy navigation of the library collections and services including software to enlarge text and change font and contrast. It should equally offer alternative formats and search capabilities. The study by Agangiba and Agangiba (2019) suggested that library websites should be designed to be accessible and compatible with assistive technologies.

Kurt (2018) explored the recent status of web accessibility in education and presented a summary of the web content accessibility guidelines in four function-specific categories, namely, perceivable, operable, understandable, and robust. These guidelines according to the author would make content accessible and usable to diverse populations.

In making information technology accessible and usable, it is important to ensure:

- the availability of wrist and forearm rests to assist students with mobility impairments.

- the availability of trackballs for users with difficulties controlling a mouse.

- that videos have appropriate captions.

- that the library website is designed according to the web content accessibility guidelines (WCAG).

- that the content on the library website is accessible to everyone including those with disabilities.

- that online catalogues, indexes, databases, and e-journals can be accessed with various assistive technologies and devices such as screen readers.

- that computers are installed with assistive technology such as JAWS.

- there are adaptive technologies such as magnifiers, recorders, CCTV, Braille displays, Braille printers, embossers, scanners, DAISY (Digital Audio Information System), and Video/DVD books with sign language, among others, are available in the library.

3.6.4.4 *Universal design of library staff communications*

Communication is one of the areas that should also be universally designed to support the provision of services and programmes that meet the needs of diverse users. A designated staff member should be appointed to support persons with disabilities. Both studies were conducted in India. Dodamani and Dodamani (2019) revealed that only 21% of the university libraries surveyed had designated staff members to serve the needs of students with disabilities. A study on disabled users' satisfaction with library and information services at Aligarh Muslim University in India brought to light the need for skilled library staff with proficiency in sign language, interpretation and Braille reading (Gul & Khowaja, 2020). The study by Majinge and Msonge (2020) and Patil and Kumbar (2020) found the lack of well-trained library staff in disability issues as a major challenge to information access for persons with impairments. Appropriate disability awareness training should be offered to new and front-line library staff who interact with patrons on daily bases to enhance the necessary skills to assist wheelchair

patrons, communicate with hearing-impaired patrons, and offer appropriate services to visually impaired users. The overall value of disability awareness training is the fact that it helps staff to recognise the service principle of "Person first, disability second", and fully understand the psychological needs of users with disabilities (Zhao et al., 2019, p. 46).

Chiscano (2021) similarly asserted that training library personnel and equipping them with the necessary tools and materials on how to effectively communicate and interact with students with disabilities are critical issues. A study on serving the needs of students with disabilities at the University of Texas recommended the training of librarians to provide universal access to materials (Day & Fleischmann, 2020). Similarly, Small et al. (2015) investigated developing accessible libraries and inclusive librarians in the 21st century depicting unawareness of disability services and inadequate training of librarians as barriers to accessible and inclusive libraries. The study suggested that the redesign of libraries would ensure that their facilities, programmes, and services are inclusive and accessible. More importantly, staff should be trained on universal design, to enable them to offer equitable and accessible environments, communications, appropriate facilities, and services that promote the full participation of persons with disabilities in academic libraries. This is supported by the study by Chiscano (2021) who asserted that the application of universal design has a positive impact on the perception of satisfaction with the library experience for students with disabilities. The author further noted that online and offline communication resources, staff awareness of disability services, and inclusive practices that focus on individual user preferences improve the experience of students with disabilities.

For library staff to communicate effectively and to support students with disabilities, the library should ensure that:

- sign language interpreters are easily identified and available to assist students with hearing impairments.

- library staff are trained in policies and procedures to provide appropriate accommodations for students with disabilities.

- library staff are trained to use adaptive technology and devices to assist students with disabilities.

- library staff are educated on disability issues and how to communicate with patrons with disabilities.

3.6.4.5 *Universal design of policies*

Universal design can be applied to the policies, procedures, and processes to accommodate the needs of students with disabilities. The study by Giannoumis and Stein (2019) which examined the potential of universal design by applying it to disability laws and policies, argued that universal design as a foundation for accessibility and usability embraces social equality for every individual. This suggests that the concept can promote equal access and can augment wider participation in society. Thus, universal design policies are regarded as significant in determining educational and social equity. The study by Oldham (2019) noted that eliminating all forms of barriers in society promotes equal educational opportunities for all individuals and may be a factor in realising equitable and socially-just environments in university communities and education systems via universal design policies that take into account the needs of differently-abled people. This suggests that educational institutions should strive to eliminate segregation (preferences for some and exclusion of others) based on disabilities or ethnical differences to model value-oriented practices through the universal design of policies. Diverse stakeholders should rather develop a new mindset and policy strategies for equity, inclusion,

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and integration (Ackah, 2020). Hence, the better way for higher institutions and libraries to provide equitable access and participation for all is to embrace the "spirit" or concept of universal design.

The following requirements can guide when planning policies and evaluation:

- Consider diversity issues in your planning and evaluation of services, resources, and facilities.

- Ensure that students with disabilities are involved in the design of services and resources for them.

- Confirm the library has a disability written policy as well as a description of resources and services for students with disabilities.

- Ensure that the policies and procedures give access to information resources, facilities, and services for students with disabilities.

- Warrant that disability-related access issues are addressed in the library's evaluation methods.

- Ensure that accessibility is considered in the procurement of library materials.

- Ensure that the policies, procedures, and processes provide a timely and appropriate response to the demand for disability-related accommodations.

- Ensure that students with disabilities can participate in an event organised by the library.

3.6.4.6 Universal design of information literacy instruction

Universal design through universal design for learning can make library information literacy instruction inclusive. According to Grier-Reed and Williams-Wengerd (2018), universal design paradigm supports many teachers to align classroom practices with culturally sustaining

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pedagogy that advances inclusion for all students in higher education. The authors indicated that universal design is a model that promotes the implementation of an inclusive environment to address intersecting identities including disability in higher education. This means it is an approach that creates effective learning facilities that benefit all students regardless of their identities or disabilities. From the thinking of universal design, each student is unique, and the students are rather disabled by the systems in education rather than their disability. Sanger (2020) posits that universal design promotes an inclusive educational environment and teaching quality that benefits a diverse student population. This means that universal design responds to student learning needs and helps learners to experience diversity. Sanger indicated that universal design is a practical tool and a view that helps educators associate students' diversity with learning. Similarly, Peter and Clement (2020) suggest that libraries should provide multiple means of representation (visual, graphic, auditory, tactile); multiple means of action and expression (provide different and alternate methods for users to interact with the resources); multiple means of engagement (provide users with multiple and different opportunities to develop their skills). This means that library users can have multiple means to seek information to address their needs or different ways to interact with the resources. These ways present varied opportunities for students to select an approach that meets their needs, learning styles, and preferences.

In designing, it is crucial to ensure that the library offers:

- *Multiple means of representation,* to provide the students with disabilities with various methods of gaining information and knowledge.

- *Multiple means of action and expression,* to give students with disabilities alternatives to demonstrate what they know.

- *Multiple means of engagement,* to stimulate interests and increase the motivation of students with disabilities.

3.7 Library experiences of students with disabilities

Various studies (Fitzgerald et al., 2020; Moriña, 2017; Mulliken, 2017; Mutanga, 2017) have investigated the library experiences of users with impairments. Participants shared experiences on the inaccessibility of library facilities, technology, communication, signage, navigation, and privacy issues (Brunskill, 2020; Pionke, 2017). The World Health Organisation (2022) declared that people with disabilities have fundamental rights just like any other person to access facilities, information materials, and services without restriction. But many university libraries are unaware or unwilling to create accessible information resources to accommodate persons with disabilities. This section will examine some of the library experiences of differently-abled people.

3.7.1 Library facilities

The study by Pionke (2017) reported that patrons with impairments expressed the need for a better layout for easier access to information resources and spaces, as well as proper lighting outside and within the library building for easy navigation. Chiscano (2021) highlighted how some libraries are aware of accessibility issues and largely fail to meet the needs of patrons with impairments due to the absence of adaptable communication mechanisms and unsuitable signage. Library anxiety (Fitzgerald et al., 2020; Mellon, 2015) was reported by university students who struggled to find their way into the library building within bookshelves due to unclear signs. Another study conducted by Attakora-Amaniampong, Miller and Tengan (2022) on all-inclusiveness and disability end-user satisfaction in student housing nexus indicated that only 33% of student housing had clear signage across the study locations which provided some psychological effects on students with disabilities. Students with disabilities had challenges accessing group discussion spaces in the housing facility.

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The studies by Mutanga (2017) reported on students with physical impairments, in particular, those in wheelchairs. They found that sanitary facilities, buildings, and transport at higher education institutions were inaccessible resulting in students with disabilities being excluded or limited from full participation. This means that these students' academic performance would be affected due to the inaccessible nature of the facilities, resources, and services for their learning (Chiwandire & Vincent, 2017).

A study by Chaputula and Mapulanga (2017, p. 4) discovered that most of the libraries surveyed were not accessible to people with disabilities due to the absence of "necessary architectural structures and equipment" to facilitate access for them. The study further revealed that the libraries lack automatic doors as well as lifts to aid easy entry and access to the different floors respectively. Braille buttons were also not provided in the lifts. Equally, Majinge and Stilwell (2014a) confirmed that the design of buildings of some university libraries restricted students with disabilities especially the visually impaired and wheelchair users easy access to the library's information materials and services. The reason was that there were no appropriate and well-functioning lifts, rail marks, or ramps to facilitate access for visually impaired and wheelchair users to the various floors where some information materials and services were located. This means that the mobile impaired in wheelchairs were restricted to the ground floor, irrespective of the location of the resources. Chaputula and Mapulanga (2017) further confirmed that reading and computer tables were not appropriate and suitable for wheelchair users, whereas doors leading to other locations and facilities within the library were deemed narrow and difficult to use by wheelchairs. This suggests that differently-abled people were faced with inaccessible facilities which resulted in stress and frustration while seeking information. This calls to attention the social model of disability which seeks to eradicate all obstacles that affect the inclusion of students with disabilities in the academic community.

3.7.2 Library resources

Fitzgerald et al. (2020) and Mulliken (2017) investigated library users with visual and/or print disabilities and concluded that the patrons were comfortable having content in online formats or inclusive virtual spaces. But some online resources and those in print formats are still inaccessible (Beyene, 2018). Similarly, Mutanga (2017) observed that South African students with disabilities were not content with the library services as a few of the materials were in inaccessible formats. Babarinde and Onifade (2020) discovered that visually impaired students in Nigeria could not use the library due to the unavailability of resources such as large print books, playback machines, talking books and audio descriptive videos. Pionke (2017) reported on visually impaired users expressing concern about screen readers not being able to access digital resources or databases.

Ahmed and Naveed (2020) established that the blind and visually impaired expressed dissatisfaction with the format of handouts, notes, and reading materials because they had challenges while transforming required information into a convenient and usable format. There is also evidence from Majinge and Stilwell's (2014a) study which demonstrated that academic libraries have no alternative materials for visually impaired users. The users especially the blind and visually impaired relied on print materials with readers employed to read for them. A similar claim by Kaunda and Chizwina (2019) indicated that participants with impairments in the North West University library had limited information resources in alternative formats. This evidence clearly illustrates the inadequate alternative materials for visually impaired students in academic libraries (Nazim, Beg & Sarkar, 2021). The study by Day and Fleischmann (2020) at the University of Texas lamented that digital rights management presents a major obstacle to acquiring accessible content as well as making resources more difficult to modify and manipulate by students with disabilities. A study on the utilisation of e-

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reference services by students with disabilities in the Federal University Libraries in Nigeria showed that only email e-reference service was available to students with disabilities but only a few used the email service (Chijioke et al., 2020). The study further discovered that most e-reference resources were designed for abled users resulting in restricted utilisation among disabled users. The researchers recommended systems that facilitate universal accessibility and usability, provide web-based library services to disabled users, and support services should be provided as well as the enactment of a disability policy. However, if this situation is not resolved, it affects the academic performance of these students and leads to a high rate of dropout among students with disabilities in higher education.

3.7.3   Library websites

Webpages designed according to the Web Content Accessibility Guidelines of the World Wide Web Consortium ensure web page content and navigation accessibility resulting in full accessibility for persons with disabilities (Foxwell, 2023; Kurt, 2018). Cooke (2019) indicated that the Internet provides an opportunity for libraries to expand information access to their users, improved the contents available and granted effective retrieval of information. A study by Al-Harrasi and Taha (2019) in the United Arab Emirates discovered that the university library does not accommodate the needs of students who are visually impaired as access to digital content and online services is inadequate.

Although the Internet facilitates access to alternative formats of resources and facilities for people with disabilities, there are still obvious challenges encountered by users during their Internet access and use (Verma, 2021). Baumgartner et al. (2023) revealed that people with disabilities especially the visually impaired non-use of digital media were hindered by the complexity of the content provided during their Internet use. The study shed light on ways in which persons with disabilities make use of digital media to improve their learning. Similarly,

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Ahmed and Naveed (2020) reported how the visually impaired faced series of problems interacting with online content. Also, the study by Mulliken (2017) concluded that visually impaired students had challenges navigating the library website because they could not work independently. Mulliken (2017) revealed that the amount of time consumed to navigate a new webpage using a screen reader presented challenges to blind students. The website content coupled with navigational challenges including limitations of speech software hindered their access to the desired information. A study on provision of assistive technology for visually impaired students in university libraries in India uncovered that most of library websites were inaccessible restricting access to useful information by visually impaired students (Dodamani & Dodamani, 2019). This suggests that websites that are not designed according to the web content accessibility guidelines, and without the principles of universal design applied, present accessibility and usability challenges for students with disabilities. Therefore, without universal access to learning resources in the appropriate formats in the library, disabled users may be affected academically and may not complete their education.

In contrast, a study on facilitating access to learning materials for students with disabilities at Katholieke Universiteit Leuven, Belgium, reported how a Book-a-Book web application developed facilitated access to learning resources for differently-abled students. This is an online tool that served all higher education students with disabilities (Vuegen et al., 2020).

3.7.4   *Communications*

When universal design principles are applied in a library, communication with patrons with disabilities not only strengthens mutual friendship but ensures quality service delivery. Pionke (2017) reported how patrons with disabilities were surprised by the lack of disability awareness of library staff. The staff had inadequate training and lacked sensitivity concerning communicating and supporting persons with disabilities.

Another challenge encountered by visually impaired people is inadequate computers and information literacy skills of patrons. This observation is confirmed by Ahmed and Naveed (2020) who indicated that people with disabilities lacked computer and searching skills when accessing online content with devices. This further affected their full utilisation of electronic resources housed in the library. This suggests that inadequate information literacy training adversely affects students with disabilities' research skills as well as retrieval of appropriate information for assignments and research purposes.

3.7.5   *Inadequate budget for disability-related issues in the library*

The quest of libraries to provide equitable access to facilities, resources, and services that are universally designed for a wide range of users, encounters several challenges related to funding among others. In recent times, libraries experience budget cuts problems that constrain them from designing or redesigning their services to meet the needs of varied user populations. Some managers of higher institutions may not invest in projects or services that do not generate profit. So, they do not see it necessary to invest in universally designed information resources and services and disable barriers to access for students with disabilities. There is evidence of a declining trajectory of university funding support for libraries (Savova & Price, 2019). This phenomenon has affected the provision of relevant equipment and support for students with disabilities resulting in negative experiences in university libraries. The study by Chakrabortya and Jana (2021) in India revealed that shrinking budgets limit subscriptions to online resources and revamping of information services to enable access to all users including students with disabilities. This is supported by the study by Ifijeh and Yusuf (2020) which discussed the paradigm shift in teaching pedagogy in universities in Nigeria and the role of the academic library as a result of COVID-19. The authors suggested the provision of adequate funding for academic libraries to enable the deployment of information resources, relevant ICT

infrastructures, and services that support teaching, learning, and research. Similarly, Enweani (2018) suggested adequate funding of academic libraries as one of the effective strategies for managing university libraries in the face of advancement in information technology, and the changing needs of users. Chiwandire and Vincent (2019) also recommended that higher institutions should provide an enabling educational environment for students with disabilities to succeed academically by addressing the disability funding-oriented barriers. Though libraries encounter some challenges in the provision of services and resources to students with disabilities, the most aching is the budget cuts that decrease their capacity to implement the necessary best practices (Majinge & Msonge, 2020; Ilako et al., 2020).

3.8 The impact of ICTs on universally designed library services for disabled students

Article 9 of the Convention on the Rights of Persons with Disabilities (CRPD) categorically declares the right of persons with disabilities to access ICTs on an equal basis and without discrimination (United Nations, 2006). The CRPD enjoins member states and the private sector to provide accessible environments, products, systems, and services. The CRPD recommends the provision of reasonable accommodation including ICTs, especially assistive technologies. ICTs in library services for people with disabilities are vital in achieving full participation and independence. Wang et al. (2017) posit that networking technology like online discussion groups presents new ways of communication among individuals with disabilities as well as increased social participation and levels of confidence of differently-abled people. Impaired library users can independently access information services and various digital formats for learning and research through ICTs (Kiruki & Mutula, 2021). Matalala (2020) also argued that through the use of ICTs, users with disabilities have equal opportunities to enjoy an inclusive and access-free information society.

The application of ICTs in libraries facilitates the transformation of information materials into a format that is appropriate and suitable to meet the needs of all patrons and affords remote access to the library thus overcoming the need to visit the physical library (Majinge & Stilwell, 2014a). A study on library and information services for persons with disabilities in India reported that disabled students had a positive view of the accessibility of their libraries and the impact of ICT on their studies and research work (Yadav & Singh, 2022). However, the students with disabilities requested more training and orientation on using new tools and services.

3.8.1   Assistive technologies and information access for persons with disabilities

Computers and assistive technology in libraries are indispensable tools that are used by people with disabilities for information access (Chaurasia & Singh, 2022; Bhalani, 2019). An assistive device is any piece of tool, equipment, or system that improves, sustains, and facilitates the performance capabilities of persons with a disability (Ahmed, 2018; Tripathi & Shukla, 2014). Atanga et al. (2020) describe assistive technology as devices that accommodate and compensate for a disability and improve the ability to perform various activities such as communication, mobility, hearing, and reading. They enhance function, re-place missing parts, give an alternative means of function and reduce physical barriers (Ahmed, 2018) to facilitate interaction and improve the learning outcomes. For effective utilisation of assistive technology, studies by Odigie and Okube (2021) and Munyoro et al. (2021) advocated for librarians to be trained on how to use these tools as well as to train patrons with impairments in using them.

Assistive technologies include convertors of electronic or print text to synthetic speech, Braille, or enlarged text, colour coders, highlighter tape, tape recorders, voice projectors, Braille embossers, on-screen keyboards, refreshable Braille, screen magnifiers, screen readers, speech

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recognition, text-to-speech, speech synthesisers, and Accessible Library Experience (Bhalani, 2019). Kiruki and Mutula (2023) conducted a study in Kenya university libraries and asserted that assistive technology enhances functional independence and increases participation for persons with disabilities as these technologies and programmes assist in providing access to content. Tyson (2015) indicated that assistive technology mitigates the digital divide. The studies by Atanga et al. (2020) and Abu Alghayth (2019) both opined that assistive technology empowers people with disabilities, grants access to information, allows for interaction with different people irrespective of their location and allows students to learn independently at their own pace. Assistive technology proved to be effective in improving and maintaining accessibility, communication, and interaction of students with disabilities in higher education (Atanga et al., 2020).

3.9 Guidelines for redesigning spaces and services to accommodate disabled students

Although there is still no comprehensive universal design strategy for libraries, some guidelines for accessibility in libraries exist (Bostick & Eigenbrodt, 2017). Some countries have established guidelines and standards for library spaces, while other professional bodies have developed guidelines and standards for operations. The IFLA library building guidelines and the IFLA checklist for access to libraries for persons with disabilities are for instance practical tools to guide the universal design of libraries to accommodate varied users.

3.9.1 Legal issues

As mentioned already, Ghana has enacted legislation to promote social justice and the human rights of persons with disabilities. The law promulgates that no person with disabilities should be excluded from participation in society, and libraries are not exempted. At least at a minimum, libraries are expected to conform with the Persons with Disability Act, which stipulates that environmental, structural, communications and attitudinal barriers in libraries

are eliminated to promote equitable access to facilities and information resources for people with disabilities. Wilcher (2018, p. 17) and Link (2022, p. 360) stated the need for a legislative requirement to address the notion of "equal access for people with disabilities via the removal of architectural, employment and transportation barriers". The American Library Association's library services for people with disabilities policy proclaims that all libraries should adopt the principles of universal design with appropriate strategies to make sure their library policy, information resources, and services available meet the demands of varied users (ACRL, 2021).

3.9.2 Designing and redesigning library spaces

The design of the library space is moving to user-centred as libraries are shifting from collections and storage to communication and access. Libraries are also expected to provide access to information in alternative formats. Not only printed items but other physical and electronic resources should be available on digital platforms. In designing and redesigning the interior spaces of the library, the following guidelines should be considered along with the universal design principles.

3.9.2.1 Functional

When designing library spaces, Calvert (2014) suggested that the design should be functional creating a multiplicity of interrelated and flowing spaces to meet the expectations of diverse users. O'Donnell and Anderson (2022) warned that library spaces are fast transforming due to the ever-changing demands of users and rapid advances in digital technologies. Guidelines for library spaces incorporate the principles of universal design and appropriate features that make each design more inclusive, accessible, and usable by a wide range of patrons. The layout of the library must facilitate or provide access to the collection, interactive learning and study spaces, and allow a balance to the needs of teaching, learning, and research. User-centred

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spaces where patrons can interact with the collections, information technology, and services are needed (O'Donnell & Anderson, 2022; Calvert, 2014).

3.9.2.2   Adaptable

A library space design based on these principles and guidelines would be accessible and flexible and easily adaptable to new developments and the various learning styles of users including students with disabilities. Reimagining and redesigning service spaces differently has influenced the range of quality services that are provided to diverse users (Sobol, 2020). Staines (2012) cautioned that, with the frequent advancements in ICTs, university libraries should not plan to exceed twenty years. Planning and developing library space also presents some uncertainty, particularly with the changes in user information-seeking behaviour and their use of technology. Considering this, libraries must be flexible to easily accommodate new developments with minimal disruption. For instance, the design should cater for free adjustment of chairs, tables, and lighting at different heights and levels as well as the easy movement of equipment around on the floor without challenges (Guder, 2014). The cost of long-term flexibility can be more than short-term functionality. Hence, long-term flexibility should not be compromised for any potential savings.

3.9.2.3   Accessible

Academic libraries should be at the centre of the institution where everyone can easily locate them. The library should be designed in a way that accessing it is intuitive. Patrick and Hollenbeck (2021) shed light that the design should provide accessibility, engage participation by creating equitable experiences, and facilitate empowered success through flow experiences. The library environment including parking areas, ramps, and sanitary facilities should be accessible to persons with disabilities. Navigation and orientation of service desks, shelves, learning and study areas, self-service, and assistive devices should be accessible to all users

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(Foxwell, 2023; Barnett, 2013). Users should be able to navigate the library building and easily locate and retrieve resources that meet their needs. All these should be created in a way that allows moving throughout the library building effortlessly (Pionke, 2017). It must cater for all categories of users by providing alternative formats of resources to equalise opportunities for patrons with disabilities (Fleming, 2013).

Accessibility does not only apply to the physical space of the library but the webpage as well. Ideally, a library webpage needs to be designed and developed by standards and best practices in accessibility and usability to deliver web services and interfaces that are clear, appropriate, and consistent (Kurt, 2018; Riley-Huff, 2012). Guder (2014) suggested that, if universal design principles are applied in creating a library website, it eliminates a lot of barriers to accessibility by making the webpage simple with fewer links, graphics, and the appropriate use of colour.

3.9.2.4 Varied

This guideline and the principle centres on the user by designing a library to provide different study areas to meet diverse users' needs including their learning and discovery styles. The library layout should be able to provide quite independent study and collaborative group work in different spaces. Different spaces can be created with furniture arrangement, lighting, and even temperature levels. Group study spaces can be achieved through the use of learning pods, screens, and canopies (Calvert, 2014). This would allow users to learn independently at their own pace either individually or in groups. Creating inclusive spaces with appropriate colours that reflect diversity is crucial for improving access to libraries for students with disabilities. Users should also have access to both print and digital resources including information skills training and technical support (Bickley, 2013).

3.9.2.5   Interactive

When the principles are applied along with this guideline to design library spaces, it tends to facilitate the use of the resources and services by diverse users. When a library is properly organised, it promotes optimum use of the space and facilitates interaction among staff, diverse users, services and resources offered. More importantly, consideration should be accorded to circulation, reference desks, self-service, and information literacy training spaces because of their interactive nature which promotes contact between users and services (Calvert, 2014). Therefore, a well-organised library optimises space and promotes interaction between patrons and services (Shobha, 2015). To increase users' satisfaction, the library must create multiple spaces such as discussion rooms, group workspaces, and collaborative spaces that encourage more interactions while keeping separate rooms for quiet activity.

3.9.2.6   Conductive

The library space should create a serene and conducive atmosphere that promotes study and reflective experience as well as providing motivation and inspiration that bring transformative experience to its users (Staines, 2012). Barnett (2013) asserted that comfort and image influence and motivate patrons to use the library space and sustain their usage into the future. The library space should also be comfortable and safe for learning and research. The installation of imaginative and exciting features can enhance the quality and value of the library space (Shobha, 2015). Paintings, sculptures, and sensory gardens can also contribute to making a conducive environment. To achieve the maximum conducive library atmosphere, each feature must be applied by considering the principles of universal design.

3.9.2.7 Environmentally suitable

Library spaces with appropriate and suitable environmental conditions are crucial for users and the preservation of materials and equipment. There is a need to regulate and control environmental conditions such as humidity, temperature, noise, and ventilation. Similarly, lighting should be utilised well to create the most feasible effect possible (Fleming, 2013). Mood and behaviour are enhanced by the use of lighting technology (Watson, 2017). The library layout should create a more welcoming and suitable environment that promotes student learning. A study by Calvert (2014) found that the quality of the overall library environment including workspace and layout were the indicators that improved usage of the library.

3.9.2.8 Safe and secure

The guidelines can help ensure low physical effort, minimise errors, and provide size and space for approach and use. Ideally, there should not be any expected security threat to the library building, users, collections, and equipment. The design of the library space should conform to health and safety best practices. It is crucial to ensure that the ergonomic design of workstations and IT equipment does not cause stress for users while operating. To achieve functionality, it is necessary to provide comfortable chairs and tables which are ergonomically styled for informal seating areas as well as reference and study areas. The design of library space, for instance, the floor should be designed in a way that does not cause accidents or injuries to users or restrict access for persons with mobility and visual impairments (Bickley, 2013). All obstacles that are impediments to the accessibility and usability of the library space should be removed. Giving attention to the safety and security of equipment, users, and ease of access gives peace of mind (Guder, 2014). In order not to trigger any accident, it is important to switch off the power supply of equipment that is not in use. Also, it is crucial to constantly check to ensure that rodents and termites do not intrude into the building to destroy the collections.

Overall, it is vital to ensure that security and safety measures and best practices are enforced (Staines, 2012).

3.9.2.9 *Efficient*

The libraries need to operate as efficiently as possible by ensuring that running costs are minimised. Minimum maintenance and staffing costs and effective utilisation of services and space must be ensured because of the funding challenges (Calvert, 2014).

3.9.2.10 *Effective and suitable for information technology*

Effective planning of libraries should support users to take advantage of developments in the information technology world (Barnett, 2013). The design should support the establishment of Information Commons, which is a "one-stop-shop" of information technology services that foster improved collaboration and user experience (Staines, 2012). The library building should make provisions for future expansions and new developments. As the Internet and information technologies are necessary for effective access to information, academic libraries should install appropriate Internet facilities and technological devices that facilitate online access to resources for users to support their projects and assignments at any time without restrictions (Akbar et al., 2022).

Although the guidelines for building libraries provide the criteria for creating spaces, the universal design aims to provide products, environments, communication, and systems that are accessible to everyone regardless of their abilities. It provides particularly, the ways for designing and redesigning inclusive spaces that cultivate a sense of belonging for all users and address individual needs and preferences. It equalises opportunities for people with disabilities in academic libraries and eliminates spaces that are designed to exclude them. Therefore,

libraries need to create "inspirational spaces that capture the minds of users and the spirit of the institution" (McDonald, 2007, p. 25; O'Donnell & Anderson, 2022, p. 233).

3.10 Chapter appraisal

This chapter discussed relevant literature on disability, library information resources and services for students with disabilities, challenges of access for people with disabilities, universal design principles, universal design in libraries to accommodate people with impairments, and experiences of people with impairments in university libraries. The review concludes that libraries assist persons with disabilities by supporting their integration and full participation in higher education. Libraries need to be encouraged to adopt strategies like disability awareness programmes and universal design principles to ensure that library information materials and services address the demands of all learners to the greatest extent possible. Again, libraries need to plan and implement technological interventions and access through the philosophy of universal design, which ensures effective and efficient use of resources and information services by diverse users. Therefore, regardless of a student's disability, ensuring and facilitating equal access to technology for them to experience meaningful integration and full participation in learning is the key goal for effective library services. The next chapter describes the methodological perspective adopted for the study.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.0   Introduction

This chapter discusses the research design and methodology employed to address the objective of this study, namely, to investigate the redesign of university libraries to conform to universal design principles to accommodate students with disabilities. It further describes the data-gathering instruments used in collecting relevant data.   Additionally, it offers a brief explanation of the procedures and methods applied to ascertain the validity and trustworthiness of the data as well as the analytical methods used to analyse it.

4.1   Research design

According to Abutabenjeh and Jaradat (2018), a research design is a plan that guides the research process by setting out how a research project will progress through all the various stages to the final results. Creswell (2014, p. 5) also considered a research design as a framework "to conduct research" or for the ultimate "research product". In other words, it is a complete planning process that is used for data collection and analysis to provide a better understanding of a phenomenon. Additionally, a research design offers a suitable blueprint for a study (Sileyew, 2019). Maggetti, Gilardi and Radaelli (2017) described research design as a set of decisions that researchers take as a way of reducing or controlling bias by regulating how appropriate and relevant data are gained. This assertion is supported by Pandey and Pandey (2015) who indicated that a good research design increases the reliability and organisation of the data gathered and analysed while reducing bias and invalid conclusions.

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The research design therefore coherently connects the research objectives and research questions to the valid conclusions of the research via the appropriate data collection and analysis of data.

4.2 Research philosophy

The information about why researchers select a specific research design for study is influenced by their philosophical worldviews. Worldviews according to Creswell and Creswell (2018, p. 54) and Rashid et al. (2019, p. 3) are the "basic set of beliefs that guide action". In other words, the philosophical orientation about the world and the nature of research that an investigator brings to a study is generally considered as their worldviews (Abutabenjeh & Jaradat, 2018). Research philosophy has been described by White (2019) and Pandey (2016) as a belief that guides how data is collected, analysed, and used in a study. This helps to establish the basis for a researcher's study and explain to the audience, the basis for an individual's knowledge claims. It is usually a good practice to state clearly the philosophical foundation for claiming to know what others know which is the research paradigm (White, 2019).

The following four worldviews widely found in the literature, are discussed by Creswell and Creswell (2018), Abutabenjeh and Jaradat (2018), and White (2019). The first and foremost is the post-positivist worldview which is sometimes called the scientific method and represents the traditional form of research. This worldview typically embraces quantitative research more than qualitative study. The post-positivists hold a deterministic philosophy in which causes determine outcomes, such as those found in experiments. A research study that holds the worldview of the post-positivist, makes claims, verifies, and refines them to understand the world. To achieve the desired goal, it tests and controls research methods (Kelly, Kabiri & Alizadeh, 2018).

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The second is the constructivist worldview which is typically a theoretical framework found in qualitative research. Constructivists depend on the participants' understanding of the situation being studied. Constructivist researchers turn their attention to the lived and work experiences of people to understand the background of the participants (Creswell & Plano Clark, 2018). It is typically interpretive, and the goal of the investigation is not to generalise to a population but to understand a particular situation (Creswell & Creswell, 2018).

The third is the transformative approach which is also known as a participatory worldview. The transformative research focuses on important social issues such as inequality, oppression, and empowerment (Creswell & Creswell, 2018). It seeks to provide a voice for persons with disabilities by advocating for an action agenda for change to improve their lives. In addition, a transformative worldview holds that research investigation needs to appreciate politics and political agendas to confront social issues (Creswell & Poth, 2018).

Finally is the pragmatist worldview which states that true knowledge is gained by a mixed method approach (Rahi, 2017). Thus, the focus is on the research problem and researchers adopt various approaches to comprehend the problem. Researchers who hold this worldview employ both qualitative and quantitative approaches when they engage in their research. The researchers select methods, techniques, and procedures that best solve the problem.

The researcher's motivation for adopting a pragmatist paradigm for this study is because it addresses the need to conduct a study that is time-bounded, engages with frameworks or models, supports practical application as well as communicates to diverse audiences (Ramanadhan et al., 2021). The pragmatic approach presents the researcher with the opportunity to explore useful points of relationship between both qualitative and quantitative data (Tran, 2017). Kaushik and Walsh (2019) argued that pragmatism is a strong fit for close engagement and

empowerment of the marginalised and oppressed in society. The current study is aligned with this view as it seeks to eliminate barriers that impede access to library buildings, resources, facilities, and services for students with disabilities to fully participate in university education.

There is a strong fit between the social model of disability and pragmatism as they all advocate for social justice. Pragmatists have a great sense of justice, and an awareness of the suffering of individuals as well as the need to build just universities (Kaushik & Walsh, 2019). The social model and pragmatism are concerned with the pursuit of a tolerant and nondiscriminatory culture that treats all individuals with equal concern and respect (Dieleman, Rondel & Voparil, 2017). The pragmatist paradigm "views inquiry as a natural part of life that aimed at improving our condition by adaptation and accommodations in the social world in which we live" (Kaushik & Walsh, 2019, p.11). Pragmatism is in line with the current study objectives, the social model and the concept of universal design which all seek to eliminate social barriers to accommodate the full participation of students with disabilities in universities. This would restore the social justice imperative of institutions of higher education.

4.2.1 *Research paradigm*

A paradigm is understood as a framework comprising a set of valid assumptions and designs for gathering and interpreting data. The structure of orientation an individual brings to a study is the researcher's paradigm. A paradigm could be explained as the beliefs that are shared by research groups in a specific discipline (Teddlie & Tashakkori, 2017). It is a concept that refers to the way people think, observe and understand the environment and make valid inferences about the phenomena (Ntombela, 2020). A paradigm also offers appropriate tools for researchers to recognise and communicate particular views and assumptions (Rashid et al., 2019) resulting in it influencing both the selection of methodology and the methods used in research (Kivunja & Kuyini, 2017) and informs the practice and direction of inquiry (Ntombela,

2020). Rahi (2017) is of the view that the research paradigm is the most recommended method for defining valid research. This is pivotal because by selecting a specific paradigm the researcher gets a better stance chosen in relation to other alternatives and does not dwell on his own philosophical know-how.

Given these assertions, the present research is associated with the pragmatist paradigm because of the objectives of this study. A pragmatist worldview emanates from actions, situations, and consequences rather than prior conditions. In this view, the research problem is the main focus of the researcher instead of focusing on methods, and the researcher uses all methodologies that best meet their needs and purposes (Rahi, 2017). Pragmatism opens the door to mixed methods research, applying multiple methods, different assumptions, and various forms of data collection and analysis (Creswell & Creswell, 2018). The proposers of this worldview hold the belief that by using a mixed-method approach true knowledge can be obtained (Rahi, 2017).

This worldview would enable the researcher to collect and analyse both qualitative and quantitative data to best understand the research problem through the application of the best techniques and research procedures.

4.3   Research approach

To get a deeper understanding of the experiences of the participants, a mixed methods design was adopted for this study. The purpose of mixed methods is to provide complementarity, corroboration, completeness, developmental, compensation, diversity, and expansion to both qualitative and quantitative data (Venkatesh, Brown & Bala, 2013) to present more robust findings and conclusions. Mixed methods design, according to Creswell and Creswell (2018) as well as Creswell (2014), allows the collection of both quantitative and qualitative data to offer an understanding of a study problem, and to draw on the strengths of each type of data. It offers an enriched validity through the triangulation of data sets which has the potential to

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increase the ability to generalise the findings (Caruth, 2013). A mixed methods approach requires the researcher to learn multiple approaches, combine them intelligently, support the use of different methods and apply them in a professional manner (Cronholm & Hjalmarsson, 2011). For this study, a convergent parallel design was employed as both qualitative and quantitative data were collected simultaneously at the research sites during the study process, equal weights were given to the approaches, all sets of data were independently analysed and findings were interpreted together (Demir & Pismek, 2018; Creswell & Plano Clark, 2018). This enabled the researcher to best understand the research problem as this facilitates a deeper, broader understanding, expands and improves analytical power and increases the validity of the findings (McKim, 2017). The research process for this study is shown in Figure 4.1 below.
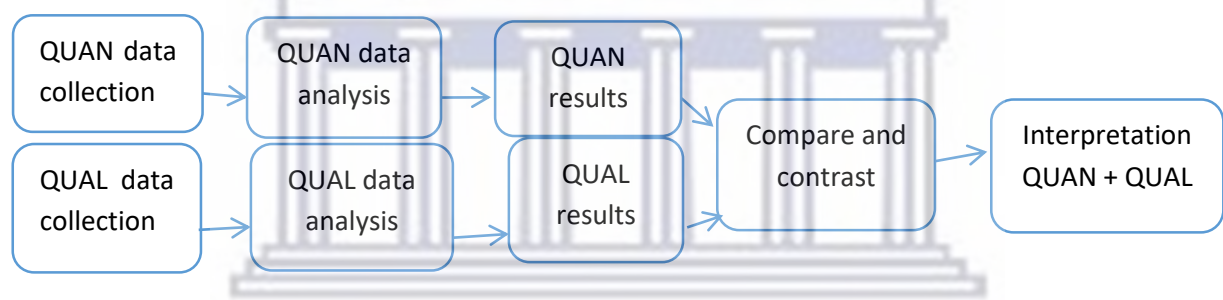
Figure 4. 1: Convergent mixed-parallel design (Creswell & Creswell, 2018)

The researcher employed the mixed method due to the nature of the research problem. This study compares the different perspectives drawn from qualitative and quantitative data, as well as compares one or more cases. Besides this, the expected outcomes, the integration of two databases as well as the timing of the data collection necessitated the use of a mixed method. To discover the nature of university libraries on how they conform to universal design to accommodate students with disabilities, the researcher needed to gather quantitative data from students with disabilities (hearing, visual, physically impaired) who use the facilities, information resources and services of the libraries. Also, observation of how accessible and usable the facilities, information resources and services of these libraries to disabled students were necessary. The researcher further interacted with librarians, heads of the development

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office and heads of the disability office who initiate policies to solicit their views and relevant information on how students with disabilities are accommodated in the university libraries. The purpose is to collect qualitative and quantitative data for answering research questions.

4.4 Research methodology

A research methodology is necessary to address problems in a systematic and integrated manner. To ensure valid and reliable results that solve the research problem, the research needs to be systematically designed and carried out (Rajasekar, Philominathan & Chinnathambi, 2013). Usually, the research methodology involves the various steps that are engaged by the researcher in the conduct of a research problem (Sileyew, 2019). In other words, it is the procedure by which researchers describe, explain and predict phenomena using appropriate methods to gain knowledge (Rajasekar et al., 2013). A research methodology aims to offer a work plan for the study (Rajasekar et al., 2013) as well as to select specific research methods to find solutions to the question (Mhona, 2018). The choice of a research methodology may depend on whether the task of the study is to discover and unravel individuals' multiple views in normal field settings or whether to discover external truth (Gray, 2014).

4.4.1 Research method

The research method employed in this study is a multiple case study. It is a case study method that examines a contemporary phenomenon in-depth to understand a real-world case, and as a result depends on evidence from multiple sources (Yin, 2018). Morgan et al. (2017) postulate that the case study method integrates multiple sources of data to offer comprehensive accounts of intricate research phenomena in real-life contexts. In order to reveal and understand the multiple facets of the phenomenon, a case study method ensures that the case is not examined through a single lens but rather via a multiplicity of lenses (Rashid et al., 2019; White, 2019). Multiple cases can offer more confidence in the findings produced from the overall study. But

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the challenge, however, is how to understand and effectively interconnect case studies with mixed methods (Yin, 2018).

The researcher through a multiple case study investigated real-time cases within their naturally occurring settings, with the reflection that context will generate a difference (Rashid et al., 2019). Besides this, the case studies made it possible for the researcher to recognise critical factors, relationships, and processes. It further allowed the researcher to highlight attributes, actions, and interactions of individual cases (Rashid et al., 2019) and for explanatory or confirmatory findings (Creswell & Creswell, 2018). As this research study focused on a contemporary phenomenon within a real-life context, and the fact that the researcher has little control over occurrences, a multiple case study method was the preferred strategy (Yin, 2018). It provided the researcher with the opportunity to gain a deep and complete understanding of the research problem and enabled description, comprehension, and explanation of the problem (Baškarada, 2014). This design permitted the researcher to explore how academic libraries conform to universal design principles to accommodate students with disabilities by examining actions, lived experiences, and interactions of students with disabilities as well as university librarians, heads of university development offices and heads of university disability offices. This provided a full comprehension of how students with disabilities are accommodated in academic libraries to have equitable access and use of information resources and services.

The inductive approach was also adopted by the researcher to collect and analyse both quantitative and qualitative data to develop multiple cases, and comparisons were made among the cases. This approach allowed fact-searching that corroborates the assumptions associated with the case (Rashid et al., 2019). In this current study, the researcher visited the selected research sites and both qualitative and quantitative data were collected concurrently at the same time. Thus, two data sets were generated, analysed separately, and the results were discussed

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separately and side by side constructed on themes generated from the research objectives. The results were further merged in a triangulating manner as validity checking. Quantitative and qualitative data was used to provide appropriate comparisons of cases and relevant interpretations to generate findings. This resulted in the comprehension of how university libraries conform to universal design principles to accommodate students with disabilities.

This study applied the convergent design (Creswell & Creswell, 2018) and collected both qualitative and qualitative data concurrently and the findings were merged to explore a case (s) and compare multiple cases. In other words, this method intends to gather both qualitative and quantitative evidence and their integration to develop a case.

The mixed method convergent parallel design employed provided an opportunity to obtain an in-depth understanding of how university libraries conform to universal design principles to accommodate students with disabilities. Demir and Pismek (2018), as well as Creswell and Creswell (2018), stated that convergent parallel design requires the investigator to combine the qualitative and the quantitative data approximately at the same time to generate a complete analysis of the research problem, analyse, integrate and then interpret the results together. This design demands explanation or probing further into inconsistencies or incongruent findings (Creswell & Creswell, 2018). The researcher employed this design and concurrently collected both qualitative and quantitative data from interviews, observations, the university library strategic plan and questionnaires. The information obtained was weighed equally, integrated, compared, and interpreted together to produce findings that afforded insights to address the redesign of academic libraries to conform to universal design principles to accommodate students with disabilities (hearing, visual and physical impairments). This design is further pivotal as it enabled the researcher to offer comprehensive outcomes for a better understanding

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of the research problem by explaining and probing further into incongruent findings that arose in this study. Besides this, the design allowed the researcher to triangulate both the results and findings for corroboration and validation.

4.5 Research population

A population may be defined as a complete set of people with specified features (Thacker, 2020). It is usually any group of persons that have one or more features in common that a researcher is interested in studying (Williamson, 2018b). It is the unit from which information is sought by a researcher, and upon whom conclusions of a study are drawn. It is the pool of people from which a sample size is drawn for a research study.

The study targeted two main population groups. The first comprised the university librarians, heads of the physical development department and heads of the disability office in each of the ten public universities in Ghana. This population would thus be a group of thirty (30) university staff members. The reason for targeting these participants was because of their responsibility to initiate policies, especially on the accessibility of resources and services in university libraries for students with disabilities, and to collaborate with other departments or units to provide an inclusive environment to accommodate students with disabilities. This group was also in the position to provide relevant information to address the research questions.

The second population comprised students with hearing, visual and mobility impairments enrolled in the ten Ghanaian public universities. This group did not include students with sensory and intellectual impairments. The researcher selected this group of students as they faced accessibility problems in university libraries affecting their inclusion and educational performance. Their knowledge, opinions and lived experiences provided an appropriate picture of the accessibility, usability, and inclusiveness of the university libraries, and how they

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accommodate students with disabilities. The researcher wrote to the various university registrars and obtained a list of students with disabilities from the disability units. The research populations for this study are shown in Tables 4.1 and 4.2

Table 4. 1: The population of participants for the in-depth interviews

Name of Participant	Number
University Librarians	10
Heads of Disability Unit	10
Heads of Physical Development Dept.	10
Total	30

(Source: Field Data, 2022)

Table 4. 2: The population of students with disabilities (SWDs) in the ten Ghanaian public universities

Name of University	Number of SWDs
University of Ghana	160
University of Education, Winneba	188
University of Cape Coast	59
Kwame Nkrumah University of Science and Technology	66
University for Development Studies	5
University of Professional Studies	1
University of Mines and Technology	2
University Health and Allied Sciences	1
University Energy and Natural Resources	2
Ghana Inst. of Mgt and Public Administration	1
Total	485

(Source: Field Data, 2022)

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4.6 Sampling techniques

Sampling may be described as the process of selecting part of the population for study. In other words, it is the process of choosing a sample of cases from a data set to measure the characteristics, beliefs and attitudes of the individuals (Rahi, 2017). Usually, a small number of people is normally selected and analysed to gather information about the entire population. Rahi (2017) listed better speed of data collection, results accuracy, and cost efficiency as some of the reasons for sampling. More importantly, the purpose of sampling is to help a researcher select cases to be included in a sample. Conversely, the main drawback of sampling is the probability of bias.

There are two major types of sampling techniques, namely probability and non-probability (Sharma, 2017; Taherdoost, 2016). Etikan and Bala (2017) opined that probability sampling is a technique that allows every single member of the population to have an equal chance of being included in the sample. In other words, each element in the population has the same chance of being selected in the sample (Taherdoost, 2016). Researchers choose probability sampling when they want precise and numerical justifications for large populations.

Non-probability sampling, however, can be used for a study that follows mixed methods, qualitative, and even quantitative study designs. A non-probability sampling method according to Rahi (2017) is a sampling approach in which the likelihood of each case to be chosen is not known or confirmed. In non-probability sampling, researchers use their discretion to select the cases for the study. The researcher uses his/her subjective judgment to carefully select the samples rather than random selection. Taherdoost (2016) is of the view that the sample of cases does not need to be representative, but a clear justification is required for the inclusion of some cases rather than others. The above statement as indicated does not necessarily denote that a non-probability sample is not representative but that the underlying principle for probability

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sampling does not underpin this kind of sample selection (Williamson, 2018b). Whilst there are some views expressed by some researchers that non-probability sampling is inferior compared to probability sampling, however, there are strong practical and theoretical rational for using non-probability sampling. For instance, purposive sampling can offer authors vigorous theoretical reasons for their selection of cases to be part of their sample. Williamson (2018b) is of the view that since random selection might easily fail to produce the most informative samples of human subjects, skewing outcomes because of sampling bias. As a result, the basis for making selections of cases and human subjects is consequently purposive.

Again, practicalities may often lead to the use of a non-probability sampling technique because the procedures applied to select cases to be included in the sample are much easier, quicker, and cheaper as compared to probability sampling. Convenience sampling is a typical example to support this argument.

In addition to the theoretical and practical issues, the nature of the research study may determine the selection of the sampling technique. The sampling technique is intended to maximise efficiency and validity whether the methodology employed is qualitative or quantitative. But the sampling must be consistent with the aims and assumptions inherent in the use of either method.

Thus, this study employed the non-probability sampling technique because it can be used for research that follows qualitative, mixed methods and even quantitative research designs.

4.7   Sampling method

Some research studies outlined the different types of probability sampling methods (Bhardwaj, 2019; Alvi, 2016) that exist to help researchers select an appropriate sample for a study. These

http://etd.uwc.ac.za/

probability sampling methods include simple random sampling, stratified random sampling, systematic sampling, cluster sampling and multistage sampling. Similarly, Taherdoost (2016) lists the four types of non-probability sampling methods as quota sampling, snowball sampling, judgmental or purposive sampling, and convenience sampling.

4.7.1 Non-probability sampling

To understand non-probability sampling, there is a need to explore the various types.

4.7.1.1 Purposive or Judgmental sampling

Purposive or judgmental sampling is an approach in which a researcher deliberately selects specific people or events to provide essential information that cannot be gained from other choices (Taherdoost, 2016). In other words, groups of participants for a sample are chosen according to preselected criteria relevant to the purpose of the study or a particular research question (Bhardwaj, 2019; Etikan & Bala, 2017). The primary objective is to choose a portion of a population so that the outcomes may be extended to the entire population (White, 2019).

4.7.1.2 Convenience sampling

Convenience sampling is also called reliance on available subjects (White, 2019). In this type of sampling method, members are selected because they are often ready and easy to access (Taherdoost, 2016). That is, selecting members of a population based on accessibility. The researcher usually selects members who are conveniently available and accessible for inclusion in the sample (Bhardwaj, 2019).

4.7.1.3   Snowball sampling

Snowball sampling is also known as chain sampling and may be recognised as a type of purposive sampling (Jawale & Baba, 2012). Taherdoost (2016) posits that it is a non-random sampling method that uses a few respondents to identify other respondents to take part in the study, thus increasing the sample size. In this sampling method, informants whom the researcher has already established contact with use their social networks to refer the researcher to other participants (Jawale & Baba, 2012). This kind of approach is most applicable in situations where it is difficult to access members in a sample due to their closed nature (Bhardwaj, 2019).

4.7.1.4   Quota sampling

Quota sampling according to Taherdoost (2016) is a non-random sampling method whereby respondents are selected based on some predetermined characteristics so that the whole sample has the same distribution of characteristics as the entire population. In quota sampling, the researcher selects respondents based on some characteristics.

4.8   Sampling method adopted for this study

This study adopted the purposive sampling technique. It is a technique that is widely applied in qualitative studies for the identification and selection of information-rich cases (Patton, 2015) for effective use of scarce resources. Thus, this sampling technique is convenient and cost-effective (Rahi, 2017). It usually involves identifying and choosing individuals that are particularly knowledgeable about or experienced with a phenomenon that is of interest to the researcher (Creswell & Creswell, 2018). Palinkas et al. (2015) also emphasised the importance of availability and willingness to participate, as well as the ability to communicate experiences

and opinions in an articulate, reflective, and expressive manner as additions to the knowledge and experience of participants.

There exist numerous purposive sampling suggested by Sharma (2017). These are deviant (extreme) case purposive sampling, maximum variation purposive sampling, typical case purposive sampling, homogeneous purposive sampling, expert purposive sampling, and total population purposive sampling.

The total population purposive sampling technique was applied in this study because of its ability to select the entire population that has a particular set of features. All the students with disabilities (hearing, visual and physical impairments) at the ten public universities were selected for this study regardless of their year of enrolment, and questionnaires were administered to all of them. The researcher also purposefully selected ten university librarians, heads of physical development offices and heads of disability units from ten Ghanaian public universities to participate in this study. These participants were selected because they head departments, initiate policies and more importantly they are information-rich (Patton, 2015) and can help in answering the research questions.

4.9   Sampling size

There is a conceptual controversy and practical ambiguity in choosing an appropriate sample size for a qualitative study (Vasileiou et al., 2018). Williamson (2018b) suggested that samples are small in non-probability and that the sample size at the end of a research study may not be the size that is used for planning purposes. Several writers have argued for the terms 'saturation' and 'redundancy' in relation to sample size. These terms mean when the

"researcher is no longer seeing or hearing new information" and "when new information is not forthcoming" respectively (Savin-Baden & Major, 2013, p. 317).

In view of this, Williamson (2018b, p. 372) postulated that the best rule of thumb when a researcher uses a non-probability sample is to ensure continued sampling until a researcher has "deep, rich data sets which take into account cultural complexity and multiple interpretations of life". More importantly, according to Williamson (2018b), the consensus seems to suggest that sample size in non-probability research ought to be determined just before the end of the study, with a confident estimate made at the onset.

Based on the above assertions, the researcher is optimistic that the first group of 30 participants would be interviewed, and the second group of participants which constitute all students with hearing, visual and mobility impairments with a sample size of 485 would be enough to bring out deep and rich data sets which take into consideration "cultural complexity and multiple interpretations of life".

4.10   Data gathering tools

This section highlights the four data-gathering tools that were used for this study.

4.10.1 Questionnaire

A questionnaire according to Roopa and Rani (2012) is a sequence of questions asked to individuals to gain statistically valuable information about a given topic. Roopa and Rani (2012) argued that questionnaires, when properly designed and responsibly administered, become an important tool by which statements can be made about an entire population. Questionnaires are considered a valuable method to record the responses of individuals accurately to facilitate data analysis. It is, however, vital that the questionnaire is adequately

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constructed. Kiruki (2018) is of the view that questionnaires can collect consistent and reasonably valid information in a simple, inexpensive, and timely manner. The main purpose of the questionnaire is to help extract information from participants that are related to the objectives of the research (Roopa & Rani, 2012).

In social sciences research, a questionnaire is one of the frequently used instruments for data gathering (Rowley, 2014). This is because of its potential to solicit information from a larger number of respondents as well as its ability to generate more generalisable results. More importantly, it allows the participants ample time to provide well-thought-out responses (Bryman, 2016).

However, the major challenge of using a questionnaire is the fact that some respondents may not understand or misinterpret some questions and the researcher is not always available to explain to them (Rowley, 2014).

An online questionnaire designed using Google Forms was used to gather quantitative data from students with disabilities at the ten (10) Ghanaian universities. The questionnaires contained fixed responses as well as open-ended questions. Separate questionnaires for the students with visual, hearing, and mobility impairments were constructed using five (5) major sections based on the objectives of the study.

Section A gathered demographic and background information about the respondents.

Section B focused on physical access into and within Ghanaian public university library buildings.

Section C solicited information about the facilities, services, and assistive technology offered to render an information service to students with disabilities. This section also dealt with the attitude of library staff towards students with disabilities.

Section D captured the library experiences of participants on accessibility, usability, and inclusivity of library resources and services.

Section E solicited information on the redesigning of library spaces and services to accommodate students with disabilities. This section also dealt with how university libraries conform to the universal design principles.

4.10.1.1 Administration of questionnaires

After permission from the registrar to conduct the research was obtained, lists of students with disabilities and their email addresses were acquired from each university disability office at the ten Ghanaian universities. An information sheet and web-based questionnaire containing an informed consent statement were emailed to students with hearing, visual and mobile impairments during the time of visit to each university. Follow-up requests for the submission of questionnaires were emailed after two weeks. It took a period of five (5) months to cover the ten public universities, from 24th of February 2022 to 30th June, 2022.

After each visits, the researcher recorded less than hundred (100) responses from the students. The researcher made a follow-up and scheduled meetings with special dates and times through the various presidents of the Association of Students with Disabilities on the various university campuses. As students with disabilities arrived for the meetings, the researcher requested verbal consent and self-administered questionnaires to them. A total of 110 completed questionnaires were received.

4.10.2 In-depth interviews

The use of in-depth interviews to collect data for this study is consistent with the qualitative design which seeks to understand, uncover and describe the understandings which participants share about a situation (Roberts, 2020). This view is shared by Guest, Namey and Mitchell

(2017) who stated that interviews can be conducted to solicit information about knowledge, attitudes, experiences, behaviours, and perspectives to gain an understanding of some components of people's experiences outside the basic truths. The main objective is to uncover the meaning and experience from the viewpoint of the participant, articulated in their words. The participants relate to the researcher in a detailed manner concerning the experience being described based on what they think and know. Thus, the interview aimed to capture the subjective perspective of the study respondents (Roberts, 2020).

Several researchers employed in-depth interviews to understand students with disabilities' perspectives on processes, decision making, interpretations, expectations, and motivations (Lourens, 2015; Mhona, 2018). Similarly, Ahmed and Naveed (2020) and Coetzee (2016) employed in-depth interviews to examine information accessibility of the visually impaired in higher academic institutions.

4.10.2.1 *Interviews with university librarians, heads of the university development office and heads of the university disability office.*

Considering the objectives of the study, an interview guide was constructed consisting of five (5) major sections.

Section A dealt with the demographic data of the participants.

Section B focused on physical access for students with disabilities into and within Ghanaian public university library buildings.

Section C dwelled on the facilities, services, and assistive technology offered to render an information service to students with disabilities. This section also ascertained the attitude of library staff towards students with disabilities.

Section D focused on the library experiences of students with disabilities in terms of accessibility, usability, and inclusivity of library building, resources, and services.

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Section E gathered opinions on the redesigning of library buildings and services based on universal design principles to accommodate students with disabilities.

The study followed the rules governing the conduct of in-depth interviews. The researcher was guided by the interview canons pre-interview, interview, and post-interview standards instituted by Ary et al. (2014).

Based on the pre-interview standards, the researcher after permission for the study was obtained from each university registrar, letters were sent to all university librarians, heads of the physical development offices and heads of disability offices requesting their participation. Feldman, Bell and Berger (2003) are of the view that networking during the initial contact must reflect the researcher's trustworthiness, reliability, and openness. The participants were informed about the study through information sheets emailed to them. According to Lincoln and Guba (1990), this would enable the participants to reflect on the nature and purpose of the study, possible benefits, risks, and costs as well as the time the study may pose to them and their organisations. The quality of the data collected was improved by the careful, respectful and mutual access arrangements made which took into account the vulnerabilities and needs of both the gatekeeper and the researcher (Singh & Wassenaar, 2016). All the participants who agreed to partake in this study were assured of anonymity and confidentiality of the information they shared. Participants were also made to know that they could rescind their decision at any time to partake in the research. All the participants were further made aware that the interviews would be audio recorded to facilitate and improve accuracy as well as to provide a source to review data for completeness (Lincoln & Guba, 1990). These engagements facilitated rapport and build trust that enabled participants to provide accurate information, and shared their thoughts and experiences (Alase, 2017) on the universal design of libraries to provide access to students with impairments.

Prior to conducting the interviews, appointments with each participant were made. To allow interviewees to familiarise themselves with the subject, the interview schedule was emailed to them prior to the interview dates. Face-to-face interviews were conducted in the participants' offices or rooms that they considered suitable. Rapport was developed by putting participants at ease and making them feel relaxed by assuring them of the confidentiality of the information shared. Consent forms were signed by each participant, and permission was granted for an audio recording of the interviews.

The interviews were guided by key open-ended questions which focused on the research questions and the research topic. This allowed the researcher to interact with research participants to capture their feelings, experiences, knowledge and lived worlds (Roberts, 2020). Participants particularly shared their experiences and perspectives on the universal design of libraries to accommodate students with disabilities. The researcher exited the interviews by recapping and restating some important aspects of what participants shared and thanking them for their participation and time.

The interviews conducted alternated from 45 to 60 minutes. It appears there is no consensus in the literature on interview time frames as scholars used varied time range (Jamshed, 2014; Kim, 2020; Advocat, 2023), thus the lengths of the interviews were considered appropriate to gather adequate and relevant data that would generate appropriate findings.

4.10.3 Observation

The researcher equally used direct observation schedules to gather quantitative data on the physical access from outside the library, physical navigation inside the library, facilities, and services of all the ten Ghanaian university libraries. Observation is considered one of the important and most commonly employed scientific qualitative or quantitative methods in social

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and behavioural sciences (Ciesielska, Boström & Öhlander, 2018) and is characterised by the systematic recording and noting of events in the social environment selected for study (Kiruki, 2018). As a method and an instrument for data gathering, it has to be carried out systematically, focusing on the research questions (Ciesielska et al., 2018), and is subject to checks and controls for validity and reliability (Kiruki, 2018). If it is carried out correctly, it avoids subjective bias, and the data collected recounts what is presently happening. More importantly, the method is not reliant on the willingness of participants to respond (Kiruki, 2018). Observation allows the investigator to observe what people do rather than what people say they do (Morgan et al., 2017).

The seven principles of universal design (Bostick & Eigenbrodt, 2017) and the checklist of access to libraries for people with disabilities (Irvall & Nielsen, 2005) were employed as observation rubrics. The checklist for access to libraries for persons with disabilities is a valuable tool for all categories of libraries for evaluating existing levels of accessibility to buildings, services, resources and programmes (Irvall & Nielsen, 2005). The primary objective of the checklist is to offer guidance to libraries in making their resources and services more accessible to persons with disabilities (Kiruki, 2018) whereas the principles of universal design seek to guide the design of products, services, programmes, and environments so that they are accessible and usable to all regardless of their abilities (Burgstahler, 2018a, 2018b). The researcher incorporated the universal design principles into the checklist through the development of observation items that seek to address the design, accessibility and usability of library services, resources, and environments that promote inclusion.

To address the research questions, both structured and unobtrusive observations were applied. Structured observation involved an observation schedule with a fixed number of points to observe in a pre-determined number of cases. For unobtrusive observation, different aspects of

the library building, facilities and resources were observed allowing the gathering of data devoid of interference with the subjects under study (Kiruki, 2018) and curtailing the biases that result from the interference of the researcher (Trochim et al., 2016). See the observation instrument in Appendix N.

4.10.4 Document Analysis

Document analysis is considered an orderly procedure to assess and review both printed and electronic materials (Koyuncu & Kılıç, 2019). In document analysis, the researcher makes every effort to systematically use data from documents to discover, extract, and evaluate the content related to the research question (Khodayari-Zarnaq, Kabiri & Alizadeh, 2020). Sometimes, it is used as a separate technique or as a supplemental research method. According to Hancock & Algozzine (2016), documents are sources of relevant information that augment data gathered through observations and interviews to provide insights to understand a research problem. Document analysis needs no interaction with participants and provides low cost and access to qualified resources (Koyuncu & Kılıç, 2019).

The present study purposefully selected relevant university documents such as the university and library strategic plans and disability policy for additional data. In particular, the study focused on statements in the above-mentioned documents that promote access and inclusion of students with disabilities in university libraries. Data gathered from respondents corroborated and augment evidence from documents (Atkinson & Coffey, 2011).

4.11   Validity of the study

Validity determines whether a research study is plausible and true as well as whether it is measuring what it purports to evaluate. In other words, it is the degree to which a research study specifically assesses the concept being investigated (Noble & Heale, 2019) and whether

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the conclusions are true based on the information that was gathered to support the claims of the researcher (Johnson & Christensen, 2017). Validity seeks to assess the truth of an inference (Perez, 2019). It can also be regarded as a critical principle for evaluating the quality and acceptability of a research study (Zohrabi, 2013). The researcher must build validity into the various stages of the research design through to data collection, analysis and interpretation (Eeva-Mari & Lili-Anne, 2011). As different instruments are used for data collection, the quality of these instruments is essential since the conclusions that are drawn by researchers depend on the information investigators gained using these instruments (Zohrabi, 2013). Thus, validation of the instruments and the data is important. The instrument's validity can be considered as the degree to which the various instruments used in this study reveals the abstract concept being studied. The following measures were used to validate the data and instruments.

4.11.1 Content validity

Content validity is the degree to which the content of the instrument appears to adequately and effectively measure the scope it is envisioned to assess (Zohrabi, 2013). In this study, the instruments were reviewed by an expert in charge of the differently abled section of the UWC library. This led to the revision of unclear and obscure questions and the rewording of complex items. Some ineffective questions were discarded altogether. In this study, the researcher ensured that appropriate concepts and words were used in developing the data collection instruments that eliminated uncertainties thereby enhancing clarity and general appropriateness (Sileyew, 2019). In addition, the interview schedule, questionnaires and checklist included relevant sections and content that guided the achievement of the study's objectives.

Furthermore, a self-evident measure was conducted which ensured that the face validity of the interview schedule, questionnaires and checklist was subjectively evaluated for the relevance

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of the questions. This was achieved when the supervisor critically assessed these instruments, and suggestions made were implemented.

4.11.2 Internal validity

Internal validity deals with the true reflection of the research findings with reality. It is concerned with the extent to which the inquirer observes and measures what is supposed to be evaluated. The findings of the study are presented in such a manner that they reflect the reality of the original views of participants and truth-value (Lourens, 2015). Therefore, the research design employed in this study ensured valid conclusions. The study captured "authentically" the lived experiences of the participants and represented them in a "convincing text, which establishes that the researcher fully comprehends the cases" (Eeva-Mari & Lili-Anne, 2011, p. 42). The researcher further employed triangulation, pilot testing and sought to guard against researcher's bias to increase the internal and external validity of the research instruments and data.

4.11.2.1   Triangulation

Triangulation means the application of multiple approaches or sources of data to develop a full understanding of phenomena (Carter et al., 2014). That is use of multiple measures to develop a construct (Heath, 2015). It is a technique employed to increase the credibility and validity of a study's findings (Noble & Heale, 2019). It is a method that ensures the validity of the study's conclusions. In other words, it validates the findings by examining that the different methods generate the same results. Nightingale (2020) indicated that triangulation creates a more in-depth representation of the study problem as well as interrogates various means of comprehending a research problem. More importantly, triangulation strives for correspondence, corroboration, and convergence of findings from multiple methods

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(Schoonenboom & Johnson, 2017), and may compensate for the weaknesses in the methods used.

Williamson (2018a) noted four forms of triangulation as follows: (1) method triangulation which refers to the application of multiple methods in the same study, for instance, observation and interviews; (2) data triangulation which refers to the use of different data sources for the research study, for instance, an array of different respondents; (3) the investigator uses some different researchers to offer multiple perspectives; and (4) the researcher applies multiple theories to interpret one set of data.

In the quest to support the validity of the evaluation of data and findings, this study employed data and methodological triangulation. The researcher used multiple methods of data collection: interviews, questionnaires, observation, and documents. The researcher also collected data from university librarians, heads of university development officers, heads of the university disability office, and students with disabilities. The application of more than one data collection method in the present study improved the validity of the findings as a result of several perspectives and further allowed for the emergence of an internally consistent picture of the phenomenon (Kiruki, 2018). It also allowed the researcher to avoid questionable, weaknesses and fundamental biases that are associated with a single technique of gathering data (Noble & Heale, 2019; Heale & Forbes, 2013). The collection of information from various techniques can confirm findings (Zohrabi, 2013). In addition, the qualitative and quantitative data collected in this study allowed the researcher to corroborate the findings (Creswell & Poth, 2018). Triangulation also allowed the researcher to develop converging lines of investigation that generated findings and conclusions that are more accurate and convincing. Thus, convergence denotes a strong extent of overlap and accuracy between the data sets gathered through the different methods (Nightingale, 2020). Triangulation improved the study as it provided a variety of datasets to elucidate divergent aspects of the phenomenon of concern

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(Noble & Heale, 2019). Hence, the credibility of the findings was strengthened by triangulation which improves the accuracy and completeness of the study (Yin, 2014).

Although triangulation provides richness and clarity to research (Johnson et al., 2017), it has limitations. Triangulation is a time-consuming activity as it adds to the complexity of the research (Heale & Forbes, 2013). The findings of the two sources may be inconsistent when compared. In addition, the processes involved in triangulation are complex and demand a skilled researcher (Noble & Heale, 2019).

4.11.2.2 *Researcher's bias*

Researcher bias occurs when the investigator skews the whole process in the direction of a particular research result by presenting a systematic error in the sample data. In other words, it refers to a process where the investigator influences systematic enquiry to attain a certain result. The researcher's bias is evident when the personal selections and preferences of the investigator have an excessive influence on the research project (Fusch et al., 2018). This was achieved when the researcher avoided the risk of shaping the realities of respondents both during data gathering and analysis by distancing the study from any subjective experiences, biases, and preconceptions. Rather the researcher collected, analysed, interpreted data, and generated themes as impartially as possible (Zohrabi, 2013), and remained clear throughout the research process. The research process which is considered detailed and explicitly presented makes the study to be dependable and possible to be repeated (Korstjens & Moser, 2018).

4.11.2.3 *Threats to internal validity*

The threat to internal validity arises when the happening of an event that may be unrelated to the study affects the result of the study. In other words, alternative explanations that cannot be ascribed to the research (Perez, 2019). The internal validity of a research study can be

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threatened during data collection, data analysis and interpretation. A study may be threatened by instrumentation issues, researcher bias in the use of techniques, observer bias, data access limitations, and lack of descriptive validity of environments and events. Issues with instrumentation occur when scores generated from a measure lack the appropriate level of consistency because of inadequate content (Eeva-Mari & Lili-Anne, 2011). A researcher's bias occurs when the researcher exhibits personal bias in the use of one technique over another. All the threats to internal validity were minimised by the clear description of the research design, data collection, data analysis and interpretation of the findings.

4.11.3 External validity

External validity refers to the degree to which the research findings; are transferable to a wider context or can be generalised beyond the sample used in the study (Eeva-Mari & Lili-Anne, 2011). In other words, the applicability of the results in other environments or with other subjects (Zohrabi, 2013). Zohrahi (2013) asserted that the research design influences how the researcher can generalise beyond the subjects investigated to a wider population. The present study is transferable if another researcher can generalise the findings to other contexts as well as other settings with new participants (Forero et al., 2018). This present study can be reproduced elsewhere since the researcher has offered an appropriate and detailed description of participants' experiences, behaviour and experiences as well as their context which are important to others (Creswell & Poth, 2018). The study further provided relevant information about the university libraries, their disability policies and practices which are significant to an outsider. Information about the respondents was also provided without violating their privacy.

4.11.3.1   *Piloting*

Pilot testing according to Fraser et al. (2018) is the conduct of a miniature version of the main study to specifically pre-test a research instrument such as a questionnaire, observation

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checklist or interview schedule. Traditionally, a pilot test is conducted first, is often associated with the larger project (Eldridge et al., 2016) and is often envisioned to guide the planning of a larger study inquiry (Thabane et al., 2010). It facilitates decision-making and serves as a set of observations taken on to decide how and whether to conduct a full-scale project (Fraser et al., 2018). The purpose of pilot testing is to test on a small scale, the steps defined in the research plan, and upon the results of the pilot make revisions to the plan. Malmqvist et al. (2019) assert that pilot testing aims to increase research quality, and this may be accomplished in most phases of a research process. These authors argued that a pilot study enhances validity and reliability in research and is a vital part of a research design.

To minimise the chance of failure in this current study, pilot testing served as a mitigation strategy (Fraser et al., 2018). This helped the researcher to identify and address actual and potential problems before undertaking the expected future study. It also assisted to assess the clarity of the items used to confirm that the data collection tools were valid and reliable in the educational setting before carrying out the actual research (Chu, 2013). Where respondents encountered difficulty in understanding and completing the instruments appropriately, this informed the researcher to revise the wording of the questions, modified the sequence in which the questions were asked, or changed the format of the instrument (Fraser et al., 2018). More importantly, it revealed practical and ethical concerns that may hinder the actual study (Doody & Doody, 2015). It helped the researcher to detect design weaknesses and improve analysis plans and data collection (Fraser et al., 2018). It critically interrogated how the researcher could best effectively utilise the data gathered or recorded (Malmqvist et al., 2019).

For this study, a pilot test was carried out at Accra Technical University to assess the performance characteristics and the procedures for respondent selection, usability and clarification of the questionnaires, the observation checklist, the data collection, and the

interview schedule. The Accra Technical University Library is regarded as one of the best-ranked and oldest technical universities in Ghana. The library performs similar functions, has a similar diverse population as well as practices inclusive education just like the ten (10) universities targeted for this study. Based on feedback from the pilot, minor adjustments, and corrections were made to improve the instruments and methodology.

4.11.3.2   Threats to external validity

The external validity of a study can be threatened by environmental validity and selective plausibility. Environmental validity is all about whether the findings of the study can be generalized across other settings (Eeva-Mari & Lili-Anne, 2011). Selective plausibility indicates the failure of the researcher to reconnect the empirical findings of the present study to other cases and theories and provide an explanation of how the new evidence enhances the understanding of the research question (Eeva-Mari & Lili-Anne, 2011). The lack of comparison of the findings to previous contributions can produce narrow conclusions. The present study corroborated the findings of previous studies. The study provided appropriate inference quality and inference transferability which are used in evaluating validity in mixed methods research (Perez, 2019). Furthermore, meta-inferences were formed from the qualitative and quantitative components of the study, and their integration to answer the research question (Perez, 2019).

4.11.4   Reliability

The reliability of the data and findings is one of the main requirements of any research process. According to Zohrabi (2013), reliability is related to the consistency, replicability and dependability of the findings attained from a research study. That is the extent of consistency with which the instrument measures a characteristic (Eeva-Mari & Lili-Anne, 2011). It is also considered the degree to which independent administration of the same instrument produces the same outcomes under similar situations. To have higher reliability, there must be less

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variation of results produced in repeated measurements of an attribute by the instrument. Traditionally, there is a connection between validity and reliability since an instrument that is not valid cannot perhaps be reliable.

External reliability refers to the obtaining of the same outcomes as the original study when it is repeated or replicated by another independent researcher (Zohrabi, 2013). Internal reliability refers to consistency in the data collection, analysis, and interpretation. This implies that, when an independent researcher reanalyses the data, similar conclusions to that of the original investigator should be drawn (Zohrabi, 2013).

In ensuring reliability in this study, the researcher explicitly explained the main tools for gathering information (interviews, questionnaires, observation). The study further described in detail how data was collected, analysed, different themes generated, and the results obtained. The interviews were recorded and preserved so that any independent researcher can easily reanalyse or replicate the study. This comprehensive information in effect contributed to the reliability of the data and findings.

4.11.4.1   Threats to reliability

In quantitative research, reliability can be threatened by data gathering factors like lack of clear and standard instructions, lack of pretesting, illogical question order or the questionnaire being too long or difficult to read (Eeva-Mari & Lili-Anne, 2011). Similarly, qualitative research is threatened by inaccurate and unsystematic interview questions, inaccurate transcriptions, failure to tape-record or take notes, relations that develop between participants and researchers, not taking distance from preconceptions, errors in reduction, interpretation and development of links with theory (Eeva-Mari & Lili-Anne, 2011).

4.12 Analysis of research data

Data analysis is concerned with the segregation of data into parts, and examining the data to differentiate its constituent parts separately in relation to the whole (Kiruki, 2018). It is a process concerned with reducing large data sets to make sense of them (White, 2019). Creswell (2014) indicated that a case study is concerned with the comprehensive description of the setting or participants, followed by an analysis of the data for themes. Hence, the gathered data were analysed on various themes under different subheadings.

4.12.1   Analysis of questionnaire data

The data from questionnaire responses were automatically captured in Google Forms Excel spreadsheets and subsequently uploaded to the IBM Statistical Package for Social Sciences (SPSS) for analysis. SPSS was used to generate descriptive statistics, and the results were presented by using frequency tables, percentages, bar graphs and pie charts for easier interpretation of the findings.

4.12.2   Analysis of interview data

The interview data collected were analysed using qualitative thematic analysis (Bryman, 2016; Trochim et al., 2016). Qualitative data analysis involves organising, accounting for, and explaining data (Cohen, Manion & Morrison, 2013). Naturalised transcription was adopted and the whole conversation was captured as detailed as possible (Nascimento & Steinbruch, 2019). In naturalised transcription, the conversation is transcribed as it is, without over-filtering by transcribers. The essence is to produce data in an accurate, objective, and natural manner. Thus, the data recorded during the interviews were transcribed verbatim to maintain their meaning (Ary et al., 2014) by using Microsoft Web on Word 365 and saving each file. The individual transcript files were then uploaded into ATLAS.ti data management software for coding.

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4.12.3   Coding of transcripts

Coding was employed to support the researcher in comprehending the perspectives of the study participants and in analysing their combined experiences. Coding the transcripts into meaningful and manageable chunks of data was instrumental in focusing the interview analysis on the experience of the participants. The transcripts were read thoroughly to generate codes based on the variables derived from the research questions and the adopted theory for the present research study. At each phase of the coding process, the researcher continued to review the data in previous phases for constant connections until saturation occurred (Saldaña, 2013). The researcher adopted open and descriptive coding for this thesis. Open coding occurred when the researcher coded each line of the transcribed interview text line by line using a few words to describe the data (Saldaña, 2013). This coding method aided the researcher to focus in-depth on each interview.

Descriptive coding method which is also called "topic coding" occurred when the researcher summarised in a word or short phrase the basic topic of a passage of the qualitative data (Saldaña, 2013, p. 87). It is the method of analysing the data's basic topics to help in answering research questions.

The researcher also adopted an inductive approach. The inductive approach is a process in which the analysis of qualitative data is guided by specific evaluation objectives. Inductive analysis refers to "approaches that primarily use detailed readings of raw data to derive concepts and themes" (Azungah, 2018, p. 393). It entails a thorough examination of data line by line and assigning codes to paragraphs or segments of texts as concepts emerge relevant to the research questions. It also allowed the researcher to go "back and forth between data analysis and the literature to make meaning out of emerging concepts" (Azungah, 2018, p. 393). The analysis was an iterative process of qualitative inquiry which is regarded as an

overarching principle of "goodness" (Nascimento & Steinbruch, 2019). Salient themes in individual transcripts and repetitions within and across narratives and field notes were identified (Vaismoradi, Turunen & Bondas, 2013; Xiao, Elueze & Kavanaugh, 2013). The labeled themes were reviewed to explore whether the themes fit in relation to the data (Ntombela, 2020). Themes and subthemes were refined to relate them to the research questions to ensure a clear focus and purpose. The results of qualitative data were presented using narrative and interpretive reports. The data analysis process employed in this study is outlined in Table 4.3 below:

Table 4. 3: Data analysis process

Step 1	Transcription of the interview data
Step 2	Familiarising with the data - reading and memoing of interview data
Step 3	Assigning preliminary codes
Step 4	Identifying/searching for themes
Step 5	Reviewing potential themes and associating them with the research questions
Step 6	Defining and naming themes (interpreting and checking consistency among themes)
Step 7	Producing the report and relating them to the literature (Reflection)

4.12.3.1   Trustworthiness of the research

The criteria for quality play a significant role in ensuring research trustworthiness (Marshall & Rossman, 2014; Cinarbaş, 2016). These criteria are referred to as "truth value" (Cinarbaş, 2016, p. 52). According to Ntombela (2020), trustworthiness is the key criterion of good qualitative research. A qualitative research study can only be trustworthy if it is transferable, credible,

confirmable and dependable (Ntombela, 2020). According to Kivunja and Kuyini (2017), these terms are better suited to the nature of qualitative inquiry and replace the quantitative terms of objectivity, reliability, external validity and internal validity. Thus, objectivity (corresponds to confirmability), reliability (corresponds to dependability), external validity (corresponds to transferability, and internal validity (corresponds to credibility) (Sections 4.11.2, 4.11.3 and 4.11.4).

According to Creswell (2013), at least two of the eight validation strategies should be engaged by a researcher. These are external audits, rich and thick description, member checking, clarifying researcher bias, negative case analysis, peer review or debriefing, triangulation and prolonged engagement and persistent observation. In this study, the researcher engaged in triangulation, clarifying researcher bias (Section 4.11.2.2) and a rich and thick description.

4.12.3.2 Rich and thick description

To better help the reader understand the case researched, Yin (2018) suggests the provision of a rich and thick description of the case(s). In this research, the context of the study, the data collection site, and the participants among others were described in detail. This study has presented a clear and thick description of the research design, data gathering, and analysis procedures in a step-by-step manner including an insightful evaluation of its effectiveness and reporting of findings. The "excerpts and quotes of the participants were presented in the findings section as a tool to provide a rich and thick description of the cases" (Creswell, 2013, p. 178). The records of the research process are set out through the study (Forero et al., 2018). More importantly, the researcher has been transparent and reflexive concerning the processes of data collection, analysis, and interpretation (Galdas, 2017).

4.12.4   Observation

The researcher visited the ten selected universities and before conducting the interviews observed the accessibility of the library buildings, facilities and resources available to students with disabilities. The library observations were documented in checklists, and this generated ten (10) separate records providing a thick description of what occurred in a natural setting and producing raw data for the analysis of the accessibility of university libraries. The observation data collected by the completion of the checklists were analysed using IBM SPSS to generate descriptive statistics. The SPSS was used in generating frequencies and percentages for the data analysis.

4.12.5   Analysis of documents

The documents indicated in Section 4.10.4 with their PDF versions were equally uploaded to AtlasTi data management software. This software assisted to cluster paragraphs that contained relevant information required for the analyses of the current study.

4.12.6   Data presentation

 Both qualitative and quantitative data were presented in textual, tabular, and graphical formats reflecting various themes and subtopics. In the research process, two datasets were obtained, analysed separately, and appropriate interpretations were provided. The researcher triangulated the methods for validation and corroboration and compared the qualitative findings and quantitative results directly. In sum, all the data were merged to address the objectives of the study.

4.13   Chapter appraisal

This chapter provided a detailed description of the research design and methodology used. A mixed approach, in particular, the convergent parallel mixed method approach to gathering both qualitative and quantitative data was discussed. The study adopted the pragmatist worldview and pragmatism paradigm allowed for the collection of both qualitative and quantitative data. A multiple case study method was used to offer an appropriate understanding of the universal design of academic libraries in ten (10) Ghanaian higher education institutions to accommodate disabled constituents. The data-gathering tools used namely questionnaires, interviews, observation, and document analysis, were discussed. Methods used to capture and analyse data were reflected in detail. The next chapter presents quantitative data and findings gathered through questionnaires and an observation checklist.
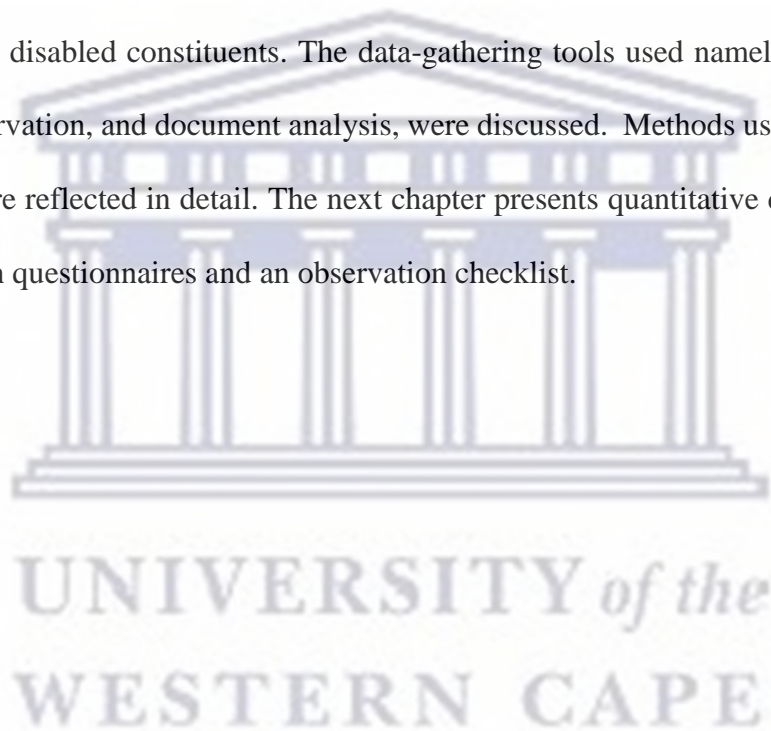
CHAPTER 5

PRESENTATION OF QUANTITATIVE DATA

5.0   Introduction

This chapter presents two quantitative data sets collected using questionnaires and an observation checklist. It provides the analysis of data gathered from the three questionnaires distributed to students with visual, hearing, and mobile impairments in the ten (10) public universities in Ghana. The quantitative data were captured using Google forms and analysed with the Statistical Package for Social Sciences (SPSS). The results are presented in textual, tabular, and graphic formats.

5.1   Questionnaires to students with disabilities

The first part of the chapter presents the data gathered from the web-based questionnaires administered to students with disabilities at ten (10) public universities in Ghana. Data from the questionnaires administered to students with different impairments are presented separately.

5.1.1   Introduction

This section recaptures the total number of students with disabilities at the ten Ghanaian public universities selected for the study as well as the response rates obtained.

5.1.1.1   Distribution of students with disabilities in the ten public universities

The total number of students with disabilities across the ten (10) public universities in Ghana was 485, consisting of 254 students with visual impairment, 150 students with mobility issues, and 81 hearing-impaired students. From Table 5.1 UEW had the highest number (188) of

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students with disabilities, followed by UG with 160, KNUST with 66, and UCC with 59 students. The least were UPS, UHAS, and GIMPA with one student with a disability each.

Table 5. 1: Distribution of students with disabilities

	Visually impaired	**Mobile impaired**	**Hearing impaired**	**Total**
UG	75	73	12	160
UEW	111	13	64	188
UCC	54	4	1	59
KNUST	13	49	4	66
UDS	1	4	0	5
UMAT	0	2	0	2
UPS	0	1	0	1
UHAS	0	1	0	1
UENR	0	2	0	2
GIMPA	0	1	0	1
Total	254	150	81	485

(Source: Field data, 2022)

5.1.1.2   Students with visual, hearing, and mobility impairment responses

Responses were received from 162 visually impaired, 69 mobile impaired, and 30 hearing impaired students. The distribution of responses according to universities that the highest was UEW with 109, followed by UG with 59, KNUST with 41, and UCC with 40 student responses. Table 5.2 represents the details.

Table 5. 2: Distribution of responses

	Visually impaired	Mobile impaired	Hearing impaired	Total
UG	41	14	4	59
UEW	74	13	22	109
UCC	35	4	1	40
KNUST	11	27	3	41
UDS	1	4	0	5
UMAT	0	2	0	2
UPS	0	1	0	1
UHAS	0	1	0	1
UENR	0	2	0	2
GIMPA	0	1	0	1
Total	162	69	30	261

(Source: Field data, 2022)
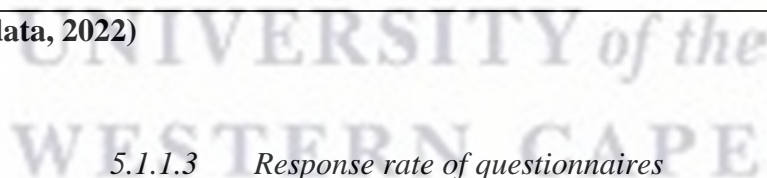
5.1.1.3   Response rate of questionnaires

Three sets of questionnaires were distributed to the 485 students with disabilities comprising 254 students visually impaired, 150 students with mobility problems, and 81 students with hearing impairments. A total of 261 completed questionnaires were received to reflect an overall satisfactory response rate of 53.8%. Maxfield and Babbie (2015) believed that a response rate of at least 50% is acceptable for analysis and reporting.

Of the 254 questionnaires distributed to visually impaired students, 162 completed questionnaires were received resulting in a response rate of 63.7%. Sixty-nine of the 150

students with mobile-impaired respondents resulting in a response rate of 46%. Thirty of the 81 hearing-impaired students returned completed questionnaires resulting in a response rate of 37%.

5.1.2 Questionnaire for students with visual impairments

The analysed data from the questionnaires administered to students with visual impairments are presented based on the order of the questions in the questionnaire.

5.1.2.1 Background information – students visually impaired

To gather biographical information about the respondents, students were asked to indicate their university, programme of study, gender, and age.

5.1.2.1.1 Universities - students visually impaired

The universities were asked to enable the researcher to confirm the records of the students with disabilities that were received from the authorities in the various universities. The results indicate that only five universities have students with visual impairments, with 74 (45.7%) from UEW, 41 (25.3%) from UG, 35 (21.6%) from UCC and one (0.6%) from UDS. Details are reflected in Table 5.3 below.

Table 5. 3: University students visually impaired (n=162)

University	Frequency (n)	Percent (%)
UG	41	25.3
UEW	74	45.7
UCC	35	21.6
KNUST	11	6.8
UDS	1	0.6
Total	162	100.0

(Source: Field data, 2022)

5.1.2.1.2   Programmes of study - students visually impaired

Visually impaired respondents were requested to indicate their programme of study. The responses in Table 5.4 below indicate that the majority 158 (97.5%) of the students with visual impairment were registered for Bachelor's degree programmes while four (2.5%) were undertaking Master's degrees.

Table 5. 4: Programmes of study -students visually impaired (n=162)

	Frequency (n)	**Percent (%)**
Bachelor	158	97.5
Masters	4	2.5
Total	162	100.0

(Source: Field data, 2022)

5.1.2.1.3   Gender - students visually impaired

The respondents were asked to indicate their gender as this will enable university libraries to adequately plan for accessibility and the provision of facilities according to the demands of each gender. As can be witnessed from the data presented in Table 6.5, most of the students with visual impairment 107 (66%) were male while 55 (34%) were female.

Table 5. 5: Gender-students visually impaired (n=162)

	Frequency (n)	**Percent (%)**
Female	55	34.0
Male	107	66.0
Total	162	100.0

(Source: Field data, 2022)

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The ages of the majority (43.2%) of the visually impaired students were between 25-29 years while those aged between 20-24 years had a frequency of 55 (34%). Eight (8) students (4.9%) were in the category 15-19 years, while 29 (17.9%) of students were 30 years or older. The age of the respondents is shown in Table 5.6 below.

Table 5. 6: Age-students visually impaired (n=162)

Years	Frequency (n)	Percent (%)
15-19	8	4.9
20-24	55	34.0
25-29	70	43.2
30+	29	17.9
Total	162	100.0

(Source: Field data, 2022)

5.1.2.2   Access into and within libraries by students visually impaired

This section of the questionnaire focused on the external and internal spaces and facilities of the library designed to accommodate students with disabilities including those with visual impairment. Details on the physical accessibility outside and within the university library building spaces and various facilities available are provided.

External and internal library environments

This section determined if the external and internal environments of their university libraries were accessible to students with visual impairments.

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5.1.2.2.1   *Sound warnings at glass doors*

A question sought to find out whether sound warnings were placed at glass doors and installed at vantage points outside and within the library building to warn and guide visually impaired students. Most of the respondents (69.75%) indicated that there were no warning signs provided, while 15.42% responded in the affirmative, 4.32% indicated that glass doors had 'partly' warnings and 10.49% were not sure. The responses are depicted in Figure 5.1.
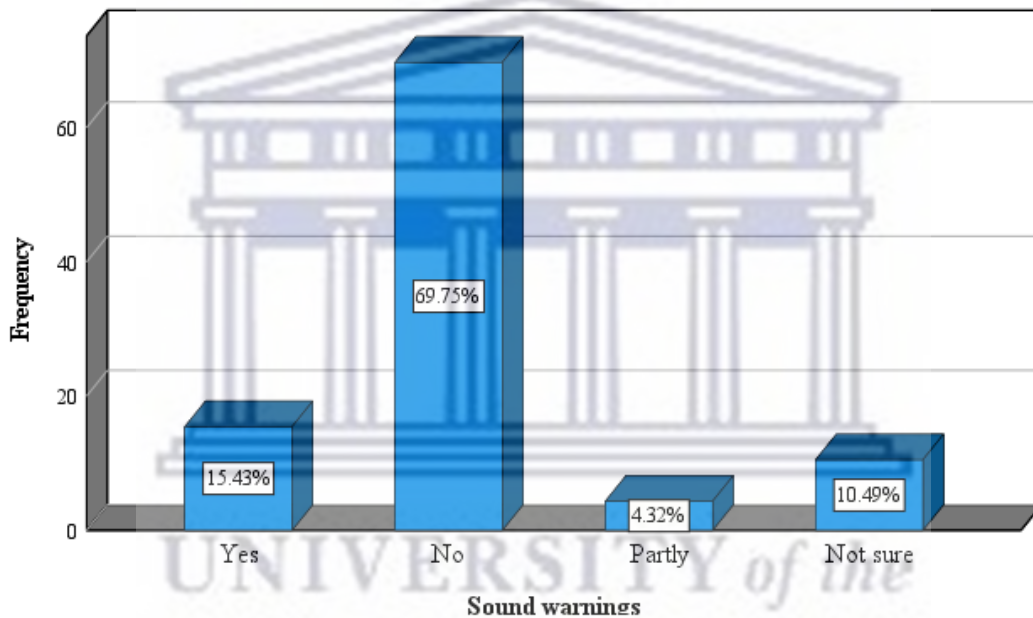
Figure 5. 1: Sound warnings (n=162) (Source: Field data, 2022)

5.1.2.2.2   *Elevators with Braille buttons and synthetic speech*

The next question requested visually impaired students whether there are well-lighted elevators with buttons and signs in Braille and synthetic speech. Most of the respondents (69.75%) indicated that there were no Braille buttons, signs or synthetic speech installed whereas 19.75% of participants acknowledged the presence thereof. A few (7.41%) of the respondents were not sure if the elevator had these features. The responses are shown in Figure 5.2 below.

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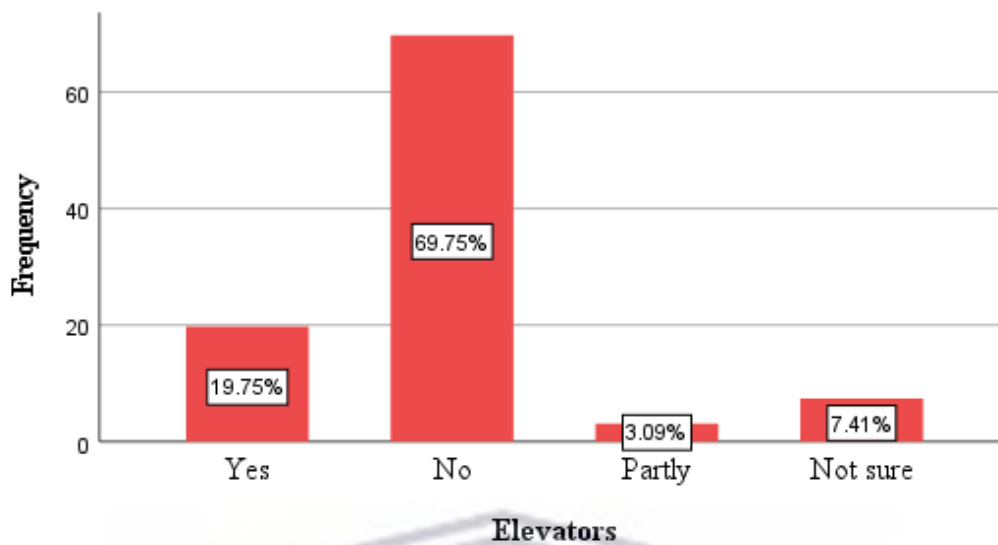
Figure 5. 2: Elevators with Braille buttons and synthetic speech system (n=162)

(Source: Field data, 2022)

5.1.2.2.3   Resources retrieval from inaccessible locations

Students with visual impairments were asked whether procedures are in place to assist them in retrieving resources from inaccessible locations. The responses show that most (44.44%) of the respondents are not aware of the library's procedures to assist them in retrieving materials from inaccessible locations while 36.42% indicated awareness of procedures. A few visually impaired students (7.41%) were not sure if there were procedures. Figure 5.3 summarises the findings.

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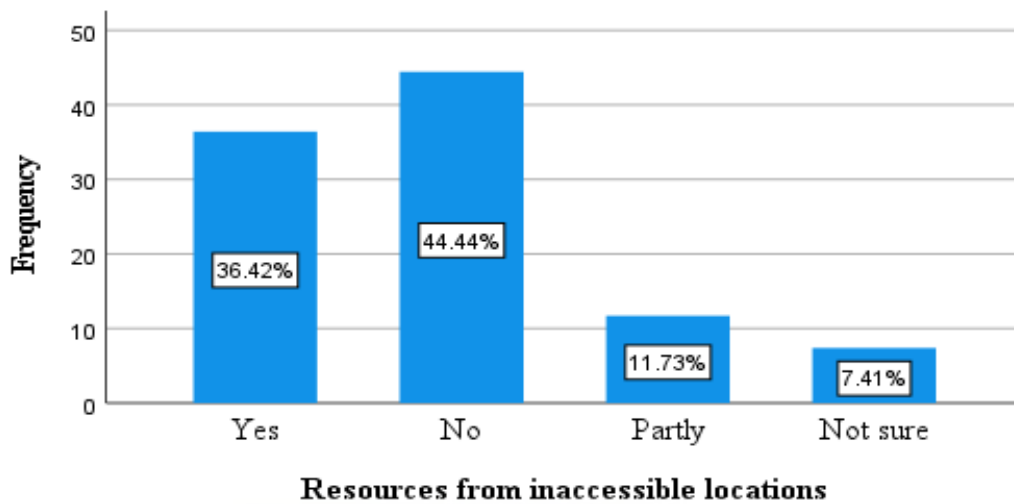
Figure 5. 3: Resources from inaccessible locations (n=162) (Source: Field data, 2022)

5.1.2.2.4   Access to facilities and services

Students with visual impairment were asked to indicate if the library design provided easy access to facilities and services. The majority (54.94%) of the respondents indicated that the library design did not provide easy access to facilities and services while only 29.63% regarded access to some facilities and services as easy. The rest of the respondents answered 'partly' (10.49%) and 'Not sure' (4.95%). Figure 5.4 illustrates the detailed data.
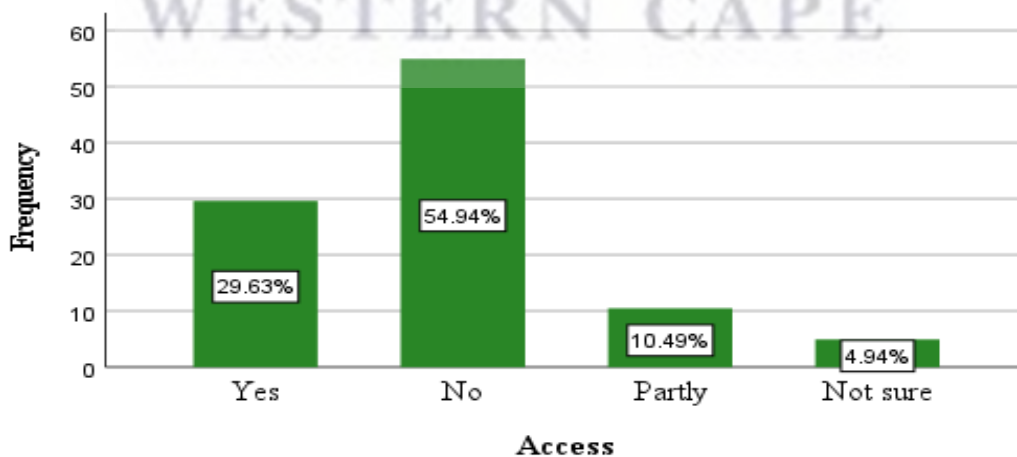
Figure 5. 4: Access to facilities and services (n=162)
(Source: Field data, 2022)

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5.1.2.2.5   Barrier-free walkways

The IFLA checklist for access to libraries by students with disabilities required that visually impaired students should be able to walk into the library building and access other locations without bumping into obstacles. The social model of disability equally requires the elimination of all forms of barriers that hinder the inclusion and full participation of students with disabilities. The respondents were asked to indicate if they can easily find their way into the library and have access to other sections without impediments. The majority (59.2%) of the respondents acknowledged having challenges walking freely into the library or accessing all the library sections without experiencing obstacles. A few of the respondents (22.8%) indicated no challenges, while 4.9% were not sure. The responses are depicted in Figure 5.5 below.
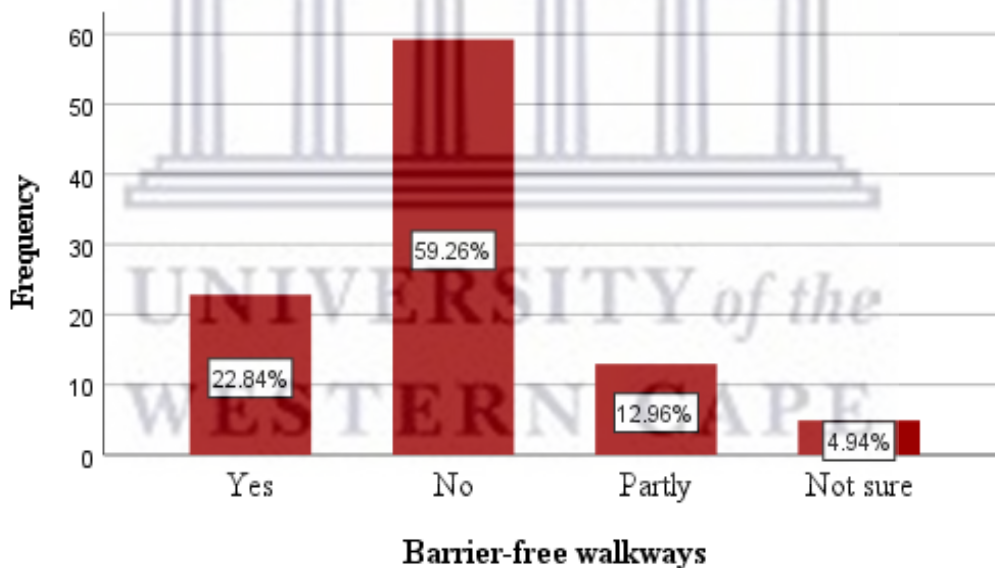
Figure 5. 5: Barrier-free walkways (n=162) (Source: Field data, 2022)

5.1.2.2.6   Designated washroom

Respondents were asked to indicate if there are disability-friendly washrooms. The majority of the respondents (73.4%) intimated that there were no designated disability-friendly washrooms compared to 13.5% who responded in the affirmative. A few of the respondents (8.0%) were

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not sure whether there were disability-friendly washrooms. The responses are reflected in Figure 5.6.
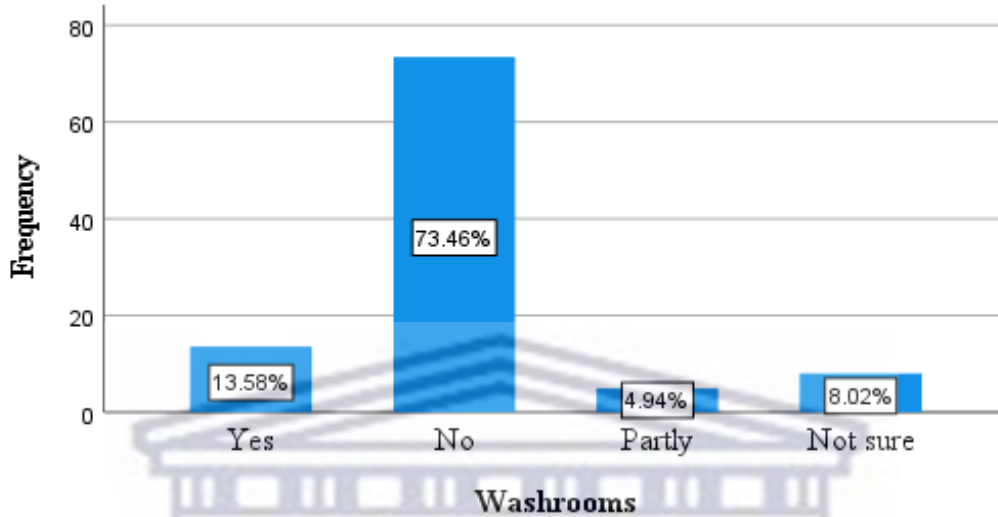
Figure 5. 6: Designated washrooms (n=162) (Source: Field data, 2022)

5.1.2.2.7 *Braille shelf labels*

To ascertain whether the visually impaired can independently access and retrieve books from the shelves, respondents were asked to indicate if the library shelves had Braille labels. The results revealed that 54.3% of the respondents indicated that the library shelves had no Braille labels while 31.4% confirmed that some shelves had Braille identifiers to guide them. A few of the respondents (7.4%) were not sure if there were shelves with Braille labels. The results are reflected in Figure 5.7 below.
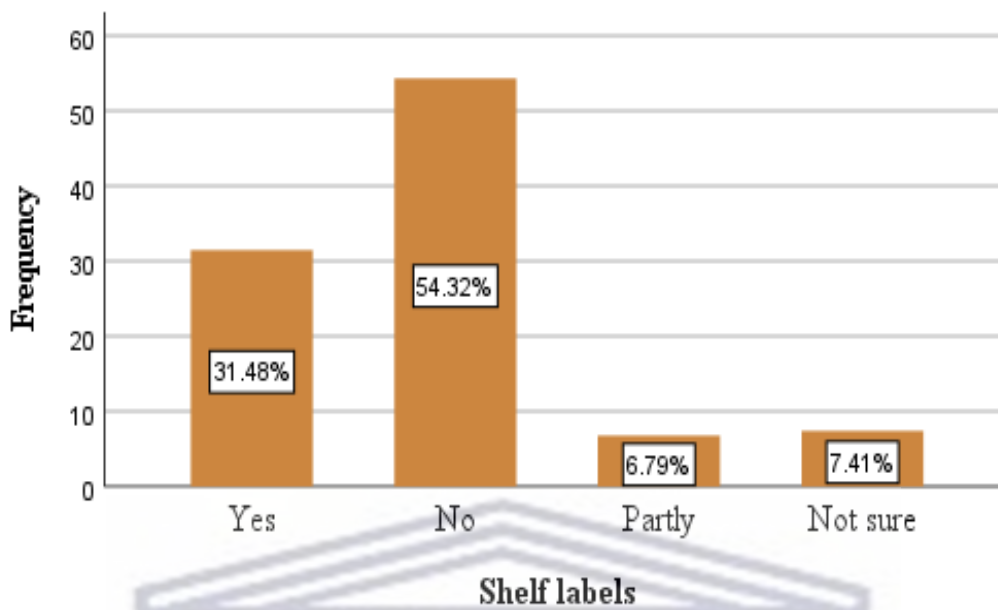
Figure 5. 7: Shelf labels provided in Braille format (n=162)

(Source: Field data, 2022)

5.1.2.2.8   Access to the various library levels

In response to the question of whether students visually impaired have access to all the levels in the library, 67.2% of the respondents indicated that they do not have access to all the floors of the library. This may be a result of the lack of lifts to provide easy access for students with disabilities. Some respondents (17.9%) indicated that they could access all the floors, while 6.1% were not sure whether visually impaired students could access all the floors in the library. Figure 5.8 below reflects the details.
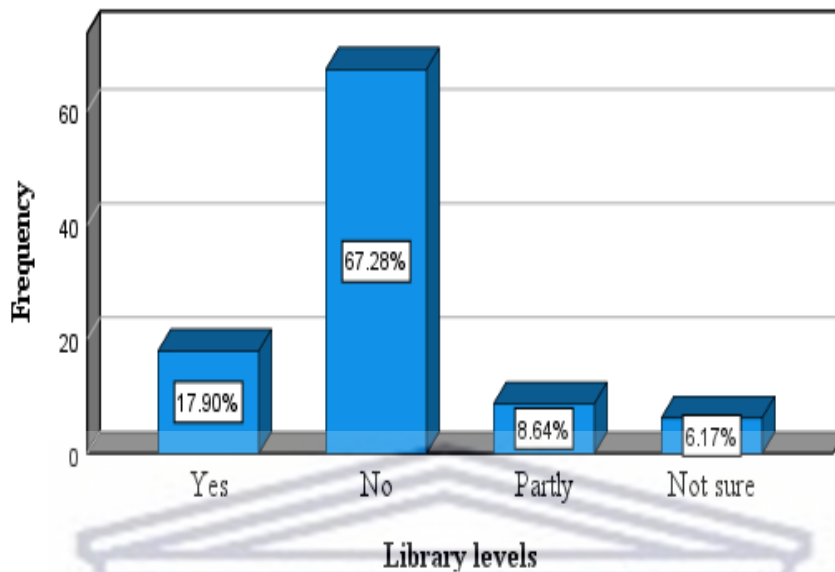
*Figure 5. 8***:** Access to library levels (n=162) (Source: Field data, 2022)

5.1.2.2   Information services and ICTs

This section of the questionnaire requested responses from the students with visually impairments concerning the provision of information services, the provision of ICT tools to facilitate access to information, and the attitude of library staff toward students with disabilities.

5.1.2.3.1   Reasons for non-visits to the library

An enquiry from the students visually impaired on the reasons that may contribute to them not patronising or visiting the library revealed that 48 (29.6%) of the respondents mentioned inappropriate and/or not easy-to-read formats of library resources while 43 (26.5%) attributed it to the inaccessible website. Other reasons for non-visits were inadequate tape/DAISY/CD/DVD availability (20.4%), inadequate Braille materials (17.3%), and inadequate large print (6.2%). Results are summarised in Table 5.7 below.

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Table 5. 7: Reasons for library non-visits (n=162)

	Frequency (n)	Percent (%)
Inappropriate not easy-to-read formats of resources	48	29.6
Inaccessible Website	43	26.5
Inadequate Braille	28	17.3
Inadequate Tape/DAISY/CD/DVD	33	20.4
Inadequate Large Print	10	6.2
Total	162	100.0

(Source: Field data, 2022)

5.1.2.3.2   Training offered

The study sought to determine the training initiatives provided to students with visual impairments to enable them to be independent and able to participate fully in higher education.

Table 5. 8: Training offered to students visually impaired (n=162)

	Frequency (n)	Percent (%)
Training on access to Internet resources and services	30	18.5
Training on the effective use of assistive technology and devices	81	50.0
Search strategies for information on the Internet	24	14.8
How to use the OPAC	27	16.7
Total	162	100.0

(Source: Field data, 2022)

From Table 5.8 the majority of respondents 81(50%) indicated that they have received training on the effective use of assistive technology and devices to support their learning, while 30

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(18.5%) alerted to training on accessing online resources and services, 27 (16.7%) on how to use the Online Public Access Catalogue (OPAC) and 24 (14.8%) on search strategies.

5.1.2.3.3 *Information services provided to students visually impaired*

In response to information services offered, most of the visually impaired students 65 (40.1%) specifically mentioned Braille documentation, whereas library staff assistance in retrieving information from the Internet received a frequency of 32 (19.8%). Other services mentioned were the provision of computers with assistive software for use in the library (11.7%), availability of designated staff for service provision to students with disabilities (11.1%), information literacy training (9.9%) and the provision of materials in various accessible formats (7.4%). Responses are captured in Table 5.9.

Table 5. 9: Information services provided to students visually impaired (n=162)

	Frequency (n)	Percent (%)
Braille documentation	65	40.1
Information literacy training	16	9.9
Computers with assistive software	19	11.7
Materials in various accessible formats	12	7.4
Staff assistance in retrieval of information from the Internet	32	19.8
Staff designated for service provision to students with disabilities	18	11.1
Total	162	100.0

(Source: Field data, 2022)

To ascertain whether information resources are available and accessible to students visually impaired, the respondents were asked to indicate the information resources available to them to support their learning and education. The majority of students visually impaired indicated that talking newspapers 146 (90.1%), talking books 134 (82.7%), e-databases and e-books 127 (78.4%), Internet and digital resources using Braille display 117 (72.2%), Braille books 114 (70.4%) and audio-visual materials 98 (60.5%) were not available to them. Responses are captured in Table 5.10.

Table 5. 10: Information resources for students visually impaired (n=162)

	Available	**Not Available**	**Total**
Talking books	28	134	162
	17.3%	82.7%	100%
E-databases and e-books	35	127	162
	21.6%	78.4%	100%
Internet and digital resources using Braille displays	45	117	162
	27.8%	72.2%	100%
Talking newspapers	16	146	162
	9.9%	90.1%	100%
Audio-visual materials	64	98	162
	39.5%	60.5%	100%
Braille books	48	114	162
	29.6%	70.4%	100%

(Source: Field data, 2022)

5.1.2.3.5   Alternative formats of information resources

In response to the question of whether the university libraries were providing alternative formats of information resources for students with visual impairment, the majority of the respondents (43.8%) indicated alternative formats of resources are not provided or partially provided (33.3%). Only 22.8% acknowledge university libraries offering alternative formats. The responses are shown in Figure 5.9.
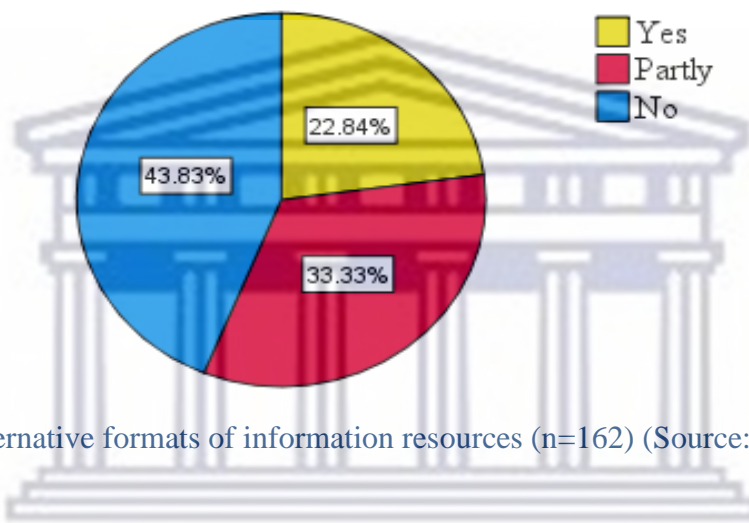
Figure 5. 9: Alternative formats of information resources (n=162) (Source: Field data, 2022)

5.1.2.3.6   Assistive devices - students visually impaired

In response to whether assistive devices for students with visual impairment were available in the university libraries, Table 5.11 reflects that respondents acknowledge embossers 54 (33.3%), laptops or desktops 45 (27.8%), screen readers 22 (13.6%), recorders 20 (12.4%) and scanners (13, 8%). Eight (8) students (4.9%) did not respond.

Table 5. 11: Assistive devices – students visually impaired (n=162)

	Frequency (n)	Percent (%)
Laptops or desktops	45	27.8
Recorder	20	12.4
Scanner	13	8.0
Embosser	54	33.3
Screen reader	22	13.6
No Response	8	4.9
Total	162	100.0

(Source: Field data, 2022)

5.1.2.3.7   *Significance of assistive technology and devices*

The students with visual disabilities were further required to indicate the importance of assistive technology and device in accessing information resources, facilities, and services in the library. Figure 5.10 reflects that assistive technology and devices were rated very important (72.2%), important (17.9%), somewhat important (8.6%) and not important 2 (1.2%).
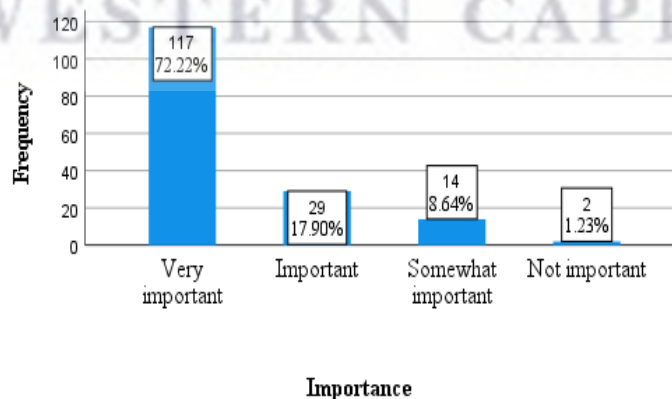
Figure 5. 10: Significance of assistive technology and devices (n=162)

5.1.2.3.8   Level of library resources accessibility

Access to library facilities and resources not only support learning but promotes the academic performance of students with visual disabilities. The respondents were asked to indicate the level of accessibility of the library resources. A four-point Likert scale of 1= very good, 2= good, 3= neutral, and 4= poor was used to grade the level of accessibility. Table 5.12 reflects that most visually impaired students rated accessibility as poor: e-journals (47.5%), library databases (45.7%), library websites (43.2%), OPAC (42%), and e-books (40.7%).

Table 5. 12: Library resources accessibility (n=162)

	Very Good	Good	Neutral	Poor	Total
Library website	8	29	55	70	162
	4.9%	17.9%	34.0%	43.2%	100%
E-books	6	37	53	66	162
	3.7%	22.8%	32.7%	40.8%	100%
Library databases	7	23	58	74	162
	4.3%	14.2%	35.8%	45.7%	100%
E-journals	5	27	53	77	162
	3.1%	16.7%	32.7%	47.5%	100%
OPAC	8	18	68	68	162
	4.9%	11.1%	42%	42%	100%

(Source: Field data, 2022)

5.1.2.3.9   Accessibility library website

The library website as the portal to all library and information resources should be accessible and easy to navigate by people with visual impairments. In response to a question on whether the library website was accessible, students with visual impairment indicated that the website

is not accessible (31.4%), somewhat not accessible (32.1%), somewhat accessible (25.1%) and

accessible (11.1%). In total, the findings revealed 63.4% perceived the content of the library

website as not accessible. Figure 5.11 presents the responses.
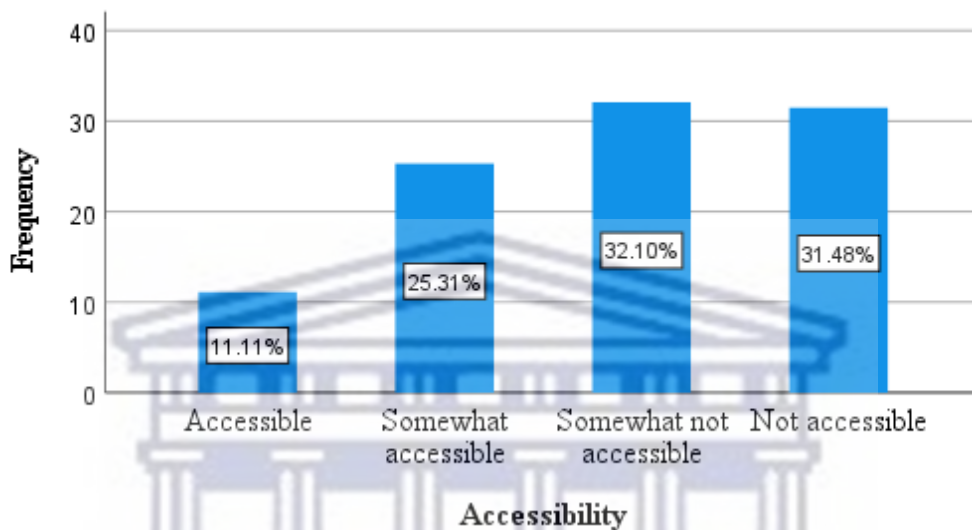
Figure 5. 11: Accessibility of library website (n=162) (Source: Field data, 2022)

5.1.2.3.10   *Compatibility of library website with assistive technology and devices*

The students with visual impairment were further asked to indicate if the library website was

compatible with their assistive devices. In response, 32.1%) of the respondents indicated that

the website was not compatible with their devices, 24.6% were not sure, 24.6% indicated partly

compatible and 18.5% claimed compatibility. The responses are illustrated in Figure 5.12.

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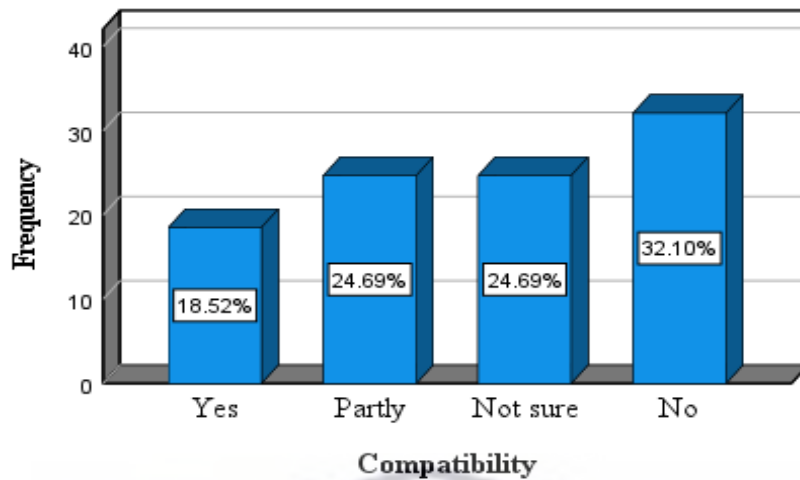
Figure 5. 12: Compatibility of library website with assistive technology and devices (n=162)
(Source: Field data, 2022)

5.1.2.3.11   *Benefits of ICT and assistive devices*

Students with visual impairments were then asked to indicate whether they agree with statements regarding the benefits of ICT and assistive devices. From Table 5.13 respondents agreed that ICT and assistive devices assisted with the acquisition of knowledge and skills (93%), promote inclusion and participation in academic libraries (92.6%), independent learning (90.7%), facilitate communication and collaboration with others (87.7%), as well as promote equitable access to information (87.7%). Fifteen (9.2%) students indicated that they were not sure.

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Table 5. 13: Benefits of ICT and assistive devices to visually impaired students (n=162)

	Agree	Disagree	Not sure	Total
It promotes independent learning.	147	6	9	162
	90.7%	3.7%	5.6%	100%
It helps in the acquisition of knowledge and skills for disabled students.	152	5	5	162
	93.8%	3.1%	3.1%	100%
It promotes equitable access to information.	142	7	13	162
	87.7%	4.3%	8.0%	100%
It facilitates communication and collaboration with others.	142	5	15	162
	87.7%	3.1%	9.2%	100%
It promotes inclusion and full participation of disabled students in the university community.	150	2	10	162
	92.6%	1.2%	6.2%	100%

(Source: Field data, 2022)

5.1.2.4   Library experiences of students with visual impairments

This section of the questionnaire focused on the library experiences of students with visual disabilities. It looked at the attitude of library staff, the library needs of students with visual impairments, and barriers that impede the inclusion, access, and participation of students with visual impairments in public university libraries. Ways of addressing these barriers were also explored.

5.1.2.4.1   Attitude of library staff

The students with visual impairments were asked to indicate their level of agreement with statements regarding the attitude of library staff toward students with disabilities. A five-point scale (1= strongly disagree, 2= disagree, 3= Neutral, 4= agree, 5= strongly agree) was used for this purpose. Table 5.14 below shows that respondents strongly agreed and agreed that library

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staff do not respond to my greetings (49.4%), are unfriendly and unapproachable (49.4%), are too busy to help me (36.5%), have an intimidating tone of voice (43.2%), are polite and communicates clearly and effectively with me (37%), and look at me directly when we are communicating. Only 27.2% of the respondents strongly disagreed that library staff lack adequate knowledge of the needs of students with disabilities.

Table 5. 14: Attitude of library staff (n=162)

	SD	D	N	A	SA	Total
Staff lack adequate knowledge of the needs of students with disabilities	32	38	31	17	44	162
	19.7%	23.5%	19.1%	10.5%	27.2%	100%
Library staff are polite and communicate clearly and effectively with me	60	31	40	19	12	162
	37%	19.1%	24.8%	11.7%	7.4%	100%
Library staff have an intimidating tone of voice	19	70	29	10	34	162
	11.7%	43.2%	17.9%	6.2%	21%	100%
Library staff are too busy to help me	31	59	21	31	20	162
	19.1%	36.5%	13%	19.1%	12.3%	100%
Library staff are unfriendly and unapproachable	13	80	27	6	36	162
	8%	49.4%	16.7%	3.7%	22.2%	100%
Library staff do not respond to my greetings	6	80	10	3	63	162
	3.7%	49.4%	6.2%	1.9%	38.8%	100%
Library staff look at me directly when we are communicating	54	36	42	9	21	162
	33.3%	22.2%	25.9%	5.6%	13%	100%

(Source: Field data, 2022)

5.1.2.4.2   Library needs - students with visual impairments

Respondents were asked to ascertain whether their needs were accommodated by the library. Figure 5.13 shows that the needs of students with visual impairments were partly accommodated (46.3%), not accommodated (32.1%) and accommodated (16%). Nine students were not sure about their needs being accommodated.
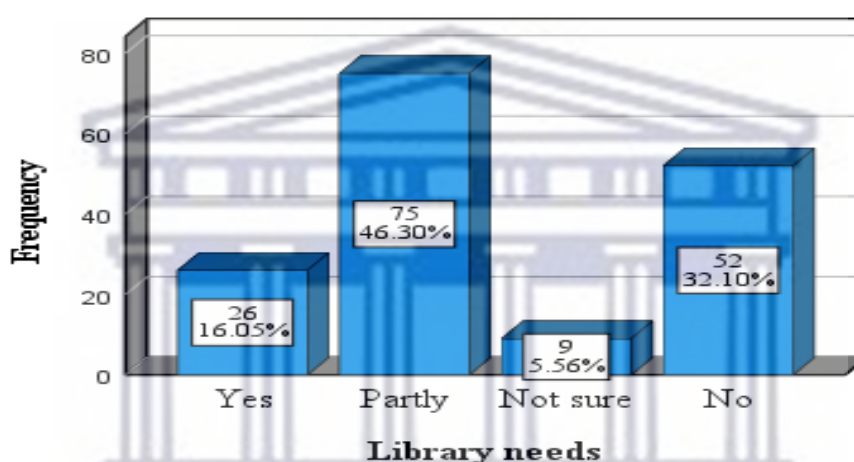
Figure 5. 13: Library needs (n=162) (Source: Field data, 2022)

5.1.2.4.3   Barriers experienced in libraries

To determine barriers experienced in the library, respondents were asked to indicate their agreement with eight (8) statements using a three-point Likert scale of 1= agree, 2= disagree, and 3= not sure. The respondents agreed that barriers are inadequate funding for equipment and devices (72.8%), dependence on readers to read (61.1%), lack of a library policy to guide the provision of accessible services (56.8%), lack of well-furnished designated area (54.6%), lack of resources in alternative formats (53.1%), inadequate ICT facilities, assistive technology

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and devices (53.1%), lack of tactile communication (52.1%) as well as the negative attitudes of library staff (32.1%). Details are recorded in Table 5.15.

Table 5. 15: Barriers in library experiences by students visually impaired (n=162)

Barriers	Agree	Disagree	Not sure	Total
The inability of the library to provide tactile communication	83	49	30	162
	51.2%	30.3%	18.5%	100%
Lack of resources in alternative formats for visually impaired students	86	53	23	162
	53.1%	32.7%	14.2%	100%
Lack of a well-furnished designated section in the library for students with visual impairments	89	49	24	162
	55.0%	30.2%	14.8%	100%
Inadequate ICT facilities and assistive devices for visually impaired students	86	54	22	162
	53.1%	33.3%	13.6%	100%
Students with visual impairments depend on readers to read	99	41	22	162
	61.1%	25.3%	13.6%	100%
The negative attitude of library staff	52	77	33	162
	32.1%	47.5%	20.4%	100%
Lack of a library policy relating to services, resources, and accessibility provisions for visually impaired students	92	40	30	162
	56.8%	24.7%	18.5%	100%
Inadequate funding to provide visually impaired students with equipment and devices	118	21	23	162
	72.8%	13%	14.2%	100%

(Source: Field data, 2022)

5.1.2.4.4 *Removing barriers to library experience*

An open-ended question requested the respondents to suggest ways to address the challenges that students with visual impairment face in academic libraries. Most respondents 48 (29.6%) suggested the provision of adequate funding for the acquisition of relevant equipment, assistive technology, and devices to support the visually impaired. Other suggestions were the creation of disability-friendly and accessible environments and facilities (16.1%), the creation of a Disability unit in the university to help address discrimination and exclusion in higher institutions (16.1%), the provision of alternative formats of resources (10.5%), the employment of skilled and dedicated ICT staff to support students with disabilities (4.3%), the formulation of a library policy to guide the provision of accessible environments, resources, and facilities (4.3%), the creation of a well-furnished Braille library (3.7%), mass education and advocacy about disability issues in the university community (3.1%), as well as consultation/involvement of students with disabilities in decision-making (3.1%). A high number of 30 students (18.5%) did not respond. The responses are shown in Table 5.16.

Table 5. 16: Removing barriers in library experiences (n=162)

	Frequency (n)	Percent (%)
Create a Disability Unit in the university	11	6.8
Provide alternative formats of resources for visually impaired students	17	10.5
Provide adequate funding to acquire equipment and assistive devices	48	29.6
Create disability-friendly and accessible environments and facilities	26	16.1
Employ skilled ICT staff dedicated to supporting SWDs	7	4.3
Formulate a policy to guide the provision of accessible environment, resources, and facilities	7	4.3
Massive education and advocacy in the university community about disability issues	5	3.1
Consult SWDs regarding facilities and resources for them	5	3.1
Create a well-furnished Braille section	6	3.7
No response	30	18.5
Total	162	100%

(Source: Field data, 2022)

5.1.2.5 Redesigning buildings, facilities, and services

This questionnaire section focused on library spaces, services, facilities, and sections that need redesigning to facilitate access to accommodate students with disabilities.

5.1.2.5.1 Redesigning spaces and facilities

This question wanted to determine if there are library spaces and facilities in need of redesigning to accommodate students with disabilities. The responses are presented in Table 5.17 below.

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Table 5. 17: Redesigning spaces and facilities (n=162)

	Frequency (n)	Percent %)
Braille library and provide appropriate assistive devices	23	14.2
Alternative formats of resources	8	4.9
Computer laboratory	16	9.9
Library website	15	9.3
Provide ramps, elevators, disability-friendly toilets	20	12.4
Research commons	7	4.3
Study carrels	5	3.0
Disability training for library personnel	7	4.3
No response	61	37.7
Total	162	100%

(Source: Field data, 2022)

From Table 5.17 twenty-three (14.2%) of the respondents suggested redesigning of the current Braille library equipping it with appropriate assistive technology and devices. Also suggested were redesigning of ramps, washrooms, elevators (12.4%), computer laboratories (9.9%), library websites (9.3%), library resources to offer alternative accessible formats (4.9%), research commons (4.3%), training of library personnel on disability issues (4.3%) as well as study carrels and furniture (3%). Many students, 61(37.7%), did not offer suggestions.

5.1.2.5.2   *Universal design in university libraries*

To determine the application of universal design principles in university libraries, respondents were asked to indicate their level of agreement on the principles of universal design in libraries by using a five-point Likert scale of 1= strongly agree (SA), 2= agree (A), 3= neutral (N), 4= disagree (D) and 5= strongly disagree (SD).

Most of the respondents disagree and strongly disagree with the statements that the library communicates necessary information effectively to the users 96 (59.3%), services and resources are useful and marketable to people with diverse abilities 82 (50.6%), design and facilities can be used with low physical effort 78 (48.1%), design, website and instruction guide for students are easy to understand 63 (38.9%), design and facilities do not minimise hazards and accidents 63 (38.9%), as well as design and services accommodate a wide range of individuals preferences and abilities 57 (35.2%). In contrast, 51 (31.5%) strongly agree and agree that the library provides an appropriate size and space for approach. It should be noted that relatively many students stayed neutral. Table 5.18 reflects the responses.

Table 5. 18: Application of universal design principles in the university libraries (n=162)

Principles		SA	A	N	D	SD	Total
Equitable use	Library services and resources are useful and marketable to people with diverse abilities	10 6.2%	41 25.3%	29 17.9%	59 36.4%	23 14.2%	162 100%
Flexibility in use	The library design and services accommodate a wide range of individual preferences and abilities	6 3.7%	40 24.7%	59 36.4%	37 22.8%	20 12.4%	162 100%
Simple and intuitive use	The library design, website and instruction guide for students are easy to understand, regardless of the student's experience, knowledge, language skills, or current concentration level	11 6.8%	29 17.9%	59 36.4%	36 22.2%	27 16.7%	162 100%

Perceptible information	The library communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities	9 5.6%	37 22.8%	20 12.3%	36 22.2%	60 37.1%	162 100%
Tolerance to error	The library design and facilities minimise hazards and the adverse consequences of accidental or unintended actions	11 6.9%	40 24.7%	48 29.6%	34 20.9%	29 17.9%	162 100%
Low physical effort	The library design and facilities can be used effectively and comfortably and with low physical effort	5 3.1%	44 27.2%	35 21.6%	37 22.8%	41 25.3%	162 100%
Size and space for approach and use	The library provides appropriate size and space for approach, reach, manipulation, and use of facilities and services regardless of the user's body size, posture, or mobility	11 6.8%	44 27.2%	59 36.4%	28 17.3%	20 12.3%	162 100%

(Source: Field data, 2022)

5.1.3   Questionnaire for students with mobility impairments

The analysed data from the questionnaires administered to students with mobile impairments are presented based on the order of the questions in the questionnaire.

5.1.3.1   Background - students with mobility impairments

To gather biographical information about the respondents, students were asked to indicate their university, programme of study, gender, and age.

5.1.3.1.1   Universities – students with mobile impairments

The respondents were asked to indicate the name of their university. This was to enable the researcher to confirm the records of the students with disabilities that were received from the authorities in the various universities. Table 5.19 presents the responses.

Table 5. 19: Universities-mobile impaired students (n=69)

	Frequency (n)	Percent (%)
UG	14	20.2
UEW	13	18.8
UCC	4	5.8
KNUST	27	39.1
UDS	4	5.8
UMAT	2	2.9
UPS	1	1.5
UHAS	1	1.5
UENR	2	2.9
GIMPA	1	1.5
Total	69	100%

(Source: Field data, 2022)

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Table 5.19 above indicates that all ten (10) public universities had students with mobility impairments. The distribution of students participating was 27 (39.1%) from KNUST, 14 (20.3%) from UG, 13 (18.8%) from UEW, 4 (5.8%) each from UCC and UDS, 2 (2.9%) each from UMAT and UENR as well as 1 (1.4%) each from UPS, UHAS, and GIMPA.

5.1.3.1.2 *Programme of study - students with mobility impairments*

Responses by students with mobility impairments about the programmes they are enrolled in, revealed that most 65 (94.2%) were registered for Bachelor's degrees, one (1.4%) was registered for a Master's programme and three (4.3%) were offering Ph.D. programmes. This is depicted in Figure 5.14 below.
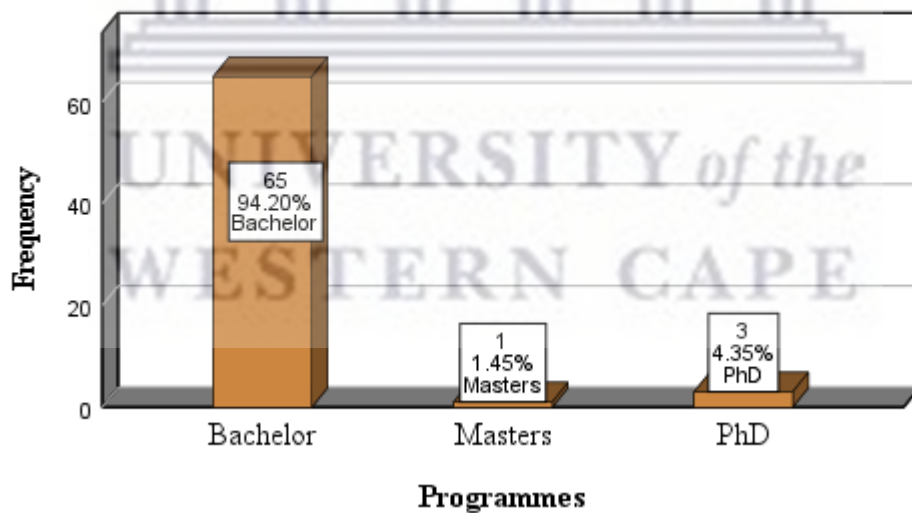
Figure 5. 14: Programme of study - students with mobility impairments (n=69)

(Source: Field Data, 2022)

5.1.3.1.3 *Gender – students with mobility impairments*

The respondents were asked to indicate their gender as this will enable university libraries to adequately plan for accessibility and the provision of facilities according to the demands of each gender's facilities. As can be seen from Figure 5.15, 49 (71%) were male and twenty (28.9%) female students. It can be observed that more males with mobility impairments were admitted as compared to their female counterparts.
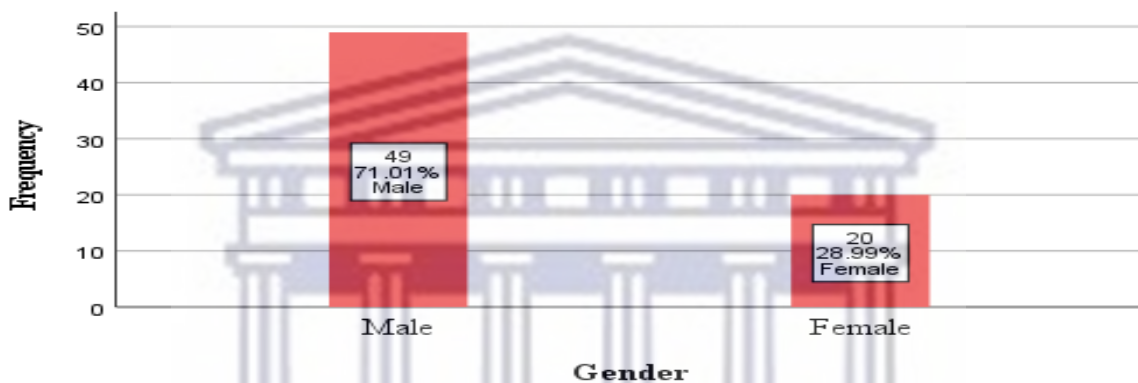
Figure 5. 15: Gender of respondents with mobility impairments (n=69)
(Source: Field Data, 2022)

5.1.3.1.4 *Age – students with mobility impairments*

The ages of most of the students with mobility impairments ranged between 20 and 24 years (69.5%), between 25 and 29 years (14.4%), older than 30 years (8.7%) and between 15 and 19 years (7.25%). The responses are presented in Figure 5.16.
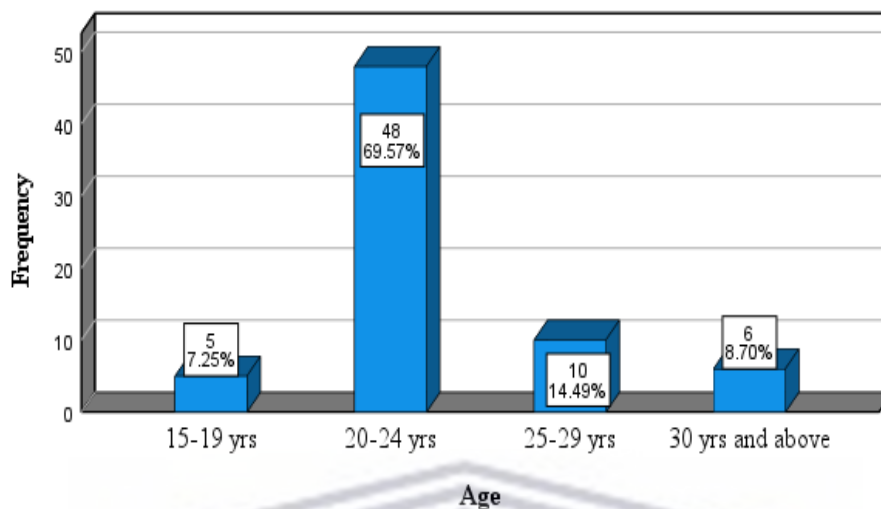
Figure 5. 16: Age of respondents with mobility impairments (n=69)
(Source: Field Data, 2022)

5.1.3.2   Physical access into and within the university libraries

Like the questionnaire for students with visual impairments, this section focused on the external and internal spaces and facilities of the library designed to accommodate students with mobility impairments. It provides details on the physical accessibility outside and within the university library building spaces and various facilities available.

5.1.3.2.1   External and internal library environments

To ascertain the physical access into and within public university libraries by students with mobility impairments, they were asked to rate the access using a four-point scale of 1= yes, 2= no, 3= partly, and 4= not sure.

Most responses regarding the external environment reported insufficient library parking spaces marked with the international symbol for persons with disabilities and close to the library entrance (55.1%), no unobstructed access paths with smooth and slip-free surfaces to the

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entrance of the libraries (43.5%) and no ramps with railings on both sides (52.2%). Forty-three (43) students (62.3%) indicated sufficient space in front of the entrance doors of the libraries to allow a wheelchair to turn around or enter easily.

Within the library students (84.1%) recorded no automatic doors in the library (84.1%), no disability-friendly toilets designated for individuals with disabilities (78.3%), no adjustable reading and computer tables (59.4%), no access to all the floors of libraries (58.0%), inadequate clear easy-to-read signs with pictograms throughout the library (52.2%), and no reachable from a wheelchair shelves (52.2%). The responses are depicted in Table 5.20.

Table 5. 20: Physical access outside and inside the library building (n=69)

	Yes	No	Partly	Not sure	Total
There are sufficient library parking spaces marked with the international symbol for disabled people and close to the library entrance.	7 10.1%	38 55.1%	2 2.9%	22 31.9%	69 100%
Are there obstructed access paths, smooth and slip-free surfaces to the entrance?	26 37.7%	30 43.5%	5 7.2%	8 11.6%	69 100%
There are ramps with railings on both sides.	20 29.0%	36 52.2%	6 8.7%	7 10.1%	69 100%
There is sufficient space in front of the entrance door to allow a wheelchair to turn around or enter easily.	43 62.3%	17 24.6%	6 8.7%	3 4.4%	69 100%
Are there disability-friendly toilets designated for individuals with disabilities?	4 5.8%	54 78.3%	3 4.3%	8 11.6%	69 100%
There are automatic doors in the library.	2 2.9%	58 84.1%	2 2.9%	7 10.1%	69 100%

There are clear and easy-to-read signs with pictograms throughout the library.	19 27.5%	36 52.2%	8 11.6%	6 8.7%	69 100%
There are procedures to assist patrons with disabilities in retrieving materials from inaccessible locations.	27 39.1%	26 37.7%	4 5.8%	12 17.4%	69 100%
Are shelves reachable from a wheelchair?	16 23.2%	36 52.2%	9 13%	8 11.6%	69 100%
There are adjustable reading and computer tables designed for people with disabilities.	14 20.3%	41 59.4%	4 5.8%	10 14.5%	69 100%
Students with disabilities have access to all the floors of the library.	15 21.7%	40 58%	6 8.7%	8 11.6%	69 100%

(Source: Field Data, 2022)

5.1.3.3   Information services and ICTs

This section of the questionnaire ascertained the support provided for students with mobility impairments in Ghanaian public universities.

5.1.3.3.1   Reasons for non-visits to the library

Respondents were requested to indicate reasons why they were not visiting the library. The responses recorded in Table 5.21 show that the majority (43.5%) of the respondents indicated a lack of flexibility in the library design, difficulties in accessing library resources (33.3%), inaccessibility of the library website (14.5%), inadequate CD/DVD tape or DAISY (5.7%) and inadequate large print materials (3.0%).

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Table 5. 21: Reasons for non-visits to the library (n=69)

	Frequency (n)	Percent (%)
Difficulty in accessing library resources	23	33.3
Inaccessible Website	10	14.5
Lack of flexibility in library design	30	43.5
Inadequate Tape/DAISY/CD/DVD	4	5.7
Inadequate Large Print	2	3.0
Total	69	100.0

(Source: Field Data, 2022)

5.1.3.3.2 Training offered

In response to the type of training offered to students with mobile disabilities, students indicated training on search strategies (46.4%), how to use the OPAC (20.3%), accessing library resources (15.9%), effective use of assistive technology and devices (14.4%) and referencing styles (3.0%). The responses are presented in Table 5.22.

Table 5. 22: Training offered to mobile-impaired students (n=69)

	Frequency (n)	Percent (%)
Access to Internet resources and services	11	15.9
Effective use of assistive technology and devices	10	14.4
Search strategies for information on the Internet	32	46.4
How to use the OPAC	14	20.3
Referencing styles	2	3.0
Total	69	100.0

(Source: Field Data, 2022)

5.1.3.3.3   Availability of support services

In response to the question of whether support services are available to students with mobility impairments, most students (82.6%) indicated that only a few support services are available. The remaining twelve (17.3%) respondents claimed the non-existence of support services. Responses are illustrated in Figure 5.17.
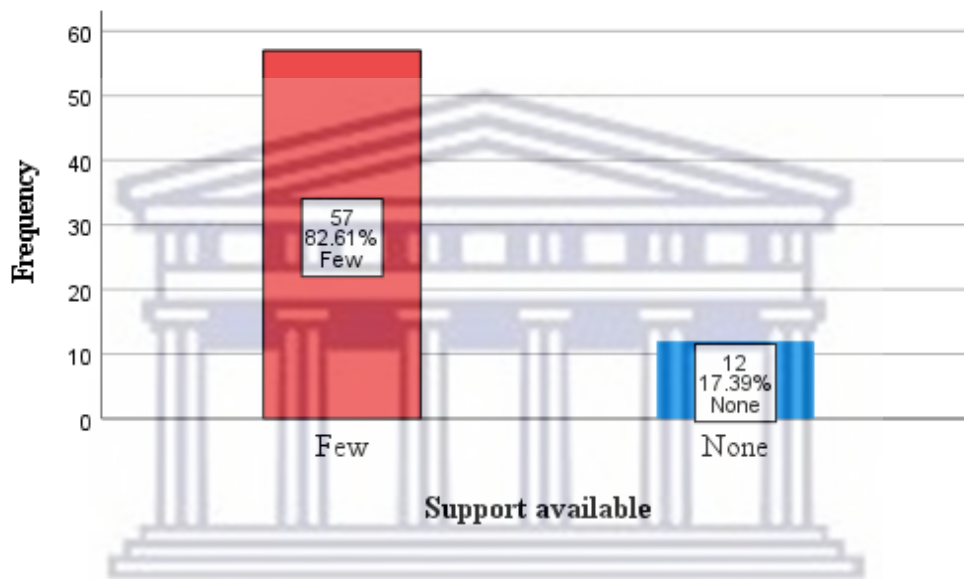
Figure 5. 17: Availability of support services to mobility-impaired students (n=69)
(Source: Field data, 2022)

5.1.3.3.4   Satisfaction with support services of the library

The students with mobility impairments were required to indicate their level of satisfaction with the environment, facilities, resources, and services provided to them by the library. A three-point Likert scale of 1= very satisfied, 2= moderately satisfied, and 3= dissatisfied was provided. The findings show that 43 (62.3%) of the respondents were moderately satisfied, 21 (30.4%) were dissatisfied and five (7.2%) were satisfied. Figure 5.18 summarises the responses.

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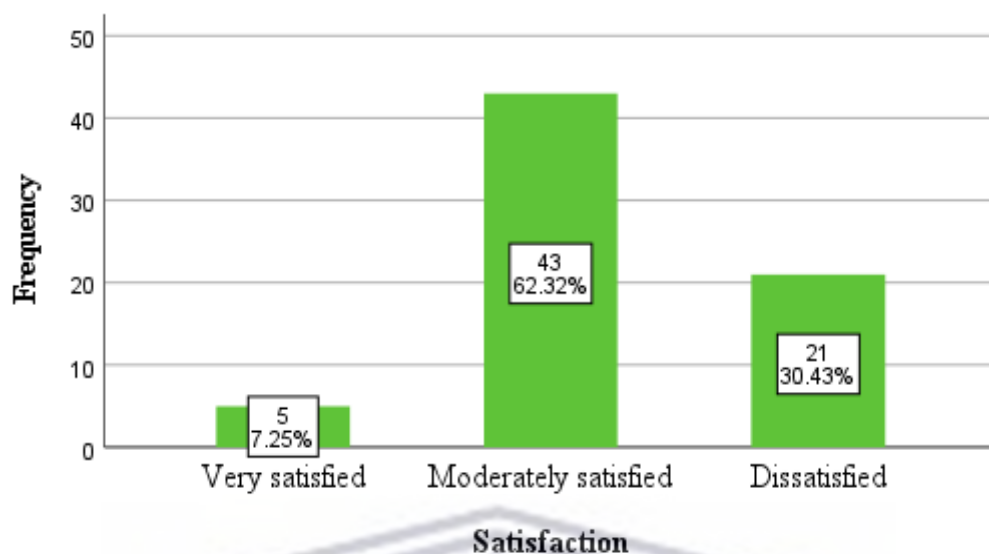
Figure 5. 18: Satisfaction with the support services (n=69) (Source: Field data, 2022)

5.1.3.3.5   Library resources for mobility impaired students

In response to the question on information resources available in the library, mobile-impaired students indicated, as reflected in Figure 5.19, the availability of the Internet and digital resources (86.9%) and e-databases and e-books (66.7%). The majority of respondents indicated the non-availability of audio-visual materials (62.3%) and assistive devices (53.6%).

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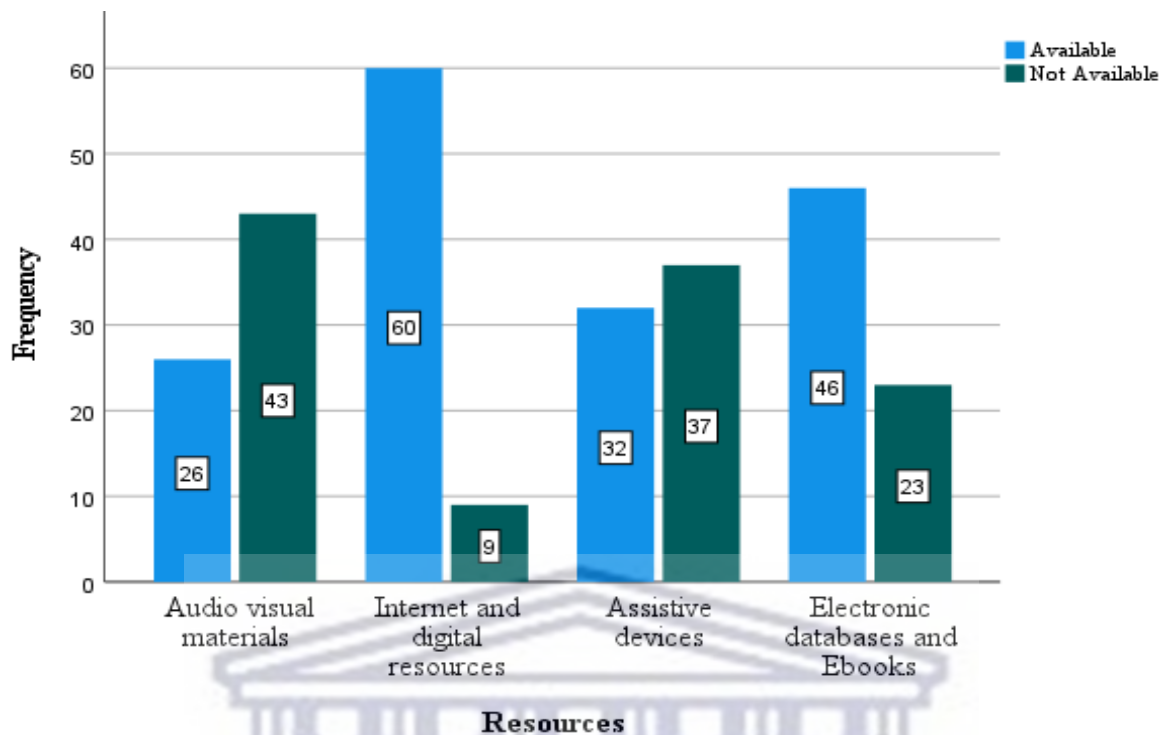
Figure 5. 19: Information resources for mobile-impaired students (n=69)
(Source: Field data, 2022)

5.1.3.3.6   *Significance of assistive technology and devices*

Students with mobility impairments considered assistive technology and devices very important (59.4%) and important (24.6%) in accessing information resources. Detailed responses are shown in Table 5.23.

Table 5. 23: Significance of assistive technology and devices (n=69)

	Frequency	Percent (%)
Important	17	24.6
Very important	41	59.4
Somewhat important	9	13.0
Not important	2	2.9
Total	69	100

(Source: Field Data, 2022)

5.1.3.3.7   Level of library resources accessibility

Students with mobility impairments were asked to indicate the level of accessibility of the library information resources. The data in Table 5.24 shows that most respondents rated access to library resources as neutral (e-books 34.8%; Internet resources 46.4%; library databases 37.7%; e-journals 42%; OPAC 50.7%). Access to the library website was rated by 32% of respondents as good.

Table 5. 24: Access to library resources-mobile impaired students (n=69)

	Very good	Good	Neutral	Poor	Total
Library Website	7	22	19	21	69
	10.1%	32%	27.5%	30.4%	100%
E-books	5	17	24	23	69
	7.3%	24.6%	34.8%	33.3%	100%
Internet Resources	9	19	32	9	69
	13.0%	27.5%	46.5%	13.0%	100%
Library Databases	4	15	26	24	69
	5.8%	21.7%	37.7%	34.8%	100%
E-journals	4	12	29	24	69
	5.8%	17.4%	42.0%	34.8%	100%
OPAC	2	16	35	16	69
	2.9%	23.2%	50.7%	23.2%	100%

(Source: Field Data, 2022)

In response to the question on the benefits of ICT and assistive devices, the results in Figure 5.20 show that most of the students with mobility impairments agreed that ICT and assistive devices promote inclusion and full participation (88.4%), facilitate communication and collaboration (85.5%), promote equitable access to information (84%), help in the acquisition of knowledge and skills (82.6%) and promote independent learning (92.7%). A few students were either not sure or disagreed with the statements.
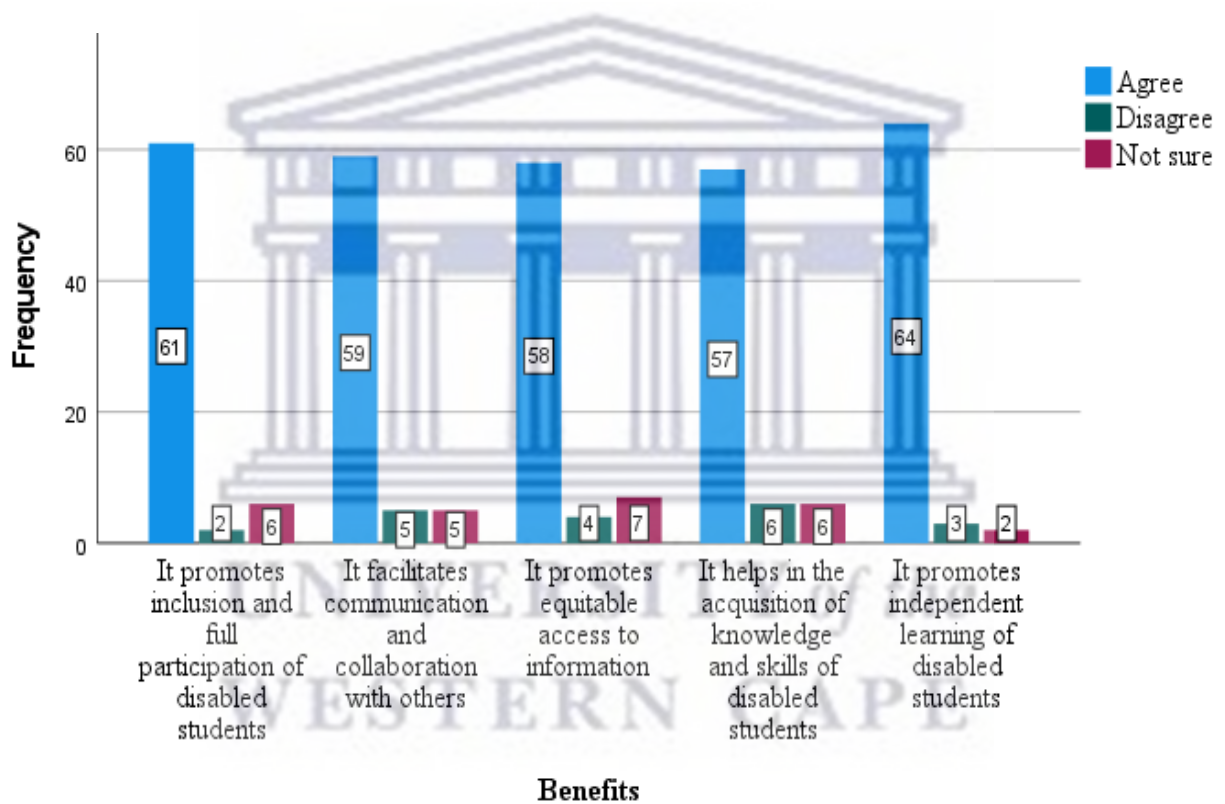
Figure 5. 20: Benefits of ICT and assistive devices (n=69)

(Source: Field data, 2022)

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5.1.3.4   Library experience of students with mobility impairments

This section of the questionnaire focused on the library experiences of students with mobility challenges. It looked at the attitude of library staff and student needs.

5.1.3.4.1   Attitude of library staff

The students with mobility impairments were required to rate statements regarding the attitude of library staff towards them using a five-point Likert scale of 1= strongly agree (SA), 2= agree (A), 3=neutral (N), 4-disagree (D), and 5-strongly disagree (SD). The positive responses (strongly agree and agree) revealed that the library staff were polite and clear in their conversations (55.1%). In contrast, the negative responses (disagree and strongly disagree) were that library staff do not respond to greetings (79.8%), are unfriendly (73.9%), use intimidating voice tone (62.3%), are too busy to assist (53.6%), lack adequate knowledge of the needs of students with disabilities (42%) but library staff look directly at students when communicating (42%). Detailed responses are illustrated in Table 5.25.

Table 5. 25: Attitude of library staff toward mobile impaired students (n=69)

	SA	A	N	D	SD	Total
Library staff lack adequate knowledge of the needs of students with disabilities	5	21	14	16	13	69
	7.3%	30.4%	20.3%	23.2%	18.8%	100%
Library staff are polite and communicate clearly and effectively with me	12	26	16	11	4	69
	17.4%	37.7%	23.2%	15.9%	5.8%	100%
Library staff have an intimidating tone of voice	1	11	14	32	11	69
	1.5%	15.9%	20.3%	46.4%	15.9%	100%
Library staff are too busy to help me	5	15	12	20	17	69
	7.3%	21.7%	17.4%	29.0%	24.6%	100%

Library staff are unfriendly and unapproachable	2	7	9	34	17	69
	2.9%	10.2%	13.0%	49.3%	24.6%	100%
Library staff do not respond to my greetings	2	5	7	31	24	69
	2.9%	7.2%	10.1%	45.0%	34.8%	100%
Library staff look at me directly when we are communicating	10	18	12	18	11	69
	14.5%	26.1%	17.4%	26.1%	15.9%	100%

(Source: Field data, 2022)

5.1.3.4.2 *Library needs – mobile impaired students*

Mobile-impaired students were requested to indicate whether their needs are accommodated by the library. The responses show that most of the students (40.5%) rated their needs to be partly accommodated, while 33.3% stated that their needs were not met by the library. Only a few (18.8%) of the respondents indicated that their needs were accommodated. Five (7.2%) indicated that they were not sure. A detailed reflection of responses is shown in Figure 5.21.
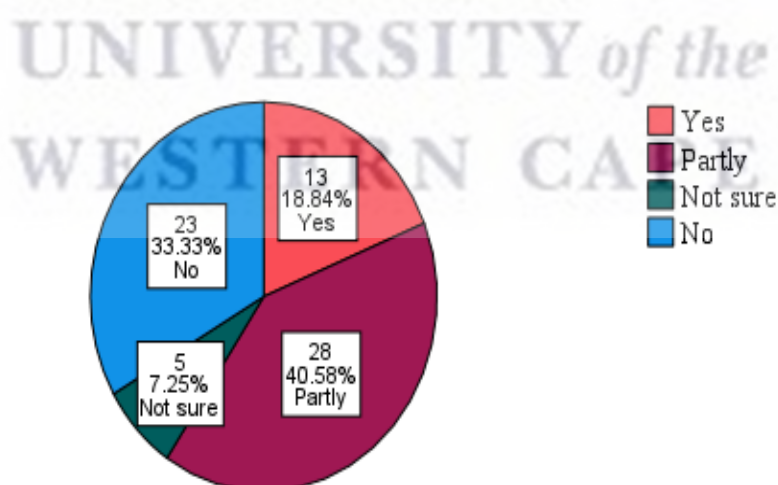
Figure 5. 21: Library needs of mobile impaired students (n=69)
(Source: Field data, 2022)

5.1.3.4.3   Barriers experienced in libraries

Students with mobile impairments were asked to identify barriers impeding access to the library spaces, facilities, and services. Figure 5.22 below indicates that most of the mobile-impaired students agreed to the statements lack of resources in appropriate formats for students with disabilities 45 (65.2%), inadequate provision of elevators/lifts in the library 48 (69.5%), inappropriate ICT technology and assistive devices in the library 45 (65.2%), students with physical impairments depend on friends to access resources in the library 51 (73.9%), inaccessible services and facilities 35 (50.7%), lack of a library disability policy relating to services, resources and accessibility provision 38 (55.0%) and inadequate funding to provide physically impaired students equipment and devices 47 (68.1%). However, 39 (56.5%) disagreed with the negative attitudes of library staff as a barrier.
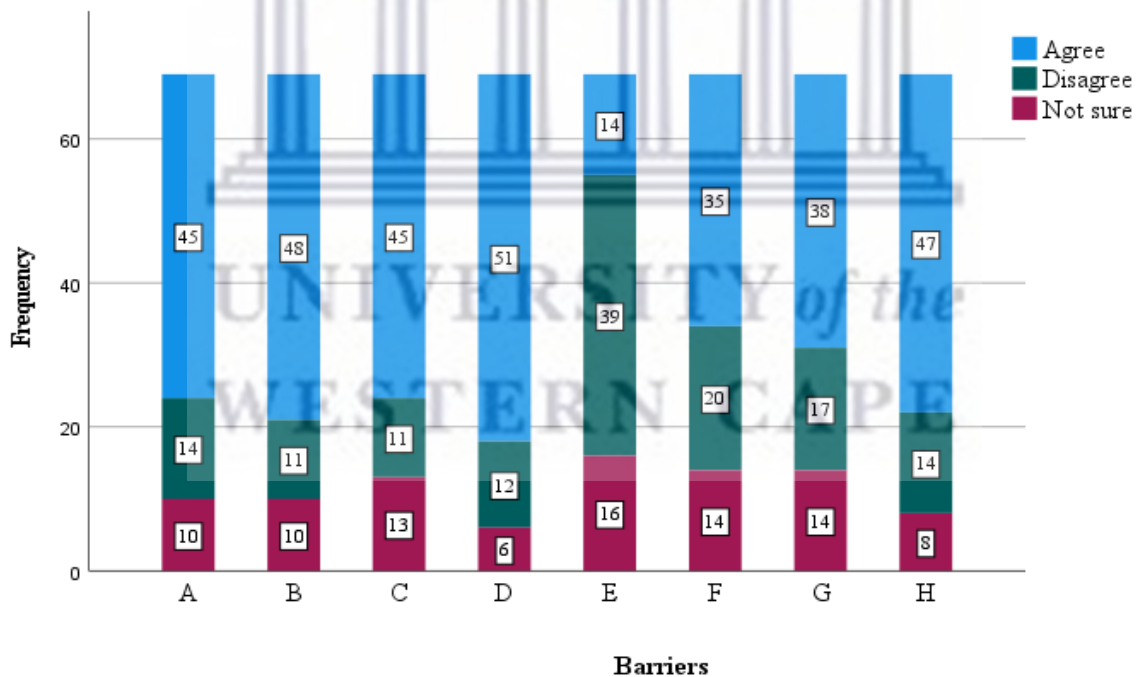
Figure 5. 22: Barriers experienced- mobile impaired students (n=69) (Source: Field data, 2022)

A=Lack of resources in appropriate formats for students with disabilities

B=Inadequate provision of elevators/lifts in the library

C=Inappropriate ICT technology and assistive devices in the library

D=Students with physical impairment depend on friends to access resources in the library

E=Negative attitudes of library staff

F=Inaccessible services and facilities

G=Lack of a library disability policy relating to services, resources, and accessibility provision

H=Inadequate funding to provide physically impaired students equipment and devices

5.1.3.5 Redesigning of buildings, facilities and services

This section focused on library spaces, services, facilities, and sections that need redesigning to facilitate access and services.

5.1.3.5.1 Redesigning spaces and facilities

An open-ended question requested students with mobile impairments to indicate the spaces and facilities that need to be redesigned to accommodate their needs. Students indicated accessible elevators/lifts (21.7%), accessible washrooms (14.5%), adjustable furniture (13%), provision of ICTs and assistive devices (11.6%), ramps at the library entrance (10.1%), accessible pathways (8.7%), specialised staff assistants (5.8%), accessible shelves (4.3%) and discussion areas (2.9%). Five (5) students did not answer. The responses are shown in Table 5.26.

Table 5. 26: Redesigning spaces and facilities in the library (n=69)

	Frequency (n)	Percent (%)
Accessible shelves	3	4.4
Adjustable furniture	9	13.0
Accessible elevators/lifts	15	21.7
Discussion area	2	2.9
Provision ramps at the entrance of the library	7	10.1
Employ specialised staff assistants	4	5.8
Assistive devices and ICTs	8	11.6
Accessible washrooms	10	14.5
Provide accessible pathways	6	8.7
No response	5	7.3
Total	69	100%

(Source: Field Data, 2022)

5.1.3.5.2 *Universal design in university libraries*

Respondents indicate their agreement with statements regarding universal design in libraries. The respondents were given a Likert scale 1=strongly disagree (SD), 2=disagree (D), 3=neutral (N), 4= agree (A), 5=strongly agree (SA) to choose from. The data indicates that most of the respondents disagreed with all the statements. Figure 5.23 reflects that students disagree with library services and resources are useful and marketable to people with diverse abilities (33.3%), the library design and services accommodate a wide range of individual preferences and abilities (31.8%), the library design, website, and instructional guide for students are easy to understand, regardless of the student's experience (43.4%), the library communicates necessary information effectively to the user, regardless of the user's sensory abilities (34.7%),

the library design and facilities minimise hazards and the adverse consequences of unintended actions (36.2%), the library design and facilities can be used efficiently and comfortably and with low physical effort (34.7%), and the library provides appropriate size and space for approach, reach, manipulation and use (40.5%).
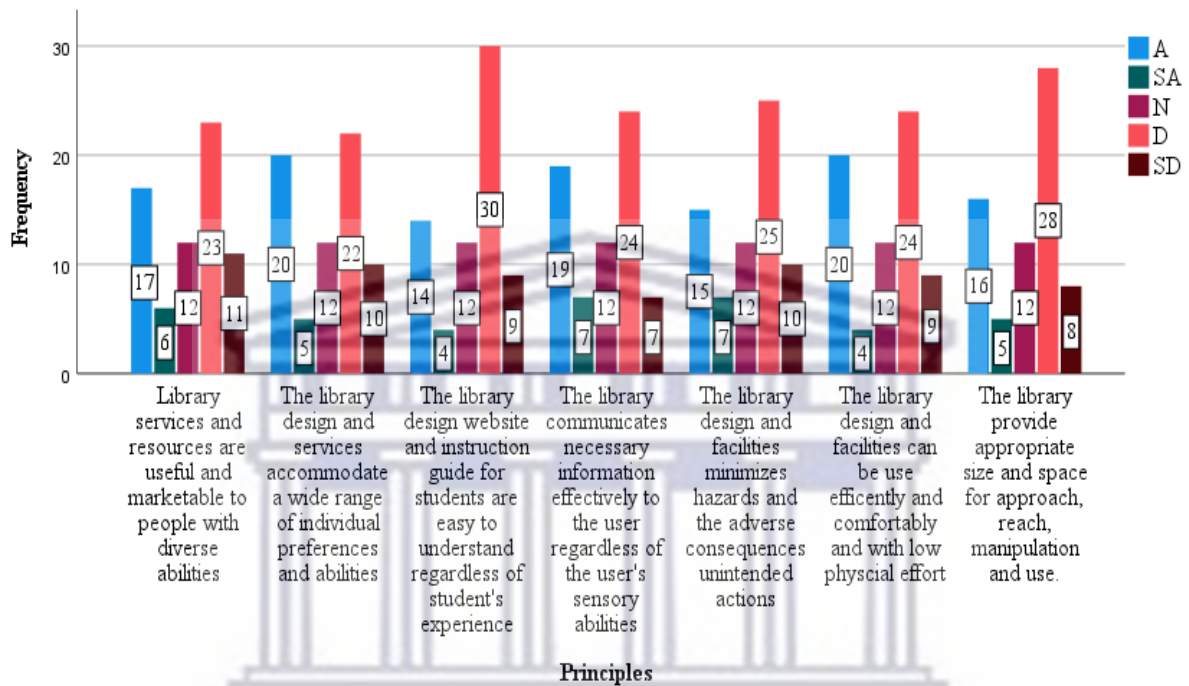
Figure 5. 23: Universal design principles in academic libraries (n=69)
(Source: Field data, 2022)

5.1.4 Questionnaire for students with hearing impairments

This questionnaire was administered to students with hearing impairments to obtain their views about the design of the library, resources, facilities, and services.

5.1.4.1 Background information - students with hearing impairment

To gather biographical information about the respondents, the 30 students with hearing impairments were asked to indicate their university, programme of study, gender, and age.

5.1.4.1.1   University hearing impaired students

Table 5.27 reflects that students with hearing impairments were enrolled at only four (4) public universities. The majority of students (73.3%) were from UEW followed by four (13.3%) from UG, three (10%) from KNUST, and one (3.3%) from UCC.

Table 5. 27: University students with hearing impairments (n=30)

	Frequency (n)	**Percent (%)**
UG	4	13.3
UEW	22	73.3
UCC	1	3.3
KNUST	3	10.0
Total	30	100%

(Source: Field Data, 2022)

5.1.4.1.2   Programmes of study – hearing impaired students

Students with hearing impairments were asked to indicate their enrolled programmes. Almost all the students (96.6%) were registered for Bachelor's degrees with one (3.3%) registered for a Ph.D. programme. This is reflected in Figure 5.24.
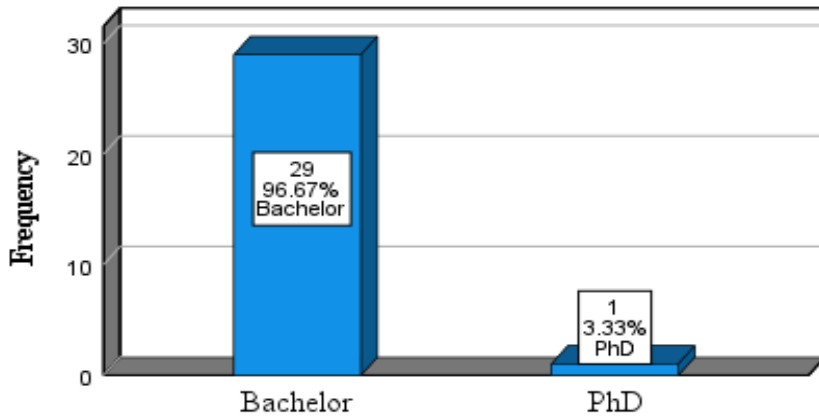
Figure 5. 24: Programmes – hearing impaired students (n=30)
(Source: Field Data, 2022)

5.1.4.1.3 *Gender – hearing impaired students*

Responses on the gender of students reflect that 23 (76.6%) of the respondents were male while seven (23.3%) were females. There is a disparity in gender indicating that more males with hearing impairment were in higher education as compared to females. The results are shown in Figure 5.25.
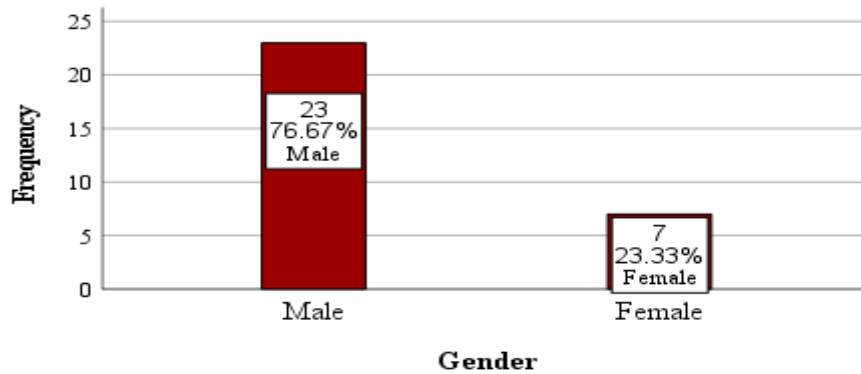
Figure 5. 25: Gender - students with hearing impairments (n=30) (Source: Field Data, 2022)

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5.1.4.1.4   Age – hearing impaired students

The responses on age showed that most of the respondents (53.3%) were between the ages of

25 and 29 years. Nine (30%) were between the ages of 20 and 24 years, while three (10%) were

30 years or older. Two (6.6%) were between the ages of 15 and 19 years. This is reflected in

Figure 5.26.
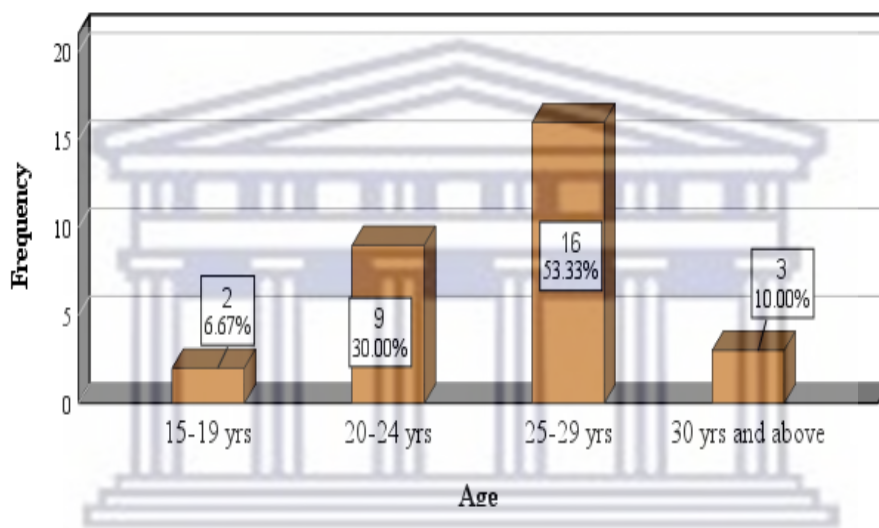
Figure 5. 26: Age – hearing impaired students (n=30) (Source: Field Data, 2022)

5.1.4.2   Access into and within libraries by hearing impaired students

This section focused on the external and internal spaces and facilities of the library designed to

accommodate students with disabilities focusing on hearing impairment. It provides details on

the physical accessibility outside and within the university library building spaces and various

facilities available.

A question sought to determine the physical access into and within the library buildings by

students with hearing impairments across the ten university libraries. The responses indicate

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no entry phone access (60%), no induction loop systems (53.3%), no adequacy of sign language interpreters in the libraries (56.7%), inadequate clear easy-to-read signs with pictograms of sign language throughout the library (50.0%), inadequate Videos/DVDs/Audiobooks with subtitles and/or sign language (60.0%), inadequate library information sent to deaf students via a text telephone (56.7%), inadequate information in an easy-to-read format with appropriate captions (46.7%), lack of computer-assisted real-time captioning or computer-assisted note-taking services (40%), inadequate non-print materials collections for deaf clientele (73.3%) and inadequate deaf-related electronic links in the online databases (40%). The detailed responses are shown in Table 5.28.

Table 5. 28: Access to the external and internal environment of libraries (n=30)

	Yes	Partly	No	Not sure	Total
There is an entry phone accessible for deaf users.	2	3	18	7	30
	6.7%	10%	60%	23.3%	100%
There is an induction loop system for hearing-impaired students in the library.	6	3	16	5	30
	20%	10%	53.3%	16.7%	100%
There are sign language interpreters.	4	3	17	6	30
	13.3%	10%	56.7%	20%	100%
Clear easy-to-read signs with pictograms of sign language throughout the library.	8	3	15	4	30
	26.7%	10%	50%	13.3%	100%
There are Videos /DVDs/Audiobooks with subtitles and/or sign language.	8	0	18	4	30
	26.7%	-	60%	13.3%	100%
The library sends information via a text telephone.	6	3	17	4	30
	20%	10%	56.7%	13.3%	100%
There is information in an easy-to-read format with appropriate captions.	6	6	14	4	30
	20%	20%	46.7%	13.3%	100%

There are computer-assisted real-time captioning or computer-assisted note-taking services.	9	5	12	4	30
	30%	16.7%	40%	13.3%	100%
There are non-print materials collections for deaf clientele.	3	0	22	5	30
	10%	-	73.3%	16.7%	100%
There are deaf-related electronic links in the online databases.	10	3	12	5	30
	33.3%	10%	40%	16.7%	100%

(Source: Field Data, 2022)

5.1.4.3   Information services and ICTs

This section of the questionnaire requested responses from students with hearing impairments concerning the provision of research assistants, information services, and the provision of assistive technology.

5.1.4.3.1   Reasons for non-visits to the library

Question 2 requested the respondents to indicate the reason for their non-visits to the library. The majority of the respondents indicated inadequate videos with subtitles and/or sign language (26.7%), followed by difficulties in accessing library resources (23.3%), inadequate large print (20%), inaccessible library website (16.7%), and lack flexibility in library design (13.3%). The responses are shown in Table 5.29.

Table 5. 29: Reasons for non-visits to the library (n=30)

	Frequency (n)	Percent (%)
Inadequate large print	6	20.0
Inadequate videos with subtitles and/or sign language	8	26.7
Lack of flexibility in library design	4	13.3
Inaccessible library website	5	16.7
Difficulty in accessing library resources	7	23.3
Total	30	100%

(Source: Field Data, 2022)

5.1.4.3.2   Training offered to hearing impaired students

Students with hearing impairments were asked to indicate the type of training offered to them. Table 5.30 below shows that students received training on access to digital resources and services (30%), search strategies (16.7%), use of the OPAC (13.3%), and the effective use of assistive technology and devices (6.7%). The majority (33.3%) of the respondents did not answer.

Table 5. 30: Training offered to students with hearing impairments (n=30)

	Frequency (n)	Percent (%)
Training on access to digital resources and services	9	30.0
Training on the effective use of assistive technology and devices	2	6.7
Search strategies for information retrieval from the Internet	5	16.7
How to use the Online Public Access Catalogue (OPAC)	4	13.3
No response	10	33.3
Total	30	100%

(Source: Field Data, 2022)

5.1.4.3.3   Availability of research assistants

The respondents were asked to indicate whether there is a research assistant available in the library to support students with hearing impairments. Most students (60%) indicated that a research assistant is sometimes available, rarely (23.2%) and never available (13.3%. Only one (1) student acknowledged always having a research assistant available. The responses are shown in Figure 5.27.
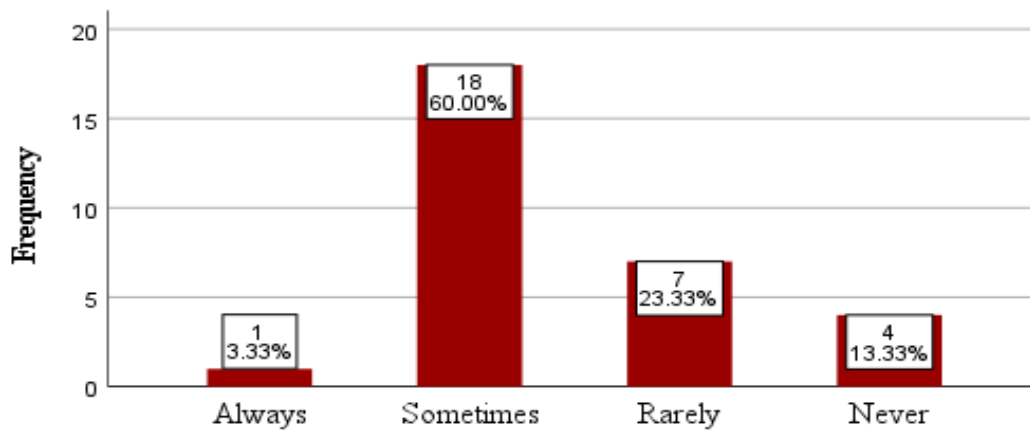
Figure 5. 27: Availability of research assistants for hearing-impaired students (n=30)
(Source: Field data, 2022)

5.1.4.3.4   *Availability of support services*

Question 5 also sought out the level to which support services were available to students with hearing impairments at the university libraries. The data in Figure 5.28 show that 66.3% of respondents indicated few support services available while 36.6% of the respondents indicated none of the support services available for disabled students.

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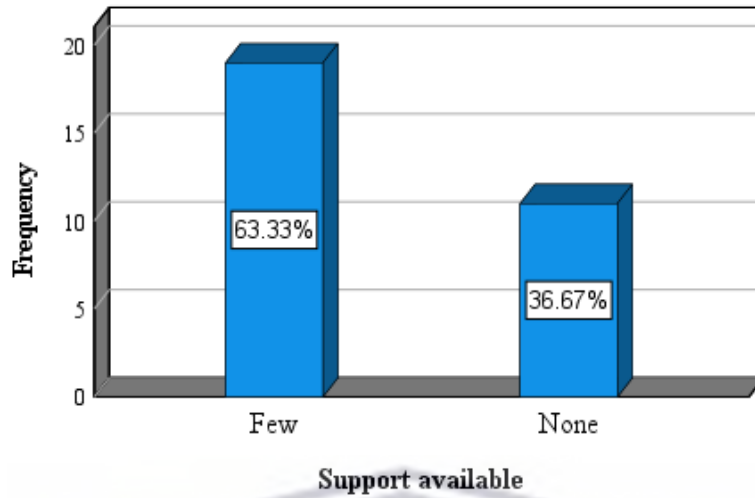
Figure 5. 28: Support available- hearing impaired students (n=30)
(Source: Field data, 2022)

5.1.4.3.5   Satisfaction with support services of the library

Question 6 was a follow-up to establish the level of satisfaction with support services received from the library. Figure 5.29 below reflects that students are dissatisfied (43.3%), moderately satisfied (40%) and satisfied (16.6%).
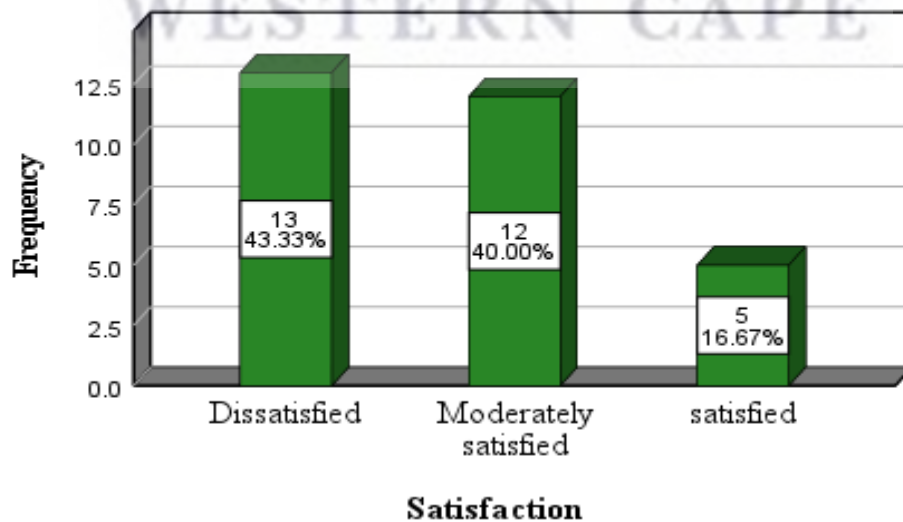
Figure 5. 29: Satisfaction with support services- hearing impaired students(n=30)
(Source: Field data, 2022)

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5.1.4.3.6   Information resources for hearing impaired students

This question was asked to determine the availability of information resources to students with hearing impairments. Figure 5.30 indicates that students regarded non-availability of audio-visual materials with appropriate captions (80%), sign language interpreters (63.3%, induction loop systems (53.3%) and Internet and digital resources (50%).
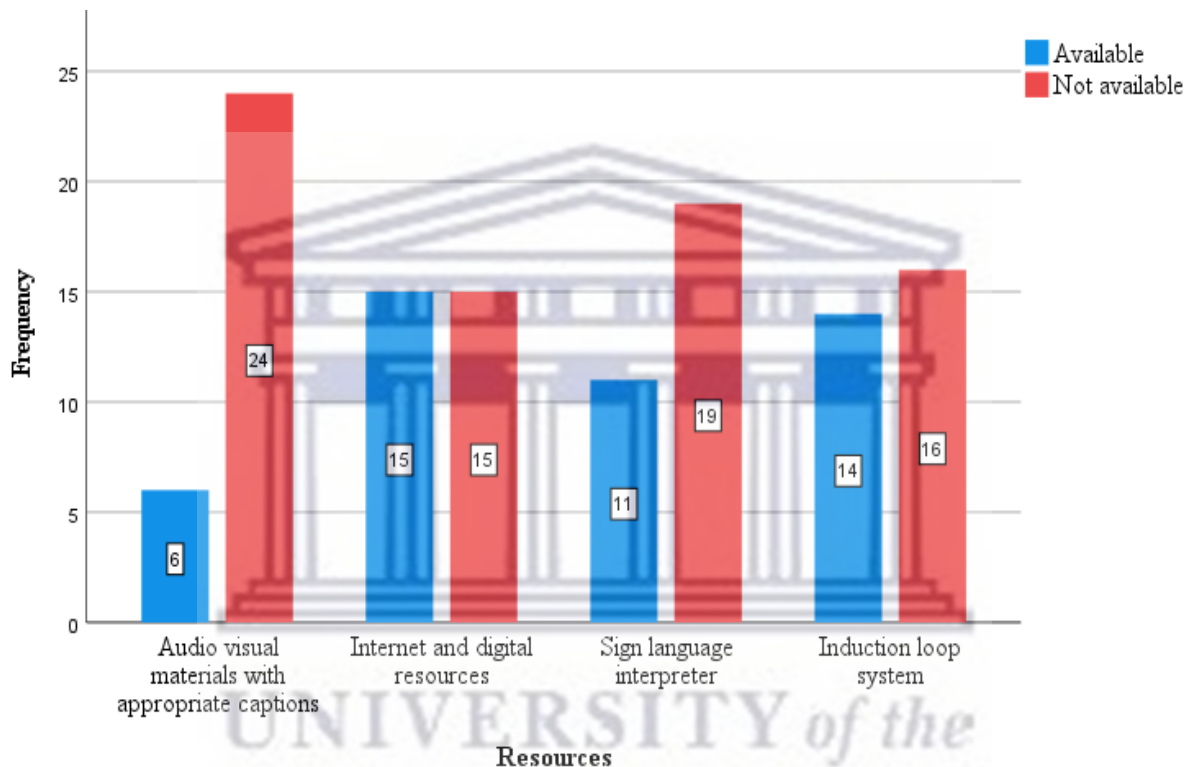
Figure 5. 30: Availability of information resources (n=30) (Source: Field data, 2022)

5.1.4.3.7   Access and use of information resources

Students with hearing impairments were asked to rate the extent of access and use of information resources provided by the library by using a three-point Likert scale of 1=high, 2= moderate, and 3= low. Access and use of information resources were rated low (46.6%), moderate (43.3%) and high (10%). The responses are shown in Figure 5.31.
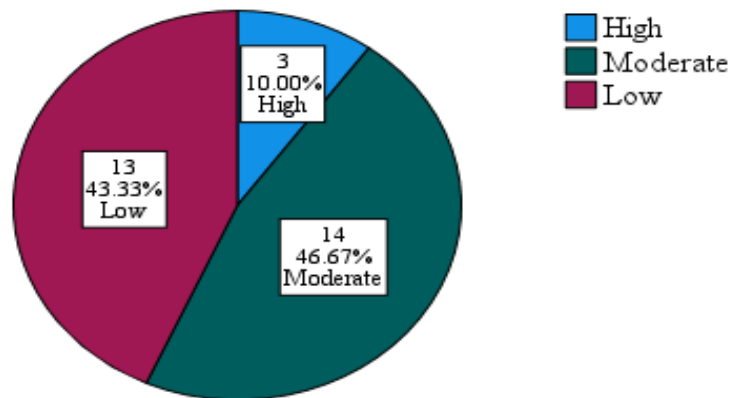
Figure 5. 31: Access and use of information resources (n=30) (Source: Field data, 2022)

5.1.4.3.8   Assistive technology and devices for hearing impaired students

Students with hearing impairments were asked to indicate the assistive technology and devices available to them. Table 5.31 represents that laptops or desktop computers (60%), printers (16.7%), voice-to-text devices/VCO/RTT (6.7%), TTY/TTD/TDD (6.7%), and text-to-speech software (6.6%) were available. One (3.3%) student acknowledged that hearing aids are provided.

Table 5. 311: Assistive technology and devices for hearing-impaired students (n=30)

	Frequency (n)	Percent (%)
Laptop or Desktop computer	18	60.0
Text-to-speech software	2	6.6
Hearing aids	1	3.3
Printer	5	16.7
Voice-to-text devices/VCO/RTT	2	6.7
TTY/TTD/TDD	2	6.7
Total	30	100%

(Source: Field Data, 2022)

5.1.4.3.9   Importance of assistive technology and devices

The students with hearing disabilities were further required to indicate the importance of assistive technology and device in accessing information resources, facilities, and services in the library. Figure 5.32 reflects that assistive technology and devices were regarded as very important (40%), important (30%), somewhat important (23.3%) and not important (6.6%).
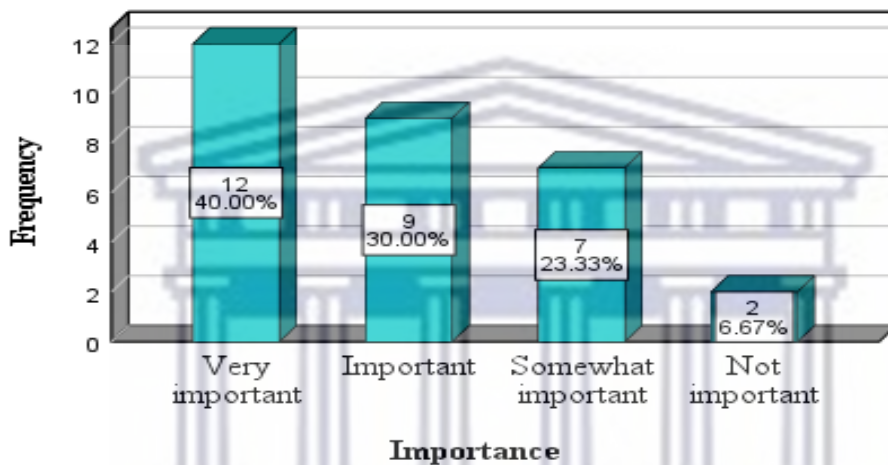
Figure 5. 32: Importance of assistive technology and devices (n=30)
(Source: Field data, 2022)

5.1.4.3.10   Benefits of ICT and assistive devices

In response to the request to indicate their agreement with the statements regarding the benefits of ICTs and assistive devices, students with hearing challenges agreed to most of the statements. Figure 5.33 below reflects agreement with promoting equitable access to information (83.3%), helping in the acquisition of knowledge and skills of disabled students (76.6%), promoting independent learning (73.3%), facilitating communication and collaboration with others (66.6%), and promoting inclusion and full participation of disabled students (63.3%).

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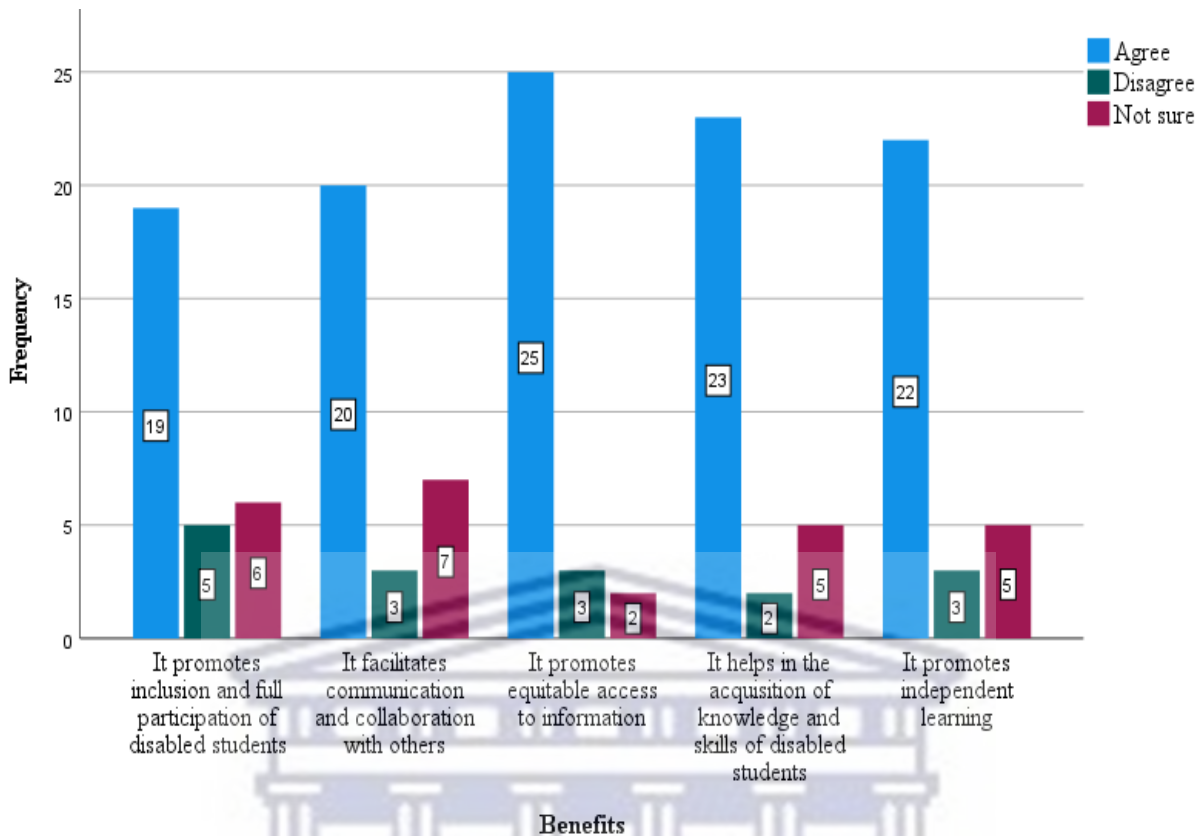
Figure 5. 33: Benefits of ICT and assistive devices (n=30) (Source: Field data, 2022)

5.1.4.4   Library experience of students with hearing impairments

This section of the questionnaire determined the attitude of library staff and barriers that impede the inclusion, access, and participation of students with hearing impairments in public university libraries.

5.1.4.4.1   *Attitude of library staff*

Question 12 was asked to ascertain the attitude of library staff toward students with disabilities. Figure 5.34 indicates most of the respondents strongly disagreed or disagreed with most of the statements. The respondents strongly disagreed and disagreed that the library staff do not respond to my greetings (46.6%), library staff are unfriendly and unapproachable (40%), library staff are too busy to help me (36.6%), library staff have an intimidating tone of voice (30%), and library staff lack adequate knowledge of the needs of students with disabilities

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(40%). Ten (33.3%) of the respondents were neutral about library staff being polite and communicating clearly and effectively with them, while nine (30%) agreed that library staff looks at them directly when communicating.
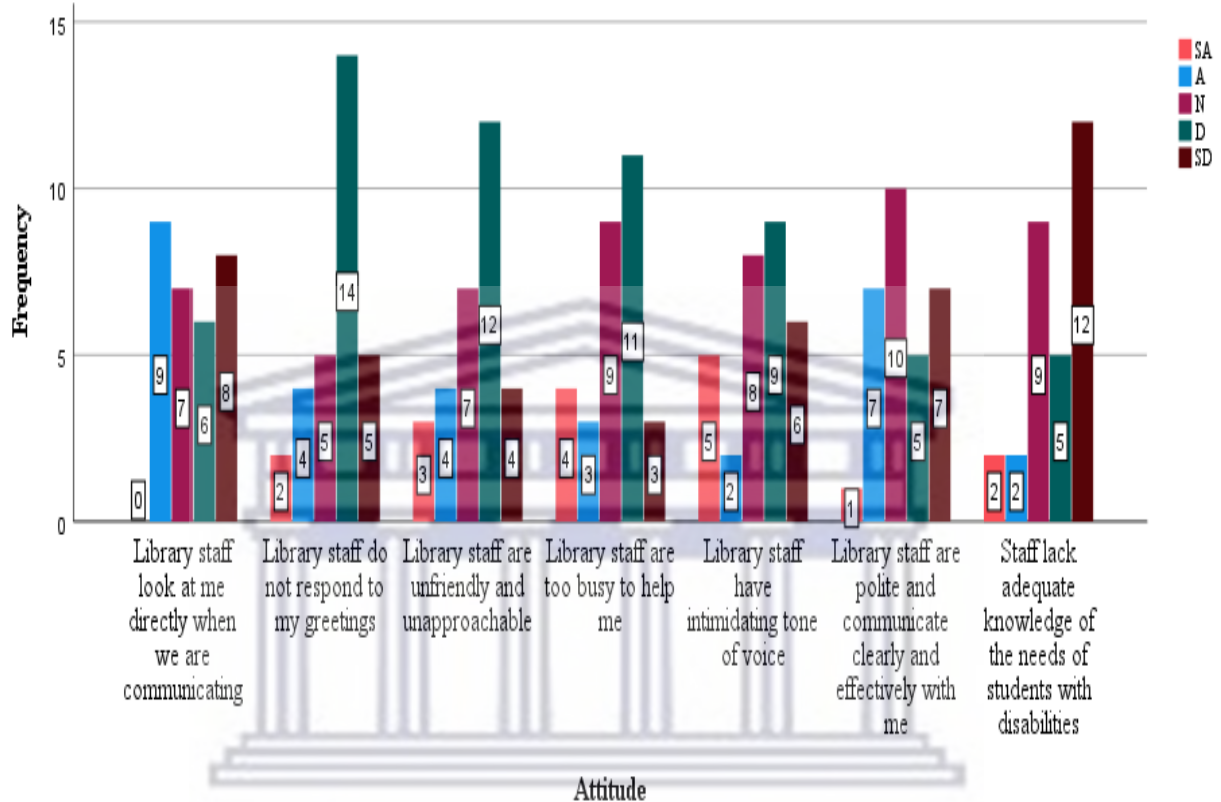
Figure 5. 34: Attitude of library staff (n=30) (Source: Field data, 2022)

5.1.4.4.2   *Barriers experienced in library experience*

Question 13 requested respondents to indicate their agreement with the statement regarding barriers experienced in the library hindering access to facilities, spaces and services. Most of the respondents agreed to inadequate ICT technology and assistive devices (60%), inaccessibility of some facilities and services (53.3%), inadequate funds to provide hearing-impaired students equipment and devices (46.6%), inadequate sign language interpreters (40%) and lack of resources in alternative formats (40%). Thirteen (43.3%) and seventeen (56.6%) students respectively disagreed with the statements that students with impairments depend on

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friends to access resources in the library and that negative attitudes of library staff hinder access. Eleven (36.6%) respondents disagreed and were equally not sure about the lack of a policy relating to the provision of services and resources to hearing-impaired students. The responses are shown in Figure 5.35.
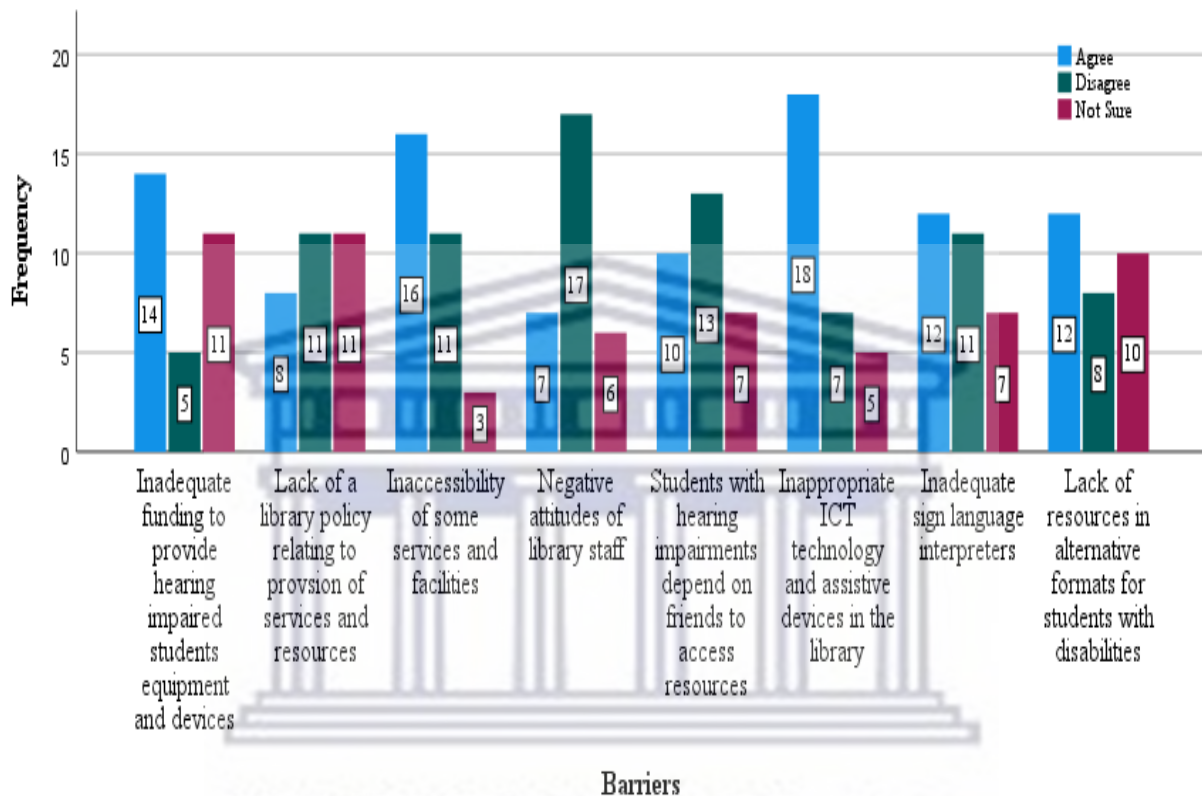
Figure 5. 35: Barriers experienced- students hearing-impaired (n=30)
(Source: Field data, 2022)

5.1.4.4.3   Library needs – hearing impaired students

Table 5.32 reflects responses gathered on the library needs of students with hearing impairments. Eleven (36.7%) of the respondents indicated their needs were not accommodated by the library while nine (30%) acknowledged that their needs were met. Eight (26.7%) acknowledged being unsure whether their needs were accommodated.

Table 5. 32: Library needs of hearing-impaired students (n=30)

	Frequency	Percent (%)
No	9	30.0
Not Sure	2	6.7
Partly	8	26.7
Yes	11	36.7
Total	30	100

(Source: Field Data, 2022)

5.1.4.4   Redesigning of buildings, facilities and services

This section focused on library spaces, services, facilities, and sections that need a redesign to facilitate access. It advocates for the application of universal design principles to the design of spaces, services, and facilities to accommodate students with disabilities.

5.1.4.4.1   Redesigning spaces and services

An open-ended question was used to request respondents to suggest sections and services that need to be redesigned to accommodate students with hearing impairments. Most (20%) students suggested the provision of accessible formats of information resources. Five (16.7%) students each suggested the training of library staff on sign language and the redesigning of the special needs section in the library. Four (13.3%) students each suggested redesigning of policies to employ sign language interpreters and redesigning the technology services. Six students did not respond to the question. The responses are shown in Table 5.33.

Table 5. 33: Redesigning spaces and services – hearing impaired students (n=30)

	Frequency (n)	Percent (%)
Technology services	4	13.3
Train library staff on sign language	5	16.7
Employ sign language interpreters	4	13.3
Provide accessible formats of resources	6	20.0
Improve the section for special needs	5	16.7
No response	6	20.0
Total	30	100%

(Source: Field Data, 2022)

5.1.4.4.2   *Technological improvements needed*

Students were asked to identify areas that needed technological improvement. Responses are recorded in Table 5.34.

Table 5. 34: Technological improvements needed (n=30)

	Frequency (n)	Percent (%)
More assistive technology to access the collection	16	53.3
Improve more appropriate formats for students with disabilities	8	26.7
More CD-ROM workstations	1	3.3
Universally redesign the library facilities, services, and resources with technology to improve access for students with disabilities	5	16.7
Total	30	100%

(Source: Field Data, 2022)

Most respondents (53.3%) identified the need for assistive devices to enable access to the library collection. Students also identified the need for appropriate and accessible formats (26.7%) and the redesign of facilities, services, and resources (16.7%). One student identified

the need for more CD-ROM workstations. These findings concur with the responses to previous questions where limited access to information recourses and assistive technology were recorded.

5.1.4.5.3   Universal design in university libraries

In the last question, the respondents were asked to indicate their agreement with the application of universal design in university libraries. As shown in Figure 5.36, most of the respondents agreed that the library communicates necessary information effectively to the user, regardless of the user's sensory abilities (40%), provides appropriate size and space for approach, reach, manipulation and use (33.3%), the library design and services accommodate a wide range of individual preferences and abilities (30%), and the library services and resources are useful and marketable to people with diverse abilities (30%). However, eight (26.6%) of the respondents indicated neutralism towards the library design and facilities can be used effectively and comfortably and with low effort, the library design and facilities minimise hazards and the adverse consequences of unintended actions, and the library website design and instructional guide for students are easy to understand, regardless of the student's experience.
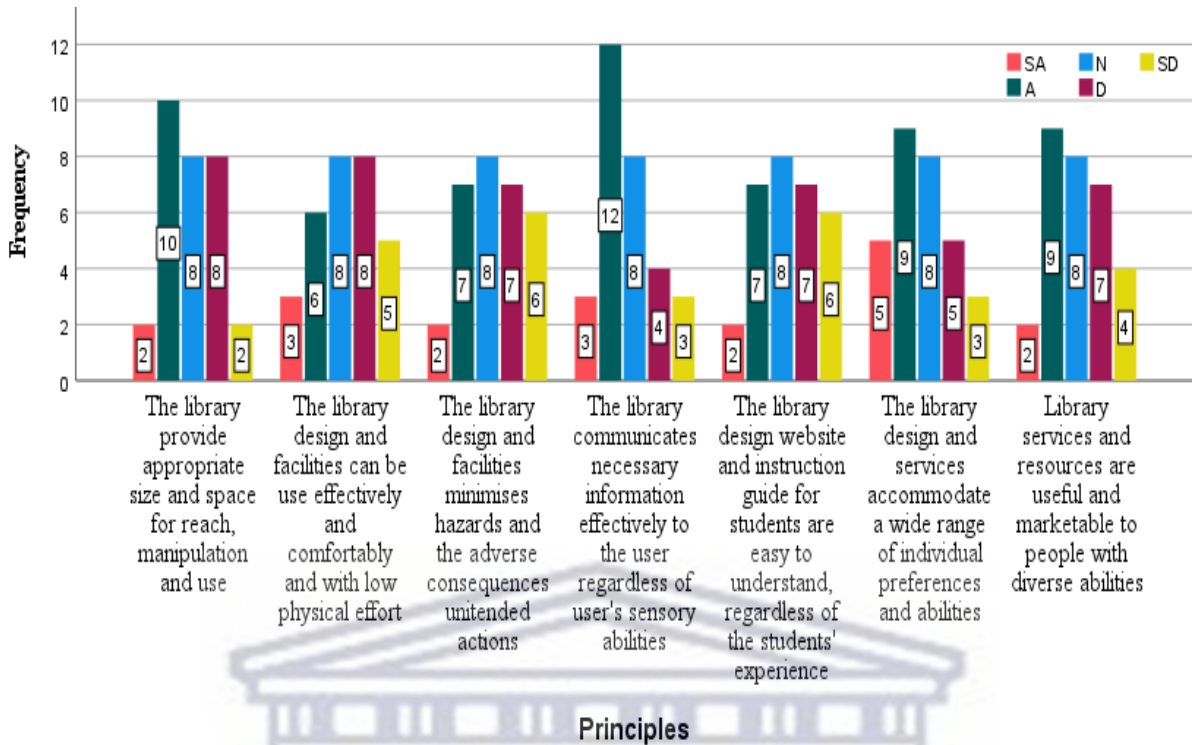
Figure 5. 36: Universal design principles in university libraries (n=30)
(Source: Field data, 2022)

5.2   Observation of library designs, resources, and facilities

The second quantitative data gathering tool used was the researcher conducting an observation

of the design of university libraries, resources, and facilities at the ten (10) public universities.

The researcher used the access to libraries for persons with disabilities checklist by IFLA for

the observations. The results of the checklist observations are shown in Table 5.35 below.

Table 5. 35: Observation of library layout, resources, and facilities (n=10)

Aspects observed	Yes	Frequency	Percent (%)
1. Are parking spaces marked with the appropriate symbol of access?	Yes	0	0%
	No	10	100%
2. Are Parking spaces available close to the library?	Yes	5	50%
	No	5	50%
3. Is there clear signage leading to the library?	Yes	5	50%

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	No	5	50%
4. Are ramps installed at entrances?	Yes	6	60%
	No	4	40%
5. Do ramps have handrails on both sides of the ramps?	Yes	5	50%
	No	5	50%
6. Do doors of the entryways provide clear openings, and can they be opened easily?	Yes	5	50%
	No	5	50%
7. For multi-storey buildings, are there working elevators or lifts?	Yes	4	40%
	No	6	60%
8. Do all stairways have handrails?	Yes	9	90%
	No	1	10%
9. Do floors have a non-slip surface?	Yes	7	70%
	No	3	30%
10. Are the building pathways wide and flat to accommodate a person with a wheelchair or students with disabilities?	Yes	8	80%
	No	2	20%
11. Is there any emergency exit plan that caters for the needs of people with disabilities?	Yes	0	0%
	No	10	100%
12. Are there signage, signs, and pictogram in Braille form that are clear to people with disabilities, especially the visually impaired?	Yes	0	0%
	No	10	100%
13. Are there restrooms available for students with disabilities?	Yes	0	0%
	No	10	100%
14. Are adjustable tables and chairs so students who use wheelchairs can fit under them?	Yes	3	30%
	No	7	70%
15. Are shelves within reach for a person in a wheelchair?	Yes	1	10%
	No	9	90%
	Yes	3	30%

16. Is there a special room/space designated for people with disabilities?	No	7	70%
17. Are there designated computer workstations such as the OPAC adapted for individuals in wheelchairs?	Yes	0	0%
	No	10	100%
18. Are service desks wheelchair accessible?	Yes	3	30%
	No	7	70%
19. Is the library well-lighted?	Yes	10	100%
	No	0	0%
20. Is there a designated toilet facility with, a washbasin, mirror at an appropriate height, handles, and flushing lever reachable for wheelchair users and persons with disabilities?	Yes	2	20%
	No	8	80%
21. Is there an induction loop system for hearing-impaired students?	Yes	0	0%
	No	10	100%
22. Are there special media for persons with disabilities? e.g., talking books, Braille books, large print books, etc.?	Yes	3	30%
	No	7	70%
23. Are there ICT and assistive devices like tape recorders, CD players, DAISY, magnifying glasses, CCTV, screen readers, disability software and apps, and adaptive keyboards?	Yes	3	30%
	No	7	70%
24. Is the library website designed logically and easy to navigate by disabled students?	Yes	0	0%
	No	10	100%
25. Does the website give alternative formats for students with visual impairments?	Yes	0	0%
	No	10	100%
26. Does the website facilitate search capabilities for hearing-impaired users?	Yes	0	0%
	No	10	100%
27. Does the website accompany the text with audio, Braille, and audiobooks?	Yes	0	0%
	No	10	100%

(*Source*: **Field Data, 2022**)

The Persons with Disability Act (Act 715) of 2006, Section 26 enjoins "parking spaces shall demarcate a special parking slot reserved for the exclusive use of persons with disabilities". However, the observation results uncovered that in all the ten university libraries surveyed, none of the parking areas were marked with the disabled international symbol of access and only five of the university libraries had their parking spaces close to the library buildings. Clear signage leading to the university library buildings was observed at five universities. This is illustrated in Figure 5.37 below.

Figure 5. 37: International symbol of access for disabled people
(Source: UWC, 2022)

Although six (6) university libraries installed ramps at the entrances into the libraries, only five (5) ramps had handrails on both sides. The ramps without and with one handrail at one Ghanaian public university library are illustrated in Figures 5.38 and Figure 5.39.

Figure 5. 38: A ramp with no handrails on both sides at one of the university libraries, UL1 (Source: Field data, 2022)

Figure 5. 39: A ramp with only one handrail at one of the university libraries, UL1(Source: Field data, 2022)

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Figure 5.40 illustrates one of the five ramps observed with handrails on both sides.

Figure 5. 40: A ramp with handrails on both sides at one of
the university libraries (UL5) (Source: Field data, 2022)

Only five (5) doors of the university libraries provided clear openings and were easy to open.

Figure 5.41 below shows one such entryway.

Figure 5. 41: A library door with clear and easy access (UL4) (Source: Field data, 2022)

Four university libraries had thresholds at the entrance that were too high for wheelchair users

(Figure 5.42).

Figure 5. 42: An entrance gate with a   threshold in one of the university libraries (UL9)
(Source: Field data, 2022)

The researchers also observed that four (4) of the university libraries had elevators but only one (1) was working during the time of the observation. The other six (6) university libraries had no elevators installed.

Seven (7) of the university libraries had non-slip surface floors and eight (8) of the university library building had pathways and corridors that were wide and flat enough to accommodate a person with a wheelchair. Figure 5.43 shows a non-slippery corridor.

Figure 5. 43: A corridor with a non-slippery floor in one of the
university libraries (UL1) (Source: Field data, 2022)

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None of the ten (10) university libraries had an emergency exit plan posted that catered for the needs of people with disabilities. Although most of the university libraries had signage, none of them had warning signals that were clear to people with disabilities and reachable from a wheelchair. None of the university libraries had restrooms available for students with disabilities. The observation further noted seven (7) of the university libraries did not have adjustable tables that wheelchair users can easily fit under nor adjustable chairs for wheelchair users to slip onto. Three of the university libraries had a special room (Braille library) designated for people with visual disabilities. One of them is illustrated in Figure 5.44 below.

Figure 5. 44: A Braille library in one of the universities (UL1) (Source: Field data, 2022)

Nine (9) of the university libraries had shelves that were not within reach for a person in a wheelchair as depicted in Figure 5.45. One library had adjustable shelves.

Figure 5. 45: Shelves not reachable by a wheelchair user in one of the university libraries (UL1) (Source: Field data, 2022)

None of the university libraries had computer workstations that were adapted for individuals in a wheelchair (Figure 5.46). Seven of the university libraries had service desks that were not reachable or accessible by wheelchair users (Figure 5.47). All ten (10) universities had well-lighted libraries.

Figure 5. 46: Computer workstations not reachable by a wheelchair user in one of the university libraries (UL1) (Source: Field data, 2022)

Figure 5. 47: A service desk not accessible to wheelchair users in one of the university libraries (UL5) (Source: Field data, 2022)

The researcher observed that eight of the university libraries had no designated toilet facilities with a washbasin, mirror at an appropriate height, handles, and flushing lever that was disability

friendly as can be seen in Figure 5.48. Only two libraries had disability-friendly washrooms. Figure 5.49 below is an example of a disability-friendly washroom.

Figure 5. 48: A washroom not disability friendly in one of the university libraries (UL1) (Source: Field data, 2022)

Figure 5. 49: A disability-friendly washroom in one of the university libraries (UL10)(Source: Field data, 2022)

The researcher observed that none of the university libraries had installed an induction loop system in certain spaces to support communication for hearing-impaired students. Three (3) university libraries had special media such as talking books, Braille books and large print books for students with visual impairments and in addition three of the university libraries had assistive devices like tape recorders, CD players, DAISY, magnifying glasses, CCTV, screen readers, disability software and applications, and adaptive keyboards to assist students visually impaired.

None of the university libraries' websites appeared easy to be navigated and facilitate searches by visually impaired students as these students have to rely on limited computers with assistive technology and software.

**5.3	Chapter appraisal**

This chapter analysed and presented the quantitative data which were obtained through questionnaires to students with visual, mobility and hearing impairments and an observation checklist. The next chapter presents the qualitative data.

CHAPTER 6

PRESENTATION OF QUALITATIVE DATA

6.0   Introduction

This chapter builds on Chapter 5 which dealt with the presentation of quantitative data. Chapter 6 presents and analyses the qualitative data collected from the various responses of the participants who were part of the interview sessions as well as from the document analysis done. To ensure confidentiality and anonymity, the following labels were assigned to various respondents/participants.

The ten (10) university libraries were labelled, UL1, UL2, UL3, UL4, UL5, UL6, UL7, UL8, UL9, and UL10.

The ten (10) University Librarians were labelled, LIB1, LIB2, LIB3, LIB4, LIB5, LIB6, LIB7, LIB8, LIB9, and LIB10.

The ten (10) Heads of Disability Units were labelled, DU1, DU2, DU3, DU4, DU5, DU6, DU7, DU8, DU9, and DU10.

The ten (10) Heads of the Physical Development Office were labelled, PD1, PD2, PD3, PD4, PD5, PD6, PD7, PD8, PD9, and PD10.

6.1   Interviews

The data were gathered via face-to-face in-depth interviews with university librarians, heads of the Physical Development Office, and heads of the Disability units in ten (10) public universities in Ghana. Some similar questions were asked to all three (3) interviewee groups and varied questions aligned to the expertise of the interviewee groups were asked. Responses were transcribed, analysed, and categorised into themes.

Kiruki (2018, p. 95) and Walliman (2016, p. 125) suggested that a response rate that is over 85% is excellent but a response rate that is below 50% is not acceptable. Kiruki (2018) further intimated that a response rate of at least 50% is reasonable for adequate analysis and reporting. The researcher interviewed 28 participants out of a targeted 30 respondents. The researcher had in-depth interviews with ten (10) university librarians, ten (10) heads of Disability units, and eight (8) heads of the Physical Development Office from the ten (10) different public universities in Ghana. The overall response rate was 93%.

Interview questions revolved around the demographic information of the interviewees as well as five major themes. These themes together with their categories are represented in Table 6.1 below.

Table 6. 1: Themes and categories

Themes	Categories
Theme 1: The design and physical accessibility of public university libraries in Ghana	• University library design and needs of differently abled students. • External environment of the library building • Internal environment of the library spaces
Theme 2: Facilities and services available to students with disabilities	• Facilities and services • ICT benefits and its support to service provision to SWDs • Attitudes of library staff and the provision of support services to SWDs
Theme 3: Library experiences of students with disabilities	• Challenges of SWDs in academic libraries • Improving the library experiences of SWDs

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Theme 4: Redesigning libraries to accommodate all users	• Redesigning public university libraries in Ghana • Guidelines for redesigning buildings, facilities, and services
Theme 5: Universal design in public university libraries in Ghana	• Application of universal design principles in university libraries • Benefits of universal design in university libraries

(Source: Field Data, 2022)

6.1.1 Demographic information

Of the 30 targeted respondents, only two respondents were not able to take part in the interview resulting in a response rate of 93.3% from the total number of interviewees of 28.

6.1.1.1 University, position and gender

The 28 respondents consisted of eighteen (18) male and ten (10) female interviewees. Table 6.2 presents the universities, positions and gender of the respondents.

Table 6. 2: Universities, positions and gender

University Library	Respondents			Total Respondents	Male	Female
	LIB	DU	PD			
UL1	1	1	0	2	0	2
UL2	1	1	1	3	1	2
UL3	1	1	0	2	2	0
UL4	1	1	1	3	3	0
UL5	1	1	1	3	2	1
UL6	1	1	1	3	1	2
UL7	1	1	1	3	3	0

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UL8	1	1	1	3	3	0
UL9	1	1	1	3	1	2
UL10	1	1	1	3	2	1
TOTAL	10	10	8	28	18	10

(Source: Field Data, 2022)

6.1.1.2   Qualification and work experience

The academic qualification and work experience of all three groups of interviewees were determined.

6.1.1.2.1   Qualification and work experience - University Librarians

Of the ten (10) university librarians interviewed, four (LIB1, LIB3, LIB5, LIB8) held a Ph.D. in Information Science while five (LIB2, LIB6, LIB7, LIB9, LIB10) obtained MPhil. in Information Studies. Only one participant (LIB4) possessed an MA in Information Studies. One participant each acknowledged 22 years (LIB4), eighteen (18) years (LIB2), twelve (12) years (LIB7) and nine (9) years (LIB9) of working experience. Two (2) participants (LIB1& LIB7) had seven (7) years, while three participants (LIB3, LIB5 & LIB8) had five (5) years of work experience respectively. The remaining participant (LIB10) with four (4) years of work experience. Details are summarised in Table 6.3.

Table 6. 3: Qualifications and work experience of university librarians (n=10)

University Librarian	Qualification	Experience
LIB1	Ph.D. Information Science	7 years
LIB2	MPhil. Information Studies	18 years
LIB3	Ph.D. Information Science	5 years
LIB4	MA Information Studies	22 years
LIB5	Ph.D. Information Science	5 years
LIB6	MPhil. Information Studies	7 years
LIB7	MPhil. Information Studies	12 years
LIB8	Ph.D. Information Science	5 years
LIB9	MPhil. Information Studies	9 years
LIB10	MPhil. Information Studies	4 years

(Source: Field Data, 2022)

6.1.1.2.2   *Qualification and work experience- University Disability Officers*

The academic qualification and work experience of the University Disability Officers reflect that DU5, DU6 and DU8 hold a Ph.D. in Guidance and Counseling with two (2), eight (8) and nine (9) years of work experience respectively. Two (2) of the participants (DU2, DU3) both had an MPhil. in Special Education with four (4) and fourteen (14) years of work experience respectively. Participants DU1, DU7, DU9 and DU10 possessed master's degrees in Guidance and Counseling with nineteen (19), fifteen (15), one (1) and ten (10) years of work experience respectively. One (1) participant (DU4) had an MPhil. Sociology with six (6) years of work experience. This data is shown in Table 6.4

Table 6. 4: Qualification and work experience of University Disability Officers (n=10)

University Disability Officer	Qualification	Experience
DU1	M.ED Guidance and Counselling	19 years
DU2	MPhil. Special Education	4 years
DU3	MPhil. Special Education	14 years
DU4	MPhil. Sociology	6 years
DU5	Ph.D. Guidance and Counselling	2 years
DU6	Ph.D. Counselling and Psychology	8 years
DU7	MA Guidance and Counselling	15 years
DU8	Ph.D. Guidance and Counselling	9 years
DU9	MPhil. Guidance and Counselling	1 year
DU10	MPhil Guidance and Counselling	10 years

(Source: Field Data, 2022)

6.1.1.2.3   *Qualification and work experience- University Development Officers*

Table 6.5 presents the academic qualification and experience of University Development Officers who participated in the study. Four of the participants (PD2, PD4, PD5, PD9) possessed MSc Architecture with three (3), 21, thirteen (13) and one (1) year of work experience respectively. Participants PD7 and PD8 hold a Master of Architecture with twelve (12) and nine (9) years of experience respectively. Two of the participants (PD6, PD10) each had MSc in Procurement Management and MSc in Engineering and Project Management with one (1) year and fifteen (15) years of work experience respectively. Although several attempts to arrange an interview were made, PD1 and PD2 could not participate in the study.

Table 6. 5: Qualification and work experience of University Development Officers (n=10)

University Development Officer	Qualification	Experience
PD1	Nil	Nil
PD2	MSc Architecture	3 years
PD3	Nil	Nil
PD4	MSc Architecture	21 years
PD5	MSc Architecture	13 years
PD6	MSc Procurement management	1 year
PD7	Master of Architecture	12 years
PD8	Master of Architecture	9 years
PD9	MSc Architecture	1 year
PD10	MSc Engineering and Project Management	15 years

(Source: Field Data, 2022)

6.1.2   Design and access to public university libraries

During the data analyses, issues related to students with disabilities' access to and within university libraries in higher education institutions emerged as a central theme. The theme is presented under the following subsections:

1. University library design

2. External environment of the library building

3. Internal environment of the library spaces

4. Policies

6.1.2.1   University library design

A question was posed to all three of the interview groups (Librarians, Disability Officers and Development Officers N=28) to solicit their views on how their university library design met the needs of students with disabilities. The responses were categorised and presented in Table 6.6.

Table 6. 6: Library design and needs of students with disabilities

Theme	Responses (N=28)
Lack of purpose-built library	*This edifice which we are currently housed does not meet the needs of students with disabilities because it is not a purpose-built library. As far as this building which we are in is concerned, and as far as the library is concerned, we do not have any provision for disability access (LIB10, May 2022).* *Now, a disabled student would have a little difficulty entering the library, especially wheelchair users. It has not been designed with a ramp although the library is on the ground floor (LIB9, April 2022).* *The library is not purpose-built, and the design does not consider the needs of persons with disabilities. The location of the library on the fourth floor hinders access to mobility and visually impaired students (LIB 2, May 2022).*
Inadequate accessibility provisions or accommodations	*The major shortcoming of the library is the lack of vertical access provision to accommodate the needs of differently-abled students in the university. So, not much has been achieved in terms of accessibility for students with disabilities (LIB3, May 2022).* *Firstly, the libraries were built without consideration for students with disabilities and secondly, lifts were not incorporated into the design of library buildings (LIB4, April 2022).* *You see that in most of the libraries, the old libraries, there are no provisions. It is now that we are making some form of arrangements for students with disabilities (LIB6, May 2022).* *The new library building provides some access to people with mobility issues, especially wheelchair users, but when it comes to the old library the actual space and furniture provided, I do not*

	think the library is accommodative enough for people with disabilities. The old library does not meet the needs of students with disabilities. There is no way someone with disabilities can feel extremely comfortable. The turning angles allowed do not accommodate wheelchair users (PD9, April 2022). *Students with disabilities were not a consideration in the design. The library just moved into an existing space that had no definite design for disability access. So, there is a challenge to access for students with disabilities (PD10, May 2022).* *Physically access, I think the university has made the provision for that because as you can see when you are entering the library all physically challenged can enter easily. Those in wheelchairs can also enter, but they are confined to only one place, especially the physically challenged (DU3, May 2022).*
Retrofitting required	*The librarian collaborated with the physical development department to design this library. To a considerable extent, it meets the needs of students with disabilities, especially those with mobility issues. There are still areas where the library needs to redesign to make it accessible to everyone (LIB7, February 2022).* *Practically, that is possible to retrofit some areas, but that will not be done because of the long-term plan for a new library. I would have liked to address the physical access issues, but management has stated that it is not prudent to spend so much on retrofitting when a new library will be built within two years (LIB10, May 2022).* *The current library is an existing building that does not meet the full needs of students with disabilities. The library needs retrofitting to eliminate all the barriers to make it accessible to everyone regardless of their abilities (PD2, May 2022).* *Initially, the design of the library did not meet the needs of disabled students but with the inception of this unit, a lot has been done. Now, the design has factored in students with disabilities in their library services. The library made some extensions and has factored in the needs of students with disabilities by constructing a ramp at the entrance of the library for wheelchair users (DU1, February 2022).* *The university library used not to be friendly but now the library has redesigned some spaces to accommodate students with disabilities and has installed lifts for easier access to all the floors*

	(DU4, April 2022).
Non-conformance with accessibility standards	*First and foremost, the current library design does not meet accessibility standards because accessibility features were not embedded in the design (LIB10, May 2022).* *OK, so I will say that the main university library does not meet the accessibility standards, but for the law school library there is a lift, and there is a disability access ramp that takes you to all floors. It caters for students with mobility impairments but there is an access challenge for visually impaired students because there are no resources for them (PD10, May 2022).*
Inadequate markings and warning signs	*The design of the library and its relationship with persons with disabilities is not acceptable. The library does not have markings to aid access for visually impaired students (LIB8, July 2022).* *The library has made some yellow markings that lead users who have never been to the centre or unit. But some extra needs to be done about the yellow markings. There should be a sign describing what the yellow markings are about to guide users to the unit which is in the basement of the library building (LIB3 & DU3, May 2022).* *The first is accessibility. The library should be designed in such a way that it does not discriminate and hinder access to people of various abilities, whether a blind person, whether someone who has mobility issues, and so if it is blind, then obviously use tactile finishing to guide that person as to where he or she is going. The need to provide access control devices and appropriate ramps for persons with mobility issues. Installation of mechanical systems such as lifts to higher floors (PD9, April 2022).*
Navigation challenges	*In terms of design, the spaces and furniture provided are different to make it easier for navigation and access. When it comes to the WCs, their facets, plumbing fixtures, and fittings are different (PD9, April 2022).*

Table 6.6 reflects that the needs of students with disabilities were not met in some university libraries because most of the libraries were not purposely built as libraries. Some libraries had inadequate accessibility provisions/accommodations, inadequate markings and warning signs,

navigation challenges, non-conformance with accessibility standards and needed redesigning/retrofitting in order to accommodate students with disabilities.

6.1.2.2 External environment of the library building

To determine the accessibility of the external environment of the library building, interviewees were asked about the parking area and pathways as well as the entrance gate of the library.

6.1.2.2.1 *Library parking slots and pathways*

In response to the questions on whether the library has parking areas and pathways marked with the international symbol of access and whether the parking spaces are close to the entrance. The responses are presented in Table 6.7 below.

Table 6. 7: Library parking slots and pathways

Theme	Responses (N=28)
Lack of designated parking slots marked with international symbol of access	*There is no designated parking area for wheelchair users marked with a symbol of access (LIB1, LIB2, LIB3, LIB4, LIB5, LIB6, LIB7, LIB8, LIB9, LIB10, 2022).*
	I do not think it is marked. If it is marked it will help. But even if it is marked for wheelchair users' other people will still use it. The pathways are wide enough for a wheelchair, but the library needs to mark out the access point for students with disabilities, especially those on wheelchairs (DU4, April 2022).
	There are no parking spaces allocated to disability people at the library (DU1, DU2, DU5, DU6, DU8, DU8).
	Well, the library has not necessarily marked out that, but then there is a portion or area where the librarian parks, and from that area, you can get access to every area of the facility. But probably the development unit needs to mark that out. So, currently, the development unit is marking every parking space on campus and designating places for people with disabilities. The marking design has been completed on paper awaiting the University Council's approval (PD4, April 2022).
	The pathways are not marked with an appropriate symbol of

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	access for wheelchair users (PD9, April 2022; PD8, July 2022).
Inadequate Signage	There are no signages on pathways that direct disabled students to the library. The library was not designed as a library. It was not purposely designed to accommodate the needs of students with disabilities (LIB10, May 2022).
Distance of parking slots to the entrance and uneven pathways	Well, the parking slots are a little distance away from the main entrance with a rough pathway (LIB1, February 2022). The parking area has no pavement (LIB2, May 2022).

Table 6.7 cites the lack of designated parking slots marked with the international symbol of access for wheelchair users, inadequate signage, little distance of parking slots to the entrance and uneven pathways as some of the external environmental barriers that hindered access of students with disabilities.

6.1.2.2.2   Library entrance gate

The responses to the question regarding the accessibility of the main entrance gate for students with disabilities are presented in Table 6.8 below.

Table 6. 8: Library entrance gate

Theme	Responses (N=28)
Lack of automatic doors	The doors are not easy to open, it requires some amount of effort by users, especially students with disabilities. There are no automatic doors installed in the library (LIB1, DU1, February 2022).
Inadequate swing doors	We need to provide wide access doors for wheelchair users, and the doors should demand minimal effort to be opened (PD8, DU7, DU8, DU9, DU10, 2022)
Threshold at entrance gate	Currently, the library has installed a lift but there is still a challenge getting into the library because of a step at the entrance. It is difficult to access the entrance of the library with a wheelchair (LIB4, April 2022). As of now, I do not think there is any provision. There is a

	challenge of a threshold in front of the entrance to the library. There is a need to construct a concrete or metal or wooden ramp to provide access to students with disabilities (LIB9, April 2022)
	The problem is the step at the main entrance (PD7, PD9, 2022).
	Apart from that, the threshold at the gate, wheelchair users can easily navigate and get access to every space because the rest of the floors are not stepped at the entry doors (PD42022)

Table 6.8 indicates that all ten (10) university libraries' main entrances lack automatic doors, while others had inadequate swing doors and thresholds at the entrance gate which restricted access to students with disabilities, especially wheelchair users and visually impaired patrons.

6.1.2.2.3   *Access ramps*

Responses to the questions regarding access ramps to the entrance of the university libraries for easy access especially for students with mobile and visual impairments are shown in Table 6.9.

Table 6. 9: Access ramps

Theme	Responses (N=28)
Minimal provision of ramps	*We have a few provisions in place. For instance, at the entrance, we have a slide walkway/ramp for wheelchairs to easily access the library building. There is also another designed ramp/walkway leading to the Research Commons for graduate students with disabilities. So far these are some of the designed strategies in place for students with disabilities (LIB1, February 2022).* *There are no ramps constructed to provide easy access at the entrance of the main library (LIB2, May 2022).* *At the entrance, we can install a wooden ramp and a wider door for easy access for wheelchair users (LIB9, April 2022).* *The library does not have ramps and elevators to facilitate access for disabled students. Students with disabilities struggle to access the various facilities and resources of the library (LIB10, May 2022).* *The library currently has no ramps or lifts to support horizontal and vertical access into the library. There is a need to construct concrete or metal or a wooden ramp to provide access to students with disabilities, especially those in wheelchairs or blind (PD2, May 2022).* *You are right. There are two entrances. That is old and the new. Recently, we were renovating the new, so you will realise we just did some tiling. So, we need to construct a permanent ramp but currently, there is a wooden ramp that takes you into the facility and where the elevator is located (PD 4, April 2022).* *The library has a pedestrian ramp that provides access to the entrance of the library. In the library, some ramps give access to some sections on the ground floor for wheelchair users (PD7, February 2022).* *OK, so I will say the law school library has a lift, and there is a disability access ramp that takes you to all floors. It caters for students with mobility impairments but there is an access challenge for visually impaired students because there are no resources for them (PD10, May 2022).*
Inadequate signal systems on ramps	*There is a need to install metal rails or signal systems that will be able to guide visually impaired students to specific places or*

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	sections in the library to access the information and facilities needed (DU1, DU2, DU3, 2022).

Table 6.9 reflects that some of the university libraries provide minimal access to ramps with no warning signals which hindered access for students with mobile and visual impairments.

6.1.2.3   Internal environment of the library building

It is required that the internal layout and space facilitate access for students with disabilities. The responses to the question of whether the internal design and space of the libraries provided easy access for students with disabilities are shown in Table 6.10.

Table 6. 10: Access to the internal environment of the library

Theme	Responses (N=28)
No tactile floors	*The visually impaired have difficulties using the library because there are no tactile floors or guide rails (PD7, February 2022).* *No tactile floors and markings to aid access for visually impaired students" and further suggested the inclusion of tactile floors and markings that reorient users getting into the library, especially the visually impaired (PD9, April 2022).*
Inadequate lifts or elevators	*As of now, it would be difficult for some students with disabilities to have access to the Research Commons which is on the third floor unless lifts are installed to provide access for them (LIB1, February 2022).* *Equally, some faculty libraries hinder access and participation of differently abled students because of their location on the top floors of buildings with staircases and without lifts. The libraries were built without consideration for students with disabilities. So, lifts were not incorporated into the design of library buildings. This means that the libraries have not been designed to meet the needs of students with disabilities (LIB4, April 2022).* *In the past, most of our buildings did not have disability access routes. Even now, students with disabilities can only have access to the ground floor. In the library, students with special needs can only have access to the ground floor but beyond that, there is a challenge (LIB5, April 2022).* *There is a provision for a lift shaft that needs to be installed to facilitate*

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	access to all the floors (LIB8, June 2022).
	The current existing library design does not provide access to resources and facilities for students with disabilities. The library does not have ramps, elevators, and students with disabilities struggle to access the various resources of the library (LIB10, May 2022).
	Unfortunately, the library design provides access to the ground floor, but the rest of the floors are not accessible to students with disabilities, especially wheelchair users (PD5, April 2022).
	The library is designed in such a way that there is a ramp that takes wheelchair users onto the ground floor but there is no lift for wheelchair access to the rest of the floors (PD8, July 2022).
	Most lifts are not always accessible to disabled people especially those with visual impairment. Some architects may create a lift shaft, but management may consider it expensive and may not acquire it (PD9, April 2022).
	The challenges are enormous. Some of the facilities around are not disability friendly. Most of the buildings, including the university library, do not have a lift system. Students using a wheelchair are carried up to certain buildings by their colleagues (DU1, February 2022).
	The library needs to install an elevator to facilitate access to the whole building and some facilities for disabled students (DU5, April 2022).
Inappropriate signage	*There is difficulty locating sections of the library because of inadequate signage (LIB7, February 2022).*
	Appropriate signage should be installed to aid movement and circulation in the library (PD8, July 2022).
Inappropriate height of shelves	*Wheelchair users cannot retrieve books without assistance because of the height of the shelves (LIB4, April 2022).*
	The existing library building provides minimal access to resources and facilities for disabled students. There is a minimum turning radius of 1.5m for wheelchair users. This current library does not satisfy this minimum turning point considering the arrangement of the furniture. The study carrels in the library are not appropriate for wheelchair users because most of the study carrels are high for their use. Even the shelves are high for wheelchair users unless they are assisted, and that too is discriminatory (PD9, May 2022).
	Wheelchair users cannot retrieve books without assistance because of the height of the shelves (LIB4, April 2022).
	The library shelves should be adapted to suit the needs of those in a

	wheelchair (DU2, May 2022; DU3, May 2022)
Lack of Braille shelf identifier or labels	*The arrangement of the shelves needs to be designed in a manner to allow visually impaired students to locate books on the shelves independently (LIB1, February 2022)*
Restricted circulation and navigation	*The arrangement of the library should eliminate barriers and provide free circulation and navigation for disabled students (LIB3, May 2022).* *There is no way someone with disabilities can feel extremely comfortable. The turning angles allowed do not accommodate wheelchair users (PD8, July 2022; PD9, May 2022).*
Inaccessible computer workstations and reference desk	*The computer tables' height is not appropriate for wheelchair users (LIB3, April 2022).* *The height of the desk for the library Online Public Access Catalogue poses an access challenge to wheelchair users (LIB4, April 2022).* *Currently, wheelchair users cannot access the library catalogue because of the height of the workstation (LIB5, April 2022).* *The design and height of the reference desk should be accessible to those in a wheelchair. The design should not discriminate against some categories of library users (PD9, May 2022).* *The library has no Braille section because the university has no visually impaired students. The library has no assistive devices and workstations for disabled students (LIB7, February 2022).* *A wheelchair user cannot access the reference section on the second floor because of a staircase, and there is no ramp to aid easy access (LIB10 & PD10, May 2022).*
Inadequate adjustable furniture	*The library should provide appropriate adjustable furniture and computer workstations to accommodate wheelchair users (LIB2, May 2022; PD8, July 2022).*

Table 6.10 reflects the mentioning of lack of tactile floors, inadequate lifts/elevators, inappropriate signage, lack of Braille shelf identifiers/labels, inappropriate height of shelves, restricted circulation and navigation, inadequate adjustable furniture, inaccessible computer workstations and reference desk as some of the internal barriers in university libraries that restricted access and full participation of students with disabilities in university education.

6.1.2.4   Disability policy

A subsequent question was asked to find out whether the university and/or library had a disability policy reflecting the practice of inclusion. The responses are shown in Table 6.11.

Table 6. 11: Disability policy

Theme	Responses (N=28)
Lack of a disability policy	*The university does not have a policy on the provision of inclusive environments for students with disabilities (LIB5, LIB8, LIB9, LIB10, PD10, May 2022).* *The university would need a developed policy with guidelines for the provision of an inclusive environment, facilities, and services to accommodate students with disabilities (PD5, April 2022).* *The library has no disability policy and guidelines to promote inclusive practices (LIB7, February 2022).*
Availability of a disability policy	*The disability policy of the university has tasked the development unit to alter some buildings on campus for accessibility purposes, but this is gradually done to phase out inaccessible areas. So, we are working on them, and we are hoping to get there (PD4, April 2022).* *Currently, the university has an approved comprehensive policy on disability issues ranging from academics to social matters (DU3, April 2022).* *The university has a disability policy that is promulgated and included in the Student Handbook and other documents. The provisions are provided but whether we implement them is another matter (LIB3, May 2022).* *The disability unit has a policy that it works with which is published on the university website. The policy supports inclusive education and serves as a guide to the disability unit. The revised policy has now included university staff with disabilities (DU1, February 2022).* *The university has a policy, but the library does not have a written policy that guides the provision of an inclusive environment to accommodate students with disabilities (LIB1, February 2022).*
Draft disability policy	*The Braille library has a draft policy mainly for visually impaired students which is yet to be approved for implementation (LIB2, May 2022).* *Currently, there is a policy document that is going through the necessary*

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	procedures for it to be approved to serve as a guide for managing persons with disabilities and addressing these accessibility challenges (DU6, June 2022).
	The development of a disability policy means that the library must provide resources, facilities, and services that are accessible to every individual regardless of the physical state of the person (LIB6, June 2022).

Table 6.11 above reflects that while some participants (LIB5, LIB8, LIB7 LIB9, LIB10, PD5, PD10) indicated that they had no disability policy, other participants (LIB1, LIB3, DU1, DU3, PD4) revealed that their libraries have a disability policy which supports the inclusion of students with disabilities. Some participants (LIB2, LIB6, DU6) indicated that their libraries had a draft disability policy yet to be approved.

6.1.3   Facilities

The responses of interviewees on what facilities are offered to students with disabilities are discussed.

6.1.3.1   Washrooms

Responses to whether there are washrooms dedicated to students with disabilities are recorded in Table 6.12.

Table 6. 12: Washrooms in the libraries

Theme	Responses (N=28)
Lack of disability-friendly washrooms	*The library does not have any designated washrooms specifically for students with disabilities (LIB5, April 2022).*
	The washrooms and doors are narrow and difficult to navigate by wheelchair users (PD9, April 2022).
	It is the ordinary Water Close-set (WC) that abled bodies use that has been put there (DU5, DU6, DU10, 2022)

	There is a washroom that is specifically allocated to students with disabilities, but it is not disability-friendly (DU3, May 2022).
	We have disabled toilets in some places, especially in the newer buildings. We have old structures that have not made provisions for students with disabilities, and newer structures that made provisions for differently abled students. Currently, we do not have such specialised facilities and services (PD10, May 2022).
Inadequate provision of handrails and other fixtures	*The washrooms have no rails and other fixtures making them not conducive to persons with disabilities (LIB1, LIB2, LIB4, LIB7, LIB9, 2022).*

Table 6.12 above shows that not much effort has been made to accommodate students with disabilities in some of the university libraries. The participants heightened the lack of disability-friendly washrooms with the appropriate installation of handrails and other fixtures to accommodate students with disabilities, especially students with mobility and visual impairments.
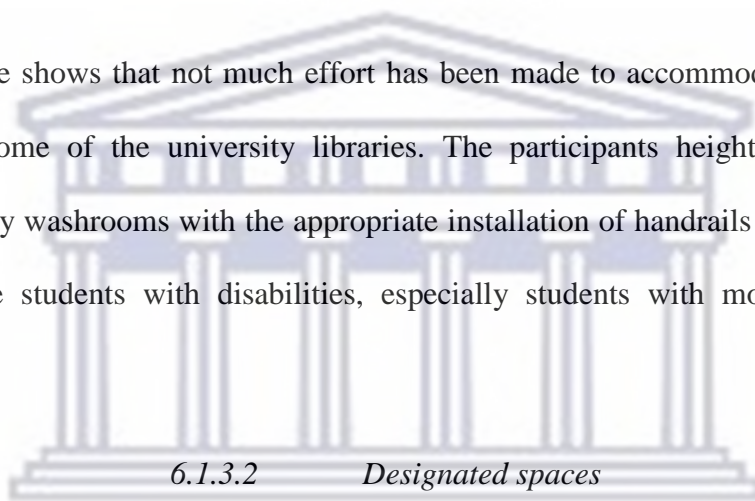
6.1.3.2 *Designated spaces*

Responses to whether university libraries had designated sections or space(s) for students with disabilities to practice inclusion and take into consideration the needs of students with disabilities are presented in Table 6.13 below.

Table 6. 13: Designated spaces

Theme	Responses (N=28)
Lack of Braille library	*There is no Braille library for the visually impaired, so there are no information services available for them (LIB4, April 2022).*
	Unfortunately, the library has no special space for them (LIB5, April 2022).
	We do not have such a place in the library (LIB6, June 2022).
	The library has no Braille section because the university has no visually

	impaired students (LIB7, February 2022).
	The library has no space designated for students with special needs (LIB8, July 2022).
	There is no designated space for them. There is no assistive technology or devices available in the library for disabled students (LIB9, April 2022).
	Our library lacks a Braille library to support visually and hearing-impaired students to access library resources. There is no provision for assistive devices in the library to accommodate disabled students (LIB10, May 2022).
	The library does not have a designated place for students with disabilities. The new library that is yet to be built has made provisions for Braille production and digitising materials (PD10, May 2022).
	The disability policy recommended that a Braille section for the visually impaired shall be introduced at the main library and a Braille librarian employed. But it is yet to be done (PD4, April 2022).
Availability of a disability section	*There is a section for disabled students in the basement of the library. The library is collaborating with the Faculty of Education and Educational Foundation to provide assistive devices and services for differently abled students (LIB3, May 2022).*
	I know the Braille library offers transcription services to students with disabilities. Sometimes staff transcribes lecture notes for visually impaired students (LIB1, February 2022).
	We have a Braille library that provides information services and resources to visually impaired students (LIB2, May 2022).
	The library has also allocated spaces for a computer laboratory and a Braille library to accommodate the needs of differently-abled students (DU1, February 2022).

Table 6.13 shows that university libraries UL1, UL2, and UL3 had Braille libraries. The rest of the libraries had no designated spaces for students with visual or any other disabilities.

6.1.4 Services

A specific question was put to the respondents to determine the services that are available or offered to students with disabilities. Responses extracted from the interviews are presented in Table 6.14.

Table 6. 14: Services

Theme	Responses (N=20)
Reprographic services	*The Braille library provides digital scanning services, embossing services, and large printing for low-vision students (DU2, May 2022).*
Braille documentation services	*We provide information search, reading room, Braille services, embossers, and CCTV for low-vision students (DU1, February 2022).*
Literature search	*The library makes available to students with disabilities some reference services, information retrieval services, and documentation services (LIB1, February 2022).*
Examinations and quizzes support	*The library offers Braille services to visually impaired students. The staff teaches visually impaired students how to use Braille, transcribes answers for lecturers, and supervises examinations of visually impaired students (LIB3, May 2022).*
Sign language interpretation	*The library has sign language interpreters to assist students who are hearing impaired (LIB2, May 2022).* *The disability unit locates sign language interpreters in various lecture halls to help students with hearing impairments (DU2, May 20220).*
Library services	*The library has computers installed with software that helps the deaf and dumb to learn and communicate. The services vary based on the needs of the various categories of users. Library services are offered to disabled students just like the other category of students (LIB3, May 2022).*
Digitisation services	*The library also offers digitisation services to differently-abled students (LIB1, February 2022).*

Lack disability services	*The library does not offer any facilities and services to students with disabilities. But as a librarian, I am aware of assistive technologies and devices that other university libraries make available to support students with disabilities. There is no provision for assistive devices in the library to accommodate differently abled students (LIB10, May 2022).*
	There is no Braille library for the visually impaired. So, no information services are available for them (LIB4, April 2022).
	Currently, we do not have such specialised facilities and services for students with disabilities (DU10, May 2022).
	The library has no specially designed services geared towards students with disabilities. The library has not made any conscious efforts to design services and facilities for them (LIB5, April 2022).
	There are no services rendered to students with disabilities (LIB8, July 2022).
	Currently, we do not have facilities and resources for them in the library (LIB9, April 2022).

Table 6.14 indicates that three university libraries provided specialised services such as Braille documentation, literature search, digitisation services, library services, technological services, reprographic services, Internet services, sign language interpretation and examinations and quizzes support to facilitate the education of students with disabilities, especially the visually and hearing impaired. The majority of the university libraries (7) indicated the nonexistence of specialised services for students with disabilities.

6.1.5   ICTs

A specific question was to ascertain the use of ICTs in benefitting students with disabilities in accessing relevant information resources and services. The following extracts from the various interviewees are presented in Table 6.15 below.

Table 6. 15: ICTs

Theme	Responses (N=20)
Promotes equal access and participation	*ICT has been able to eliminate discrimination as well as unequal access to resources by students with special needs and makes information easily available and accessible to students with diverse abilities (LIB2, May 2022).* *ICT facilitates easy access to information and resources for students with disabilities without physically visiting the library (DU4, April 2022).* *ICT use has enhanced services for students with disabilities thereby promoting full participation for them in education (LIB1, March 2022).*
Facilitates information dissemination	*ICT use in the library facilitates the dissemination of information to students with disabilities. It also promotes access to library resources such as electronic books, online databases, and electronic journals by students with disabilities through assistive devices (LIB10, May 2022).* *It also facilitates the use of the online public access catalogue to search for the availability of books in the library. ICT makes it possible to listen to audio text by visually impaired students (LIB10, May 2022).*
Facilitates the production of accessible formats	*It facilitates Braille documentation for visually impaired students (LIB10, May 2022).* *ICT assists in the production of audio-visual materials which facilitate access to information for students with disabilities (LIB7, April 2022).*
Supports independence of students with disabilities	*ICT use helps students with disabilities to be independent without help from others. This enables disabled students to participate fully in society. Most of the services that the library provides to students with disabilities are better delivered through ICT. ICT is what is making work and disabled students'*

	access to information easier (LIB3, May 2022).
	Assistive technology and devices assist students with disabilities to retrieve information for academic activities (LIB4, April 2022).
	ICT use has made it possible for students with disabilities to access electronic resources without having to be present in the library, especially those with mobility challenges (LIB5 & DU4, April 2022).

The responses in Table 6.15 highlight the importance of ICT support to the learning and full participation of students with disabilities in university education. The participants indicated that ICTs promote equal access and participation, facilitate information dissemination and the production of accessible formats, and support the independence of students with disabilities. This means that ICTs have not only supported the integration and full participation of students with disabilities but have also supported their academic performance.

6.1.6 Assistive technology

A subsequent question was posed to the University Librarians and University Disability Officers to determine if assistive technologies and devices are available to students with disabilities. The extracted responses from the interviews recorded in Table 6.16 below reveal the situation.

Table 6. 16: Assistive technologies

Theme	Responses (N=20)
Assistive technologies for the visually impaired	*Some of the assistive devices provided are CCTV, human wear, embossers, magnifiers, screen readers, speech software, JAWS, and Non-Visual Desktop Access (LIB1, February 2022.)*
	The library has Braille machines and materials, Braille books, recorders, and magnifiers to support students with disabilities to access information (LIB2, May 2022).
	We have embossers, Braille machines, computers with

	different software, JAWS, recorders, screen readers, and learning-related equipment that support the education of disabled students (LIB3, May 2022).
	The library provides speech recognition software, and a digitally accessible information system (DAISY) to support the visually impaired (DU1, February 2022).
	We provide screen magnifiers and closed-circuit television (CCTV) for students with residual vision or low vision to read. CCTV is like a monitor and their background can be manipulated to either black or white to enable low-vision students to read. There are also Braille embossers, Perkins Braille, hand frame, stylus, and Braille sheets. Apart from these, we also give visually impaired students digital recorders to record lectures and playback later to extract salient information or to prepare their notes (DU2, DU3, May 2022).
Inadequate devices for mobility impaired	*Currently, the library does not have devices to support students with arm mobility issues (LIB2, May 2022).*
No assistive devices for students with disabilities	*The university has no visually impaired students but for those with mobility impairments, the library needs to create an enabling environment with relevant facilities and services to support their educational needs (LIB5, April 2022).*
	The library has no Braille section because the university has no visually impaired students (LLIB7, April 2022).
	We do have assistive devices for students with disabilities (LIB4, LIB5, LIB6, LIB8, LIB9, LIB10, 2022).

Table 6.16 reveals that three (3) university libraries provided assistive technology and devices to students with disabilities, especially the visually impaired. Most of the university libraries (7) had no assistive software, tools, and technologies to support students with disabilities because they had no visually and hearing impaired students. Inadequate devices for mobile impaired students in some university libraries were recorded.

A follow-up question was put to the University Librarians and Disability Officers on the challenges students with disabilities encounter in using assistive technologies and devices in the library. The responses are presented in Table 6.17.

Table 6. 17: Difficulties in using assistive technologies

Theme	Responses (N=20)
Incompatibility of devices and conversion distortions	*Sometimes the devices are not compatible with some technologies. Conversion distortions occur making editing very tedious (DU2, May 2022).*
Inadequate skills of students with disabilities	*Students with disabilities may not have adequate skills to use the devices to support their learning (LIB1 & LIB2, March 2022).* *Some of the gadgets may be new to some students with disabilities or they lack the skills to use these devices (LIB10, May 2022).* *Some visually impaired students are not exposed to some assistive technology and devices and may not have the requisite skills needed to use the equipment and will need some training (DU2, May 2022).*
Inadequacy skills of library staff	*Inadequacy of staff with the requisite expertise to assist students with disabilities (LIB3, May 2022).* *The lack of expertise of library staff in the use of assistive technology or devices contributes to the challenges disabled students face in using these devices (LIB10 May 2022).* *Some staff lack basic skills in handling and interacting with students with disabilities. These staff members will need training to enable them to deliver services to students with special needs (LIB2, May 2022).*
Inadequate funding	*Inadequate funds for SWDs to acquire their own devices affect their use of technology (DU2, May 2022)*
Frequent Internet interruptions	*Frequent interruptions of the Internet affect students with disabilities' usage of adaptive technologies (DU3, May 2022).*

Inadequate devices and maintenance	*Inadequate maintenance of the devices can cause them to malfunction posing challenges to their use (LIB10, May 2022).*
	The devices are not enough to serve the number of students with visual impairments and the few existing ones break down hindering the provision of information services to them (DU2, May 2022).
	So, the main challenge would be inadequate equipment (LIB1, February 2022).

Table 6.17 shows that University Librarians and University Development Officers outlined incompatibility of devices and conversion distortions of materials, inadequate skills of students with disabilities, frequent Internet disruptions and inadequate devices and maintenance as major challenges that hinder the use of assistive technology by students with disabilities. The participants further indicated inadequacy skills of library staff and inadequate funding as other challenges that hinder the use of assistive technologies by students with disabilities.

6.1.7   Library staff

Three questions on the attitudes, support provided and training received by the library staff were posted to university librarians.

6.1.7.1   Attitude of library staff

University librarians were asked to describe the attitude of library staff towards students with disabilities. This was meant to ascertain the interpersonal relationship and communication level between students with disabilities and library staff. The responses are recorded in Table 6.18.

Table 6. 18: Attitude of library staff

Theme	Responses (N=10)
Non-discriminatory	*Non-discriminatory (LIB2, May 2022)*
	The staff of the library does not discriminate against students with disabilities that visit the library (LIB6, June 2022).
Friendly	*The staff have exhibited a good attitude towards students with disabilities and they are always ready to bring their requests to us (LIB7, February 2022).*
	They have a good and positive attitude toward SWDs (LIB8, July 2022).
	I am yet to see any library staff who are hostile toward students with disabilities. Library staff act cordial to every student irrespective of their abilities (LIB4, April 2022).
	Staff are friendly and willing to offer help to all students (LIB9, April 2022).
	The attitude of staff towards students with disabilities is always friendly (LIB10, May 2022).
Equal treatment of all users	*Staff treat all the users equally without discrimination (LIB5, April 2022).*
Marginalisation	*Marginalisation of students with disabilities may affect their visit to the library (LIB2, May 2022)*

Table 6.18 indicates the positive attitude of library staff towards students with disabilities. The University librarians stated that library staff exhibit non-discriminatory, friendly, and equal treatment towards students with disabilities. However, LIB2 suggested that the marginalisation of students with disabilities may affect their visits to the library. Students with disabilities' patronage of the resources, facilities and services of the library may be influenced by the attitude of the staff. But the responses indicate that library staff were prepared to help students with disabilities.

6.1.7.2   Support provided by library staff

The researcher further inquired about the support offered to students with disabilities in the library in order for them to access the needed information and enhance academic performance. The responses are presented in Table 6.19.

Table 6. 19: Support by library staff

Theme	Responses (N=10)
Computer literacy training	*The provision of computer literacy training to SWDs on how to use the keyboard command to type and print documents (LIB3, May 2022).*
Assignment support	*We support students when they need information for assignments (LIB2, May 2022).*
Informational retrieval	*Staff at the computer laboratory supports SWDs in a literature search. However, library staff encounters some challenges in supporting SWDs (LIB3, May 2022).* *We provide individualised assistance and staff personally retrieve books from the shelves and convert them to appropriate formats for students (LIB1, February 2022).* *Staff personally retrieve books from the shelves and search for information resources online for students (LIB7, February 2022).*
Limited support for wheelchair users	*It is difficult assisting wheelchair users to access the library building because of the physical barriers that impede them (LIB4, April 2022).* *Currently, the library does not have devices to support students with arm mobility issues (LIB2, May 2022).*

Table 6.19 above reflects computer literacy training, information retrieval, and assignment support are provided to students with disabilities. However, LIB4 acknowledged limited support for mobility-impaired students because of physical barriers that impede access, especially wheelchair users as stated.

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6.1.7.3   Library staff training

Staff training is required for the effective provision of services to students, especially those with disabilities. The training equips library staff with skills in accessing information, organising, and disseminating information. The responses of the university librarians on the specialised training provided to library staff to enable them to effectively offer information services to students with disabilities are presented in Table 6.20.

Table 6. 20: Training for library staff

Theme	Responses (N=10)
Training on the use of assistive technology	*Library staff have been specifically trained on how to handle and use assistive devices to support SWDs (LIB2, May 2022).* *We train staff and students with disabilities on the use of technological tools. This helps the students with disabilities to maximise the use of resources in the library (LIB3, May 2022).* *The library has specialised training for some staff on how to use the system, software, and equipment (LIB3, May 2022).*
Training on Braille transcription	*Some library staff are trained in sign language, transcription of Braille materials, and the use of systems, software, and equipment available to support students with special needs (LIB2, May 2022).*
Training on sign language	*The hearing impaired can also access the main library because a resource interpreter is always available to assist them (LIB2, May 2022).* *The library has sign language interpreters in the Braille library that communicate with hearing-impaired students but in the main library where those come to access information and services, we communicate with hearing-impaired individuals through writing. Some library staff should be trained on how to communicate and interact with hearing-impaired students in sign language (LIB1, February 2022).*

General staff training on customer service	*The library has organised general training for staff to be efficient in accessing information, organising, and disseminating information. All these skills are applied to help students with disabilities (LIB3, May 2022)* *The library periodically trains staff on how to support students with special needs. During the orientation programme students with disabilities are informed of the services and resources available to them (LIB7, February 2022).*
Lack of disability training	*The library staff had training and workshops that were not tailored toward providing support for students with special needs (LIB8, July 2022).* *There has not been any training provided for library staff on how to effectively deliver information services to students with disabilities (LIB10, May 2022).* *There has not been any targeted training to enable staff to effectively offer information services to differently-abled students except the workshops and orientations organised for staff members (LIB6, June 2022).* *The library staff have been trained in customer service, but they have not been trained specifically on how to handle and offer services to students with disabilities (LIB5, April 2022).*
Lack of disability-designated staff	*So far, no library staff has received any training and there are no designated staff available to effectively offer information services to differently-abled students. There are no professional interpreters to assist provide information services to hearing-impaired students (LIB4, April 2022).* *The Braille library has no dedicated staff that organises and supervises examinations for students with disabilities (LIB9, February 2022).*

Table 6.20 reveals that some university libraries (UL1, UL2, UL3) provided some specialised training for their staff. LIB1, LIB2, and LIB3 mentioned training received on the use of assistive technology, Braille transcription and sign language. However, LIB5, LIB6, LIB8 and LIB10 indicated the lack of training to accommodate students with disabilities. The staff of LIB4 and LIB7 were only trained in customer service.

The lack of designated staff to effectively offer information services and support to students with disabilities was mentioned by UL4, UL5, UL6, UL7, UL8, UL9, and UL10. Seven (7) university libraries had no dedicated disability staff such as sign language interpreters.

6.1.8   Library experiences of students with disabilities

Under the theme of library experiences of students with disabilities, two subthemes, challenges of students with disabilities in academic libraries and ways of improving the library experiences of students with disabilities were addressed.

6.1.8.1   Challenges

In order to determine the difficulties experienced, a question was posed to all the participants (N=28) on the experiences of students with disabilities in accessing library services and information resources. Responses from twenty-eight (28) interviewees are presented in Table 6.21 below.

Table 6. 21: Challenges

Theme	Responses (N=28)
Inaccessible website	*The library website. Seriously, I cannot indicate even if students with disabilities use it, especially students with visual impairments. This calls for further studies to find out whether students with disabilities can use the website and the resources available on it because differently-abled students are part of the university system, and their population is quite large (LIB1, February 2022).* *Students with visual impairment have difficulties accessing the website with their devices because there is no speech software installed on it (LIB2, May 2022).* *The library has installed software that helps to monitor the*

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	number of people visiting the website and the downloads done but being able to know whether the individuals are visually or hearing impaired is difficult (LIB3, May 2022).
	Visually impaired students cannot access the library website and retrieve resources from the databases unless they are assisted by a staff member (LIB4, April 2022).
	Students with disabilities have challenges accessing the website with their devices (DU2, May 2022).
	The visually impaired students are completely out because the website is not designed to provide access for them (DU3, May 2022).
	The features to allow access to the website for visually impaired students are not yet incorporated into the university website (DU6, June 2022).
Inaccessible formats of electronic resources	*Students with special needs are not able to access E-books and E-journals in their preferred format in the library. If they do not have the appropriate software technologies on their phones, it would be difficult for visually impaired students to access e-books and e-journals (LIB1, February 2022).*
	Students with special needs especially the visually impaired may not be able to access the online resources independently. So, visually impaired students cannot use databases, e-books, and e-journals because it is not speech-activated (LIB2, May 2022).
	No, it has not come to my attention. Those who want to access it, should not have difficulties. However, the visually impaired will have difficulties accessing e-books and e-journals (LIB3, May 2022).
	The reason these resources are not provided is the number of students with disabilities. There is only one amputee student. The library has no resources in accessible formats like audio and Braille for differently abled students (LIB8, July 2022).
	The library databases, e-books, and e-journals are not in accessible formats for visually impaired students (DU2, May 2022).
	Visually impaired students are not able to access e-books and e-journals on their own because the interface does not support their access (DU3, May 2022).

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Inaccessible online library catalogue	*The users who attended the library instruction for students should be able to use the catalogue except for visually impaired students because there is no protocol and speech activation embedded in the library catalogue. I think visually impaired students are not able to use your catalogue (LIB1, February 2022).*
	Students with visual impairments may find it difficult to access the library's Online Public Access Catalogue based on the way it is designed (LIB2, May 2022).
	The visually impaired students cannot use the library catalogue because it has no Braille component (LIB3, May 2022).
	All the students can access the library catalogue except visually impaired students (LIB8, July 2022).
	The library catalogue is available and accessible to every student, including those with mobility impairments, but no blind person has been here or used the system (LIB9, April 2022).
	Visually impaired students would encounter difficulties using the catalogue and databases since there is no voice activation installed to aid their access (LIB10, May 2022).
	Students with visual impairments may find it difficult to access the library's Online Public Access Catalogue based on the way it is designed. Disability students were not factored into the design process (DU2, May 2022).
Physical accessibility difficulties	*Access to the physical library building is a major problem that restricts usage (LIB1, February 2022).*
	Students with disabilities experience difficulties accessing the physical library building and some of the facilities available to them. Students in wheelchairs have experienced restrictions with chairs and reading as well as workstations (LIB5, April 2022).
	Due to the nature of the library building, differently-abled students encounter physical barriers when accessing the library (DU4, April 2022).
	It will be difficult to navigate for the visually impaired because there is nothing to indicate to them to go left or right unless they are guided by someone (DU3, May 2022).
	The university library in its current state does not meet

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	accessibility requirements because those considerations were not provided (PD8, July 2022).
	Students with disabilities were not considered in the design. The library just moved into an existing space that had no definite design for disability access (PD10, May 2022).
	The library lacks enough space to accommodate the huge number of visually impaired students during training sessions (DU2, May 2022).
Inadequate computers and adaptive technologies	*There are inadequate computers in the library to provide access to relevant information to support disabled students' education and academic performance (LIB2, May 2022).*
	The devices are not many to serve the number of students with visual impairments and the few existing ones break down hindering the provision of information services to them (DU3, May 2022).
	The library has no assistive technology or devices to support students with disabilities to access information (LIB5, April 2022).
	We do not have these devices in the library. We do not have these things. Most of the students with disabilities do not visit the library for us to render these services (LIB9, May 2022).
	The library does not offer any assistive devices to differently-abled students because these devices are not available in the library (LIB10, May 2022).
	Currently, we have not acquired assistive devices to help students with special needs access information (DU5, April 2022).
Obsolete and lack regular maintenance of devices	*Disabled students face the frequent breakdown of adaptive devices, and sometimes the devices are not quickly repaired or replaced (LIB1, February 2022).*
	Sometimes the devices are not compatible with some technologies and conversion distortions occur making editing very tedious (DU2, May 2022).
Inadequate funding	*Inadequate funding hinders the provision of accessible information services, facilities, and digital resources for students with disabilities (LIB7, April 2022).*

Table 6.21 lists the impediments which students with disabilities experience in university libraries including inaccessible websites, inaccessible formats of electronic resources, inaccessible online library catalogues, physical accessibility difficulties, inadequate computers and assistive devices, and obsolete and lack of regular maintenance of devices. LIB7 indicated inadequate funding to acquire relevant resources for students with disabilities in university libraries.

<p style="text-align:center">6.1.8.2   Improving experiences</p>

The responses to the question of how university libraries can improve the experiences of students with disabilities in order to eliminate challenges and increase library participation are presented in Table 6.22 below.

Table 6. 22: Improving library experiences

Theme	Responses (N=28)
Provision of appropriate accessible infrastructure	*We need a purpose-built library designed to provide access to facilities, services, and resources for every user (LIB2, May 2022).* *The Online Public Access Catalogue (OPAC) workstation needs to be redesigned to provide access for wheelchair users (LIB5, April 2022).* *There is a need to set up a Braille section in the library and equip it with all the relevant assistive devices to support the full participation of students with disabilities. There is also the need to install elevators, construct ramps and provide appropriate facilities that would accommodate and improve the library experiences of students with disabilities (LIB10, May 2022) .* *We need to incorporate elements that will facilitate vertical access and circulation into the library building (PD2, May 2022).* *Some of the things we can do to improve differently-abled students' experiences are the markings of access points and*

	direction signs. But there is a notion that when you decide to earmark a certain area for them, they sometimes feel isolated (PD4, April 2022).
	Appropriate study carrels should be provided and there should be enough space between the shelves for navigation (PD9, April 2022).
	The university needs to retrofit some areas of the library to make it more accessible to differently-abled students. The university should also install disability-friendly facilities in the library although it is more expensive and more space-consuming to create ramps and lifts (PD10, May 2022).
	Provision of more appropriate support systems to students with special needs (DU2, May 2022).
Provision of advanced assistive technologies and devices	*Speech recognition software and Digital Accessible Information System (DAIY) should be provided to support the visually impaired (LIB1, February 2022).*
	Assistive technologies need to be available to students with disabilities to exploit electronic resources (LIB2, May 2022).
	Activate speech software into the online public access catalogue to improve access for visually impaired students (LIB3, May 2022).
	The library also needs to acquire assistive technology and devices to support differently-abled students to utilise information (LIB5, April 2022).
	Speech software can be integrated into the website to make it accessible to visually impaired students. Assistive technology and devices should be acquired to support the provision of services and information resources to differently-abled students. This, when done, will improve the library experiences of students with special needs (LIB8, July 2022).
Frequent maintenance of assistive devices	*Frequent maintenance of assistive devices for proper functioning to improve the library experience of SWDs (DU2, May 2022).*
Un-interrupted Internet connection	*We need to improve the Internet facility and acquire more computers to augment what is already available (DU3, May 2022).*
Provision of alternative accessible formats of digital	*Subscription of Braille materials or documents in accessible formats to support the learning and research of disabled*

resources	*users (LIB1, February 2022).*
	Websites should be installed with speech software like JAWS to provide access to digital materials for visually impaired students (LIB5, April 2022; LIB8, July 2022).
	Digital books, e-journals, and audiobooks should be more available in an accessible form for the visually impaired to have access to needed information (DU3, May 2022).
	Students with disabilities have adequate access to electronic information and relevant books would improve their academic performance (DU4, April 2022).
Provision of adequate information services	*Designing facilities and services which are accessible to visual and hearing-impaired students (LIB7, February 2022)*
	More support services should be provided for students with special needs (DU2, May 2022).
Establishment of a disability policy	*There is a need to develop a policy and advocate for adequate and inclusive facilities to improve the academic work of students with disabilities (LIB3, May 2022).*
	When the disability policy document of the university is put in place. It is a framework that would guide how students with disability issues would be managed in the university (DU6, June 2022).
Provision adequate funding to acquire relevant resources	*Providing adequate funding to support the activities of differently abled students (LIB3, May 2022).*
	The university needs to allocate more funding to equip disabled students with all the resources, facilities, and services that make academic studies more comfortable and convenient for them (DU3, May 2022).
Train library staff on disability issues	*Train staff to be able to attend to the needs of differently-abled students (LIB1, February 2022).*
	Educate librarians on the provision of resources and services to students with disabilities (DU1, February 2022).
Employ sign language interpreters	*Dedicated staff should be available to train SWDs on computer literacy (DU3, May 2022).*
	Train specialists to assist the visually impaired to have access to most materials (PD9, April 2022).
Conduct accessibility audit	*Embark on a regular accessibility audit of facilities,*

	resources, and services offered to students with disabilities. Develop legislation and constitute a committee to enforce the accessibility provisions for students with disabilities (LIB4, April 2022).
Intensify advocacy on disability	*To improve library information services for students with disabilities, there is a need to create awareness and train library staff on disabilities resources and services provision (LIB4, April 2022).*
	Advocacy is needed by the university librarian to project disability issues at the university management level. We need to conduct a survey to ascertain the number of categories of students with disabilities in the university to plan for library resources to accommodate them (LIB10, May 2022).

Table 6.22 above indicates that for university libraries to improve the experiences of students with disabilities, the following must be done: provision of appropriate accessible infrastructure, advanced assistive technologies and devices, alternative accessible formats of digital resources, adequate information services, adequate funding to acquire resources; establishment of a disability policy; training of library staff on disability issues; employing sign language interpreters; conducting accessibility audits; intensifying advocacy on disability among staff; frequent maintenance of assistive devices; and ensuring the availability of un-interruption Internet connection.

6.1.9 Redesigning libraries to accommodate all users

Redesigning libraries to accommodate all users was another theme identified. Two components namely redesigning public university libraries in Ghana and guidelines for redesigning buildings, facilities, and services were addressed.

The question was asked to all 28 participants how Ghanaian university libraries can be redesigned to accommodate students with special needs. Responses from the interviews are presented in Table 6.23.

Table 6. 23: Redesigning Ghanaian university libraries

Theme	Responses (N=28)
Install lifts/elevators	*Students with disabilities have been discriminated against, side-lined, and neglected for some time now. As of now, it would be difficult for some students with disabilities to have access to the Research Commons, which is on the third floor unless the library is redesigned, and lifts installed to provide access for them (LIB1, March 2022)..*
Accessible OPAC and computer laboratories	*The OPAC and the computer laboratories should be redesigned, and appropriate assistive technology and devices installed to ensure unimpeded access to information by disabled students (DU1, February 2022; DU3, May 2022).*
Acquisition of assistive devices	*The library should be redesigned and equipped with necessary assistive technologies and devices to support the educational needs of students with disabilities (LIB2, May 2022).*
Disability accessible washroom	*The washroom facilities should be designed in such a way that it is accessible to everyone, especially wheelchair users (DU2, DU5, DU6, DU9, DU10, 2022).* *The library would need to retrofit some spaces to eliminate certain barriers to providing access to disabled students (PD2, PD4, PD5, PD9, PD10, 2022).*
Establish a Braille section	*It would be difficult to physically alter the library building but we can redesign sections within the library to accommodate an audio-visual unit to provide resources and services to visual and hearing-impaired students (LIB7, April 2022).*
Subscription of Braille electronic resources	*Libraries should consider subscribing to journals and databases that provide accessible formats like audio and Braille forms to support the education of disabled students (LIB2 & LIB8, July 2022).*

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Redesign library website	*Redesign the library website to accommodate students with disabilities especially visually and hearing impaired (LIB1, LIB4, 2022).*
Provide Braille labels	*The university library can be retrofitted with Braille labels for the visually impaired (PD10, May 2022).*
Adequate funding	*This could be possible if adequate funding is allocated to support university libraries (PD4, April 2022).* *The library needs adequate funding to be able to redesign some spaces and facilities to make them accommodative to students with disabilities (LIB4, April 2022).*

Table 6.23 indicates the physical, technological, and communication environments of university libraries need to be redesigned to accommodate students with disabilities. Redesigning suggestions include lifts/elevators, an accessible library website, subscriptions to accessible E-journals and databases, set up a Braille and audio-visual unit, disability-friendly washrooms, appropriate assistive technologies and devices, materials in alternative formats, accessible OPAC, and provision of Braille labels.

6.1.9.2 *Guidelines for redesigning of university libraries in Ghana*

Responses to the questions on what guidelines for redesigning library buildings, facilities and services are recorded in Table 6.24 below.

Table 6. 24: Guidelines for redesigning buildings, facilities, and services

Theme	Responses (N=28)
Building codes	*We apply the building codes and more recently the accessibility standards (PD2, May 2022).* *The building codes specify the requirements for the design so that everyone can use the facility, including persons with disabilities (PD8, July 2022).*
Disability Act 2006 (Act 715) guidelines	*The Office for Students with Special Needs applies the guidelines in the Disability Act 2006 (Act 715) and the University Disability*

	Policy for the redesign of facilities to make them accessible to everyone irrespective of their abilities (DU1, February 2022).
	The library is always guided by the Disability Act with other regulations and institutional guidelines (LIB3, May 2022).
	The university adheres to the guidelines in the national disability act to make sure that the facilities, resources, and services are friendly to disabled individuals (DU6, June 2022).
	Everything is in the policy. First, we classify people with disabilities into various categories and give them access according to what is required for their full participation. Since the implementation of the disability policy, we have made a conscious effort to ensure every student's hostel accommodation there are sections with labels reserved for students with disabilities which are furnished with gadgets that support access and participation (PD4, April 2022).
No written guidelines	*To the best of my knowledge, the library has no written policy or guidelines, but I am sure IFLA could have these guidelines which can be customised to suit our library (LIB1 February 2022).*
	The library has no written guidelines for the redesign of facilities and services to accommodate disabled students (LIB2, May 2022).
	The library has no written guidelines for the redesign of facilities and services to accommodate disabled students. The library contacts the physical development department for assistance concerning redesigning issues (LIB7, February 2022).
	I have not come across guidelines but the Ghana Tertiary Education Commission as a regulatory body should insist on the provision of access facilities, information resources, and services for students with disabilities (LIB8, July 2022).
Conducive library environment	*We need to take into consideration the needs of the students. I must take into consideration their accessibility. How accessible will it be when we redesign, would that be accessible to all students irrespective of their disabilities? The environment of the library should be conducive considering the paint use that does not affect people who are color blind (DU3, May 2022).*
	The colour of the painting should be able to provide an atmosphere that is attractive and conducive to learning (PD9, April 2022).

According to the responses in Table 6.24, some university libraries seem to use some guidelines for the redesign of facilities, services, and resources. While PD2 and PD8 used building codes, DU1, LIB3, DU6 and PD4 used the Disability Act 2006 (Act 715) guidelines. DU3 and PD9 indicated that their libraries considered conducive environment and disability-friendly painting in redesigning their libraries. LIB1, LIB2, LIB7 and LIB8 said their libraries have no written guidelines, procedures, and processes for the redesign of their facilities, services, and resources.

6.1.10 Universal design in public university libraries in Ghana

Two subtopics of the universal design of public university libraries were addressed during the interviews. Questions on the application of universal design principles in libraries and the benefits thereof were asked.

6.1.10.1   Application of universal design principles in university libraries

The concept of universal design deals with the design of buildings, facilities, communications, services, and products in a way that is accessible to everyone regardless of their abilities. The concept has seven principles with guidelines for the design process. The respondents were asked if they were familiar with the concept of universal design and how they incorporated the seven principles in the new and redesigning of library buildings and services to accommodate students with disabilities. Responses are shown in Table 6.25 below.

Table 6. 25: Application of universal design principles in university libraries

Theme	Responses (N=28)
Lack of awareness of universal design	*Some libraries and mine are not aware of the universal design principles and their potential to promote inclusion (LIB1, March 2022).*
	Well, the framework/concept you mention is new to me. I am not familiar with the principles, but these principles could have been

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	embedded in the Disability Act (LIB3 May 2022).
	There is inadequate knowledge and awareness about disability issues and universal design among some librarians (LIB7, February 2022).
	I am not familiar with the concept of universal design (LIB9, May 2022).
	Universal design has not been implemented in our library to accommodate students with disabilities due to the lack of knowledge of the principles (LIB10, May 2022).
Lack of incorporation of universal design principles	*Universal design principles were not fully incorporated into the design of the library because access for students with disabilities is restricted (LIB8, July 2022)*
	We have not incorporated these principles into any of the structures we have currently, including the library building (LIB10, May 2022).
	Sometimes the nature of some library buildings makes them difficult to alter or break down (LIB3, May 2022).
	These principles of universal design were not applied in the design of the library, so the arrangement is not easy to navigate for students in wheelchairs (DU1, February 2022).
	Sometimes, we apply some of the principles in the construction of ramps, washrooms, and other facilities (PD2, PD7, PD8, PD9, 2022).
Expensive to implement a universal design	*It is also expensive to implement universal design in libraries due to budget constraints (DU1, February 2022).*

Table 6.25 reflects that LIB1, LIB3, LIB7, LIB9 and LIB10 indicated a lack of awareness of universal design in university libraries. LIB3, LIB8, LIB10, DU1 and PD9 reported that there is a lack of incorporation of universal design principles in the designing and redesigning of facilities and services to accommodate students with disabilities. DU1 believes that universal design in libraries would be expensive to implement.

Universal design principles have contributed a lot to the benefit of everyone, especially students with disabilities in higher education institutions and their libraries. The responses to the questions on the benefits of universal design are presented in Table 6.26.

Table 6. 26: Benefits of universal design in libraries

Theme	Responses (N=28)
Eliminates discrimination	*It eliminates discrimination and marginalisation to allow everyone to benefit (DU1, February 2022).* *It does not discriminate but provides easy accessibility (DU3, May 2022).* *It eliminates discrimination in buildings and provides access for all (PD2, May 2022).* *The concept promotes fairness and there is no discrimination (LIB3, May 2022).*
Promotes equity and inclusion	*It allows equal treatment of students irrespective of their abilities and also promotes equity and inclusion of students with disabilities (LIB2, May 2022).* *It promotes equity and people have equal access to information and facilities (LIB3, May 2022).* *It promotes equity and allows everyone to access resources, facilities, and services, and it supports the inclusion of persons with disabilities (DU2, May 2022).* *It promotes all-inclusive buildings that accommodate everyone (PD2, PD7, PD8, PD9, 2022).*
Promotes independence of students with disabilities	*The universal design principles promote barrier-free environments (PD2, May 2022).* *The major benefit is that it accommodates everyone as well as provides easy access for everybody (DU,1 DU3, DU7, May 2022).*

Table 6.26 above reflects that DU1, DU3, PD2 and LIB3 reported that universal design eliminates discrimination which allows everyone to benefit while LIB2, LIB3, DU2, PD2 PD7, PD8, and PD9 indicated that universal design promotes equity and inclusion of people with disabilities in universal libraries. DU2, DU3 and DU7 are of the view that universal design promotes independence of students with disabilities.

6.2 Document analysis

The researcher analysed some policy documents to ascertain the provision of facilities, services, and resources to accommodate and promote the inclusion and full participation of students with disabilities in university education, in particular university libraries. The following documents were analysed:

- University Disability Policy (DP)
- Library Strategic Plan (LSP)
- University Strategic Plan (USP)

Of the ten (10) universities surveyed, only three (3) of them had a disability policy. The three (3) disability policies and ten (10) strategic plans of the universities were analysed. Six (6) themes with categories were identified during the data analysis process. These themes and categories are shown in Table 6.27 below.

Table 6. 27: Emerging themes and categories from documents

Themes	Categories
Theme 1: equity and inclusion	- Equal opportunities for students with disabilities - Avoid discrimination based on disability
Theme 2: access to facilities and services	- Braille library - Information communication technology (ICT)

Theme 3: Training of resource persons	• Sign language interpreters • Advocacy on Disability
Theme 4: Elimination of accessibility barriers	• Provision of physical accessibility
Theme 5: Universal design	• Universal design principles • Universal design for learning

6.2.1 Equity and inclusion

As this study was focused on students with disabilities, the document analysis focused on policies that highlighted equitable opportunities and inclusion of students with disabilities. It focused on providing fair opportunities and inclusion regardless of the person's abilities in the universities including libraries. Some of the statements extracted from the documents are presented in Table 6.28 below.

Table 6. 28: Equity and inclusion in universities

Theme	Information
Diversity and Equality opportunities	*To provide them (students/staff with special needs) with an equal opportunity to participate fully in all reasonable aspects of their life at the university (DP1 October 2019, p1).* *The University is committed to its policy of equal opportunities for all students, including those with special needs and aims to create an environment that enables them to participate fully in the mainstream of university life (DP3 August 2018, p6).* *Diversity and equal opportunity for all encompass the need for the establishment of an atmosphere where individuals are offered equal opportunities for self-development and learning, to enable them (students with disabilities) to learn, grow and lead (DP3 August 2018, p2).* *We will value diversity among our students and staff and we will be committed to the establishment of an atmosphere where individuals can get equal opportunities to challenge, self-develop and learn for growth and leadership (USP4 July 2017,*

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	p8).
Inclusive environment	*We will strive to live that belief as champions of a more inclusive community by creating a diverse and inclusive work environment, cultivating an inclusive guest experience, and fostering equal opportunities in our community (USP3, 2017, p1).*
Avoid discrimination based on disability	*The university is committed to fostering the right of individuals to be free from discrimination while engaged in activities undertaken as part of their study (DP1 October 2019, p5).*
	The university will provide support services and make the necessary modifications in policies, practices, and procedures to avoid discrimination based on disability (DP2 2020, p4).
	Equity and inclusion in universities contribute toward the elimination of discrimination (USP1 April 2019, p27).
	The university is committed to the elimination of unlawful discrimination against persons with disabilities and promoting positive attitudes toward disabled people whiles encouraging participation of persons with disabilities (DP3 August 2018, p7).

Table 6.28 reflects that some universities seem to provide equal opportunities for students with disabilities. It further shows that diversity has been practiced in some public universities in Ghana. The policies appear to suggest that some public universities are committed to eliminating discrimination as they provide support services and make reasonable modifications to policies, practices, and procedures to accommodate students with disabilities. However, most of the university libraries (7) do not have policies or guidelines for the provision of inclusive environments.

Accessibility to library facilities, services and resources is crucial to the educational development of students with disabilities in higher institutions of learning. Table 6.29 presents statements extracted from the policy documents on access to facilities and services.

Table 6. 29: Policy statement on access to library facilities and resources

Theme	Information
Braille library	*The Braille section potentially shall ensure regular supply of Braille and related materials and assist students in library research and transcribe reference material on demand" (DP1 October 2019, p8).* *The Persons with Special Needs Section (PSNS) shall provide library and information services to persons with special needs. The section asserts that education is a basic human right, and all persons must be included in accessing library services (LSP1 2022, p39).* *The Braille library will have books in Braille and on appropriate recorded media (DP3 August 2018, p16).*
ICTs	*The university's ICT shall offer students with disabilities the ability to access knowledge by adapting digital media to the nature of their disabilities, and to enhance their social and academic integration in the university community, including the library (DP1 October 2019, p10; DP3 August 2018, p16).*
Alternative media	*The institution's purpose is to provide ICT resources and services that are accessible to students with disabilities and staff, alternative media, web accessibility, and acquire assistive technology (DP2 2020, p6).*
Assistive technologies	*Assistive technologies such as screen reader software, JAWS-text-to-speech, CCTV text magnification systems, and reading and writing enhancement software among others shall be made available for individuals with disabilities (DP2 2020, p6; LSP2, 2022, p39).*

Table 6.29 above shows that some universities (UL1, UL2, UL3) are committed to the provision of a Braille library, digital media, web accessibility, and adaptive technologies to enhance social and academic integration in the library for students with disabilities.

6.2.3 Training of resource persons

The employment and training of resource persons on disability not only equip them to provide appropriate support and services to students with disabilities but helps them to communicate with differently-abled students. Sign language is key for resource persons to be able to communicate with hearing-impaired students. Table 6.30 presents extracts from the analysed policy documents.

Table 6. 30: Training of resources persons

Theme	Information
Sign language interpreters	*To maintain an agreed standard of proficiency by practice and instruction, specialised Resource Persons such as Sign Language Experts, Scribes, and Braille transcribers shall undertake continual training to keep abreast of the latest techniques and innovations (DP1 October 2019, p21; DP2 2020, p8).* *The university shall make necessary efforts to provide sign language interpreters for deaf persons and mobility guides for low vision or blind persons (DP3 August 2018, p18).* *Resource persons are trained to be informed about university standards, rules and policies, model these policies, educate students, enforce policies, and confront violations (DP1 October 2019, p20-21).*
Advocacy on disability	*The university shall work to promote better understanding among the campus community by sponsoring activities such as awareness programmes and speakers' bureau (DP1 October 2019, p10; DP3, August 2018, p2).* *The university will provide mandated disability sensitization training for all incoming faculty, administration and staff, including all health, safety, and security personnel (DP2 2020, p11).*

	Advocacy and outreach programmes aimed to raise awareness on disability issues (DP1 October 2019, p15).

The policy statements in Table 6.30 indicate that three university libraries seem to have specialised resource persons such as sign language experts, scribes, and Braille transcribers among others who educate students, create awareness about disability and enforce policies.

6.2.4   Elimination of barriers

The social model of disability advocates for the elimination of all forms of barriers that hinder the inclusion and accessibility of persons with disability including libraries in higher education institutions. Policy statements on the elimination of barriers in libraries are presented in Table 6.31.

Table 6. 311: Elimination of barriers

Theme	Information
Provision of physical accessibility	*The university will ensure appropriate physical accessibility for all persons with disabilities according to guidelines set by international standards of accessibility. The institution shall improve physical accessibility including but not limited to ramps at buildings, accessible restrooms in every building, Braille signs, automatic doors at building entrances, handrails, curb ramps, clearly delineated crosswalks, and cleared walkways among others (DP2 2020, p9).* *As far as practicable, every building on campus that is used by PEOPLE WITH DISABILITIES shall have the appropriate facilities to enable them to gain easy access and move about freely. The University shall ensure that new buildings and service facilities like hospitals, lecture rooms, and halls of residence constructed at the university include structures appropriate for students, staff, and visitors with disabilities (DP1 October 2019, p10; DP3 August 2018, p19).*
Disability-friendly facilities	*They shall be housed in rooms that give them easy access to toilets, bathrooms, libraries, dining halls, and other hall facilities. Toilets and other facilities should be adapted to make them user-friendly to students with special needs (DP1 October 2019, p10;*

	DP3 August 2018, p19). *The University should evolve inclusive culture and policies; adapt existing infrastructure and services to make them accessible (SP1 April 2019, p27).* *Only 40% of university facilities are friendly to the physically challenged (SP3, 2017, p10).*

Table 6.31 above suggests that some public university libraries appear to adapt their existing infrastructure, facilities, and resources to accommodate students with special needs.

6.2.5   Universal design

Universal design requires the provision of environments, products, services, resources, structures, and communications that are accessible and usable by all individuals regardless of their abilities. This is witnessed by the following extracts from the documents as shown in Table 6.32.

Table 6. 32: Policy statement on universal design

Theme	Information
Universal design	*The university should ensure all new infrastructure, equipment, and services are universal design compliant (SP1 April 2019, p27).* *The university also adopts universal design principles in the development of architectural, programmatic, instructional, and technological access (DP2 2020, p11).*
Universal design for learning	*The university adopts a universal design for learning as a strategy to meet the needs of students with disabilities (SP1 April 2019, p27).* *Universal design for learning "highlights the value of a multitude of learning styles and abilities and develops a much-needed overall plan for academic assessment, teaching, and learning (DP2 2020, p11).*

Table 6.32 indicates that only two university libraries (UL2, UL3) appear to adopt universal design strategies to support the learning of students with disabilities.

6.3   Chapter appraisal

This chapter presented and analysed information obtained from qualitative data. The major themes in the study included the current design of university libraries, facilities, and services offered to students with disabilities, the library experiences of students with disabilities, redesigning university libraries to accommodate all users, and universal design in universal libraries. Although facilities and services were offered to students with disabilities, the majority (7) of the university libraries did not have facilities, services, and resources for students with disabilities. ICTs are applied but the majority (7) of the university libraries had no assistive technologies and devices to support students with various disabilities. The attitude of library staff towards students with disabilities was found to be positive but the majority (6) lacked disability-targeted training to enable them to deliver support services. Students with disabilities encounter challenges such as inaccessible websites, inadequate alternative accessible formats of library resources, and inaccessible online public access catalogues among others during their library experiences. However, the application of universal design principles can promote equity and inclusion, promote the independence of differently-abled students, and eliminate discrimination to support the completion of university education of students with disabilities.

CHAPTER 7

INTERPRETATION OF FINDINGS

7.0   Introduction

Chapter 5 presented mostly quantitative data collected using questionnaires from students with visual, mobility and hearing impairments as well as data obtained from observing facilities, resources, services, library buildings and the surroundings of the library. Chapter 6 presented data obtained from interviews conducted with university librarians, heads of the physical development office, and heads of the disability unit as well as from institutional documents namely the disability policies and strategic plans. This chapter interprets and discusses the findings via the lens of the literature reviewed and the theoretical frameworks, the IFLA access to libraries for persons with disabilities checklist and the social model of disability, employed in the study. The chapter seeks to uncover insights into the findings to provide appropriate answers to the research questions and the possible implications of what has been found, and how the research findings can be used in practice.

7.1   Demographic information of the respondents

The study obtained data from students with visual, hearing, and mobility impairments on their population, age, gender, and programme of study. The gender, position, and qualification of university librarians, heads of the physical development office, and heads of the disability unit were also determined. This data helped the researcher to understand and best describe the respondents (Kiruki, 2018).

7.1.1 Profile of questionnaire respondents

The highest population of students with disabilities in public universities were those with visual impairments with a frequency of 254 (52.3%) as compared to other forms of disabilities (Table 5.1). Although the number of students with visual impairments was high in some public universities, it appears some public universities did not admit certain categories of people with disabilities. This result might be attributed to the nature of the programmes that were offered.

The majority 252 (96.6%) of the students with disabilities in this study pursued Bachelor's degree courses while 5 (1.9%) were enrolled in Master's degree programmes. Four (1.5%) students were pursuing Ph.D. programmes. This finding implies that fewer persons with disabilities pursue higher degrees as compared to their abled counterparts. This trend may be a result of the lack of financial support available for students with disabilities to undertake higher degree programmes. It could also be attributed to the inadequate facilities, resources, services, and assistive technology that are offered to support their education.

The majority (68.6%) of the students with disabilities across the ten public universities were male. The low female enrolment may be attributed to cultural beliefs and discrimination against women and female school education. Evidence showed that "girls and women with disabilities are most affected by stigma and discrimination, experiencing it both as a result of their disability and their gender" (Ando, 2017, p. 2.).

One hundred and twelve (42.9%) students were between the ages of 20 and 24 years followed by those aged between 25 and 29 years (36.7%). This indicates that most of the students with disabilities who enrolled in tertiary education were between the ages of 20 and 29 years to pursue various degree programmes.

The study discovered that of the 28 respondents interviewed eighteen (64.3%) were male and ten (35.7%) were female. Two (LIB1, LIB5) out of the ten females had Ph.D. qualifications compared to five males holding Ph.D.s (LIB3, LIB8, DU5, DU6, DU8). There is evidence of gender disparity among the interview respondents as more males were employed as heads of departments in public universities. It appears that there is less emphasis on gender equity as well as social justice and gender fairness regarding employment in higher education institutions in Ghana.

7.2 Physical access into and within university libraries

The checklist developed by IFLA for Access to Libraries for Persons with Disabilities required accessibility to buildings, services, materials, and programmes. Similarly, the social model of disability advocates for the elimination of all forms of physical barriers that impede and exclude students with disabilities from fully participating in higher education.

7.2.1 Current university library design

The interview findings from University Librarians revealed that most university libraries did not meet the needs of students with disabilities because they were not purposely built as libraries (Table 6.6). Some libraries had inadequate accessibility provisions/accommodations, inadequate markings and warning signs, navigation challenges, and non-conformance with universal accessibility standards. Most of the students visually impaired (69.7%) indicated the absence of sound warnings in university libraries to guide them (Figure 5.1). The researcher observed that none of the university libraries had warning signals that were clear to people with disabilities and reachable from a wheelchair. In the quest for libraries to provide appropriate buildings and environments, a study in Kenya by Khakali (2021) intimated that there should

not be building design barriers that pose challenges for students with disabilities. Sholanke et al.'s (2019) study conducted in Nigeria suggested that easy navigation of floors without obstacles would greatly help the visually impaired and those in wheelchairs to move independently and safely throughout the library building. A study by Addai-Wireko (2019) at two libraries at Ghanaian Public Universities concluded that although some adaptive technologies were found, the environment of the libraries was not conducive for independent use by students with disabilities. The study by Cinarbas and Hos (2020) in Turkey caution that the way university buildings are designed especially libraries can restrict access to facilities and services and may infringe on the rights of students with disabilities. However, university libraries can employ universal design principles to ensure that spaces, facilities, services, and resources among others are accessible and meet the needs of students with disabilities (Kiruki, 2018).

7.2.2 External library environments

The section deals with the external environment of the library building which includes the parking slots, pathways, directional signs/guide signals, library entrance gate, and access ramps. These were examined to determine the accessibility and accommodation of students with disabilities.

7.2.2.1 *Library parking spaces and pathways*

The findings from the University Librarians, University Development Officers, University Disability Officers, observation and students with mobile impairments indicate that all ten public university libraries did not have parking spaces marked with the international accessibility symbol for persons with disabilities, that the parking areas of some university libraries were a little distance away from the main entrance of the library building and that pathways were not marked with the symbol of access, especially for wheelchair users (Table

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6.7). The findings are supported by the Ghanaian studies of Tudzi et al. (2017a) and Ayoung et al. (2021) reported no parking lots marked with the international symbol of access for students with disabilities. While 59.2% of the students visually impaired acknowledged having challenges walking freely into the library or accessing other library sections without bumping into obstacles or experiencing hurdles, the students with mobile impairments indicated that there were unobstructed access paths (Table 5.19) and that pathways were wide and flat to accommodate wheelchair users (Table 5.37).

7.2.2.2 Library entrance gate

The University Librarians, University Development Officers, University Disability Officers as well as students with mobile impairments drew attention to the non-existence of automatic doors at the main entrance of all ten university libraries. (Table 5.19). It was observed that five (5) university libraries had entry doors that opened easily without exerting much effort by students with disabilities while four (4) of the libraries (UL4, UL5, UL7, UL9) had thresholds (Table 5.37). These high thresholds either impeded wheelchair users or tripped individuals with visual impairments. The findings concur with the study by Attakora-Amaniampong et al. (2021) which uncovered that only 29.4% of off-campus accommodations for students with disabilities in Ghana had installed automatic or swinging doors. Tudzi et al. (2017a) also reported on 63% of the library entrances in Ghana with thresholds that were higher than the 20mm standard.

Students with hearing impairments drew attention to the lack of an entry phone at the entrance of the libraries to support improved communication. A similar study investigating access to academic library services and facilities by persons with disabilities in the Eastern Region of Ghana also noticed that eleven (11) libraries surveyed had no entry phones accessible to deaf patrons (Ayoung et al., 2021).

7.2.2.3 Access ramps

A ramp at the entrance of every building is an integral part of the accessibility standards. It is required that ramps are constructed with a gentle gradient and with handrails on both sides to provide easy access for people with disabilities. The University Librarians, University Development Officers and University Disability Officers indicated minimal provision of ramps with handrails on both sides at the library entrance. The majority 52.2% of students with mobile challenges reported inadequate provision of ramps with railings on both sides (Table 5.19). Observations concluded that five (5) of the university libraries had no ramps with appropriate railings on both sides at the entrance gate (Table 5.27). The finding is supported by those of Ayoung et al. (2021) who found that only three (3) academic libraries observed had ramps and railings on both sides while one library had clear easy-to-read signs for users with low vision problems. However, the findings are in sharp contrast to a study carried out in India by Nazim et al. (2021) who discovered that the facilities at the Helen Keller Library at the Awaharlal Nehru University were almost sufficient including ramps with railings on both sides at the main entrance and clear signs/symbols at the entry gate for persons with disabilities.

7.2.3 Internal library environments

The section of the report examined the internal environment of the library such as the floors of libraries, elevators, appropriate signage, shelves, adjustable furniture (computer workstations, reference desks) designated washrooms as well as spaces and navigation in the library.

7.2.3.1   Floors of libraries

The University Development Officers indicated that none of the university libraries had tactile floors to caution or guide visually impaired patrons. Observation revealed that seven (7) of the libraries had non-slippery floor surfaces (Table 5.37). This suggests that students with

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disabilities were able to access the library without restriction especially wheelchair users and students with visual impairments. The results are similar to those of Tudzi et al. (2017a) who discovered that none of the sixteen (16) libraries surveyed had tactile warning systems, but had floors generally firm and non-slippery and that doors and corridors widths were adequate.

7.2.3.2   *Elevators*

Elevators are required in multi-level libraries to provide both vertical and horizontal circulation for people with or without disabilities. Findings from the interview showed inadequate elevators available to facilitate access for students with disabilities in Ghanaian university libraries (Table 6.10). Most of the students visually impaired (69.75%) indicated inadequate provision of elevators with Braille buttons or signs and synthetic speech installed (Figure 5.2) resulting in them not having access to all the levels of the library (Figure 5.8). Similarly, the majority of the students mobile-impaired (58%) revealed a lack of access to all the levels of the library (Table 5.19). The observation report also revealed that 60% of the multi-leveled university libraries did not have elevators with Braille buttons and handrails to enable easy access for students visually or mobile impaired (Table 5.37). The absence of lifts excludes students with disabilities from access to all resources as there is also not enough dedicated staff (Table 6.20) to assist students with disabilities in obtaining the needed resources shelved in different parts or levels of the university libraries. Most of the university libraries did not facilitate vertical circulation for students with disabilities as advocated under the universal design principles.

This finding corroborates the conclusion of both Ayoung et al. (2021) and Tudzi et al. (2017a) that students mobility-impaired could not access multi-level library buildings effectively because of a lack of lifts and ramps resulting in students with disabilities not having access to research materials and e-resources on the upper floors. In Nigeria, a study by Babarinde and

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Onifade (2020) concluded that the library lacks lifts, walkways free of obstacles as well as automatic doors for the visually impaired. Studies by Burgstahler (2021) at the University of Washington and Spina (2021) on creating inclusive libraries by applying universal design, indicated that elevators in the library should have control buttons that indicate numbers and symbols that are simple and easy to understand. Additionally, Gawronski's (2014) study at Colorado State University recommended the retrofitting of public buildings including libraries with ramps, elevators, wider doorways, and automatic doors to improve accessibility. Hayes and Bulat (2017) in Eswatini reported the lack of resources and government support for learners with special needs. The study recommends the retrofitting of buildings, environments, and sports fields in tertiary institutions to accommodate learners with disabilities as well as acquire inclusive learning resources and train staff members on inclusive education.

7.2.3.3   *Appropriate Signage*

The University Librarians, University Development Officers and University Disability Officers reported inappropriate signage as a barrier that hindered access and full participation of students with disabilities (Table 6.10). Although the university libraries studied provided signage, it was observed that none of the university libraries had Braille components alongside signs and pictograms, that the size of the signboards and the letters used were not proportional to the reading distance, and the color of the letters and background were not adequate for students with color blindness (Table 5.37). Both the students with mobile (52.2%) and hearing (50%) impairments reported inadequate clear easy-to-read signs with pictograms and sign language throughout the library. Tudzi et al. (2017a) also found that adequate library signage and perceptible information like Braille, tactile information, and acceptable pictograms were not provided for easy access to facilities and services in libraries. Nazim et al. (2021) noticed that the Helen Keller Library at the Awaharlal Nehru University provided assistive technology and specialised services to students with disabilities, but had no pictograms and clear, easy-to-

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understand signs. A study by Kiruki (2018) indicated inappropriate signs as well as navigational signage found in Kenyan libraries and concluded that safety signage was not at an appropriate height for the visually impaired and wheelchair users. Bostick and Eigenbrodt (2017) suggested that clear and easy-to-read signage with appropriate fonts, colours and sizes should be provided, especially electronic guidance systems and overview maps in print. Attakora-Amaniampong et al. (2022) reported that inadequate signage in student housing had psychological effects on students with disabilities.

The observation further indicated that all the university libraries lack an emergency exit with an emergency exit floor plan that accommodated the requirements of students with visual impairments (Table 5.37). This suggests that students with disabilities, especially those with visual impairments, may find it difficult to navigate and access the library building during an emergency and thus heightened the need for the implementation of universal design principles for the redesign of libraries to accommodate all users. This finding is in line with the study by Kiruki (2018) in Kenya which reported how the inappropriate use of background colour, text, and typefaces made it difficult to read floor maps, especially for students with low vision or colour blindness. The study by Spina (2021) on creating inclusive libraries by applying universal design recommended that floor plans should be posted and all sections in the library and that spaces must be arranged logically.

7.2.3.4 *Shelves, adjustable furniture, and navigation*

The University Librarians, Development Officers and Disability Officers acknowledged during the interviews inappropriate height of shelves with lack of Braille identifiers/labels, inadequate adjustable furniture and restricted circulation and navigation as some challenges that affect the inclusion of students with disabilities in university libraries (Table 6.10). Many students with

mobile challenges (52.2%) publicised that shelves were not reachable from a wheelchair while 59.4% reported inadequate adjustable chairs and tables (Table 5.19). Similarly, the majority of the students with visual impairments (54.3%) specified that the library shelves had no Braille labels (Figure 5.7). It was observed that only one university library had some shelves reachable from a wheelchair, but that seven (7) of the university libraries did not have appropriate adjustable tables so that wheelchair users can fit under them (Table 5.37). The findings suggest that most university libraries are not designed to meet the needs of students with disabilities. Tudzi et al. (2017a) also found that library facilities and book stacks were not accessible primarily because of limited maneuvering spaces. Although Nazim et al. (2021) noticed that shelves in the Helen Keller academic library were not reachable from a wheelchair, tables of various heights are available for physically challenged users.

7.2.3.5 *Computer workstations and reference desk*

During the interviews, University Librarians and Development Officers revealed wheelchair-inaccessible reference desks and computer workstations (Table 6.10). The observations confirmed that seven (7) of the universities had no service desks that were accessible from a wheelchair and all the computer workstations such as at the OPAC were too high for wheelchair users (Table 5.37). The lack of workstations meant that wheelchair users were restricted from accessing information independently in the library. This further deepens the need for university libraries to adopt the principles of universal design to enable the provision of accessible facilities. Studies by Nazim et al. (2021), Burgstahler (2021), as well as Spina (2021), recommended adjustable computer tables to suit different user needs and to create inclusive libraries. A study conducted by Cross (2020) on library computer workstations for inclusive student populations at Tri-County Technical College recommended the incorporation of

universal design workstations in library facilities to promote equitable access to information for all users to participate in the learning process.

7.2.3.6 Designated washroom

University Librarians, Development Officers and Disability Officers acknowledged during the interviews that not much effort has been made to accommodate students with disabilities in some of the university libraries. The respondents highlighted the lack of disability-friendly washrooms with appropriately installed handrails and other fixtures to accommodate students with disabilities, especially mobile and visually impaired students (Table 6.12). This was confirmed by the majority (73.4%) of the students visually impaired (73.4%) (Figure 5.6) as well as students mobile challenged (78.3%) (Table 5.19). Observations reflected that eight university libraries did not have disability-friendly washrooms with appropriate space for maneuvering, grab rails, flushing levers, and door handles (Table 5.37). The finding appears to suggest that students with disabilities, especially those with mobility impairments encounter challenges in accessing washrooms because of the non-compliance to the principles of universal design. A study conducted at the University of Ghana by Yayra et al. (2013) showed that all the sanitary accommodations observed had 66.7% accessibility deficiencies, restricted reachability and usability resulting in the safety of students with disabilities being poor. Similarly, Braun and Naami (2019) observed that university libraries in Ghana had inadequate requisite facilities for students differently abled. These findings are in sharp contrast with findings by Nazim et al. (2021) indicating that the Helen Keller Library at Jawaharlal Nehru University had remarkably adequate spacious washrooms with wide doors, easy-to-reach flushing levers, door handles, as well as washbasins and mirrors at appropriate heights for access to people with disabilities.

7.2.3.7   Designated spaces

The majority of University Librarians, Development Officers and Disability Officers confirmed the lack of Braille libraries to accommodate the needs of students with disabilities in university libraries (Table 6.13). The majority (55%) of students visually impaired reported the lack of a well-furnished designated section in the library to support their learning (Table 5.14). It was observed that only university libraries UL1, UL2, and UL3 had special rooms and/or spaces designated for people with disabilities. The study by Kiruki (2018) found that the lack of special reading rooms, lack of restrooms among others hindered students with visual and physical impairments from accessing information services in some academic libraries in Kenya.

From the interviews, six (6) (UL5, UL6, UL7, UL8, UL9, and UL10) of the public universities acknowledge that they have not established separate disability units. This implies that most of the public universities were not in compliance with the inclusive education policy of Ghana as well as global best practices. The importance of a disability unit in higher institutions of learning cannot be overemphasised. Gumbi et al. (2015) stated how South African students with disabilities receive specialised support services from disability units. After conducting studies on the experiences of students with disabilities in South African universities, Mutanga (2017) as well as Mutanga and Walker (2015) recommended that all university management should consider establishing separate disability units to accommodate and assist both staff and students with disabilities. The later study by Ntombela (2020) reported on the value of counselling and support with emotionally related matters provided by the disability unit to students with disabilities at the University of KwaZulu-Natal in South Africa.

7.2.3.8   Existence of university disability policy

From University Librarians, University Disability Officers and University Development Officers and through document analysis, the presence of university disability policies was ascertained. To ensure smooth running and accountability in every organisation, policy guidance is required. Table 6.11 showed that the majority of the university libraries (7) had no disability policy to guide their operations and support the inclusion of students with disabilities. Only three (3) university libraries had a disability policy to model best inclusive practices. From this, it can be deducted that most of the university libraries (7) are not meeting the needs of students with disabilities. Most of the university libraries are not accessible, thereby excluding students with disabilities from participating in learning. The documentary analysis as presented in Table 6.28, the three (3) university libraries with disability policies seem to provide equal opportunities for students with disabilities. This indicates that diversity is being practiced in some public universities in Ghana. The policies appear to suggest that some public universities are committed to the elimination of discrimination among staff and students as they provide support services and make reasonable modifications to policies, practices, and procedures to accommodate students with disabilities.

From the documentary analysis (Table 6.29), the three disability policies indicated a commitment to the provision of Braille libraries, digital media, web accessibility, and adaptive technologies to enhance social and academic integration in the library for students with disabilities. The three (3) university libraries appear to have specialised resource persons such as Sign Language Experts, Scribes, and Braille Transcribers among others who educate students, create awareness about disability and enforce policies as presented in Table 6.30. The analysis of the documents further suggests that some public university libraries appear to adapt their existing infrastructure, facilities, and resources to accommodate students with special

needs (Table 6.31). This study corroborates the findings of Dodamani and Dodamani (2019) in Indian university libraries which reported that only 22.7% have written disability policy or documented minutes related to library resources and services for persons with disabilities. Eneya et al.'s (2020) study on responding to the needs of students with disabilities at the University of Zululand reported a lack of a disability policy and a lack of collaboration hindered services and resources provision at the university library. The study concluded that the development and implementation of an institutional disability policy and the provision of adaptive technologies are crucial to ensuring the accessibility of library resources and services to students with disabilities in higher education. Similarly, Osadebe et al. (2019) revealed that library policy and technical and personnel affect library services delivery to visually impaired students in selected universities in Nigeria. The study recommends regular user satisfaction surveys to be conducted by the university libraries to ensure their services accommodate the needs of students with disabilities. The study by Day and Fleischmann (2020) at the University of Texas lamented that the digital rights management (DRM) presents a major obstacle to acquiring accessible content as well make resources more difficult to modify and manipulate.

7.3   Information services and ICTs

The section investigated the information services, resources, and ICTs facilities available in university libraries to accommodate the needs of students with disabilities. It also explored the training offered to equip students with disabilities to use assistive technology, access resources, and utilise the library website to retrieve needed information.

7.3.1   *Reasons for non-visits to the library*

The majority of students with visual impairments (76.5%) mentioned, amongst others reasons for not visiting the library, the inappropriate and/or not easy-to-read formats of library

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resources, inaccessible website, and inadequate CD, DVD and DAISY book collections (Table 5.7). Most (76.8%) of students with mobile impairments attributed the lack of flexibility in the library design and difficulties in accessing library resources as reasons for non-visits to the library (Table 5.21). The majority of the students with hearing impairments (86.7%) did not use the library due to inadequate videos with subtitles and/or sign language, difficulties in accessing library resources, and the inaccessible library website (Table 5.29). Phukubje and Ngoepe (2017) acknowledged that although a library service unit created for students with disabilities exists at the University of Limpopo in South Africa, students with visual impairments were not adequately satisfied as an insignificant number of library materials were transcribed into accessible formats. The study by Coetzee (2016) recorded challenges in navigating the library as well as inadequate training in the use of library services and assistive technology as reasons for students visually impaired not using the library at Stellenbosch University.

7.3.2 *Training offered to students with disabilities*

Findings indicated that students with disabilities have received varying degrees of library training and have acquired some basic skills. Although the majority of students with visual impairments (68.5%) received training on the effective use of assistive technology and devices to support their learning and accessing online resources and services, only 46.7% of students with hearing impairments received training on access to digital resources and services as well as on information retrieval search strategies. Students with mobile impairments (66.7%) were trained on information retrieval search strategies and how to use the OPAC. The findings are in sharp contrast to a study conducted in Pakistan by Ahmed and Naveed (2020) which indicated that people with disabilities lacked computer and searching skills when accessing

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online content with devices resulting in them not fully utilising electronic resources housed in the library.

7.3.3   *Information services provided to students with disabilities*

From the analysed interview results, the University Librarians and Disability Officers revealed that seven of the university libraries had no specialised services for students with disabilities and thus don't conform to the social model of disability advocating for universal access to information services without restrictions. The other three university libraries provided specialised services to facilitate the education of students with disabilities, especially those visually and hearing impaired. Services include Braille documentation, information searching, digitization, special library, technological and reprographic services, sign language interpretation as well as examination support (Table 6.14). Most of the students visually impaired (81.5%) specifically mentioned Braille documentation, library staff assistance in retrieving information from the Internet, provision of computers with assistive software for use in the library and information literacy training (Table 5.9). These findings support the reasons for students with disabilities not to visit the library. Lack of specialised services and low library usage might influence their learning negatively. Similar findings were recorded by Osman and Kwafoa (2020) who uncovered that students with visual impairments frequently had to access traditional library services, computers and ICT services to support their learning in higher education institutions in Ghana. A study on the utilisation of e-reference services by students with disabilities in the Federal University Libraries in Nigeria showed that only email e-reference service was available to students with disabilities but only a few used the email service (Chijioke et al., 2020). The study further discovered that most of the e-reference resources were designed for abled users, and the high cost of acquiring these electronic reference resources restricted the utilisation of e-reference services among disabled users.

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Chijioke et al. (2020) recommended the design of systems that facilitate universal accessibility and usability, provide web-based library services to disabled users, and support services should be provided as well as the enactment of a disability policy. Akolade et al. (2015) observed that transcription, online reference and inter-library loan services were not offered to students physically impaired at Kwara State higher education institutions' libraries. Nall (2015) intimated that reference services, in-person help, appointments, text and video conversations, and phone or email communication should be provided in multiple forms and formats. Gul and Khowaja (2020) revealed that most of the disabled users were satisfied with the resources but were least satisfied with the services and facilities offered by the library. Yadav and Singh (2022) discovered that graduate, postgraduate, and doctoral students with disabilities were satisfied with the library resources and services available to them, but asked for creating more awareness about disabilities to strengthen libraries' commitment to persons with disabilities.

7.3.4   *Information resources for students with disabilities*

The IFLA's checklist for access to libraries for persons with disabilities requires library materials to be accessible for all clientele including those with disabilities. Information resources in alternative formats should be available to students with disabilities. Students visually impaired acknowledged the availability of Talking Newspapers (90.1%), Talking Books (82.7%), Electronic Databases and E-books (78.4%), Internet and digital resources using Braille display (72.2%), Braille Books (70.4%) and Audio-Visual Materials (60.5%). This is in line with Chaputula and Mapulanga (2017) who indicated that Talking Books and Audio Recordings have a playback facility and as well present content that is easy to comprehend. However, a large number of students mobile impaired (43.8%) indicated inadequate alternative formats of resources (Figure 5.9), and most of the students with hearing impairments indicated the absence of audio-visual materials with appropriate captions (80%), sign language

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interpreters (63.3%) and induction loop systems (53.3%). Observations uncovered that the alternative formats of resources were only available at three of the university libraries. The same trend was recorded by various studies. Cinarbaş (2016) reporting on the experiences of students with disabilities in an English language teacher education program at Middle East Technical University, indicated that no materials were provided in Braille. After investigating information services offered to people with visual and physical impairments in Kenya, Kiruki (2018) discovered that most of the university libraries did not provide audio-visual materials, CD-ROMs, Braille books, and large print books forcing students visually impaired to rely on human readers. Dodamani and Dodamani (2019) study in Indian university libraries observed that only 12.9% have Braille books in their collection. Majinge and Stilwell (2014a) and Acheampong et al. (2020) reported that most university libraries in Tanzania and Ghana respectively had no special media to support the learning and education of visually impaired students. Braun and Naami (2019) observed that university libraries in Ghana had inadequate requisite facilities for differently-abled students. Adebayo et al. (2018) suggested that the availability of media resources such as audiobooks, music, and pictograms helps students with dyslexia get maximum satisfaction from the use of the library. The study recommends that stakeholders should ensure that students with disabilities are not left out in the information age.

7.3.5 *Accessibility of library resources, facilities and services*

Most of the students visually impaired perceived the library design as not providing easy access to facilities and services. Both the students visually and mobile impaired graded all the digital resources such as e-journals, e-books, library databases, library websites, and the OPAC as poor. Students with hearing impairments reported low usage of information resources due to inadequate access as alternative formats, appropriate captions and deaf-related electronic links in the online databases were not provided. The inaccessibility of the resources and services

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resulted in 46.3% of students visually impaired, 40.5% of students with mobile challenges and 36.7% of students with hearing impairment indicating that their needs were not accommodated by the library. The study by Cinarbaş (2016) at Middle East Technical University also asserted that the lack of availability and accessibility of resources and materials impedes the learning of students with disabilities. Eneya et al. (2020) reported inaccessibility of library services, and unavailability of resources in alternative formats that restrict access for differently-abled students.

7.3.6   *Assistive devices for students with disabilities*

The University Librarians (LIB1, LIB2, LIB3) and Disability Officers (DU1, DU2, DU3) indicated that their university libraries provided assistive technology and devices to students with disabilities, especially the visually impaired (Table 6.16). This is evident from students with disabilities (visually impaired 240, mobile impaired 90 and hearing-impaired 77) registered in these universities (UL1, UL2, UL3) as presented in Table 5.1. The other seven (7) university libraries had no assistive software, tools, and technologies to support students with disabilities (Table 6.16). This was confirmed by the majority of the students visually impaired (87.1%) who listed embossers, laptops or desktops, screen readers and recorders being available to them. JAWS software was not installed to make the online library catalogue accessible to them. Lacking or in short supply were assistive devices like tape recorders, CD players, DAISY books, magnifying glasses, CCTV, screen readers, and adaptive keyboards. The minority of students hearing impaired (20%) acknowledged the availability of text-to-speech software, voice-to-text devices/Voice carry over or Real Text Time, and Teletypewriter/Text Telephone Devices/Telecommunication devices for the deaf (Table 5.31). This appears to suggest that the unavailability of assistive technologies, software and application restricted student with disabilities access and use of information resources.

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In contrast, 72.2% of the visually impaired (Figure 5.10), 59.4% of the mobile impaired (Table 5.23), and 70% of hearing-impaired students (Figure 5.32) considered assistive technology and devices very important to their learning. Similar findings were recorded by Ayiah (2017) on the non-existence and provision of assistive technologies to students with visual impairments in academic libraries in Ghana. The study recommends the promulgating of disability policies, effective staff training, and the acquisition of adaptive technologies to assist visually impaired students access relevant information for academic activities. Thomson's (2019) study in Canada reflected a lack of computer accessibility including keyboards, trackballs, large monitors, screen readers, screen magnification, touch screens, captioning mirrors, and speech recognition programmes as some of the technological barriers for students with disabilities. Similarly, the study by Onsinyo (2018) demonstrated how university libraries in Kenya had no adequate hearing aids for students with hearing impairments indicating that the plights of the differently abled were not prioritised. Kaunda and Chizwina (2019) proposed a legislative framework and partnerships to promote and improve material and access to resources for differently-abled people at the North-West University in South Africa. Kiruki and Mutula (2023) call for improved assistive technology infrastructure as well as enactment policies that offer staff development programmes to provide services to persons with disabilities.

In contrast, Chaurasia and Singh (2022), Mahawariya (2019) as well as Alsalem and Doush (2018) demonstrated that the provision of adaptive technologies, software, tools and resources in alternative formats facilitated access to the physical environment of the library building. It can be concluded that students with disabilities depend on assistive technology and devices to execute daily activities.

7.3.7 Benefits of ICT and assistive devices to students with disabilities

ICTs promote equal access and participation, facilitate information dissemination and the production of accessible formats, and support the independence of students with disabilities (Table 6.15). The majority of students with visual, hearing, or mobile challenges indicated that ICTs and assistive tools assisted with the acquisition of knowledge and skills, enhance inclusion and participation, endorse independent learning, facilitate communication and collaboration, as well as promote equitable access to information (Table 5.3, Figure 5.20 & Figure 5.33). This means that ICTs have not only supported the integration and full participation of students with disabilities, but also support their academic performance in higher institutions. Therefore, regardless of the type or degree of disability, ensuring and facilitating equal access to technology providing integration and full participation in learning should be the key goal for effective library services. Yadav and Singh, 2022), Chaurasia and Singh (2022), Kiruki and Mutula (2021) as well as Seale et al. (2018) corroborate this as they argued that ICTs hold the potential to expand accessibility and inclusivity of tertiary education for differently-abled students.

7.3.8 Difficulties in using assistive technologies

From Table 6.17 it can be seen that the University Librarians and Disability Officers acknowledged that incompatibility of devices and conversion distortions of materials, inadequate skills of students and library staff, frequent Internet disruptions, inadequate funding, insufficient devices and inadequate maintenance as major challenges that hinder the use of assistive technology. Similar findings are reported by Sanaman and Kumar (2015) who revealed that students with disabilities face barriers to the use of assistive technologies in some libraries in India due to a lack of awareness, adequate skills of both students and staff, and individual training. Studies like Ilako et al. (2020) and Savova and Price (2019) attributed the

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lack of funds and inadequate budgets allocated to academic libraries as the reason for providing needed assistive technologies and implementation of best practices.

7.3.9   Accessibility library website

Both the students with visual and hearing impairments rated the public university libraries' websites as inaccessible resulting in their needs not being catered for. The majority of the students visually impaired perceived the content websites as inaccessible (63.4%) or not compatible with their devices (32.1%) (Figure 5.11 & Figure 5.12). Observations found that all the websites of the ten (10) university libraries were not designed to provide easy navigation or search capacities by students with visual or hearing impairments resulting in them not being able to access resources independently and find resources in audio or Braille formats. This suggests that the websites were not designed according to Web Content Accessibility Guidelines to facilitate amongst others easy navigation, software to enlarge text and offer alternative formats or search capacities (Guder, 2014).

These findings agreed with those of Majinge and Msonge (2020), Al-Harrasi and Taha (2019), Agangiba and Agangiba (2019), Dodamani and Dodamani (2019) as well as Alsalem and Doush (2018) who discovered that the websites in higher education institutions were not accessible for students with disabilities and that none of the websites conformed to the standards of web accessibility.

In contrast, Vuegen et al. (2020) reported how a Book-a-Book web application developed facilitated access to learning resources for differently-abled students.

7.4   Library experience of students with disabilities

This section explored the library experiences of students with disabilities in academic libraries. The attitude of library staff, availability of support services, training of library staff on disability issues, the barriers experienced and the ways of improving the experiences of students with disabilities were investigated.

7.4.1   Attitude of library staff

During the interviews, all the university librarians revealed a positive attitude of library staff toward students with disabilities which influenced their patronage of the resources, facilities, and services of the library. The library staff exhibited non-discriminatory, friendly, and provided equal treatment towards students with disabilities (Table 6.18). In contrast, the students with hearing impairments revealed that library staff do not respond to their greetings, are unfriendly and unapproachable, are too busy to help them, use an intimidating tone of voice, and lack adequate knowledge of their needs (Figure 5.34). Some of the visually and mobile impaired students also agreed that library staff do not respond to their greetings, are unfriendly and unapproachable, are too busy to help them, and use an intimidating tone of voice. Others, however, indicated that library staff were polite and clear in their conversations, look directly at students when communicating and did not lack adequate knowledge of their needs (Table 5.14 and Table 5.25). However, the findings seem to suggest that library staff are not always ready to assist students with disabilities to retrieve relevant and needed information. Akbar et al. (2022) also discovered that librarians in Pakistan had attitudes that were helpful, very cooperative, and friendly toward students with vision impairments. However, the study by Freer (2021) in Canada on the breaking down of attitudinal barriers, indicated that poor attitudes towards disability affected the interactions between disabled and other students resulting in social exclusion. Similarly, Grischow et al. (2019) indicated that negative attitudes

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toward disability is contributing to the stigma of persons with disabilities and suggested a change in public attitudes and the designing of disability interventions to improve the experiences of students with disabilities in higher institutions. Negative attitudes persist, reflected by Pionke (2017), in the pervasive use of language. Negative attitudes and perceptions create isolation and stigmatisation and prevent persons with disabilities from participating as members of society with the same rights as other citizens.

7.4.2 *Availability of support services*

The university librarians acknowledged during the interviews that some university libraries provided support services such as information retrieval for assignments, computer literacy training, and information searching to students with disabilities. The majority of students with mobile impairments (82.6%) indicated that only a few support services were available to them resulting in 62.3% of them being moderately satisfied with the support services provided (Figures 5.17 and 5.18). Although 60% of students with hearing impairments acknowledged the availability of research assistants, 66.3% stated that few support services were available to them resulting in 43.3% being dissatisfied with the services (Figures 5.27, 5.28 and 5.29). Some support services are provided by some university libraries, but not enough to satisfy students with disabilities. The finding is similar to a study conducted in Pakistan by Akbar et al. (2022) which indicated how librarians help students with vision impairments to find needed articles. However, Sanaman and Kumar (2015) study identified the lack of sufficient ICT infrastructure and facilities as a challenge to supporting students with disabilities in Indian libraries.

7.4.3 *Training of library staff*

During the interviews, only three (3) of the university librarians (LIB1, LIB2, LIB3) revealed that their libraries provided some specialised training for their staff such as the use of assistive technology to assist students with disabilities, Braille transcription and sign language

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interpretation. Seven (7) university libraries (LIB4, LIB5, LIB6, LIB7, LIB8, LIB9, LIB10) had no dedicated disability staff to support students with disabilities and inadequate disability training targeted at staff to effectively provide information and support to persons with disabilities but only received general customer service training. This might result in students with disabilities encountering challenges to interact with library staff and affecting their information access and use of the library resources. The lack of dedicated disability staff to assist students with disabilities obtain resources, excludes them from participating in learning. This lack of dedicated disability staff suggests that most university libraries appear not to accommodate the needs of persons with disabilities as provided under the universal design principles. This is supported by Ayoung et al. (2021), Gul and Khowaja (2020), Akolade et al. (2015) as well as Sanaman and Kumar (2015) who revealed that highly skilled and knowledgeable library staff are needed to support persons with disabilities in this digital age, that not enough library staff members have the required skills resulting in the need for additional training. A contributing factor is the lack of awareness of disability issues and the negative stereotyping of disabilities (Eneya et al., 2020; Oud, 2019; Zhao et al., 2019).

7.4.4 Barriers experienced in library experience

The social model of disability advocates for the elimination of all forms of barriers that hinder access to library resources, facilities, and services by students with disabilities. The previous discussions revealed that persons with disabilities at Ghanaian public university libraries face impediments such as inaccessible websites, formats of printed and e-resources, OPACs, physical accessibility challenges, as well as inadequate adaptive technology and devices. Due to the lack of a library policy relating to services, resources and accessibility provision, and inadequate funding to provide assistive technology and devices, students with physical impairments depend on friends to access resources in the library. The lack of well-furnished

and equipped, designated spaces for students with disabilities in the library, inadequate library assistants, and lack of librarians trained in special needs, were the major factors hindering students with disabilities to visit the university libraries and having good experiences there (Tables 5.14 5.22 and 5.36).

It appears most of the university libraries did not consider students with disabilities as advocated under the universal design principles resulting in persons with disabilities having difficulties visiting the libraries, and accessing library resources to find needed information which in turn might affect their learning and academic performance.

Similar studies conducted in Ghana support these findings. Odame et al. (2021) recorded students with visual impairments experiences in Ghanaian universities and indicated how students experience difficulties accessing programmes, encounter inaccessible environments, as well as lack learning resources. Opoku and Nketsia (2021) also reported inaccessible and non-inclusive schools as the challenges faced by differently-abled students in Ghana. Attakora-Amaniampong et al. (2021) as well as Acheampong et al. (2020) further revealed that university libraries in Ghana did not provide accessible formats like Braille or large print of library books for students with visual impairments and provide only handouts reproduced in an accessible format for visually impaired students. Addai-Wireko et al. (2020) listed enumerated faulty machines, incompatibility of installed software, and inadequate equipment as some difficulties experienced by students with disabilities.

Outside Ghana, several studies drew the same conclusions. At Addis Ababa University, Keinen (2018) reported on the lived experiences of students with mobility impairments revealing that the inaccessibility of facilities, discomfort at the library and dependence on peers resulted in unsatisfactory experiences. Ndiweni et al. (2022) highlighted physical inaccessibility, lack of infrastructure to support adaptive technologies use, inadequate information resources and the

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absence of adequately trained staff to handle users with disabilities. In Zimbabwe, Obim and Akpokurerie (2022) listed lack of government support, inadequate funding, and unstable electric power supply as major challenges associated with the utilisation of assistive technology for effective library services to differently-abled students. South African studies by Ntombela (2020) as well as King and Coetzee (2018) reported on inaccessible library buildings, inadequate assistive technology and the unavailability of information resources in large print and Braille for students with visual impairment. Akbar et al. (2022), Mahawariya (2019), as well as Awais and Ameen (2015), found that the majority of the academic libraries in Pakistan lack e-libraries, digitizing facilities, library helpers and alternative format catalogues. The Nigerian study by Adebayo et al. (2018) reported barriers such as the inability to remember passwords to access media resources, reading spine labels on books and unreadable signage.

However, the findings of this study are in sharp contrast to Nazim et al. (2021) study in India which discovered that the Helen Keller Library at Jawaharlal Nehru University provided materials in alternative formats like Braille or large print, provided audio, talking and e-books to students visually impaired as well as also subscribed to databases which provide relevant collections in a variety of forms such as DAISY and e-text to support the learning of students visually impaired.

7.4.5 *Improving library experiences*

Libraries have the function to deliver innovative and equitable information resources and services to meet the demands of all users, because "all persons have a right to information regardless of disability" (Abodunrin & Olutoyosi, 2020, p. 147). The provision of accessible infrastructure, advanced assistive technology and devices as well as alternative accessible formats of digital resources improve the library experiences of students with disabilities. The implementation of a library disability policy and the employment of specialised library staff

would improve and promote the education of persons with disabilities. The creation of dedicated spaces for students with disabilities in academic libraries is needed to provide safe and comfortable learning areas. Disability units, the advocacy about disability issues and the involvement of students with disabilities in decision-making will improve the learning experiences of students with disabilities at all universities. The library experiences of students with disabilities will improve if infrastructures such as accessible pathways in and around the library, accessible car parks close to the library, access to disability restrooms, adjustable tables, and computers equipped with assistive technology and software.

Addai-Wireko et al. (2020), King and Coetzee (2018) as well as Tudzi et al. (2017b) called for the construction of all library facilities using universal designs, provision of alternative information resource formats and the embracement of assistive technology in the future to ensure effective service delivery and full participation in teaching and learning by students with disabilities. Akbar et al. (2022) also recommended the provision of assistive technology and devices as well as the implementation of Web Content Accessibility Guidelines.

The study by Ifijeh and Yusuf (2020) discussed the paradigm shift in teaching pedagogy in universities in Nigeria and the role of the academic library as a result of COVID-19. The authors suggested the provision of adequate funding for academic libraries to enable the deployment of information resources, relevant ICT infrastructures, and services that support teaching, learning, and research. Chiwandire and Vincent (2019) at Rhodes University, South Africa, recommended higher institutions to provide an enabling educational environment for students with disabilities to succeed academically by addressing the disability funding-oriented barriers. The study by Obim and Akpokurerie (2022) also recommended the provision of adequate adaptive technology, adequate training of both students with disabilities and librarians in the use of assistive technology, government to develop an interest in inclusion and provide

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adequate funding for the acquisition of resources to support students with disabilities in higher education.

After examining increasing accessibility to academic library services with Alt Text, colour contrast, captioning and transcripts, Pope and Creed-Dikeogu (2022) concluded that access to video tutorials by both disabled and non-disabled users increases academic library accessibility. Pope and Creed-Dikeogu (2022) further intimated that universal design for learning offers university librarians the opportunity to create accessible library video tutorials that can be repurposed and circulated widely. However, librarians may require training on how to carry it out effectively.

7.5 Redesigning buildings, facilities, and services

The study surveyed the redesigning of spaces, facilities and services, guidelines for redesigning of university libraries, universal design in university libraries and benefits of universal design principles in university libraries.

7.5.1 Redesigning spaces and services

The University Librarians, Development Officers and Disability Officers acknowledged that the physical, technological, and communication environments of university libraries need redesign. The University Librarians, Development Officers and Disability Officers advocated for the addition of elevators, transformation to ensure accessible library websites and OPACs, subscriptions to accessible e-journals and databases, set-up of a Braille and Audio-Visual Unit as well as disability-friendly washrooms, purchasing of appropriate assistive technologies and devices as well as resources in alternative formats and adding of Braille labels (Table 6.23).

Most (62.3%) of students visually impaired, 92.7% of students mobile impaired and 80% of students hearing impaired suggested the redesign of ramps, washrooms, elevators, computers, and library websites. They also requested library resources in alternative accessible formats, employing of specialised staff assistants, adjustable shelves, pathways without barriers, clear signage and warning signals, dedicated discussion spaces or study carrels, and the training of library personnel on disability. Most students hearing impaired (96.7%) especially indicated the need for technological improvements in library services.

These findings deepen the concern for the application of the principles of universal design, the social model of disability as well as the IFLA Checklist for access to libraries for persons with disabilities for the redesign of facilities, resources, and services in university libraries to accommodate students with disabilities.

Studies conducted in the past also suggested redesigning of both the external and internal library buildings to accommodate users with disabilities. Small et al. (2015) suggested that large font, graphic icons, and Braille should be used to redesign library signage at Syracuse University. Bostick and Eigenbrodt (2017) added the use of appropriate fonts, colours, and size for clear and easy-to-read signage; especially electronic guidance systems. Guder (2014) called for free adjustment of chairs, tables, and lighting and the easily moved equipment and furniture at Ohio University. Shobba (2015) emphasised that an organised and good designed library with tactile markings not restricting access optimises space and promotes interaction between users. A study by Sobol (2020) in Canada reflected that the redesign of the library improved the visibility of research support and addressed inclusivity via design and staffing practices.

7.5.2 Guidelines for redesigning of university libraries

From the interviews with the University Librarians, Development Officers and Disability Officers it was uncovered that seven (7) of the public university libraries did not have disability

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policy guidelines, procedures and processes for accessibility and inclusiveness as advocated under universal design, social model and IFLA checklist for access to libraries for persons with disabilities. The other three universities relied on the guidelines in the building code to provide access to facilities and resources. This further depicts that less emphasis was placed on the provision of accessible facilities, resources, and services for persons with disabilities resulting in low budgetary allocations to cater for their needs in university libraries. Butvin (2023, p. 2) on debunking seven myths and embracing a universal design mindset claimed that building code is a "minimal and often old standard that does not consider constituencies of users evenly. It mostly addresses mobility challenges". A research study conducted in Northwest United States by Peacock and Vecchione (2020) on best practices, procedures and policies indicated that both the universities and their libraries lacked a policy that promoted the provision of accessible materials and facilities. The study suggested the establishment of policies and procedures to meet the needs of differently-abled students. Ayoung et al. (2021) study in Ghana on access to library services and facilities by persons with disability discovered that none of the academic libraries surveyed had a Disability Policy to address the needs and concerns of students with disabilities. The institutions lack a Disability Policy and were not sure about drafting one. Spina (2021) concluded that libraries that meet all legal and accessibility standards sometimes fail to meet inclusivity when implemented.

7.5.3   *Universal design in university libraries*

The University Librarians, Development Officers and Disability Officers acknowledged to minimal incorporation of universal design principles and guidelines into the design of products, facilities, services, policies, and procedures to make them accessible to every individual regardless of their abilities. Most of the students visually, hearing or mobile impaired disagreed

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that the library design accommodates a wide range of individual preferences and abilities, facilities minimise hazards and efficient and comfortable usage, provides access with low physical effort, as well as provides appropriate size and space for approach, reach, manipulation and use.

It is also evident from the documentary analysis that most of the university libraries (8) are not applying Universal Design Principles in the design of their products, spaces, services, resources, and facilities to make the libraries marketable and usable by diverse persons regardless of their abilities. It appears only two university libraries adopted universal design strategies to support the learning of students with disabilities (Table 6.32). It can be concluded that universal design is a new concept among university libraries in Ghana. This corresponds with the findings of Deku (2017) and Adom (2022) who investigated the knowledge and application of the principles of universal design in Ghanaian education environments. Robertson et al. (2022) and Foxhall et al. (2020) also alert to structural issues due to a lack of universal design knowledge and experience resulting in students with disabilities relying on classmates and friends for research assistance rather than asking a librarian and inaccessible new digital systems and collections. Universal design is, however, expensive to implement due to budget constraints and difficulties to alter existing library buildings. Gawronski (2014) argued that retrofits created problems and were considered unattractive and costly at Colorado State University. Butvin (2023) suggested that Universal Design Principles can be executed in the early stages while ensuring maximum affordability resulting in increased accessibility and visually more attractive and usable features. This study is of the view that the social model of disability, the universal design principles and the IFLA Checklist for Access to Libraries for Persons with Disabilities should be adopted by university libraries to promote inclusion and full participation of students with disabilities in university education.

7.5.4 *Benefits of universal design principles in university libraries*

During the interviews, the University Librarians, Development Officers and Disability Officers acknowledged that the benefits of universal design help eliminate discrimination and marginalisation, promote barrier-free environments which accommodate diverse individuals in university libraries, promotes equity and inclusion of persons with disabilities in higher institutions and allows the independence of individuals with disabilities to thrive in learning resulting in promoting fairness in university libraries and higher institutions. The finding is supported by the studies by Oldham (2019) at the University of Tennessee and Ackah (2020) in Australia showing that the elimination of all forms of barriers in society promotes equal educational opportunities for all individuals. The authors reported that educational institutions should strive to eliminate segregation (preferences for some and exclusion of others) based on disabilities or ethical differences to model value-oriented practices. When the principles of universal design are introduced to building spaces, it can solve various accessibility issues that are faced by people with disabilities (Chrzanowska, 2020). This confirms the views of Adom et al. (2023) that universal design removes potential restrictions that can be roadblocks for effective learning of differently abled students. Equally, a study conducted by Verma (2021) reported how universal design creates environments that do not stigmatise individuals with disabilities but allows the navigation, manipulation, participation, and appreciation of society. The studies by Odunola and Tella (2019) in Nigeria and Christoffersen (2020) at Brigham Young University indicated that the quality of the library environment about designed spaces, the resource skills of the users and the information system of libraries contributed to patronage. Berget (2020) assessed the universal design of public libraries in Norway and indicated how it served as the basis for equal access to health information and minimise the health disparities of persons with disabilities. The study by Sanger (2020) in Singapore indicated that universal design promotes inclusive educational environments and teaching quality that benefits diverse

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students. Conversely, Burgstahler (2021) found at the University of Washington that universal design is considered a better strategy that addresses the needs of users at the development stage. Both the Centre for Excellence in Universal Design (2020) and West et al. (2016) observed that universal design promotes barrier-free higher education environments which allow the independence of and participation in learning by individuals with disabilities.

7.6   Chapter appraisal

This chapter discussed and interpreted the findings from the data collected and positioned the discussion through the lens of relevant literature, the theoretical framework, and the research methodology. The next chapter provides conclusions and recommendations of the study.
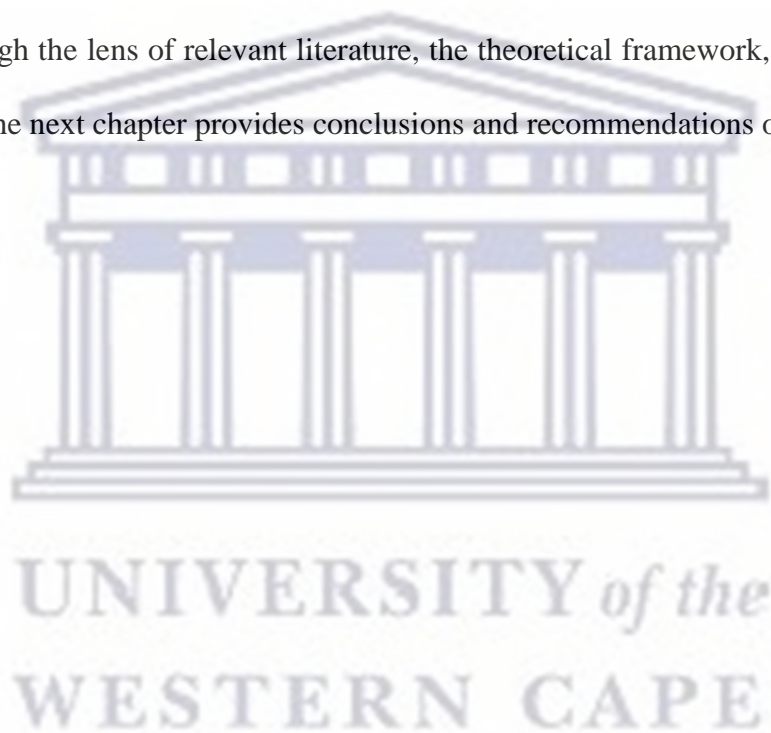
CHAPTER 8

CONCLUSION AND RECOMMENDATIONS

8.0   Introduction

This final chapter answers the research questions, concludes the study and theory, makes recommendations and points to further studies that need to be conducted to strengthen the findings of this study. The originality and contribution of this research study are also presented.

The aim of the study was to examine how Ghanaian public university libraries conform to universal design principles to accommodate students with disabilities. The following research questions were addressed:

1) Are Ghanaian public university libraries designed to meet the needs of students with disabilities?

2) What facilities and services are offered to render information services to students with disabilities?

3) How do students with disabilities experience library services and information?

4) How can Ghanaian public university libraries be redesigned to accommodate students with disabilities?

8.1   Design of Ghanaian public university libraries to meet the needs of students with disabilities

The study findings indicated that all the ten public university libraries studied did not have parking spaces, pathways marked with international accessibility symbols, and walkways had no warning signs to guide students with visual impairments. This indicates that the design of

the external surroundings of the library building did not meet the needs of students with disabilities.

The finding revealed that some of the university libraries had thresholds above 20mm at the main entrance of the library which impeded wheelchair access or tripped individuals with visual impairments. There was the absence of automatic doors, induction systems, or entry phones at the entrance gate of the library, and ramps had no warning signals or tactile markings to reduce unintended accidents by visually impaired students accessing the library. The lack of equitable access hinders the inclusion of students with disabilities in university libraries.

The findings further showed a lack of restrooms available to accommodate students with disabilities as well as the absence of lifts in some university libraries that had multi-storey buildings which restricted vertical circulation for students with disabilities.

The majority of the university had shelves that were not reachable from a wheelchair while none of the shelves had Braille labels to accommodate visually impaired students. Some university libraries appeared to have arrangement challenges that restricted wheelchair movement. Inadequate adjustable tables and chairs that wheelchairs users could fit under them were also noticed. The findings discovered that the online public access catalogue computer workstations of the university libraries studied as well as some service desks were not accessible from a wheelchair. All these physical accessibility challenges restricted the independence of students with disabilities and excluded them from fully participating in accessing the facilities and resources of university libraries. This situation indicated that the design of university libraries did not meet the needs of persons with disabilities in higher institutions in Ghana. This deepened the need for the redesign of the university libraries to conform to universal design principles to accommodate students with disabilities.

8.2 Facilities and services offered to students with disabilities

The study findings uncovered that most of the university libraries (8, 80%) had no disability-friendly washrooms/toilets with appropriate space for manoeuvring or grabbing rails including flushing leavers and door handles that were easily usable by students with disabilities. These inaccessible washrooms posed challenges due to non-compliance with the principles of universal design.

The majority of the university libraries (7) had no Braille libraries to support the learning of students with disabilities. The lack of Braille libraries in most universities affected information access and education of persons with disabilities in higher education in Ghana.

The findings also revealed that seven (7) of the university libraries had no information services for students with disabilities, especially those with visual impairments. Only three (3) of the university libraries provided technical, technological, and information services to students with disabilities. The lack of provision of information services in some university libraries is attributed to the non-availability of a Library Disability Policy. This as a result contributed to the low participation of students with disabilities in learning and research.

Although ICT facilities were available in some university libraries for students with disabilities, the majority (7) of university libraries had no ICT facilities which were adapted to suit the usability of students with various categories of disabilities. This further deepened the exclusion of students with disabilities from university education.

The results of the study revealed that most of the university libraries (7) did not have assistive technologies and devices available for students with disabilities. This suggests that the unavailability of assistive technologies restricted students' access and use of information resources.

The findings indicated the inadequacy of staff and students with disabilities skills as well as inadequate funding as some of the challenges that hindered the use of adaptive technology and devices in university libraries. The study uncovered inadequate disability-targeted training as well as a lack of designated staff (a special librarian) available in most university libraries to effectively provide information and support to persons with disabilities. This suggests the need to train more library staff and students with disabilities to equip them with the appropriate skills needed to use assistive technology and devices. More funding is needed to acquire advanced adaptive technology and devices.

8.3 Library experiences of students with disabilities in public university libraries

The study found that most public university libraries' websites did not offer easy navigation or search capabilities as well not compatible with the devices of visually impaired students. The content of the public university libraries' websites was perceived as not accessible indicating that the needs of students with disabilities were not catered for by these libraries. The public university libraries' websites did not comply with Web Content Accessibility Guidelines (WCAG). The findings further indicated difficulties encountered by students with visual impairments.

Most of the respondents indicated that Talking Newspapers 146 (90.1%), Talking Books 134 (82.7%), Electronic Databases and E-books 127 (78.4%), Internet and digital resources using Braille Display 117 (72.2%), Braille Books 114 (70.4%) and Audio-Visual Materials 98 (60.5%) were not available to students with visual impairments. The study findings showed that none of the university libraries had databases, e-books, e-journals, text with audio, electronic Braille books, and audiobooks among others in accessible formats to support visual and hearing-impaired students. This challenge of inaccessible/alternative formats of digital resources may affect the learning and academic progress of persons with visual impairments

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as well as exclude them from independent access. Visually impaired students recognise these information resources as relevant to support their learning and education however lack of assistive technology and devices such as JAWS among others made it difficult for them to access the resources.

The findings revealed the inaccessibility of the OPAC of university libraries by visually and hearing-impaired students. JAWS software was not installed in the library catalogue to enable access for visually impaired students. It appears the design of the OPAC of most of the university libraries did not consider students with visual and hearing impairments as advocated under the Universal Design Principles.

University libraries were also not capable of offering the required adaptive technology and devices due to inadequacies resulting in technological barriers that prevent the inclusion and full participation of students with disabilities in academic libraries. These challenges affect information access and academic achievements of persons with disabilities.

The majority 92 (56.8%) of students with disabilities indicated a lack of a library policy, as well as tactile communication in university libraries, hindered the provision of services, resources, and facilities. This shows the need for the implementation of universal design principles and the social model of disability in public university libraries.

The provision of accessible infrastructure, advanced assistive technology and devices, and alternative accessible formats of digital resources improve the library experiences of students with disabilities, especially those with visual impairments. This seems to suggest that the implementation of a library disability policy, procedures, and processes would improve the provision of accessible facilities, services, and resources among others that would promote the education of persons with disabilities.

8.4 Redesigning of spaces, facilities, and services to accommodate students with disabilities

The study findings revealed that physical, attitudinal, technological, and communication barriers exist in university libraries that need redesign. The findings further indicated that spaces like Braille libraries, computer laboratories, library websites, study carrels and digital resources need redesigning to make them more accessible and usable by students with disabilities. Physical environments and virtual spaces hindered access to persons with disabilities. This has therefore deepened the concern for the application of the Principles of Universal Design and the Social Model of Disability for the redesigning of facilities, resources, and services in university libraries to accommodate students with disabilities.

Most (9) of the public university libraries did not have a standalone Disability Policy and Guidelines for the provision of accessible and inclusive facilities and services, while six (6) of the public universities did not have an established Disability Unit. This suggests that most of the public universities were not in compliance with the inclusive education policy of Ghana as well as global best practices.

It can be concluded that most of the public university libraries did not conform to universal design principles. The principles of equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance to error, low physical effort, and size and space for approach and use were not applied in the design process, and the provision of resources, services, and facilities are lacking in public university libraries in Ghana. The major reason thereof was a lack of funds or budget constraints for the expensive and difficulty of altering existing library buildings.

Universal design helps eliminate discrimination, marginalisation as well as other barriers that exclude persons with disabilities from using university libraries. It also promotes fairness,

equity and inclusion in university libraries and higher education institutions, especially for students with impairments. Universal design also promotes barrier-free environments which accommodate diverse individuals in university libraries and allows the independence of individuals with disabilities to thrive in learning. Therefore, there is the need for universities to redesign their libraries to conform to universal design principles to accommodate students with disabilities. This would ensure that accessibility, information services and resources needs of students with disabilities are accommodated to improve their library experiences.

8.5   Concluding the study

The purpose of the study was to determine how public university libraries conform to universal design principles to accommodate students with disabilities. Data gathered by in-depth interviews, questionnaires, observation and document analysis were analysed using the lenses of the social model of disability and the IFLA Checklist for Access to Libraries for Persons with Disabilities to determine the accessibility of the resources, services, and facilities offered to students with disabilities. The following conclusions were drawn:

Students with disabilities encountered external and internal challenges in using public university libraries. The design of the external and internal surroundings of the library buildings did not meet the needs of students with disabilities, hindered accessibility and excluded students with disabilities from fully participating in learning.

Most of the public university libraries did not have facilities, services, and resources in accessible formats to support students with disabilities.

Due to insufficient assistive technology and devices, students with disabilities experienced challenges with inaccessible library websites, OPACs and digital resources.

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Most of the external as well as internal environments of public university libraries do not facilitate easy and safe access to the building and facilities.

Public university libraries were not universally designed to accommodate the needs of students with disabilities. This impeded equitable access and full participation of differently-abled students in higher education.

Despite some positive steps toward inclusion, this study concurs with previous research that students with disabilities are still not fully included in Ghanaian public university libraries.

8.6   Concluding the theory

The Social Model of Disability and the IFLA Checklist for Access to Libraries for Persons with Disabilities underpinned the study. Social model and universal design have been exposed to many universities in the advanced world and have necessitated changes in their policies and procedures to reflect an inclusive paradigm shift. This study concludes that none of the public university libraries meet all the principles as stipulated by the social model of disability or the requirements as indicated on the IFLA Checklist for Access to Libraries for Persons with Disabilities.

This study hopes to serve as an intervention to awaken the social justice consciousness of university management to create inclusive and enabling university libraries to accommodate students with disabilities. The study serves as a guide to university libraries in redesigning their environments, resources, buildings, spaces, facilities, services, and communications to accommodate all students, especially those with disabilities.

8.7   Recommendations

This section of the study highlights various recommendations that would help university libraries provide appropriate accessibility, resources, facilities, and services that conform to universal design principles to accommodate students with disabilities.

8.7.1   Access to external and internal environments of university libraries

The physical design of the library spaces is significant in providing access for students with disabilities. The study recommends the redesign of library spaces and facilities to provide access to appropriate parking lots, warning signs, ramps with handrails, automatic doors, elevators to provide vertical circulation, signage that accommodates disability users, disability-friendly washrooms with appropriate accessories, accessible corridors and pathways to provide horizontal circulation, and non-slippery floor surfaces and tactile warning surfaces among others to accommodate and allow participation of students with disabilities. University libraries should conduct accessibility audits using the IFLA Checklist for Access to Libraries for Persons with Disabilities to detect accessibility deficiencies in libraries.

University libraries should establish spaces dedicated to students with disabilities. If students know where their 'special space' is, they will find it easier to navigate the libraries. Dedicated spaces and restrooms will contribute to students with disabilities feeling more at home and inclusive of the library which will enhance the inclusion and quality of education for students with disabilities.

8.7.2   Facilities, services, and resources offered to students with disabilities

To address the needs identified, academic libraries should provide appropriate facilities, services, and resources to facilitate learning and promote the academic achievement of students with disabilities. Appropriate accessible alternative formats of resources, accessible retrieval

tools, assistive technology and trained Library Assistants should be provided at all academic libraries to satisfy the need of differently-abled students.

8.7.3   Experiences of students with disabilities in university libraries

Most students with disabilities encountered challenges in accessing the physical university libraries as well as the services, resources and retrieval tools. University libraries should ensure that their websites, OPACs, databases and other e-resources and e-services are designed to meet accessibility standards and guidelines like the Web Content Accessibility Guidelines. Software like JAWS should be installed to facilitate access to resources like e-journals, databases and e-books.

University management should provide university libraries with adequate funding to be able to provide better facilities, resources, and services for students with disabilities. As the redesign of spaces, the acquisition of adaptive technologies, and the training of disability-targeted library staff are expensive, Ghanaian academic libraries should form partnerships with organisations and businesses to obtain funds for projects dedicated to reducing the exclusion of students with disabilities.

Where Disability Units are lacking, university management should establish and staff such units and ensure that close cooperation between the units and the libraries is developed. These units must support students with disabilities as well as create awareness and advocate for their rights.

To promote students with disabilities playing an active role in the design and implementation of library services, it is recommended that one of them serves as a member of the Library Committee Board.

University libraries without independent disability policies should create detailed policies to bridge the gap in the information needs of users with disabilities by adopting in principle the provision of spaces, facilities, services, and resources to students with disabilities. The policy should emphasise universal accessibility as an integral component.

To increase and maximise the utilisation of information resources and services in libraries, there is a need to market these resources and services to students with disabilities. This will ensure that the resources and assistive devices acquired by university libraries are patronised and put to good use by students with disabilities.

The study recommends the subscription to databases such as EBSCO, GALE and ProQuest that have text-to-speech/read aloud functionality for screen reader users.

8.7.4   *Universal design and the redesign of libraries*

Promoting integration, inclusion, equitable access, and full participation of students with disabilities in higher education requires the adoption of a universal design. The social model of disability and universal design are considered ways of thinking about inclusive practices that benefit all. Universal design requires the design of facilities, services, resources, policies, procedures, and processes to be accessible and usable to everyone regardless of the person's abilities. The universal design offers services and environments that are more welcoming to most users through compliance with the principles and guidelines in the redesigning of spaces, facilities, and services to accommodate students with disabilities.

The study recommends that stakeholders such as the Ghana Tertiary Education Commission, University Administrators, University Librarians, Heads of disability units among others should enforce the implementation of policies including the redesigning of academic libraries,

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their resources, services, web pages and environment to ensure that students with diverse abilities achieve equal access to education.

8.8   Contribution and originality of the study

This study contributes to the call of the Persons with Disability Act, 2006 (Act 715) which mandates public places, services and resources must be available and accessible to as well as usable by persons with disabilities. The persons with disabilities also requires the implementation of technical guidelines and policies to promote access to buildings, public facilities, transport, and communications systems, information, education training, and the empowerment of individuals with disabilities. The universal design approach as argued in this thesis would effectively address these concerns.

The study contributes to filling the gap in the literature on the extent to which universal design principles are being applied in university libraries to accommodate students with disabilities.

The study is original as it applied theoretical triangulation to determine how Ghanaian public university libraries conform to universal design principles to accommodate students with disabilities using the IFLA Checklist for Access to Libraries for Persons with Disabilities and the Social Model of Disability.

The study is also unique as it adopted the pragmatic paradigm, and methodological triangulation and gathered data via questionnaires, in-depth interviews, observations, and document analysis to validate findings.

8.9   Suggestions for further research

For university management, faculties, and departments to understand accessibility and universal design, there is a need to conduct a comprehensive study on the training of university staff and students regarding universal design.

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This study focused on Ghanaian public university libraries. It is suggested that further studies on whether the products, services, built environments and communication systems of other types of libraries conform to universal design to accommodate students with disabilities should be done.

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APPENDICES

APPENDIX A: Ethical Clearance from University of the Western Cape

18 November 2020

Mr AA Alu
Library and Information Sciences
Faculty of Arts and Humanites

Ethics Reference Number: HS20/8/29

Project Title: Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities.

Approval Period: 16 November 2020 – 16 November 2023
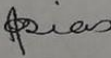
I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report by 30 November each year for the duration of the project.

The permission to conduct the study must be submitted to HSSREC for record keeping purposes.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Director: Research Development
University of the Western Cape
Private Bag X 17
Bellville 7535
Republic of South Africa
Tel: +27 21 959 4111
Email: research-ethics@uwc.ac.za

NHREC Registration Number: HSSREC-130416-049

FROM HOPE TO ACTION THROUGH KNOWLEDGE.

APPENDIX B: Letter of Introduction

FACULTY of ARTS & HUMANITIES
UNIVERSITY *of the* WESTERN CAPE

Department of Library and Information Science

1 April 2022

To Whom It May Concern

Dear Sir/madam

Letter of **introduction for a PhD student**

I write to introduce Augustine Aduko Alu a PhD student at the Department of Library and Information Science, University of the Western Cape (UWC), South Africa. He is conducting a research study titled *Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities* under my supervision. He has already received ethical clearance to conduct the research from UWC (**Ethics Reference Number: HS20/8/29**) and needs to collect data from your university involving the university librarian, development officer, disability unit, and students with disabilities. Your cooperation and support will be highly appreciated.

Please contact me if additional information is needed.

Regards

Supervisor

Dr. Lizette King
Post graduate coordinator and Head of Department
Department of Library and Information Science
Faculty of Arts & Humanities
University of the Western Cape
Email: lking@uwc.ac.za

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APPENDIX C: Information Sheet for Interviews

Date

Dear Participant

I am Augustine Aduko Alu. I would like to invite you to participate in an interview session as part of my research study titled *Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities* for a PhD at the Department of Library & Inforamtion Science, UWC. Before you decide to participate, I want to tell you why the research is being done, and what you can expect if you do take part.

The purpose of the study is to examine whether Ghanaian public university libraries conform to universal design principles and services to accommodate students with disabilities. You have been targeted to partake as you are student with disabilities and have knowledge and experience on accessing library buildings, facilities and services. If you agree to partake, you will be invited to complete an online questionnaire on your experiences at your university library. The questionnaire will take no longer than 30 minutes to complete.

Please be advised that your participation in this research is entirely voluntary, there are no costs involved, you will not be paid to participate and you will be asked to sign a consent form. Any information collected from the question will remain confidential. Your name will not be disclosed, nor will details of your responses be shared with others. There will be no risks involved if you participate.

If you require any further information, you may contact me by phone +233242562938 or email alu.aduko@gmail.com. You may also contact my supervisor, Dr. Lizette King at the Department of Library and Information Science, UWC, Private bag x17, Bellville, 7530, or phone 021 959 2535 or email lking@uwc.ac.za. In addition, you may contact the UWC Research Office at HSSREC, Research Development at telephone 021 959 4111 or email research-ethics@uwc.ac.za.

Yours sincerely

Augustine Alu

Department of Library & Information Science
University of the Western Cape
Private Bag X17 Bellville 7535
T: +27(0)219592137/2535
jcalvertwood@uwc.ac.za/lking@uwc.ac.za

A place of quality,
a place to grow, from hope
to action through knowledge

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APPENDIX D: Information Sheet for Questionnaires

Date

Dear Participant

I am Augustine Aduko Alu. I would like to invite you to participate in answering a questionnaire as part of my research study titled *Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities* for a PhD at the Department of Library & Information Science, UWC. Before you decide to participate, I want to tell you why the research is being done, and what you can expect if you do take part.

The purpose of the study is to examine whether Ghanaian public university libraries conform to universal design principles and services to accommodate students with disabilities. You have been targeted to partake as you are student with disabilities and have knowledge and experience on accessing library buildings, facilities and services. If you agree to partake, you will be invited to complete a questionnaire on your experiences at your university library. The questionnaire will take no longer than 20 minutes to complete.

Please be advised that your participation in this research is entirely voluntary, there are no costs involved, you will not be paid to participate and you will be asked to sign a consent form. Any information collected from the question will remain confidential. Your name will not be disclosed, nor will details of your responses be shared with others. There will be no risks involved if you participate.

If you require any further information, you may contact me by phone +233242562938 or email alu.aduko@gmail.com. You may also contact my supervisor, Dr. Lizette King at the Department of Library and Information Science, UWC, Private bag x17, Bellville, 7530, or phone 021 959 2535 or email lking@uwc.ac.za. In addition, you may contact the UWC Research Office at HSSREC, Research Development at telephone 021 959 4111 or email research-ethics@uwc.ac.za.

Yours sincerely

Augustine Alu

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A place of quality,
a place to grow, from hope
to action through knowledge

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APPENDIX E: Consent Form for Interviews

Consent Form Interviews   University of the Western Cape

Re-constituting Ghanaian Public University Libraries to conform to universal design principles to accommodate students with disabilities.

Researcher: Augustine Alu

Please initial box

1. I confirm that I have read and have understood the information sheet explaining the above research project and I have had the opportunity to ask questions about the project. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. (If I wish to withdraw I may contact the lead researcher at anytime) ☐

3. I understand my responses and personal data will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the reports or publications that result for the research. ☐

4. I understand that I may decline to be audio-recorded at any point. ☐

5. I agree that the data collected from me may be used in future research. ☐

6. I agree to take part in the above research project. ☐

[Since this is a sample form, you do not need to get it signed for the purposes of ethics clearance. It will have to be signed when you actually do your interviews.]

_____   _____   _____
Name of Participant   Date   Signature
(or legal representative)

_____   _____   _____
Name of person taking consent   Date   Signature
(If different from lead researcher)

_____   _____   _____
Lead Researcher   Date   Signature
(To be signed and dated in presence of the participant)

Copies: All participants will receive a copy of the signed and dated version of the consent form and information sheet for themselves. A copy of this will be filed and kept in a secure location for research purposes only. **[Enter full names and contact details in the blocks below.]**

Researcher: +233242562938 alu.aduko@gmail.com	Supervisor: 021 959 2535 lking@uwc.ac.za	HOD: 021 959 2535 lking@uwc.ac.za

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APPENDIX F: Consent Form for Questionnaires

Consent Form Questionnaires

University of the Western Cape

Re-constituting Ghanaian Public University Libraries to conform to universal design principles to accommodate students with disabilities.

Researcher: Augustine Alu

Please initial box

1. I confirm that I have read and have understood the information sheet explaining the above research project and I have had the opportunity to ask questions about the project.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. (If I wish to withdraw I may contact the lead researcher at anytime)

3. I understand my responses and personal data will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the reports or publications that result for the research.

4. I agree that the data collected from me may be used in future research.

5. I agree to take part in the above research project.

[Since this is a sample form, you do not need to get it signed for the purposes of ethics clearance. It will have to be signed when you actually do your interviews.]

Name of Participant (or legal representative)	Date	Signature
Name of person taking consent (If different from lead researcher)	Date	Signature
Lead Researcher (To be signed and dated in presence of the participant)	Date	Signature

Copies: All participants will receive a copy of the signed and dated version of the consent form and information sheet for themselves. A copy of this will be filed and kept in a secure location for research purposes only. [Enter full names and contact details in the blocks below.]

Researcher:	Supervisor:	HOD:
+233242562938	021 959 2535	021 959 2535
alu.aduko@gmail.com	lking@uwc.ac.za	lking@uwc.ac.za

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APPENDIX G: Permission from Ghanaian Public Universities

UNIVERSITY OF PROFESSIONAL STUDIES, ACCRA

P. O. Box LG 149, Accra, Ghana. Tel: (+233) 0302 500171 / 500722 Fax: (+233) 0302 - 513503
Website: www.upsa.edu.gh E-mail: enquiry@upsa.edu.gh admissions@upsa.edu.gh

My Ref. No.: IM/ROB/RCC/020

28th February, 2022

Mr. Augustine Aduko Alu
St John Bosco College of Education
Navrongo
Upper East Region

Dear Mr. Aduko,

RE: REQUEST TO CONDUCT RESEARCH IN YOUR UNIVERSITY

This is to inform you that your request to interview some selected heads of department (Physical Development, Academic Affairs, Librarian, Dean of Students) of the University for your PhD studies has been approved by Management. You are therefore requested to contact the respective heads of department for your interviews. Please show a copy of this approval letter as evidence.

We wish you success in your endeavors.

Yours Sincerely,

Prof. Ibrahim Mohammed
(Director, Research and Consultancy Centre)
For: Registrar

Cc:
- Director, Physical Development
- Ag. Director, Academic Affairs
- Librarian
- Dean of Students
- File

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UNIVERSITY FOR DEVELOPMENT STUDIES

Tel: 03720-93382/26634/22078
Email: registrar@uds.edu.gh
Website: www.uds.edu.gh

P. O. Box TL 1350
Tamale, Ghana

Our Ref:...

Your Ref:...

OFFICE OF THE REGISTRAR

Date:............ **March 29, 2022**

Mr. Augustine Aduku Alu
St. John Bosco's College of Education
Post Office Box 11
Navrongo UE/R
Tel: 0242562938

Dear Sir,

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR UNIVERSITY

Please, your letter dated March 15, 2022, requesting for permission to invite some Departments and Units of the University to participate in an interview, as part of your PhD research study on the title 'Re-constituting Ghanaian Public University Libraries to Conform to Universal Design Principles to Accommodate Students with Disabilities' refers.

I write to convey approval of your request to conduct your study in the University for Development Studies.

Note that you are governed by the rules and regulations of the University pertaining to the conduct of research.

Yours faithfully,

Abdul-Mumin Alhassan
(Assistant Registrar)
For: Registrar

CC: *Librarian*
       Director of WPD
       Dean of Students
       President, Students with Disabilities

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UNIVERSITY OF HEALTH AND ALLIED SCIENCES
Institute of Health Research

Tel: +233 362196193

email: ihr@uhas.edu.gh

My Ref: IHR/FDG/G-42

PMB 31
Ho Volta Region
Ghana

7th June, 2022.

Mr. Augustine Aduko Alu
University of the Western Cape
South Africa

Dear Mr. Alu,

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR UNIVERSITY
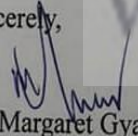
I write to acknowledge receipt of your letter dated 25th May, 2022 seeking permission to conduct your PhD research in the University of Health and Allied Sciences (UHAS). We hereby grant you permission to conduct this research.

We have a Research Ethics Committee which has been established to review and approve all research planned to be conducted in UHAS facilities and/or involves staff and students of the University. Kindly contact the Administrator of this Committee at +233 244 061 270 for the necessary guidance.

The Committee has the obligation of assuring the safety, dignity, welfare and protection of research participants hence your research will be closely monitored.

We wish you the best in this research endeavor.

Yours sincerely,

Professor Margaret Gyapong
Director

Cc: Registrar, University of Health and Allied Sciences

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APPENDIX H: Interview schedule for University Librarians

Interview schedule for University Librarians

Section 1: Background information

1. Name of the University...
2. Gender...
3. What is your highest academic qualification?...
4. How many years have you worked in the current position?..............................

Section 2: Physical access into and within public university libraries buildings by students with disabilities

1. How are Ghanaian public university libraries designed to meet the needs of students with disabilities?
2. Tell me about the accessibility of the library parking areas and pathways leading to the library for students with students and whether they are marked with the international symbol of access, and close to the entrance?
3. What about the main entrance gate and ramps at the library for students with disabilities?
4. Describe the accessibility of the interior design and space for students with disabilities?
5. Does the library/university have a disability policy?

Section 3: The facilities and services offered to render an information service to students with disabilities.

3A: Information services provided to students with disabilities.

1. What facilities are offered to render specialized services to students with disabilities?
   Probing question
   ➢ Is there a provision for a designated washroom for students with disabilities?
2. Tell me about the designated facilities/spaces provided for students with disabilities?
3. What are some of the specialized services that are available to students with disabilities?

3B: Provision of ICTs to facilitate access to information for students with disabilities.

1. Tell me how ICT used has facilitated access to information for students with disabilities?
2. What assistive technology and devices are provided by the library to enable students with disabilities to access information?
3. What are some of the challenges in the use of assistive technology and devices in the library?

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3C: Attitude and support of staff toward students with disabilities

1. Describe the attitude of staff towards students with disabilities as patrons of the library?

2. Can you tell me about the individual support you, or your colleagues, give to users with disabilities?

3. What specific training is provided for library staff to enable them effectively offer information services to students with disabilities?

Section 4: Library experiences of students with disabilities.

1. What are some of the experiences of students with disabilities with library services and information resources?

   Probing questions

   ➤ How do you describe the extent of use of the library website, and the problems faced by students with disabilities while accessing the websites?

   ➤ Can you tell me about any difficulties they have using the library catalogue?

   ➤ What about accessing e-books or e-journals?

   ➤ Are you aware of any difficulties navigating the building?

2. Tell how you can improve the experiences of students with disabilities?

Section 5: Redesigning buildings and services to accommodate students with disabilities.

1. How can Ghanaian public university libraries be redesigned to accommodate students with special needs?

2. What guidelines do you use for the redesign of facilities and services to accommodate students with disabilities?

   Universal Design

1. Share with me how you incorporated the principles of universal design in new designs and redesigning of information resources and services for students with disabilities?

2. What are some of the benefits of universal design?

APPENDIX I: Interview schedule for Heads of University Physical Development Office

Interview schedule for University Development Officers

Section 1: Background information

1. Name of the University..
2. Gender...
3. What is your highest academic qualification?...
4. How many years have you worked in the current position?......................................

Section 2: Physical access into and within public university libraries buildings by students with disabilities

1. How are Ghanaian public university libraries designed to meet the needs of students with disabilities?
2. Tell about the accessibility of the library parking areas and pathways leading to the library for students with students and whether they are marked with the international symbol of access, and close to the entrance?
3. What about the main entrance gate and ramps at the library for students with disabilities?
4. Describe the accessibility of the interior design and space for students with disabilities?
5. Does the library/university have a disability policy?

Section 3: The facilities and services offered to render an information service to students with disabilities

1. What facilities are offered to render specialized services to students with disabilities?
   ➢ Is there a provision for a designated washroom for students with disabilities?

Probing questions

2. Tell me about the designated facilities/spaces provided for students with disabilities?
3. What are some of the specialized services that are available to students with disabilities?

Section 4: Library experiences of students with disabilities.

1. What are some of the experiences of students with disabilities with library services and information resources?

Probing questions

➢ How do you describe the extent of use of the library website, and the problems faced by students with disabilities while accessing the websites?

➢ Can you tell me about any difficulties they have using the library catalogue?

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➢ What about accessing e-books or e-journals?

➢ Are you aware of any difficulties navigating the building?

2. Tell how you can improve the experiences of students with disabilities?

Section 5: Redesigning buildings and services to accommodate students with disabilities

1. How can Ghanaian public university libraries be redesigned to accommodate students with special needs?

2. What guidelines do you use for the redesign of facilities and services to accommodate students with disabilities?

   Universal Design

1. Share with me how you incorporated the principles of universal design in new designs and redesigning of information resources and services for students with disabilities?

2. What are some of the benefits of universal design

APPENDIX J: Interview schedule for Heads of University Disability Unit

Interview schedule for University Disability Officers

Section 1: Background information

1. Name of the University...
2. Gender...
3. What is your highest academic qualification?...
4. How many years have you worked in the current position?.........................

Section 2: Physical access into and within public university libraries buildings by students with disabilities.

1. How are Ghanaian public university libraries designed to meet the needs of students with disabilities?
2. Tell about the accessibility of the library parking areas and pathways leading to the library for students with students and whether they are marked with the international symbol of access, and close to the entrance?
3. What about the main entrance gate and ramps at the library for students with disabilities?
4. Describe the accessibility of the interior design and space for students with disabilities?
5. Does the library/university have a disability policy?

Section 3: The facilities and services offered to render an information service to students with disabilities.

1. What facilities are offered to render specialized services to students with disabilities?
   Probing questions
   ➤ Is there a provision for a designated washroom for students with disabilities?
2. Tell me about the designated facilities/spaces provided for students with disabilities?
3. What are some of the specialized services that are available to students with disabilities?
4. Tell me how ICT used has facilitated access to information for students with disabilities?
5. What assistive technology and devices are provided by the library to enable students with disabilities to access information?
6. What are some of the challenges in the use of assistive technology and devices in the library?

Section 4: Library experiences of students with disabilities.

1. What are some of the experiences of students with disabilities with library services and information resources?

   Probing questions

   ➢ How do you describe the extent of use of the library website, and the problems faced by students with disabilities while accessing the websites?

   ➢ Can you tell me about any difficulties they have using the library catalogue?

   ➢ What about accessing e-books or e-journals?

   ➢ Are you aware of any difficulties navigating the building?

2. Tell how you can improve the experiences of students with disabilities?

Section 5: Redesigning buildings and services to accommodate students with disabilities

1. How can Ghanaian public university libraries be redesigned to accommodate students with special needs?

2. What guidelines do you use for the redesign of facilities and services to accommodate students with disabilities?

   Universal Design

1. Share with me how you incorporated the principles of universal design in new designs and redesigning of information resources and services for students with disabilities?

2. What are some of the benefits of universal design?

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APPENDIX K: Questionnaire for students with visual disability

Questionnaire for students with visual disability

Dear Respondent,

This instrument is designed to request your views for a Ph.D. degree at the Department of Library and Information Science, University of the Western Cape on the topic: **Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities.** This exercise is strictly for academic purposes and as such your responses will be treated with the utmost confidentiality.

A consent form from the University of the Western Cape has been provided to solicit your consent to participate in this research. Kindly note that by completing the form you agree to take part in this study.

Kindly, answer the following questions, by ticking the options that best describe your answer. Your co-operation is fully appreciated.

Thank you.

A. A. Alu

Section 1: Background information

Kindly tick the appropriate box

Name of University				
Degree programme	PhD	Masters	Bachelor	
Gender	Male		Female	
Age	15-19 yrs	20-24 yrs	25-29 yrs	30 yrs and above

Section 2: Physical access into and within public university libraries buildings by students with disabilities.

Q.1 Kindly indicate appropriately those that apply regarding your physical access outside and inside the library building.				
Library Building	Yes	No	Partly	Not sure
There are glass doors with a sound warning for visually impaired students				
There are well-lighted elevators with buttons and signs in Braille and synthetic speech				

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There are procedures to assist patrons with disabilities in retrieving materials from inaccessible locations				
The library building design provides easy access to facilities and services for students with visual impairments				
Visually impaired students are able to walk with a cane or find the way into the library and other locations without bumping into obstacles				
There is a special toilet designated for individuals with disabilities				
There are shelf and stack identifiers provided in large print and Braille formats				
Students with disabilities have access to all the floors of the library				

Section 3: The facilities and services offered to render an information service to students with disabilities.

Q.2 If you have not been visiting the library, which of the following reasons describe why?			
Inadequate large print		Inaccessible Website	
Inadequate Tape/ DAISY/CD/DVD		Inappropriate and not easy-to-read formats	
Inadequate Braille		Others, specify	

Q.3 Kindly tick (√) the type of training offered to students with disabilities	
Training on access to internet resources and services	
Training on the effective use of Assistive technology and devices	
Search strategies for information on the internet	
How to use the Online Public Access Catalogue (OPAC)	
Other(s) Specify	

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Q.4 Which of the following information services are offered to students with visual impairments?	
Braille documentation	
Information literacy training	
Computers with assistive software	
Materials in various accessible formats	
Staff assistance in retrieval of information from the internet	
Staff designated for services to students with disabilities	
Other(s) Specify	

Q.5 Tick appropriately the information resources available in the library.		
Information Sources	Available	Not available
Talking books		
Electronic databases and E-books		
Assistive technologies		
Internet and digital resources using Braille displays		
Talking newspapers		
Audio-visual materials		
Braille book		
Braille printer		
Other, please specify		

Q.6 Does the offer library alternative formats of information resources for visually impaired students?	
Yes	
No	
Partly	

Q.7 Kindly indicate by ticking the assistive devices that are available or provided by the library to visually impaired students.			
Laptop or desktop		Embosser	
Recorder		Screen reader	
Scanner		Others, specify	

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Q.8 How important are assistive technology and devices to students with visual disabilities in accessing information resources in the library?

Very important	Important	Somewhat important	Not important

Q.9 Indicate the level of accessibility of the following resources

Resources	Poor	Neutral	Good	Very good
Library websites				
E-books				
Internet resources				
E-databases				
E-journals				
Online Public Access Catalogue (OPAC)				

Q. 10 How accessible is the content on the library website?

Very Accessible	Somewhat accessible	Somewhat not Accessible	Not accessible

Q. 11 Is the website compatible with assistive devices?

Yes	No	Partly	Not sure

Q.12 To what extent are you in agreement with the following benefits of the use of ICT and assistive devices?

Benefit of ICT	Agree	Disagree	Not sure
It promotes independent learning			
It helps in the acquisition of knowledge and skills of disabled students			
It promotes equitable access to information			
It facilitates communication and collaboration with others			
It promotes inclusion and full participation of disabled students in the society			

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Section 4: Library experiences of students with visual disabilities.

Q.13 On a five-point scale, (1= strongly disagree, 2= disagree, 3= Neutral, 4=agree, 5= strongly agree) Kindly, indicate your level of agreement to the following statements regarding the attitude of library staff towards students with disabilities.

Attitude	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Staff lack adequate knowledge of the needs of students with disabilities					
Library staff are polite and communicate clearly and effectively with me					
Library staff have an intimidating tone of voice					
Library staff are too busy to help me					
Library staff are unfriendly and unapproachable					
The library staff does not respond to my greetings					
Library staff look at me directly when we are communicating					

Q.14 Would you say your needs are accommodated by the library?

Yes	No	Partly	Not sure

Q.15 What is the extent of your agreement to the following barriers impeding students with visual impairments access to the library building, facilities, and services in the university library? Tick appropriately

Barriers	Agree	Disagree	Not sure
The inability of the library to provide Braille in form of tactile communication			
Braille embossers, screen magnification, and JAWS are not available			
Lack of resources in appropriate formats for students with visual impairments			

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Inadequate facilities such as well-furnished differently abled sections in the library			
Inappropriate ICT technology and assistive devices in the library for students with visual impairments			
Students with visual impairment depend on readers to read			
Negative attitudes of library staff			
inaccessible services and facilities			
Lack of a library policy relating to library services, resources, and accessibility provision for Visually impaired students			
Inadequate funds to provide visually impaired students with equipment and devices			

Q.16 Kindly suggest ways that can help to remove the barriers.

Section 5: Redesigning buildings and services to accommodate students with disabilities.

Q.17 Mention the section(s) and service(s) that you think need redesign to accommodate visually impaired students?
Services and sections

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NOTE: Universal design is the designing of products, environment, resources, services, buildings, and communication to be accessible and usable to all people to the greatest extent possible regardless of their abilities. There are seven principles that facilitate the implementation of universal design.

Q.18 On a 5-point scale, (1= SD strongly disagree, 2= D disagree, 3= Neutral 4=A agree, 5= SA strongly agree) Kindly indicate your level of agreement with the following statements regarding the principles of universal design in the library.						
Principle	**Statement**	**SD**	**D**	**N**	**A**	**SA**
Equitable use	Library services and resources are useful and marketable to people with diverse abilities					
Flexibility in use	The library design and services accommodate a wide range of individual preferences and abilities					
Simple and Intuitive use	The library design, website, and instruction guide for students are easy to understand, regardless of the students' experience, knowledge, language skills, or current concentration level					
Perceptible information	The library communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities					
Tolerance for error	The library design and facilities minimize hazards and the adverse consequences of accidental or unintended actions					
Low physical effort	The library design and facilities can be used efficiently and comfortably and with low physical effort					
Size and space for approach and use	The library provides appropriate size and space for approach, reach, manipulation, and use of facilities and services regardless of the user's body size, posture, or mobility					

Thank you for taking the time to answer the questionnaire, your answers will help shape the way the library will manage its services in the future.

APPENDIX L: Questionnaire for students with mobile disability

Questionnaire for students with mobile disability

Dear Respondent,

This instrument is designed to request your views for a Ph.D. degree at the Department of Library and Information Science, University of the Western Cape on the topic: **Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities.** This exercise is strictly for academic purposes and as such your responses will be treated with the utmost confidentiality.

A consent form from the University of the Western Cape has been provided to solicit your consent to participate in this research. Kindly note that by completing the form you agree to take part in this study.

Kindly, answer the following questions, by ticking the options that best describe your answer. Your co-operation is fully appreciated.

Thank you.

A. A. Alu

Section 1: Background information

Kindly tick the appropriate box

Name of University			
Degree programme	PhD	Masters	Bachelor
Gender	Male		Female
Age	15-19 yrs	20-24 yrs	25-29 yrs	30 yrs and above

Section 2: Physical access into and within public university libraries buildings by students with disabilities

Q.1 Kindly indicate with a (√) those that apply regarding your physical access outside and inside the library building.				
Library Building	**Yes**	**No**	**Partly**	**Not sure**
There are sufficient library parking spaces marked with the international symbol for disabled students and close to the library entrance				
There are obstructed access paths, smooth and slipping surfaces to the entrance				

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There are ramps with railings at both sides				
There is sufficient space in front of the door to allow a wheelchair to turn around or enter				
There special toilet designated for individuals with disabilities				
There are automatic door openers reachable by a person in a wheelchair and no doorsteps				
There are clear and easy-to-read signs with pictograms throughout the library				
There are procedures to assist patrons with disabilities in retrieving materials from inaccessible locations				
There are shelves reachable from a wheelchair				
There are adjustable reading and computer tables designed for people with disabilities				
There are access to all the levels of the library				

Section 3: The facilities and services offered to render an information service to students with disabilities.

Q.2 If you have not been visiting the library, which of the following reasons describe why?			
Inadequate large print		Inaccessible Website	
Inadequate Tape/ DAISY/CD/DVD		Difficulty in accessing library resources	
Lack of flexibility in library design		Others, specify	

Q.3 Kindly tick (√) the type of training offered to students with disabilities	
Training on access to library resources and services	
Training on referencing styles	
Search strategies for information on the internet	
How to use the Online Public Access Catalogue (OPAC)	
Other(s) Specify	

Q.4 What is the level to which facilities and support systems are available for students with physical impairments at the university library?	
None	
Few	

Q. 5 How satisfied are you with the support that you have received from the library?	
Very satisfied	
Moderately satisfied	
Dissatisfied	

Q.6 Tick appropriately the information resources available in the library.		
Information Sources	**Available**	**Not available**
Electronic databases and E-books		
Assistive technologies		
Internet and digital resources		
Audio-visual materials		
Other, please specify		

Q.7 How important are assistive technology and devices to students with physical disabilities in accessing information resources in the library?			
Very important	Important	Somewhat important	Not important

Q.8 Indicate the level of accessibility of the following resources				
Resources	**Poor**	**Neutral**	**Good**	**Very good**
Library websites				
E-books				
Internet resources				
E-databases				
E-journals				
Online Public Access Catalogue (OPAC)				

Q.9 To what extent are you in agreement with the following benefits of the use of ICT and assistive devices?			
Benefit of ICT	**Agree**	**Disagree**	**Not sure**
It promotes independent learning			

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It helps in the acquisition of knowledge and skills of disabled students			
It promotes equitable access to information			
It facilitates communication and collaboration with others			
It promotes inclusion and full participation of disabled students in the society			

Section 4: Library experiences of students with physical disabilities.

Q.10 On a five-point scale, (1= strongly disagree, 2= disagree, 3= Neutral, 4=agree, 5= strongly agree) Kindly, indicate your level of agreement to the following statements regarding the attitude of library staff towards students with disabilities.

Attitude	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Staff lack adequate knowledge of the needs of students with disabilities					
Library staff are polite and communicate clearly and effectively with me					
Library staff have an intimidating tone of voice					
Library staff are too busy to help me					
Library staff are unfriendly and unapproachable					
The library staff do not respond to my greetings					
Library staff look at me directly when we are communicating					

Q.11 What is the extent of your agreement to the following barriers impeding students with physical impairments from access to the library building, facilities, and services in the university library? Tick appropriately

Barriers	Agree	Disagree	Not sure
Lack of resources in appropriate formats for students with disabilities			

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Lack of elevators/lifts in the library			
Inappropriate ICT technology and assistive devices in the library			
Students with physical impairments depend on friends to access resources in the library			
Negative attitudes of library staff			
Inaccessible services and facilities			
Lack of a library policy relating to library services, resources, and accessibility provisions for physically impaired students			
Inadequate funds to provide physically impaired students with equipment and devices			

Q.12 Would you say your needs are accommodated by the library?			
Yes	No	Partly	Not sure

Section 5: Redesigning buildings and services to accommodate students with disabilities.

Q.13 Can you consider the library design flexible in response to the various learning styles of students with disabilities?		
Yes	No	Not sure

NOTE: Universal design is the designing of products, environment, resources, services, buildings, and communication to be accessible and usable to all people to the greatest extent possible regardless of their abilities. There are seven principles that facilitate the implementation of universal design.

Q.14 Are you familiar with the concept of universal design?		
Yes	No	Partly

Q.15 Mention the spaces and facilities that you think need redesign to accommodate physically impaired students?
Services and sections

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	Q.16 On a 5-point scale, (1= SD strongly disagree, 2= D disagree, 3= Neutral 4=A agree, 5= SA strongly agree) Kindly indicate your level of agreement with the following statements regarding the principles of universal design in the library.					
Principle	**Statement**	**SD**	**D**	**N**	**A**	**SA**
Equitable use	Library services and resources are useful and marketable to people with diverse abilities					
Flexibility in use	The library design and services accommodate a wide range of individual preferences and abilities					
Simple and Intuitive use	The library design, website, and instruction guide for students are easy to understand, regardless of the students' experience, knowledge, language skills, or current concentration level					
Perceptible information	The library communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities					
Tolerance for error	The library design and facilities minimize hazards and the adverse consequences of accidental or unintended actions					
Low physical effort	The library design and facilities can be used efficiently and comfortably and with low physical effort					
Size and space for approach and use	The library provides appropriate size and space for approach, reach, manipulation, and use of facilities and services regardless of the user's body size, posture, or mobility					

Q.17 To what extent do you agree that universal design courses be offered at the university level?				
Strongly agree	Agree	Disagree	strongly disagree	Do not Know

Thank you for taking the time to answer the questionnaire, your answers will help shape the way the library will manage its services in the future.

APPENDIX M: Questionnaire for students with hearing disability

Questionnaire for students with hearing disability

Dear Respondent,

This instrument is designed to request your views for a Ph.D. degree at the Department of Library and Information Science, University of the Western Cape on the topic: **Re-constituting Ghanaian public university libraries to conform to universal design principles to accommodate students with disabilities.** This exercise is strictly for academic purposes and as such your responses will be treated with the utmost confidentiality.

A consent form from the University of the Western Cape has been provided to solicit your consent to participate in this research. Kindly note that by completing the form you agree to take part in this study.

Kindly, answer the following questions, by ticking the options that best describe your answer. Your co-operation is fully appreciated.

Thank you.

A. A. Alu

Section 1: Background information

Kindly tick the appropriate box

Name of University				
Degree programme	PhD	Masters	Bachelor	
Gender	Male		Female	
Age	15-19 yrs	20-24 yrs	25-29 yrs	30 yrs and above

Section 2: Physical access into and within public university libraries buildings by students with disabilities.

Q.1 Kindly indicate appropriately those that apply regarding your physical access outside and inside the library building.				
Library Building	Yes	No	Partly	Not sure
There is an entry phone accessible for deaf users				
There is an induction loop system for hearing-impaired students				
There are sign language interpreters				
There are clear and easy-to-read signs with pictograms throughout the library				

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There are Videos/DVDs/Audiobooks with subtitles and/or sign language			
The library sends information via text telephones and/or email			
There is information in an easy-to-read format with appropriate captions			
There are computer-assisted real-time captioning or computer-assisted note-taking services			
There are non-print materials collections for deaf clientele			
There are deaf-related electronic links in the online databases			

ection 3: The facilities and services offered to render an information service to students with disabilities.

Q.2 If you have not been visiting the library, which of the following reasons describe why?		
Inadequate large print	Inaccessible Website	
Inadequate videos with subtitles and/or sign language	Difficulty in accessing library resources	
Lack of flexibility in library design	Others, please specify	

Q.3 Kindly tick (√) the type of training offered to students with disabilities	
Training on access to digital resources and services	
Training on the effective use of Assistive technology and devices	
Search strategies on information retrieval from the internet	
How to use the Online Public Access Catalogue (OPAC)	
Other(s), please specify	

Q.4 There are research assistants available to patrons with hearing impairments?			
Always	sometimes	Rarely	Never

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Q.5 What is the level to which facilities and support system are available for students with hearing impairments at the university library?

None	Few

Q. 6 How satisfied are you with the support that you have received from the library?

satisfied	
Moderately satisfied	
Dissatisfied	

Q.7 Tick appropriately the information resources available in the library.

Information Sources	Available	Not available
Induction loop system		
Sign language interpreters		
Internet and digital resources		
Audio-visual materials		
Other, please specify		

Q.8 Rate the extent of access and use of information resources by hearing-impaired students in the library

Low	Moderate	High

Q.9 Kindly indicate by ticking the assistive devices that are available or provided by the library to hearing-impaired students.

Laptop or desktop		Printer	
Text-to-speech software		Voice-to-text devices/voice carry-over/real-text time	
Hearing aids		TTY/TTD/TDD	

Q.10 How important are assistive technology and devices to students with hearing disabilities in accessing information resources in the library?

Very important	Important	Somewhat important	Not important

Q.11 To what extent are you in agreement with the following benefits of the use of ICT and assistive devices?

Benefit of ICT	Agree	Disagree	Not sure
It promotes independent learning			
It helps in the acquisition of knowledge and skills of disabled students			
It promotes equitable access to information			
It facilitates communication and collaboration with others			
It promotes inclusion and full participation of disabled students in the society			

Section 4: Library experiences of students with physical disability

Q.12 On a five-point scale, (1= strongly disagree, 2= disagree, 3= Neutral, 4=agree, 5= strongly agree) Kindly, indicate your level of agreement to the following statements regarding the attitude of library staff towards students with disabilities.

Attitude	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Staff lack adequate knowledge of the needs of students with disabilities					
Library staff are polite and communicate clearly and effectively with me					
Library staff have an intimidating tone of voice					
Library staff are too busy to help me					
Library staff are unfriendly and unapproachable					
The library staff does not respond to my greetings					
Library staff look at me directly when we are communicating					

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Q.13 What is the extent of your agreement to the following barriers impeding students with hearing impairment access to the library building, facilities, and services in the university library? Tick appropriately			
Barriers	**Agree**	**Disagree**	**Not sure**
Lack of resources in alternative formats for students with disabilities			
Inadequate sign language interpreters			
Inadequate ICT technology and assistive devices in the library for students with hearing impairment			
Students with hearing impairment depend on friends to access resources in the library			
Negative attitudes of library staff			
Inaccessible services and facilities			
Lack of a library policy relating to the provision of services and resources			
Inadequate funds to provide hearing-impaired students with equipment and devices			

Q.14 Would you say your needs are accommodated by the library?			
Yes	No	Partly	Not sure

Section 5: Redesigning buildings and services to accommodate students with disabilities.

Q.15 Mention the spaces and services that you think need redesign in order to accommodate hearing-impaired students?
Services and spaces

Q.16 Mark all areas in which you would like to see technology improved	
Area	
More assistive technology to access the collection	
Improve more appropriate formats for students with disabilities	
More CD-ROM workstations	
Universally redesign the library facilities, services, and resources to make it more accessible to students with disabilities	

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NOTE: Universal design is the designing of products, environment, resources, services, buildings, and communication to be accessible and usable to all people to the greatest extent possible regardless of their abilities. There are seven principles that facilitate the implementation of universal design.

Q.17 On a 5-point scale, (1= SD strongly disagree, 2= D disagree, 3=N neutral, 4=A agree, 5= SA strongly agree) Kindly indicate your level of agreement with the following statements regarding the principles of universal design in the library.						
Principle	**Statement**	**SD**	**D**	**N**	**A**	**SA**
Equitable use	Library services and resources are useful and marketable to people with diverse abilities					
Flexibility in use	The library design and services accommodate a wide range of individual preferences and abilities					
Simple and Intuitive use	The library design, website, and instruction guide for students are easy to understand, regardless of the students' experience, knowledge, language skills, or current concentration level					
Perceptible information	The library communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities					
Tolerance for error	The library design and facilities minimize hazards and the adverse consequences of accidental or unintended actions					
Low physical effort	The library design and facilities can be used efficiently and comfortably and with low physical effort					
Size and space for approach and use	The library provides appropriate size and space for approach, reach, manipulation, and use of facilities and services regardless of the user's body size, posture, or mobility					

Thank you for taking the time to answer the questionnaire, your answers will help shape the way the library will manage its services in the future.

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APPENDIX N: Observation Checklist

Observation Checklist

Name of University Library being observed: ……………………………………………

Name of the Observer: ………………………………………………………………

Date of Observation: ………………… Duration of the Observation: …………………

Aspect to be observed	Yes	No	Remarks
Are parking spaces marked with the appropriate symbol of access?			
Are Parking spaces available close to the library?			
Is there clear signage leading to the library?			
Are ramps installed at entrances?			
Do ramps have handrails on both sides of the ramps?			
Do doors of the entryways provide clear openings, and can they be opened easily?			
For multi-storey buildings, are there working elevators or lifts?			
Do all stairways have handrails?			
Do floors have non-slip surface?			
Are the building pathways wide and flat to accommodate a person with wheelchair or students with disabilities?			
Is there any emergency exit plan that caters for the needs of the people with disabilities?			
Are there signage, signs, and pictogram in braille form that are clear to people with disabilities, especially the visually impaired?			
Are there restrooms available for students with disabilities?			
Are adjustable tables and chairs available so students who use wheelchairs can fit under them?			
Are shelves within reach for a person in a wheelchair			
Is there a special room/space designated for people with disabilities?			
Are there designated computer workstations such as the OPAC adapted for individuals in wheelchairs?			
Are service desks wheelchair accessible?			
Is the library well-lighted?			
Is there a designated toilet facility with, a washbasin, mirror at an appropriate height, handles, and flushing lever reachable for wheelchair users and persons with disabilities?			
Is there an induction loop system for hearing-impaired students?			
Are there special media for persons with disabilities? e.g., talking books, braille books, large print books, etc			
Are there ICT and assistive devices like tape recorders, CD players, DAISY, magnifying glasses, CCTV, screen readers, disability software and apps, and adaptive keyboards?			
Is the library website designed logically and easily to navigate by disabled students?			
Does the website give alternative formats for students with visual impairments?			
Does the website facilitate search capabilities for hearing-impaired users?			
Does the website accompany the text with audio, braille, and audiobooks?			

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APPENDIX O: Editorial Certificate

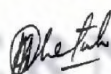## EDITORIAL
CERTIFICATE

Author: Augustine Aduko Alu

Document title: RE-CONSTITUTING GHANAIAN PUBLIC UNIVERSITY LIBRARIES TO CONFORM TO UNIVERSAL DESIGN PRINCIPLES TO ACCOMMODATE STUDENTS WITH DISABILITIES

Date issued: 13/07/2023

This document certifies that the above manuscript was proofread and edited by Prof Gift Mheta (PhD, Linguistics).

The document was edited for proper English language, grammar, punctuation, spelling and overall style. The editor endeavoured to ensure that the author's intended meaning was not altered during the review. All amendments were tracked with the Microsoft Word "Track Changes" feature. Therefore, the authors had the option to reject or accept each change individually.

Kind regards

Prof Gift Mheta (Cell: 073 954 8913)

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