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USE OF ADAPTIVE EQUIPMENT TECHNOLOGY FOR SUPPORTING DISABLED PERSONS AT FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA LIBRARY ENVIRONMENT.

By

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Abstract

The study assessed the use of adaptive equipment technology for supporting disabled persons in the Federal University of Technology, Minna Library environment. The study adopted a descriptive surootttavey design with a population of 96 librarians. Purposeful sampling technique was also used due to the size of the population. Questionnaire was the only instrument used for data collection and the data was analysed using frequency tables and simple percentages The findings revealed that librarians mostly provide library orientation services and registration services for disabled persons to a certain extent, while the other services are largely unavailable in the library. It was also revealed in the study that the required adaptive technologies are largely not available in the library. The study therefore recommended, among others, that the university library management should endeavour to acquire basic and necessary adaptive equipment technology to serve disabled persons in the library environment. These would support the PWDs in taking as much advantage of the library as the able-bodied users.

Keywords: *Adaptive equipment technology; Disabled persons, Library environment; FUT Minna*

Introduction

Disability is a societal imposition on people who have impairments, making it more difficult for people to do certain activities or interact with the world around them. Due to cognitive, developmental, intellectual, mental, physical, and/or sensory differences, disabled people are "unnecessarily isolated and excluded from full participation in society." As a result of impairments, people with disabilities can experience disability from birth or may be labelled as disabled during their lifetime. Disability is a global phenomenon that ignores all borders and differences among humans. It goes beyond lines drawn by country, gender, age, religion, race, social status, economic and political positions. Its widespread nature in today's society is alarming and ever-increasing. It is estimated that there are more than 2 billion people with physical disabilities all over the world and most of them come from developing countries. The number of disabled individuals in Nigeria has been estimated at various levels. According to a 2011 World study on disability, around 25 million

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Nigerians have at least one handicap, with 3.6 million of these experiencing severe functional difficulties. In the 2006 Nigerian census, 3,253,169 individuals with disabilities were recorded, accounting for 2.32 percent of the total population of 140,431,790.

Disabled people in Nigeria suffer from various types of disabilities, which include learning disability, blindness, and loss of limbs. It is quite clear that compared to the non-disabled, people with disabilities have very little legal protection and live in extreme poverty, have poor health, and poor educational performance, and are rarely involved in social, cultural, and political participation. Disability affects mostly vulnerable and marginalized people with a high prevalence, especially among people on lower incomes, children, women, and the elderly in today's society (Mitra *et al*., 2011). There has been increasing recognition of disabled persons, emphasizing mainstreaming them in society based on their abilities. The word "disabled persons" refers to people who are blind (visually impaired), deaf (hearing, impaired), and people suffering from a locomotor disability (i.e., disability of the bones, joints, or muscles leading to consequential reduction of limb movement). Visual impairment, hearing impairment, physical impairment, and intellectual impairment are the four most frequent categories of disability in Nigeria. Adaptive Technologies are defined as any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities, they enable blind, partially blind and other disabled disabled students to live independently (Sutar & Hande 2021). In its efforts to include people with disabilities in the day-to-day affairs of the country, on March 30, 2007, Nigeria accepted the United Nations Convention on the Rights of Persons with Disabilities, as well as its Optional Protocol, which was approved on September 24, 2010.

Disability inclusion means understanding the connection between the approach to which individuals live and perform their God-given duties and the way they participate in society and ensuring everyone has a similar opportunity to participate in each side of life to the most effective of their skills and needs. Generally, three types of inclusion for persons with disabilities exist which include; proper education, the proper employment opportunities in their social order, and therefore the right to polities/administrative positions. Therefore, there is a need to have enough facilities to support disabled person exploitation of the library daily within the library environment. However, Accommodative Instrumentation Technology can be used to support disabled persons within the library environment.

Statement of the Problem

The physically challenged students in the Federal University of Technology, Minna have the same information needs as the able-bodied users in the same institution. At the Federal University of Technology, Minna, it has been observed that physically challenged students do not have access to information services and resources that should be made available to them. This is evident in the lack of special resources tailored to assist disabled students (such as talking books, Braille books, sign language and communication devices for deaf persons) and the lack of structures that should be in the library to ease movement and access to all the different sections and

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resources in the library environment (such as ramps, elevators, washrooms for the disabled and directional signs in large print for visually impaired persons, call number of books in braille and also large print for those with low vision) among other resources.

It is therefore important for this problem to be researched and solutions provided for this group of users. It is important because if the physically challenged students do not have complete access to all the available information resources and services provided by the library, it will have a negative impact on their studies while in school and all other aspects of their lives in general. It also enhances the self-esteem of disabled persons and enables them to participate equally in their social circles. The focus of this study is to point out the barriers to access and available supportive and adaptive technologies for disabled persons in public academic libraries in Nigeria using the Federal University of Technology, Minna library as the case study.

Aim and Objectives of the Study

The aim of the study is to determine the use of adaptive equipment technology for supporting disabled persons in the Federal University of Technology, Minna library environment. The specific objectives however are:

1. to identify the types of library services available to disabled students in the Federal University of Technology, Minna library.
2. to find out the available adaptive technologies for supporting disabled persons in the Federal University of Technology, Minna library environment.
3. to find out the challenges faced by librarians in rendering service to the disabled persons in Federal University of Technology, Minna.

Research Questions

Based on the specific objectives, the following research questions guided the study:

1. What types of library services are available to disabled students in the Federal University of Technology, Minna library?
2. What are the available supportive and adaptive technologies existing in the Federal University of Technology, Minna Library?
3. What are the challenges of accessing library facilities and resources for disabled persons?

Literature Review

Overview of Disability

The term "disability" is a versatile concept which different students have understood differently. Many authors from all around the world have written extensively regarding it. In line with Addae-Wireko (2019), the world discussion, attitudes, assumptions, and perceptions of incapacity are normally classified into four models: the "Charity Model of incapacity," the "Medical or Individual Model of incapacity," the "Social Model of incapacity," and therefore the "Rights-based Model of incapacity."

The charitable model of incapacity regards people living with disabilities (PWDs) as victims of their impairment, attributing incapacity to the persons' healthiness that prevents them from doing their regular tasks. As a result, the charity model felt that for PWDs to be cared for, they required our facilitation, pity, compassion, sympathy, and

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welfare. On the other hand, the medical paradigm viewed PWDs as persons who require to be treated for a medical condition. These two models present PWDs as people who require special care through the supply of special services and institutionalization of PWDs in special institutions like special colleges, homes, secure employment places, and hospitals, where consultants like social employees, education lecturers, medical professionals, and therapists can deliver special services to them as a result of their disabilities. Todaro in Addae-Wireko (2019) supported this idea by declaring that incapacity can be a medical condition that prevents people from accessing a locality of their body to accomplish daily tasks, either partially, entirely, or with ease. Apart from the medical model of disability, the social model of disability states that instead of their bodies, people could be socially incapacitated (World Health Organization, 2011). According to Harris and Enfield in Addae-Wireko (2019), the "Right-base Model of Disability" is closely associated with the social model and focuses on fulfilling PWDs' human rights, such as the right to proper to healthcare, education, and employment, that are often denied to them, so they will have equal opportunities and share in society. If handled well, this can profit library users with disabilities by permitting them to participate on an equal basis with those who do not have impairments.

Types of Disabilities

1. **Physical Disability**

The term physically challenged is internationally accepted as referring to those groups of handicaps who have orthopedic problems, special health conditions, or sensory deficits which sometimes manifest themselves in obvious physical deformities, speech, auditory or visual disorders of varying degrees (Aina 2010). According to him, it can include; physical or mobility impairment, visual impairment, hearing impairment, dyslexia, medical conditions, and serious mental health difficulties.

2. **Hearing Impairment**

According to Gilton (2012), hearing impairments can occur in one or both ears and vary from minor to severe cases when people have challenges processing spoken words with or without aid. Hearing-impaired students may have some difficulty in integrating into mainstream libraries. Much depends on the severity of the handicap and the degree to which the student is able to follow normal speech, which also extends to how much he has learned to cope with the hearing community. Some of the characteristics of hearing impairments include lack of response to spoken words, indifference to sounds, and lack of response to noise, etc.

3. **Visual Impairment**

People with visual impairments may not be totally blind, they are those people with colour blindness, cataract, tunnel and peripheral vision, people with difficulty in reading the standard prints and other similar cases. Addae-Wireko (2019) pointed that world report on disability also declared that impaired vision may be as a result of either eye diseases or uncorrected refractive errors. Some circumstances remain constant, while others deteriorate or fluctuate.” People with visual impairments are divided into three categories based on their level of vision: those with low vision, those who are functionally blind, and those who are blind. Visual impairment describes the reduced function of the eye. Students with visual

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impairment pose a different set of problems to the libraries and librarians. They will require enough lighting, and all of their work in the library may necessitate the use of an individual reading lamp, as well as the assistance of someone to read for them; such students may also struggle with repeated worksheets or reading books. A further important point is to familiarize them with the library environment and layout so that they would be able to find their way about.

4. **Mobility impairment**

Mobility impairments refer to a broad range of disabilities which limits functions of moving in any of the limbs. This is a type of disability that affects movement ranging from gross motor skills such as walking. This aspect of disability requires the use of canes, walking sticks, wheelchairs and the likes to aid mobility.

5. **Cognitive and language impairment**

Often referred to as cognitive-linguistic impairment. It does not affect the language area of the brain directly but, but can affect attention, memory, problem solving and interpretive language. Which in turn affect communicative abilities. Cognitive impairments take different forms, including short and long-term memory loss, perceptual differences, and developmental disabilities. Language impairment is also very common. It is not only characterized by abnormal comprehension and production of the symbol and code system (grammatical structure and words) but also by the disorders in the non-linguistic and metalinguistic mechanism".

6. **Speech impairments**

Speech impairment often referred to as speech disorder is a communication disorder in which normal speech is negatively affected. Speech skills are very importment to social relationships and learning. According to Fox *et al* (2009) speech is a complex process that requires precise timing, nerve and muscle control and as a result is prone to impairments. A person who has stoke, an accident or birth defect many have speech and language issues (Ndung'u and Kinyua 2009).

7. **Multiple handicapped**

Multiple handicapped is another term used to describe multiple disabilities. As the name implies, it means that the person has more than one disability such as intellectual disability, physical or mobility challenges, visual difficulties, language delay and more

Adaptive Technologies in Libraries

Many library operations have been altered by the digital age, and a whole new set of prospective clients, known as persons with disabilities, have entered the library system. A correctly configured computer workstation can improve access to digitally displayed information. In libraries, computer units are crucial tools, and adaptive technology is that the key to making them accessible to persons with impairments. Helpful or Adaptive Technology (AT) may be a technology or a computer-based aid which assists an individual with special needs in operating around the library Goddard (Sanaman & Kumar 2014). AT is also defined as any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities, they enable blind, partially blind and other disabled disabled students to live independently (Sutar & Hande 2021). The

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researchers further stressed that the library infrastructure, services, products, materials and programmes shall be accessible for persons with disabilities through disability concern assistive technologies and devices. The assistive tools and applications such as braille and talking books, telesensorum variable speech control recorder, screen reader software, scanning and reading appliances, audio library system, tactile graphics etc. can be made available by the libraries to visually impaired students to improve the accessibility initiative. The responsibility of government and its agencies should not just be limited to providing higher education; it is supposed to play a pivotal, proactive role in identifying and eliminating the hurdles that are encountered by the students enrolled in higher education, and, thus, pave the way for equality of opportunity, access to quality education that is undoubtedly a foundation for developing an inclusive knowledge society (Sutar and Hande, 2021).

People with disabilities now have access to new areas of participation and activity that were previously inaccessible, and it is critical to ensure that users can use these enabling technologies Dixon in (Snaman and Kumar, 2014). People with disabilities can get information if libraries make the appropriate arrangements to computers available to their disabled users so that they may get the most out of electronically published items, regardless of their disability. There are numerous technical advancements for persons with impairments, therefore librarians should investigate how individuals with disabilities utilize computers and what difficulties they face when doing so. Librarians frequently get lost in technical mud when working to make libraries more accessible to persons with disabilities.

Types of Adaptive Technologies

Providing library and information services to the visually PWDs is an interesting but challenging aspect of librarianship. Some of the assistive technology used by the library for the disabled are:

i. **Braille books:** This is a universally used means of reading and writing for the blind. a system of embossed reading by touch with fingers and writing based on the 6 – dot cell devised by a blind French man, Louis Braille who was born in Coupray near Paris.
ii. **Optical aids:** Optical aids like magnifiers and specialized aids can also be used to serve the low – vision readers. Libraries can acquire these materials for use by visually handicapped readers in the library.
iii. **Computer:** These are recently the accessibility of the Internet World Wide Web. They are new avenues for exploiting information materials for the visually handicapped.
iv. **Tactile or raised surface:** These are also important information resources for the visually handicapped. It is a system of embossed representation of objects e.g., maps, animals or other objects. This is also for serving the blind readers.
v. **Toys and games with raised braille dots**: These are also used for serving the blind students and other visually handicapped readers for leisure purposes. Toys and games can also be used for serving the mentally retarded or subnormal library users.

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vi. **Wheelchairs**: these are chairs with large wheels which can assist library users with mobility impairments.

Barriers to accessing library service by Disabled Persons

Barriers in any area of the library can make the built environment unpleasant and inaccessible to people with disabilities, preventing them from accessing it. According to Mensah in Addae-Wireko (2019) mentioned that one of the most significant barriers in ensuring equal opportunity and full integration of PWDs in society is the physical and constructed environment.

According to WHO (2011), a person's environment has a major influence on the severity and duration of their disability. Inaccessible settings contribute to impairment by building barriers to participation and inclusion. Various researches have found the following instances of the influence of physical obstacles in the built environment:

i. If a wheelchair user finds oneself in a building without an accessible restroom, they may become handicapped. That is, the existence of a washroom that does not take into account the additional space required for a wheelchair user to go through renders the washroom useless for the wheelchair user, implying that the washroom does not exist.
ii. If there is no elevator, people with physical limitations and vision impairments are unable to access upper floors of a multi-story structure. That is, if elevators are used instead of steps, every section of the building becomes accessible to everyone, regardless of their disabilities (Tudzie *et al*, 2017).
iii. Steps, stairwells, and ramps without handrails on each side and tactile indications at the foot to alert those with impairments. (Addae-Wireko, 2019; Tudzie, *et al.*, 2017).

Overcoming Barriers of disabled persons using Adaptive Technology

In overcoming the challenges faced by the disabled persons in the library environment, Ivrall and Nelson in Addae-Wireko (2019) suggested the installation of elevator and ramps in the library walkways. People with mobility impairments" like those who have physical incapacity may have to consider "assistive devices," like wheelchairs, scooters, crutches, and walking sticks, proposed that doors should be equipped with an automatic door opener in order that persons with vision impairments and chair users do not encounter impediments.

Research Methodology

Descriptive survey research design was adopted for the study. A total of 96 librarians made up the population of the study. Purposeful sampling technique was also used due to the size of the population. Questionnaire was the only instrument used for data collection and the data was analysed using frequency tables and simple percentages.

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Data Analysis and Discussion

Research Question 1 - Library services available to the disabled students in your library

Table 1.

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)
1	Orientation service for PWDS	2 (6.7)	12 (40)	14 (46.6)	2 (6.7)
2	Registration services for new users with disability	4 (13.3)	14 (46.7)	10 (33.3)	2 (6.7)
3	Information retrieval service through the use of PAW	4 (13.3)	5 (16.7)	16 (53.3)	4 (13.3)
4	Provision of electronic Journal for remote access to PWDs	3 (10)	4 (13.3)	18 (60)	5 (16.7)
5	Paging services	1 (3.3)	4 (13.3)	21 (70)	4 (13.3)
6	Proxy Borrowers	1 (3.3)	9 (30)	17 (56.7)	3 (10)

Table 1 presents the library services available to disabled students in the library. The result shows that responses ranging from 1(3.3%) to 4(13.3) strongly agreed to the fact that the library provides orientation service for PWDs, registration services for new users with disabilities, information retrieval service through the use of PAW, provision of electronic journal for remote access to PWDs, paging services, and proxy borrowers. It also shows that responses from a range of 4(13.3%) to 9(30%) agreed that information retrieval service through the use of PAW, Provision of electronic journal for remote access to PWDs, paging services, and proxy borrowers while responses ranging from 12(40%) to 14(46.7%) agreed that the library provides orientation services for PWDs and Registration services for new users with disability. The Table shows that responses ranging from 10(33.3%) to 14(46.6%) disagreed with the fact that the library provides orientation services for PWDs and registration services for new users with a disability while responses ranging from 16(53.3%) to 21(70%) disagreed to the fact that the library provides Information retrieval service through the use of PAW, provision of electronic journal for remote access to PWDs, paging services, and proxy borrowers. It also shows that responses ranging from 2(6.7%) to 5(16.7) strongly disagreed that any of the aforementioned services are available to the disabled students in the library

The results shows that the library provides orientation services and registration service for PWDs to a certain extent while the other services are largely unavailable to the disabled students in the library.

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Research Question 2 - Adaptive technologies for supporting disabled persons available to the disabled students in your library

Table 2.

S/N	ITEMS	Available (%)	Not Available (%)
1	Braille books	4 (13.3)	26 (86.7)
2	Moon type	3 (10)	27 (90)
3	Talking books	7 (23.3)	23 (76.7)
4	Twin–vision books	6 (10)	24 (80)
5	Augmentative and alternative communication (AAC)	5 (16.7)	25 (83.3)
6	Screen reading software JAWS	5 (16.7)	25 (83.3)
7	Large print	10 (33.3)	20 (66.7)
8	Optical Aids	5 (16.7)	25 (83.3)
9	Tactile or raised surface	7 (23.3)	23 (76.7)

Table two showed that 26(86.7%) disagreed that braille books are available in the library, while 3(10%) of respondents agreed that the moon type is available, while 27(90%) disagreed. 7(23.3%) of respondents agreed that talking books are available, while 23(76.7%) disagreed. 6(10%) of respondents agreed that twin-vision books are available, while 24(80%) disagreed. 5(16.7%) agreed that augmentative and alternative communication (AAC) are available in the library, while 25(83.3%) disagreed. 5(16.7%) agreed that Screen reading software JAWS is available in the library, while 25(83.3%) disagreed. 10(33.3%) agreed that large prints are available in the library, while 20(66.7%) disagreed. 5(16.7%) agreed that optical aids are available in the library, while 25(83.3%) disagreed. 7(23.3%) of respondents agreed that Tactile or raised surfaces are available in the library, while 23(76.7%) disagreed. Table two clearly indicated that the required adaptive technologies are largely not available in the library.

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Research Question 3 - Challenges of accessing library facilities and resources for disabled persons

Table 3

S/N	ITEMS	SA (%)	A (%)	D (%)	SD (%)
1	Lack of proper adaptive tools to aide PWDs in the library	15 (50)	14 (46.7)	1 (3.3)	0 (0)
2	Inadequate space for easy movement of the physically challenged in the library	7 (23.3)	11 (36.7)	11 (36.7)	(3.3)
3	Poor infrastructure to accommodate PWDs	5 (16.7)	20 (66.7)	4 (13.3)	1 (3.3)
4	Mishandling of adaptive equipment by library staff	5 (16.7)	13 (43.3)	10 (33.3)	2 (6.7)
5	Lack of manpower to help PWDs in the library	4 (13.3)	9 (30)	12 (40)	5 (16.7)
6	Poor funding of the library to provide adequate support for PWDs	17 (56.7)	10 (33.3)	3 (10)	0 (0)

Table 3 presented the challenges of access to library facilities and resources for disabled persons. From the Table, it was revealed that responses ranging from 4(13.3%) to 7(23.3%) strongly agreed that inadequate space for easy movement of the physically challenged in the library, Poor infrastructure to accommodate PWDs, Mishandling of adaptive equipment by library staff and Lack of manpower to help PWDs in the library are the challenges to accessing library facilities and resources for disabled persons while responses ranging from 15(50%) to 17(56.7%) strongly agreed that Lack of proper adaptive tools to aide PWDs in the library, Poor funding of the library to provide adequate support for PWDs are the challenges to access to library facilities and resources for disabled persons. It also shows that responses ranging from 9(10%) to 14(46.7%) agreed that Lack of proper adaptive tools to aid PWDs in the library, Inadequate space for easy movement of the physically challenged in the library, Mishandling of adaptive equipment by library staff, Lack of manpower to help PWDs in the library and Poor funding of the library to provide adequate support for PWDs are the challenges to access to library facilities and resources for disabled persons while 20(66.7%) respondents agreed that Poor infrastructure to accommodate PWDs is the main challenge to access to library facilities and resources faced by disabled persons. It also showed that responses ranging from 1(3.3%) to 4(13.3%) disagreed that lack of proper adaptive tools to aid PWDs in the library, Poor infrastructure to accommodate PWDs, and Poor funding of the library to provide adequate support for PWDs are the challenges to access to library facilities and resources for disabled persons while responses ranging from 10(33.3%) to 12(40%) disagreed that Inadequate space for easy movement of the physically challenged in the library, Mishandling of adaptive

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equipment by library staff and Lack of manpower to help PWDs in the library are challenges to access to library facilities and resources for disabled persons. Finally, it showed that responses ranging from 0(0%) to 5(16.7%) strongly disagreed with the fact that any of the aforementioned are challenges to access to library facilities and resources for disabled persons.

Therefore, the data analyses in Table 3 showed the challenges existing in the library which hinder access to library facilities and resources for disabled persons.

Discussion of findings

Research question one revealed that the the library provides mostly orientation and registration services for PWDs to a certain extent while the other services are largely unavailable to the disabled students in the library. This contradicted the findings of Chaputula and Mpulanga (2017) which indicated that people with special needs were not given proper orientation on how to access the library.

Research question two revealed that the required adaptive technologies required for PWDs are largely not available. This could be attributed to a lack of funds and government interventions. This finding contradicted that of Addae-Wireko (2019) which found that there is the availability of several adaptive technologies in public academic libraries in Ghana.

Research question three revealed that poor infrastructure and poor funding are the major challenges faced by librarians in rendering the required services to PWDs. This supports the findings of Echezona *et al* (2011) which revealed that one of the major problems faced by librarians especially the university libraries are architectural barriers and poor funding. The results showed that most of the older libraries especially University libraries were built before the era of inclusive education. Therefore, such barriers as steps, high bookshelves, narrow doorways and lack of elevators are still prevalent in some libraries. These obstacles can be extremely frustrating, if not impossible for the handicapped to deal with. The researchers also pointed out that funding is another problem militating against effective library service to the handicapped. The materials and equipment needed for efficient services to the handicapped are very expensive to purchase.

Conclusion

In conclusion, the study confirmed that no library can achieve its aim and objectives satisfactorily without the provision of adequate and relevant information resources made available and accessible to its target users including disabled persons. In Federal University of Technology, Minna Library, the major problems faced in the provision of library resources and services to the disabled students is lack of basic adaptive technologies and infrastructure, resulting from poor funding, and lack of adequate attention to the PWDs using the library. This has hindered them from visiting the library for no other reasons apart from using it for assignments and to read their personal books. Although, few services were provided, especially the library orientation and registration services for PWDs, the other services listed were mostly not available or inefficient in Federal University of Technology Minna Library. This however, would definitely have negative effect on the general academic performance of the disabled students and their personal development in the society.

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Recommendations

Based on the findings of the study, the following recommendations were made:

1. The library management should endeavor to acquire basic and necessary adaptive equipment technology so they can serve the disabled persons in the library environment. These would be used to support the PWDs to take as much advantage of the library as the able-bodied users.
2. The librarians should pay more attention to the services they provide for the disabled users. Asides from the Orientation and Registration services that they provide for PWDs. The other necessary services like Information retrieval service through the use of PAW, Provision of electronic journals for remote access to PWDs, Paging services, and Proxy borrowers should be made available to the disabled persons in the library.
3. Factors like poor infrastructure, poor funding, and lack of proper adaptive tools should be properly looked into and improved drastically. Important supportive infrastructure like barrier-free facilities, teaching aids (BBM), LCD facilities, computers, and safety aspects should be installed in the library environment. Also, the library budget should be drastically increased to enable the library to provide access to library facilities and resources for disabled persons in the library under study.

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