

INCLUSIVENESS OF ACADEMIC LIBRARIES: THE CASE OF ASSISTIVE AND ADAPTIVE TECHNOLOGIES

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ABSTRACT: *This study assessed the state of inclusiveness of academic libraries in Namibia and Ghana by examining the adoption of assistive and adaptive technologies in their spaces and services to cater for users with disabilities. Applying a quantitative design approach, data were collected through face to face interviews from a sample of 12 library staff, 7 lecturers and 9 disabled students. The study found that the state of adoption of assistive and adaptive technologies is poor. Very minimum assistive and adaptive technologies are available in the libraries. Several reasons accounted for the minimum ATs in libraries but most prominent among them is lack of knowledge on ATs. As a result of this, library inclusion in terms of ATs ranged from very poor to fair. Lack of policy and financial constraints were cited as barriers for creating inclusive libraries. The study recommends the formulation and implementation of policies governing libraries to make them more inclusive; provision of adequate funds to academic libraries to enable them to incorporate assistive and adaptive technologies in their spaces and services. This study used a few university libraries from Namibia and Ghana and hence generalizing the result should be done with caution. Future studies should include more libraries including national and community libraries. This study has made a significant contribution in the understanding of the adoption of assistive technologies by academic libraries in providing spaces and services to users with disabilities. The findings and recommendations could also benefit similar academic libraries and further research in developing countries.*

KEYWORDS: *assistive/adaptive technologies, inclusive libraries, inclusiveness, disabled users, academic libraries.*

INTRODUCTION

Inclusiveness as defined by the Cambridge Dictionary online (n.d) is “the quality of including many different types of people and treating them all fairly and equally”. The Oxford English Dictionary (n.d., 720) defines it as “The practice or policy of including people who might otherwise be excluded or marginalized, such as those who have physical or mental disabilities ...” Applying this definition to the library context, inclusiveness would be termed as meeting users’ information needs including providing an enabling environment to all users irrespective of their ability or disability - a practice that would contribute significantly to inclusive societies. An inclusive society as described by the United Nations (2009, 9) is one that leaves no one behind but aims at empowering all irrespective of among others their ability or disability. One aspect of achieving an inclusive society is empowering its people through access to information, which is a basic human right and is fundamental to people of all walks of life. As such, persons living with disabilities, as part of society, have a right of access to information.

The first aspiration for the African Union Agenda 2063 aims to achieve “a prosperous Africa based on inclusive growth and sustainable development” attained through ensuring that African citizens are educated and skilled, and that “no child misses school due to poverty or any form of discrimination” (African Union Commission 2015, 2). This aspiration of the Africa we want clearly portrays the importance of being inclusive. In the same vein, Article 26 of the Universal Declaration of Human Rights (2015, 54) enshrines the importance of equity

of access by noting that education shall be equally accessible to all as everyone has a right to education. The importance of inclusion is also echoed in Sustainable Development Goal (SDG) 4, which calls for “inclusive and quality education for all”. Suffice to say; in order to be educated, one requires access to information. As such, academic libraries, whose sole purpose for existence is to support the teaching, learning and research of their host institutions should embrace inclusiveness in their quest to meet the information needs of their diversified users; which would ultimately contribute to realizing inclusive African societies in the twenty-first century.

Accessibility and inclusion are at the very core of what libraries are all about and libraries and librarians have an essential and catalytic role to play in facilitating the full participation of people with disabilities in society Small, Myhill, and Herring-Harrington (2015, 74). Therefore, the need for inclusiveness in academic libraries cannot be overemphasized, for without embracing it, a library cannot claim to sufficiently meet the information needs of its users. Academic libraries should be conscious of the fact that they serve clientele with not just different information needs, services and facilities, but also clients who are differently abled. This is regardless of whether the library has current users with disabilities or not, libraries have to ensure that their library facilities, services, programmes, collections, and technology are designed in ways in which all people, regardless of their ability, have equal opportunities to utilise them Small et al. (2015, 74). Actually, a library ought to question why it does not receive users with disabilities, and this is echoed by Mates (2011, 1) who put it this way - “unless libraries are in an alternate reality, they need to examine the reasons why they are not seeing people with disabilities using them”, thus the need of being inclusive.

In the twenty-first century, inclusiveness can be achieved through the use of assistive and adaptive technologies as these technologies make the library and its resources to work for users with disabilities. The term assistive and adaptive technology (AT) in the library context applies to aids that either assist the user in accessing a library resource or adapting a resource in such a way that it becomes usable by users with disabilities. AT promotes greater independence by enabling individuals to perform tasks that they were previously unable to perform or had great difficulty performing through providing enhancements to or changing methods of interacting and accomplish such tasks Burke (2013, 1).

However, in spite of the undisputable importance for academic libraries to be inclusive, and the fact that inclusiveness can be achieved through the use of assistive and adaptive technologies, inclusiveness in most academic libraries in Africa seems to remain a challenge. This study therefore aimed at assessing the state of inclusiveness of academic libraries in two countries from two regions in Africa by examining the adoption of assistive and adaptive technologies in their spaces and services to cater for users with disabilities.

LITERATURE REVIEW

State of inclusion in libraries

A study by Oira (2016, 76) in Kenya to analyse the potential of modern assistive technology in educational achievement for students with visual impairment at Kibos Special Secondary school found that a number of assistive technologies were being used in the secondary school. Contrary to Oira's (2016, 76) study, an earlier study by Grobbelaar-du Plessis and van Reenen (2011, 16) found that information, communication, transport, work opportunity, training and public facilities are not available to people with disabilities. Where information or the said facilities above are available, they are inaccessible to the people with disabilities.

The above is not different in libraries as studies have found that persons with disabilities encounter challenges as they use libraries, with some confirming inability to obtain information or to use the library due to their disability as revealed in a study by Mnubi-Mchombu and Tjilale (2018, 38). This was also confirmed by Alemna (n.d.) whose study found that in most African countries, library and information services to people with visual impairments are almost non-existent. This is supported by the study findings of Majinge and Stilwell (2013, 42), and Chaputula and Mapulanga (2017, 8). According to Majinge and Stilwell (2013, 42), Tanzanian libraries

provide services to persons in wheelchairs and the visually impaired; however, these services are not inclusive. Contrary to Majinge and Stilwell (2013, 42), Chaputula and Mapulanga (2017, 8) highlighted the lack of library and information services to disabled people and acknowledged possible barriers. Respondents in Ahmed (2018, 138) study in the USA emphasized the necessity of providing assistive technologies as these make the learning environment an all-inclusive one.

According to Tungaraza (2010,13), students with visual impairments at the University of Dar es Salaam depend on readers to read for them since the library does not have books in Braille. Majinge and Stilwell (2013, 48) confirmed this as their study found that there are no alternative information resources for people with visual impairments in academic libraries in Tanzania. As a result, visual impaired persons may use normal print information by asking assistance from other persons to help them or by using the services of employed readers as in the case at the University Dar es Salaam. In situations where there are only a few employed readers with more disabled persons requesting for reading services from different academic resources or persons helping the physically challenged to read are busy, then it becomes challenging for the physically challenged to access learning resources in libraries. Similar findings were reported at the University of Namibia in a study carried out by Mnubi-Mchombu and Tjilale (2018, 39). The study revealed that some disabled persons rely on library staff or friends to assist them to use the library, and in the event that they are not available, then it results to none use of the library. This has been confirmed by a study conducted in Malawi, which confirmed the lack of library and information services and lack of equipment to facilitate access to information resources to differently abled persons Chaputula and Mupulanga (2016, 9).

Furthermore, with the advancements in ICTs, most libraries' operations have also shifted from print to virtual permeated Schmetzke (2002, 390). These includes catalogues, indexes, full text databases, books, journals, reserve materials, reference services and information about libraries and their services that are commonly accessible through library websites. Access to information sources is not limited to print publications only; most databases have an option of converting text to audio, and enlarging text which can cater for the needs of the visually impaired person. However, there are also enabling and disabling conditions in the virtual environment that may lead to the exclusion of some sort of access to information Schmetzke (2002, 396). As a result of this, respondents in the study in India by Sanaman and Kumar (2015, 97) agreed that there is need of assistive aids/devices in libraries.

Importance and necessity of adopting ATs in libraries

According to Burke (2013, 45), assistive and adaptive technology makes the library and its resources to work for users with disabilities as they play a major role in aiding persons with disabilities to access information resources in libraries. It is a necessity for people with disabilities to access information resources housed in academic libraries. Adoption of AT in social spaces (like libraries) helps to increase among others integration of the disabled persons Dragoicea et al (2009, 100). AT also facilitates library services' provision to persons with disabilities by making it possible to provide information resources to them easily, independently and in formats that are suitable for them Majinge and Stilwell (2013, 40).

ATs used in academic libraries

According to Oira (2016, 55) and Ishaya and Aduku (2015, 26), assistive aids/devices include Braille machine, computer, iPad, large optical/non optical print materials, Braille books, slate and stylus, talking calculators, braille paper and optical low vision devices, hearing aids/cochlear implants, scanner/reader, talking calculators, magnifying glasses, closed captioned decoders, and audio recorders. In addition, Schmetzke (2002, 396) alludes that the ability to access web-based information is a question of the proper assistive technology such as a modified computer keyboard, an enlarged screen display, or a properly configured screen-reading programme. In a study in Western Nigeria, Ishaya and Aduku (2015, 26) found that computers, hearing aids and audio recorders were the most available assistive aids/devices. On the most frequently used assistive

technologies, the study by Oira (2016, 55) in Kenya found that the braille machine is the most frequently used, followed by the computer and large optical/non optical print materials.

On criteria for selecting the best assistive technology that suits the visually impaired student's individual needs, Oira (2016, 61) study found the functional vision as the most preferred criteria, followed by the instructional media, then lesson objective, experience of the student, nature of the topic, severity of visual impairment and the age at onset of the visual impairment.

Barriers to the provision of inclusive services in academic libraries

Using a library successfully requires positive attitudes from library staff. Reference to this, Seyama (2009, 126) pointed out that for effective library services to be provided to students with disabilities, it is essential that all staff have appropriate attitudes towards them. Majinge and Stilwell (2013, 45) study revealed that persons with disabilities are discouraged from using library services because some library staff and society as a whole display negative attitudes towards them. Library staff's negative attitudes towards persons with disabilities may be as a result of lack of training on how to handle persons with disabilities and how to use assistive technologies. This is confirmed in studies by Bodaghi and Zainab (2012, 243), Sanaman and Kumar (2015, 97), Chaputula and Mapulanga (2017, 9), and Alemna (n.d., 259).

In their study, Bodaghi and Zainab (2012, 244) observed that there are untrained library staff who are unable to assist people with disabilities. Resonating with this, Majinge and Stilwell (2013, 44) found that academic libraries in Tanzania have no trained and experienced staff to assist users with visual impairments and in wheelchairs. Sanaman and Kumar (2015, 98) study's conclusion supports this as they found that there is lack of individual orientation/training sessions and as a result the majority of users (staff and persons with disabilities) are not able to use assistive technologies effectively or to assist others to use it. Similarly, Chaputula and Mapulanga (2017, 6) found that despite an increase in the number of people with disabilities, the majority of libraries do not offer specialized training such as induction sessions or market services that cater for those with disabilities. In view of this, Ishaya and Aduku (2015, 27) recommended from their study that qualified, dedicated and trained service librarians should be posted to work in school libraries in Kaduna State.

The challenge of library use is not only restricted to information but also has to do with policies (at library, school and national levels), library building structure and ICT facilities. According to Ndumbo (2009), national policies are not clear on the availability of library and information services to persons with disabilities. This applies even at the school or library level. In Tanzania, there is no policy in academic libraries for library services for people with disabilities and the same applies at the national level as the Tanzanian National Policy on Disability of 2004 does not address library services to people with disabilities Majinge and Stilwell (2013, 46).

In addition, the nature of most library building structures does not allow people with disabilities to easily access them in order to access the information resources housed in them. Findings of Leong and Higgins (2010), Majinge and Stilwell (2013, 47 and Sanaman and Kumar (2015, 97) support this as they found that the designs of library buildings do not provide easy access for university students with disabilities. Some libraries lack simple/electric wheel chairs, adaptive furniture and no functioning lifts and ramps.

As highlighted by Sanaman and Kumar (2015, 97), barriers to using assistive technologies include 'lack of sufficient assistive technology facilities, books marked with pen and pencil which is difficult to scan for recognizing by the scanner as old scanners may not be working properly, lack of computer updates and lack of large track ball (mouse). Ezeani and Ukwoma (2017, 9) identified lack of assistive technologies to aid their access to information, unavailability of lifts to facilitate their movements especially to the floor where ICT facilities and other resources are located as the main challenges experienced by differently abled person in Nigerian universities. Other challenges enumerated by other researchers include lack of

computer maintenance and software installations and lack of local books printed in braille Silman, Yaratan, and Karanfiller (2017, 4811). Ngipandulwa (2019, 5) noted that lack of books produced in accessible format like audio books is a challenge for the visually impaired persons.

Usually a standard library computer is not usable by library users with certain disabilities, such as blindness or limited motor ability. As a result, many ATs are aimed at adapting computer-based resources such as screen magnification software, screen-reading software, and trackball controllers to make libraries more usable by patrons with disabilities Burke (2013, 45). Burke (2013, 45-46) further states that there are several technologies that can aid in making traditional library sources more usable to users with disabilities. These technologies include those that make both computer and non-computer resources more accessible and usable by library users with disabilities. Technologies such as voice recognition software such as Jaws, screen-magnifying software, screen-reading software, touchpad, trackball controllers and on-screen keyboards which make computer resources more accessible and usable, while those that make non-computers resources more accessible and usable include the teletypewriter, closed-captioning, magnifiers, audiobooks, Kurzweil readers and braille equipment (Nordström et al. 2018, 2; Rayini 2017, 5; Burke 2013, 45-46; Bell and Peters 2005, 46).

METHODOLOGY

The study employed a quantitative design approach. The study covered four academic libraries in two countries, Namibia in Southern Africa, and Ghana in West Africa. A face to face interview research instrument was employed to collect data. The interview guide for the face to face interview consisted of 23 items.

To ensure validity and reliability of the interview guide, six experts reviewed it and made inputs into the initial interview guide and after modifications it was submitted to the Research and Ethics Committee for approval (approval was sought for every library studied). Upon further modifications and approval by the ethics committee, a pilot study was administered three month(s) before the actual study commenced. After additional modification to the interview guide based on informed inputs from the pilot studies, the final interview guide was developed and the face to face interviews conducted to collect data from 12 library staff, 9 disabled students and 7 lecturers.

To ensure that informed consent was adhered to the first page of the interview guide sought respondents' consent before proceeding with interview. As part of the consent instructions, respondents could decide to opt out of the survey any time without any consequences.

DATA ANALYSIS

Demographic information

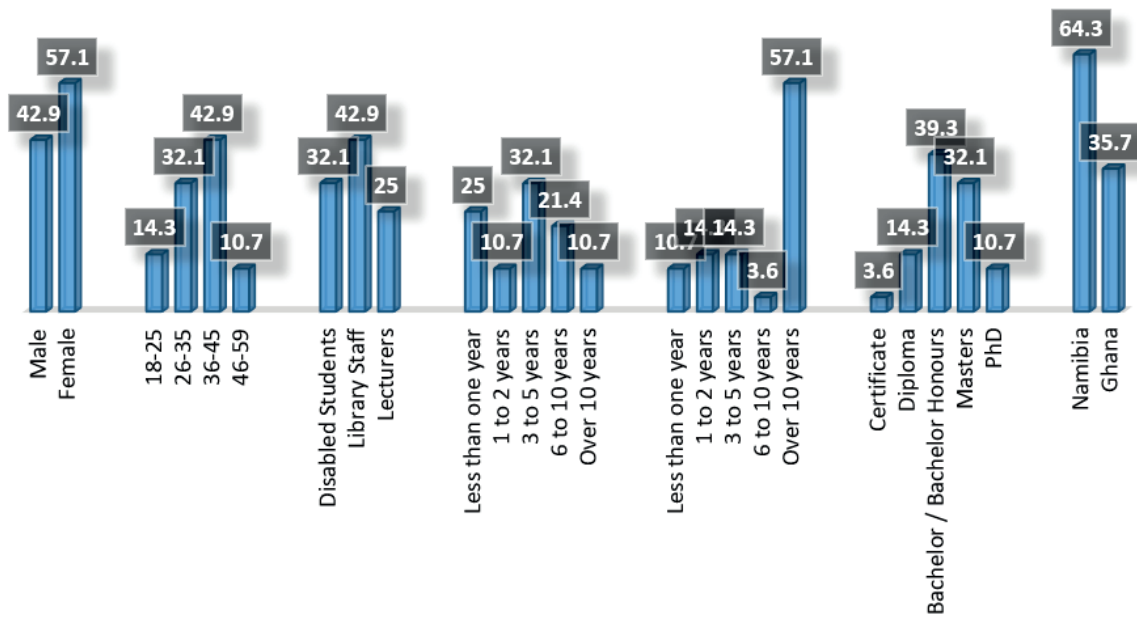


Figure 1: Demographic information of respondents

Figure 1 indicates that 42.9% of the respondents were librarians, 32.1% disabled students and 25% lecturers. The majority of the respondents indicated that they had worked or studied for three to five years in their institution. Over 50% of the librarians indicated that they had worked for over 10 years in the library. Majority of the respondents were in their youth (aged between 18 to 45 years) and held a Bachelor /Bachelor Honours Degree. The above strongly indicates that the respondents understood how libraries operate and the library needs of disabled persons.

Importance, necessity and conversance with ATs

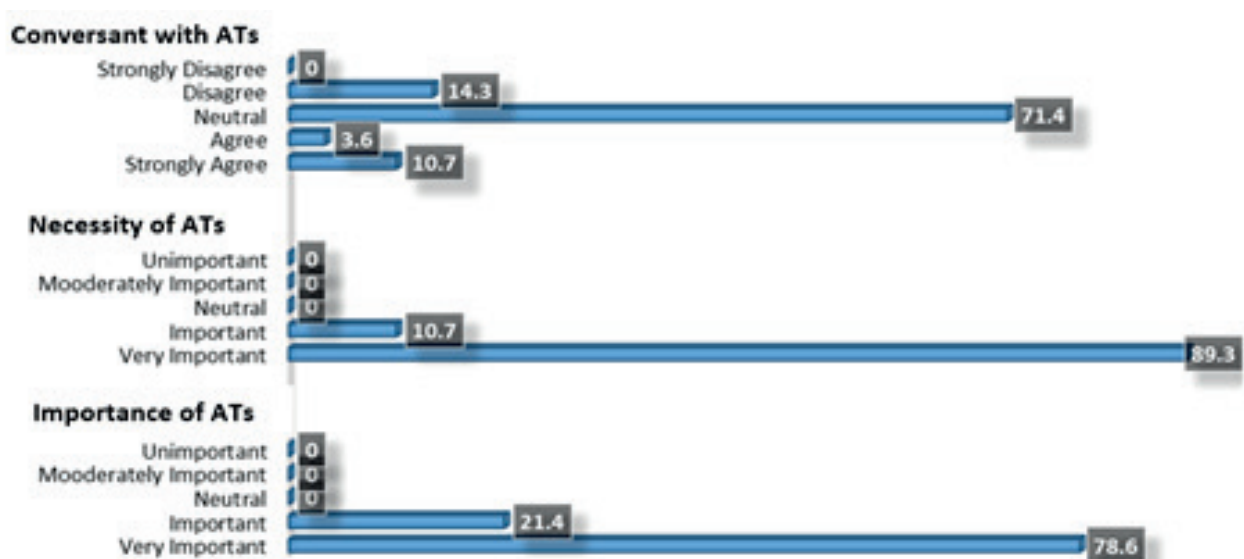


Figure 2: Importance, necessity and conversance with ATs

Figure 2 illustrates the comparison between the importance, necessity and conversance with ATs. Though 100% of the respondents indicated that ATs are necessary and important, only 14.3% of them are conversant with it. This confirms Ahmed's (2018, 136) and Sanaman and Kumar's (2015, 93) findings that ATs are important and necessary but awareness of it is low. The 100% response rate of respondents to the necessity and importance of ATs affirms the need for further ATs' actions in libraries to make them inclusive as outlined in the AU Agenda 2063 on any form of discrimination African Union Commission (2015), the Universal Declaration of Human Rights (2015) on access to education, and the Sustainable Development Goal (SDG) 4 on inclusive and quality education for all. The low percentage (14.3%) on conversance with ATs confirms Ishaya and Aduku (2015, 27) findings that available ATs are not well utilised. This is less desired and hence more should be done to get disabled persons be conversant with and use available assistive and adaptive technologies.

ATs available in academic libraries in Namibia and Ghana

Table 1: Available ATs and ATs software

Item	Yes	No
Availability of general ATs		
Braille Books	0	100
Braille Machine	0	100
Braille Embosser	0	100
Talking Books	3.6	96.4
Large Print Books	0	100
Tape Recorders	0	100
Playback Machine	0	100
Magnifying Glass/Sheet	0	100
Text to Speech (TTS) Reader	30	70
Epub	10	90
Single Handed Keyboard	0	100
Availability of ATs Software for the Blind / Sight Impaired		
SAFA Software	0	100
JAWS Software	0	100
Window-Eye Software	0	100
Zoom-Text Magnifier	17.9	82.1
Document Reader Software	0	100
Kurxweil Software	0	100
Multilingual / Bilingual OCR	0	100
Duxbury Software	0	100
Screen Enlargement Software	64.3	35.7
Availability of ATs Software for the Deaf / Hearing Impaired		
TTY emulating Software	0	100
Dragon Dictate or Convert Software	0	100
Big Mac Software	0	100
Cheap Talker Software	0	100
I Communicator	0	100
Video Captioning Software	0	100
Dragon Natural Speaking	0	100
Voice Recognition	0	100

On Screen Keyboard	67.9	32.1
Word Predictor	89.3	10.7
Abbreviation expansion	10.7	89.3
I-Learn	0	100

Table 1 shows that the libraries in Namibia and Ghana have very minimum ATs and ATs software. ATs and ATs software that are not available in the libraries include braille books, braille machine, braille embosser, large print books, tape recorders, playback machine, magnifying glass/sheet, single handed keyboard, safe software, jaws software, window-eye software, document reader software, kurxweil software, multilingual/bilingual OCR, duxbury software, dragon dictate or convert software, big mac software, cheap talker software, I-communicator, video captioning software, dragon natural speaking, voice recognition, and I-learn.

Available ATs and ATs software in some of the libraries include talking books, TTS reader, Epub, zoom-text magnifier, screen enlargement software, on screen keyboard, word predictor, and abbreviation expansion. This confirms Ishaya and Aduku's (2015, 27) and Oira's (2016, 55) findings that computers, hearing aids and tape audio recorders are available in libraries.

Table 2: Available ATs hardware

Item	Yes	No
Availability of ATs hardware for the Blind / Sight Impaired		
Scanner / Reader	0	100
Talking Calculator	0	100
Voice Recorder / CD Player	10.7	89.3
Braille Printer / Embosser	0	100
Tactile Image Enhancer	0	100
Speech Synthesizer	3.6	96.4
Magnifying Glasses	0	100
Availability of ATs Hardware for the Deaf / Hearing Impaired		
TTY / TDD	0	100
Portable Speech Synthesizer	0	100
Alarming Devices / Signal Systems	3.6	96.4
Assistive Listening Systems	0	100
Closed Captioned Decoders	0	100
Hearing Aids / Cochlear implants	0	100
Availability of ATs Hardware for the Locomotive Impaired		
Prosthetic & Orthotic devices	0	100
Simple / electric wheels	0	100
Walking Frames / Rotators	0	100
Adaptive Furniture	35.7	64.3
Adaptive Keyboards	17.9	82.1
Speech Input Devices	0	100
Cursor-control Devices	25	75
Television / Projection Tricycle	14.3	85.7
Cervical Collar	0	100

Table 2 indicates that the libraries in Namibia and Ghana have very minimum ATs hardware. ATs hardware that are not available in the libraries include scanner / reader, talking calculator, braille printer / embosser, tactile image enhancer, magnifying glasses, portable speech synthesizer, assistive listening systems, closed captioned decoders, hearing aids / cochlear implants, prosthetic and orthotic devices, simple / electric wheels, walking frames / rotators, speech input devices, and cervical collar. As a result, most library buildings and facilities are not accessible by persons with disabilities. Available ATs and ATs hardware in some of the libraries include voice recorder / CD player, alarming devices / signal systems, adaptive keyboards, cursor-control devices and television / projection tricycle. Contrary to the findings of Samson (2011, 275) and Beaton (2005, 474-475) in the USA and Scotland that ATs are provided in libraries, this study confirmed the findings of Chaputula and Mapulanga (2016, 9) that libraries in Namibia and Ghana have very minimum ATs hardware.

Barriers to the adoption of ATs

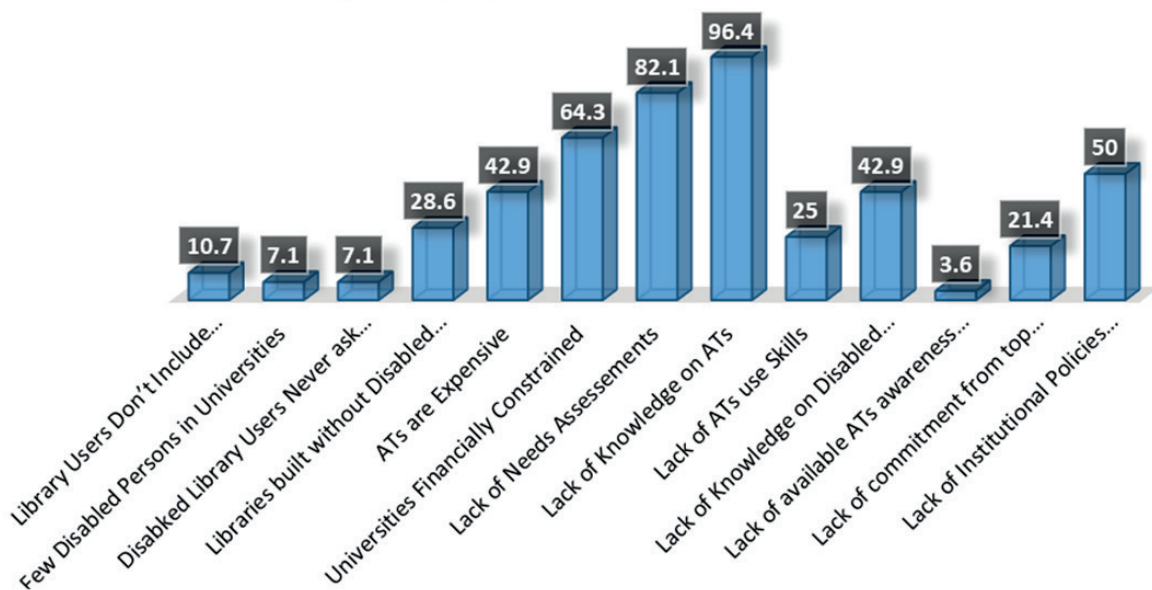


Figure 3: Factors accounting for lack of ATs in academic libraries

In a descending order, respondents indicated the following as reasons for lack of most ATs and or available minimum ATs, ATs software and hardware in the libraries. The above is illustrated in Figure 3.

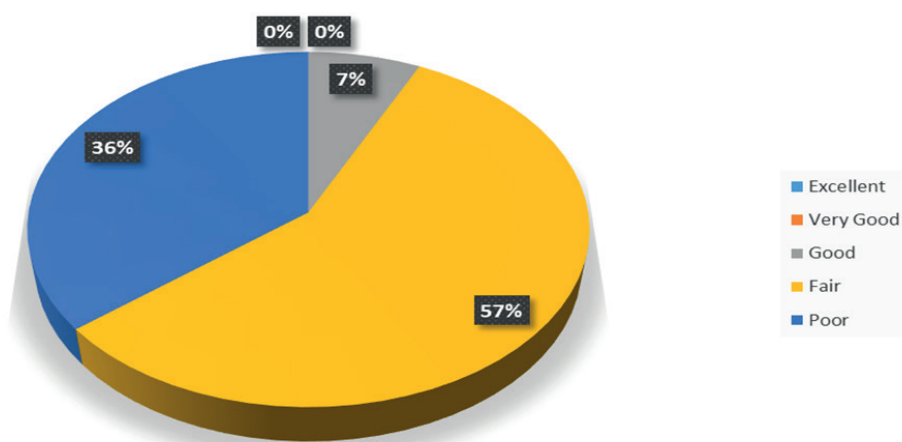


Figure 3: ATs awareness creation by libraries

Figure 4 illustrates the comparison between ATs awareness creation by libraries, training on ATs use and disabled persons trained on ATs use. Though 53% of the respondents indicated that ATs awareness creation was undertaken by libraries, only 7.1% of respondents were trained on ATs use and only 3.6% of the disabled persons were trained on ATs use.

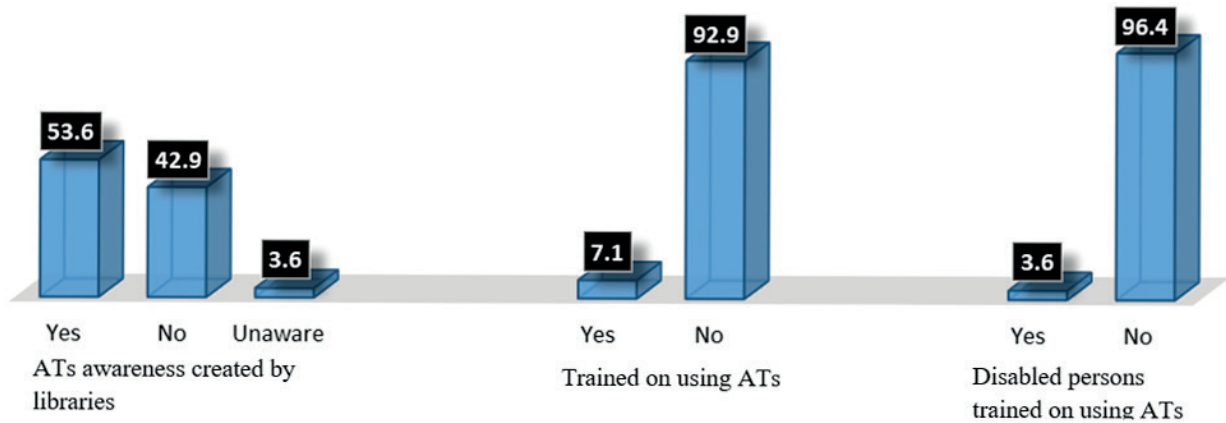


Figure 4 ATs awareness creation by libraries and training

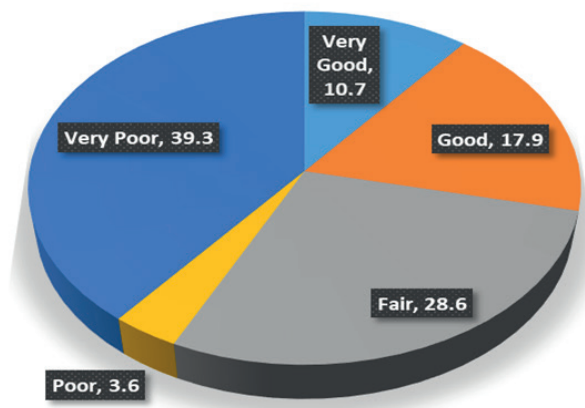


Figure 5: Perception of inclusiveness of libraries in terms of ATs

Figure 5 show that most respondents perceive inclusiveness of libraries in terms of ATs below good as the majority of them (71.5) indicated that it is very poor, poor and fair. The poor perception could be because of the lack of ATs equipment and training to support disabled persons' access to library and information resources.

CONCLUSION AND RECOMMENDATIONS

This paper aimed at assessing the state of inclusiveness of academic libraries in two countries from two regions in Africa by examining the adoption of assistive and adaptive technologies in their spaces and services to cater for users with disabilities. Findings of the study revealed that the state of adoption of assistive and adaptive technologies is poor as very minimum ATs are available in the libraries. Several reasons accounted for the minimum ATs in libraries but standing most prominent among them is lack of knowledge on ATs. As a result of this, library inclusion in terms of ATs ranged from very poor to fair.

It is recommended that libraries create more awareness of ATs and that management of universities invest more in ATs for their libraries to make them more inclusive. This study used a few university libraries from Namibia and Ghana and hence generalizing the result should be done with caution. Future studies should include more libraries including national and community libraries.

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