Assistive Technologies (AT) Preferences of People Living with Visual Disability as Information Access Tools in Academic Libraries

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ABSTRACT

Assistive technologies are necessary for ensuring independent living and equal participation in an information-based society for people living with disabilities (PLWD). This study investigated the assistive technology preference of students with visual disabilities, and the approach academic libraries should adopt in procuring assistive technologies. The study adopted a quantitative research method, with a survey as the research design. The study was conducted among visually disabled students in four public universities in Nigeria. Using the total enumeration method, an online questionnaire was used to obtain information from 151 students who voluntarily agreed to partake in the survey. The study found that access to electronic resources, scanning/conversion of print resources to electronic formats and access to information on the Web were among the technology-based services provided to visually disabled students. COBRA, ZoomText, Supernova and Dragon Naturally Speaking are the most preferred assistive technologies (software). At the same time, handheld scanners ($\bar{x}$ =4.40) and braille keyboards ($\bar{x}$ =4.60) are the most preferred assistive technologies in the hardware category by visually challenged students. The study further revealed that the library management should consult with students living with a visual disability before procuring assistive technology. Findings from this study thus provide further evidence of the need for librarians to fulfil their moral and legal obligation in advocating the provision of assistive technologies. Library administrators and university stakeholders should expedite actions on meeting the assistive technology needs of people living with visual disabilities. These actions should transcend mere policy formulation on the provision of assistive technologies to restructuring their services and spaces to accommodate assistive technologies as information service delivery tools for people with visual disabilities.

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1. Introduction

The availability of inclusive and equitable quality education and lifelong learning opportunities for all is one of the key objectives of the United Nations' Sustainable Development Goals (SDGs). Accordingly, there is a need for universal access to information, which requires equal access to relevant resources regardless of gender, age, social status and physical capacity (Queiros, Silva, Alvarelhãoa, et al., 2015). The concept of universal access to information promotes the inclusion of all regardless of individuals' physical or mental competencies. As Khetarpal (2014) notes, it is imperative for PLWDs to be able to access ICT resources. According to Pradhan and Samanta (2018), library patrons with visual disabilities comprise individuals who are blind or have visual dysfunction such as refractive errors, colour blindness, partial sight and low vision. Often, these individuals lack access to textbooks, as only five percent of published books are accessible in formats suitable to them; hence they are usually beholden to volunteer readers when their resources are not converted into Braille (de Witte, Steel, Gupta, et al., 2018; Ogwezzy, 2019).

As stated in the Libraries Serving Persons with Print Disabilities section of the International Federation of Library Associations and Institutions (IFLA), all libraries must give people living with disability a sense of belonging through the provision of inclusive libraries and information services (Irvall & Nielsen, 2005). Majinge and Stilwell (2013) assert that academic libraries should make their services more inclusive to accommodate the information needs of PLWDs. Corroborating this submission, Mutula and Majinge (2016) suggest that libraries must initiate policies that promote practical interventions, such as providing suitable buildings equipped with assistive technologies. In Nigeria and much of the rest of Africa, however, little progress has been made concerning assistive technologies in libraries and other social sectors (Eligi & Mwantimwa, 2017). Given that over 48 million people in sub-Saharan Africa, with 2.5 million being Nigerians, are living with a visual disability, this situation has grave implications for the continent (Okonji & Ogwezzy, 2019). Moreover, there is a dearth of studies examining the use of assistive technologies for the academic survival of library clientele with visual disabilities.

1.1 Statement of the Problem

In Nigeria, a notable increase in the number of people living with visual disabilities in universities has been observed (Akano, 2017). Like their sighted counterparts, these students have the mission of obtaining requisite qualifications for employment to contribute their own quota to national development. However, it is reported in the literature that these students frequently face challenges such as stigmatisation and discrimination, absence of information resources in suitable format and absence of disability policies and practices (Mates, 2011; Lyner-Cleophas, Swart, Chataika, et al., 2014; Ijadunola, Ojo, Akintan, et al., 2019). Yet, students living with visual disabilities have the same information needs as their sighted fellow students, although the latter continues to be favoured way ahead of the former (Zia & Fatima, 2016; Zaid, 2018). What is lacking is the inability of libraries to leverage on assistive technologies to unlock opportunities for equitable participation and inclusion for PLWDs. Consequently, it is necessary to provide empirical evidence on the

technological preferences of individuals living with visual disabilities with a view to adequately planning for assistive technology support for them.

2. Review of Literature

As Nyangweso (2018) reported, 80% of PLWDs are in developing countries, a situation linked to prevalent poverty, hunger and malnutrition, and limited access to health. Although disability has no universal definition, many definitions have been provided for the concept from diverse perspectives, including medical, social and activist/social-justice ones. The Convention on the Rights of Persons with Disabilities (CRPD) also supports rights to assistive technology for PLWDs (Borg, Lindström, & Larsson, 2011). Assistive technologies facilitate equitable access to library services and digital content (Abutayeh & García-Orosa, 2021). Although no definite guidelines are given on deploying assistive technologies in libraries, Tripathi and Shukla (2014) note that national disability laws generally require that institutions should facilitate access and use of resources to PLWDs. Hill (2013) demonstrates that libraries and library associations need not wait for national legislation before developing a framework for providing library services to such people. Concern about inclusive services for all users, especially through the integration of assistive technologies, has been on the rise in libraries worldwide.

Academic libraries are expected to be more proactive in providing assistive technologies to ensure both social and digital inclusion for people living with a disability. Previous research elucidate that many academic libraries still struggle with ensuring the provision of assistive technologies appropriate for meeting the information needs of visually challenged students (Bhardwaj, 2018; Spencer, Peers, & Eales, 2020). According to Mates (2011), there is a need to eradicate all barriers to information for PLWDs, including the traditional formats in which information is inaccessibly stored for this category of students. Rayini (2017) suggests that libraries should eradicate other physical barriers regarding structure or access to resources and create learning opportunities for students living with disabilities. Corroborating this submission, Kumar and Sanaman (2015) add that librarians should maximise the benefits of assistive technologies to ensure that blind and partially sighted students can easily access electronic resources as well as Web-based information.

Ndiweni, Machimbidza and Mutula, (2022) expound that meeting the information needs of persons living with visual disability require use of contemporary information and communication facilities. The onus is on university stakeholders such as vice-chancellors, library heads and deans of student affairs to make special budgetary allocations for the procurement of assistive technologies for these categories of users (Osadebe, Onuigbo, & Ewa, 2019). Scholars (see Ndiweni, et.al., 2022) posit that librarians should seek for financial donations and support for infrastructural support for assistive technologies from philanthropists.

In the developed world, many libraries, especially academic ones, ensure the provision of assistive technologies, provide assistive services, and create awareness using various platforms such as the library's website to advertise such products (Oyelude, 2017). Drawing from previous research studies, it is a fact that the availability of assistive technologies in academic libraries across many African

countries remains quite unsatisfactory (Majinge & Stilwell, 2014; Kaunda & Chizwina, 2019). If this situation remains blind and partially sighted, students will continue to stay away from using the library (Agbanu, Nwankwo, & Ogalue, 2019). In line with this submission,academic libraries must continually seek for deployment of relevant and voice-enabled assistive technology such as Alexa, Google Home, Cortana for people living with visual disabilities (Abutayeh & García-Orosa, 2021)

Mates (2011) underscores the suitability of screen readers, text-enlarging software, speech recognition software, headphones, OCR scanners and large monitors as information access tools for students with visual disability. Screen readers are software applications that allow totally blind and partially sighted students to perform basic human functions such as reading; they could be desktop-based or cloud-based. Screen readers convert text-to-speech for people living with a visual disability (Okonji, Okiki, & Ogwezzy, 2018). Evidence from a study done by Masumbika, Chipo, and Mercy (2022) show support for 'assistive service' for people living with visual impairment. Through assistive service, librarians are able to show commitment towards implementing an information literacy programmes on the use of assistive technologies by people living with visual disability.

3. Theoretical Underpinning for The Study

This study was underpinned by social model of disability (Oliver, 1990). The model posits that disability is not as a result of physical deformity but societal barriers such as architecture, policies, marginalisation and discrimination against people living with disability (Oliver, 2013; Spencer, Peers, & Eales, 2020). The strength of the model lies in its ability to promote inclusive library services. The practice of inclusive library services could be considered an offshoot of the ideology of the social model of disability. The ethos of the social model rests on the pivot that societies, institutions and individuals should change and empower people with disabilities on an equal basis with their sighted counterparts. Previous researchers whose studies were premised on the social model of disability include Seyama Morris and Stilwell (2014); Majinge and Stilwell (2015), Chaputula and Mapulanga (2016). The significance of the social model of disability for academic libraries rests upon the removal of barriers incumbering any visually impaired student from having equal access to library and information services (Eneya & Mostert, 2019).

4. Research Method

Given its cost-effectiveness, the study adopted a quantitative research method, with a survey as the research design. The population covered students with visual disabilities from four federal universities in Nigeria: University of Lagos (Unilag), University of Ibadan (UI), Nnamdi Azikiwe University (Unizik) and University of Nigeria (UNN). The four universities were purposively chosen based on the tradition of having a well-established history of offering admission to students with visual disabilities. Students who were either totally blind or with some form of visual disability

were included in the study from across all faculties within the four selected universities. The population of the visually impaired students across the four universities was 151. Equal sample size is not taken for the study because the number of visually imoaired students admitted in those schools is few. Therefore, a total enumeration method was adopted for the study due to a small sample size.

Content validity of the survey questionnaire was done to ensure that the instrument adequately covers the entire variable it should measure. An online questionnaire involving the use of Google form was adopted for the study, with its administration lasting four weeks. Participation in the study was voluntary, with respondents being duly informed of the research purpose through the consent form. Approval to conduct the research was obtained from relevant authorities in the selected institutions before the commencement of data collection. All ethical procedures for conducting research by the selected universities were also duly followed before participants were invited to partake in the survey. Copies of the questionnaire were analysed using the SPSS (version 26) software to obtain descriptive statistics such as frequency counts, means and percentages.

4.1 Questionnaire Administration and Response rate

At the end of the study, 129 students, as shown in **Table 1**, participated in the study, giving a response rate of 85%. The entire questionnaire was found usable for analysis.

Table 1. Questionnaire Administration and Response Rate from Selected Institutions

Name of Institution	No of questionnaire administered	No Returned	Percent (%)
University of Ibadan (UI)	8	7	87.5
University of Lagos (Unilag)	45	38	84.4
University of Nigeria, Nsukka (UNN)	55	46	84.0
Nnamdi Azikiwe University (Unizik)	43	38	88.4
Total	**151**	**129**	**85.4**

5. Results

5.1 Demographic Characteristics of Respondents

5.1.1 Distribution of Respondents by Gender

Figure 1 showed the frequency analysis of the respondents by gender. Result indicates that 74% of the respondents were male and 26% were female. This implies that majority of the respondents were male.

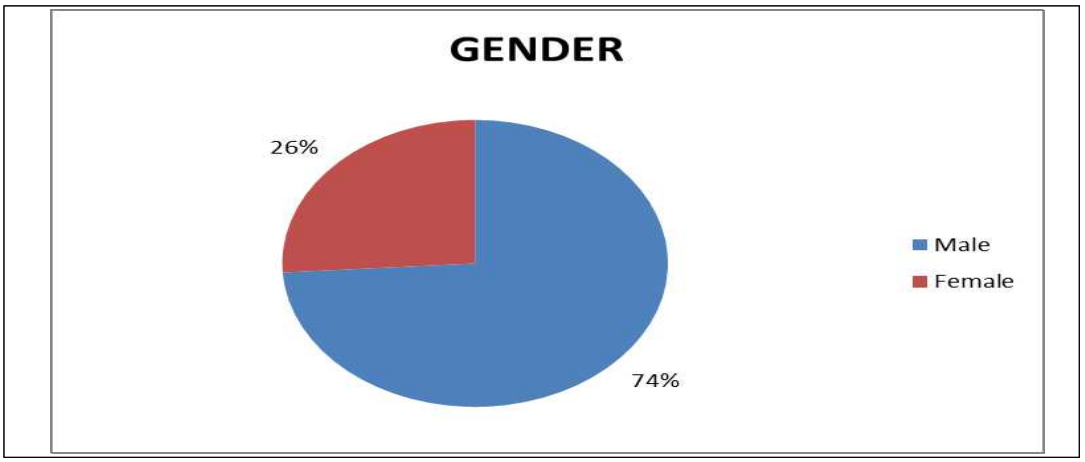

Fig. 1. Distribution of Respondents by Gender

5.1.2 Distribution of Respondents by Age

Figure 2 showed the frequency analysis of the respondents by age. The result of analysis revealed that a majority of the respondents (37%) were between 26-30 years of age, 26% were between 21-25 years of age, 22% were between 16-20 years of age, while 15% were above 30 years of age. Thus, this implies that majority of the visually implied students were 16 – 30 years of age.

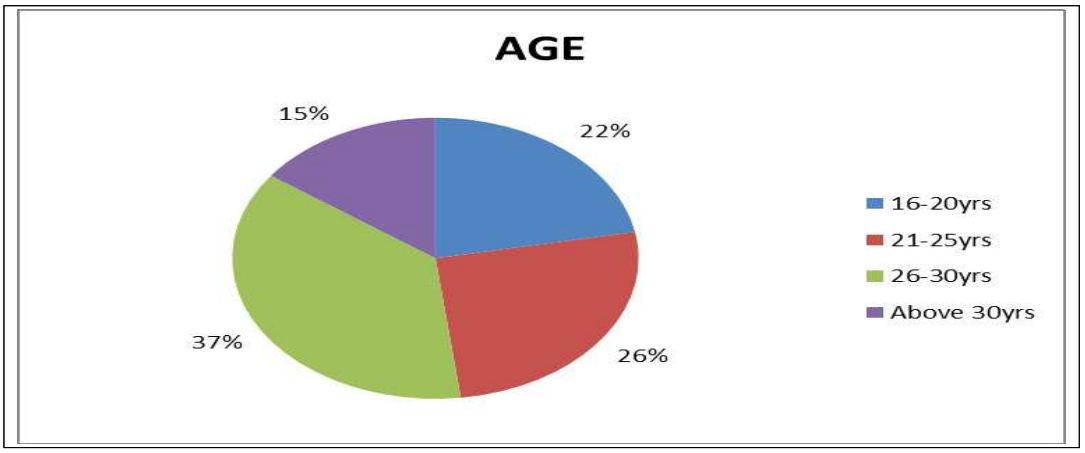

Fig. 2. Distribution of Respondents by Age

5.1.3 Distribution of Respondents by Level

Figure 3 showed the frequency analysis of the respondents by level of study. For the level of study, those in 400L and 300L maintained the highest number at 31% and 25% respectively, while those in 100L had the lowest number.

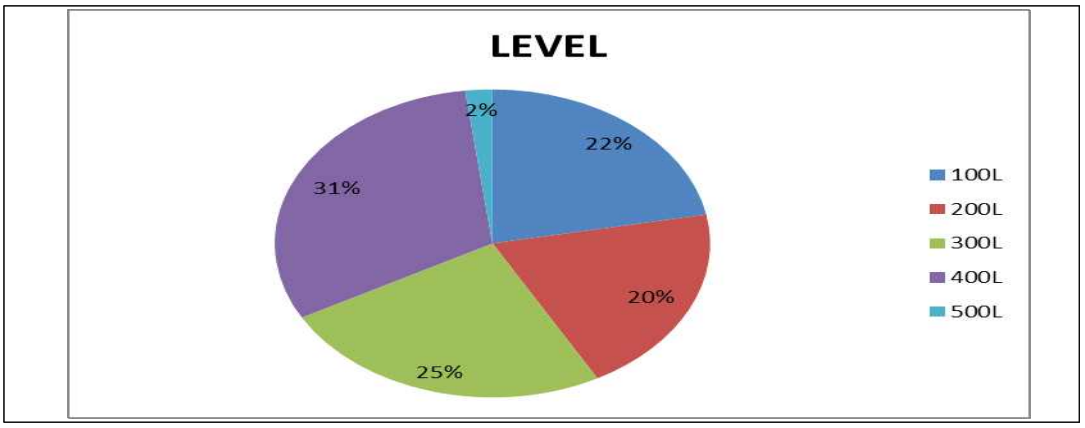

Fig. 3. Distribution of Respondents by Level

5.1.4 Distribution of Respondents by Nature of Disability

Figure 4 showed the frequency analysis of the respondents by nature of disability. The analysis revealed that 67% of the respondents were totally blind while 33% were partially sighted.

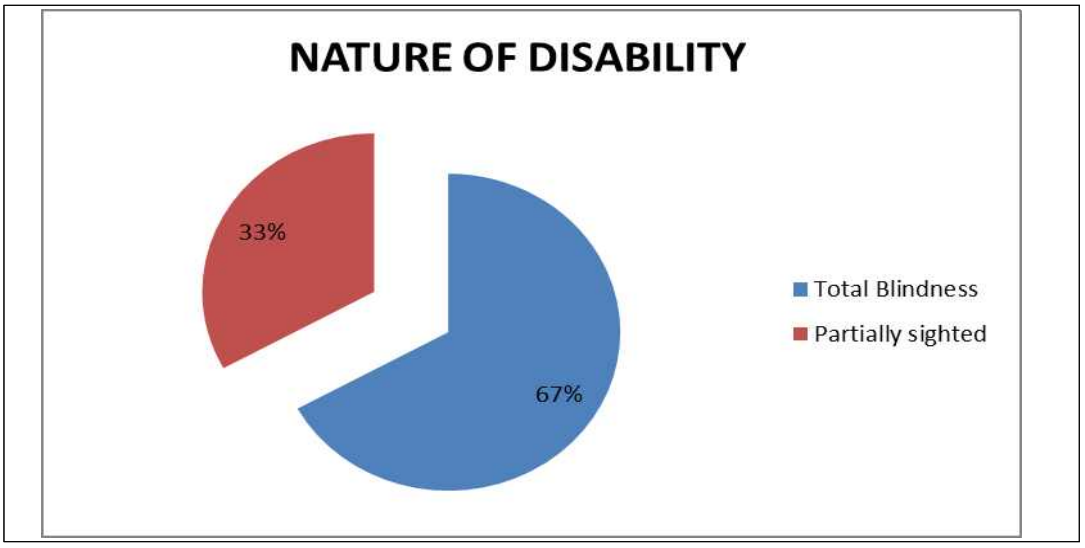

Fig. 4. Distribution of Respondents by Nature of Disability

Technology-based services offered in the library to students living with a visual disability

Results in **Table 2** show the technology-based services offered to students living with visual disabilities. A majority of the students with $\bar{x}$ = 28 or 22% enjoyed access to the Internet as one of the technology-based services offered by the library. Respondents also had access to ICT training ($\bar{x}$ =23 or 18%) and access to online catalogues (WebOPAC) ($\bar{x}$ = 21 or 16%). However, access

to electronic resources and information posted on library websites and provision of digital audio books ranked lowest among the technology-based services.

Table 2. Technology-based Services Offered in The Library to Students Living with Visual Disability

S/N	Technology-based Services	Frequency	Percent	Rank
1	Internet Access	28	21.7	1
2	ICT training	23	17.8	2
3	Access to online catalogues (WebOPAC)	21	16.3	3
4	Online database search	17	13.2	4
5	Instant chat with a librarian	13	10.1	5
6	Scanning	11	8.5	6
7	Access to electronic resources	6	4.7	7
8	Access to information on library website	6	4.7	7
9	Digital audio books	4	3.1	9
	Total	129	100.0	

Types of Preferred Assistive Technology (software) by students living with a visual disability

The assistive technology (software) are in five category: screen reader; screen enlargement software; screen enlargement; text to speech; and voice recognition software. As reported in **Table 3**, the most preferred screen reader software by the majority of the impaired students is Cobra ($\bar{x}$ = 4.69), followed by Dolphin with a mean score of 4.67. As regards the screen-enlargement software, a majority of the visually challenged students showed a high preference for ZoomText ($\bar{x}$ =4.67), followed by Video Magnifier with $\bar{x}$ =4.50. Many students showed a low preference for MAGic ($\bar{x}$ =2.74) as a screen enlargement software. Findings also showed that Kurzweil ($\bar{x}$ =4.33) and supernova ($\bar{x}$ =4.30) were the most preferred text-to-speech software. However, many of the students indicated a low preference for Claro Read ($\bar{x}$ =2.73) and Read and Write Gold ($\bar{x}$ =2.63). As regards the most preferred voice recognition software, Dragon Naturally Speaking ($\bar{x}$ =4.89) ranked number one in that category, followed by Google Now ($\bar{x}$ =4.57) and Voice Finger ($\bar{x}$ =4.45). However, many visually challenged students show a lower preference for Via Talk ($\bar{x}$ =2.26) as a voice recognition software. For braille translation, most of the students living with visual disabilities preferred Braille 2000 ($\bar{x}$ =4.15), followed by Duxbury Braille Translation Software (DBT) ($\bar{x}$ =3.89) and Liblouis ($\bar{x}$ =3.83).

Table 3. Preferred Software by Students Living with Visual Disability

S/No	Items	Mean	Stdev	Rank
A	**Screen Reader Software**			
1	COBRA	4.69	0.50	1
2	Dolphin	4.67	0.58	2
3	Windows Eyes	4.55	0.54	3
4	JAWS	4.50	0.67	4
5	NVDA	4.41	0.68	5
B	**Screen Enlargement Software**			
1	Zoom text	4.67	0.63	1
2	Video Magnifier	4.50	0.82	2
3	Readlt Wand	4.36	0.81	3
4	MAGic	2.74	1.74	4
C	**Text-to-Speech Software**			
1	Supernova	4.30	0.83	1
2	Kurzweil	4.33	0.86	1
3	Claro Read	2.73	1.64	3
4	Read and Write Gold	2.63	1.67	4
D	**Voice Recognition**			
1	Dragon Naturally Speaking	4.89	0.57	1
2	Google Now	4.57	0.57	2
3	Voice Finger	4.45	0.68	3
4	Alexa	4.12	0.92	4
5	SIRI	4.03	0.98	5
6	Via Talk	2.26	1.54	6
E	**Braille Translator**			
1	Braille 2000 / Duxbury Braille Translation	4.15	1.34	1
2	Software (DBT)	3.89	1.25	2
3	Liblouis	3.83	1.05	3

The assistive technology in terms of the hardware are divided into two: Scanners and specialised keyboards. Evidence from **Table 4** revealed that students living with visual disabilities showed a high preference for handheld scanners (with $\bar{x}$ =4.40), followed by Flatbed Scanner ($\bar{x}$ =4.33), Cam Scanner ($\bar{x}$ =4.29) and Overhead/Industrial Scanner ($\bar{x}$ =4.12). Since all the mean values were over 4.0, this finding indicates that any scanners will be suitable for students living with visual disabilities. However, among the specialised keyboard category, findings indicate that students living with visual

disabilities show a high preference for Braille keyboards with $\bar{x}$ =4.60. In contrast, a majority of the visually impaired students showed a low preference for large print keyboards ($\bar{x}$ =3.80).

Table 4. Preferred Hardware by Students Living with Visual Disability

S/No	Items	Mean	Rank
A	**Scanner**		
1	Handheld Scanners	4.40	1
2	Flatbed Scanner	4.33	2
3	Cam Scanner	4.29	3
4	Overhead/Industrial Scanner	4.12	4
5	Digital Scanner Pen	4.06	5
B	**Specialised Keyboards**		
1	Braille Keyboards	4.60	1
2	Keyboard Overlay	4.09	2
3	Large Print Keyboards	3.80	3

Approach(es) for Procurement of Assistive Technologies by Academic Libraries

When asked to suggest the approach(es) academic libraries can adopt in procuring assistive technologies, a majority of the respondents (38 or 30%) suggested consultation with students living with visual disability, followed by reliance on librarian's expertise and demonstration of the product to the visually challenged students (see **Table 5**).

Table 5. Approach(es) Academic Libraries can Adopt in Procuring Assistive Technologies

	Approach	Freq	Percent	Rank
1	Consultation with Visually Impaired Students	38	29.5	1
2	Reliance on Librarian’s Expertise	28	21.7	2
3	Demonstration of Products to the Visually Impaired Students	27	20.9	3
4	Trial Method	11	8.5	4
5	Use of Vendor’s Catalogue	11	8.5	4
6	Use of The Vendor’s Website	8	6.2	6

6. Discussion of Findings

The study aimed to investigate the assistive technology preference of visually disabled students and the approach the library should adopt in procuring assistive technologies. There is a need to highlight that most of the students who participated in this study are blind. The study found that

students living with a visual disability had access to the Internet, ICT training, online databases and instant chats with an on-the-ground librarian. Still, there was no access to digital audiobooks. This finding corroborates that of Bhardwaj (2018), who argued that assistive technologies are indispensable tools and a fundamental human right for PLWDs in libraries. However, from the viewpoint of de Witte, et al. (2018), these assistive technologies must correlate with their needs.

The present study also found that students living with visual disabilities preferred COBRA to JAWS as the screen reader. This finding differs from those of previous researchers such as Savatia, Ikoha, and Karum (2016), McCarthy, Pal, and Cutrell (2013). The study also found that ZoomText and Supernova were the most preferred screen enlargement software and text-to-speech software, respectively, while Dragon Naturally Speaking was found to be the most preferred voice recognition software.

Although the students were generally comfortable with any type of scanner, handheld scanners and digital pen scanners were their favourites. Furthermore, the Braille keyboard emerged as the most preferred (see **Table 5**), an unsurprising result since most of the respondents were totally blind. This finding implies that academic libraries must restructure their services and spaces to accommodate assistive technologies as information service delivery tools for people living with visual disabilities. This finding implies that academic libraries must restructure their services and spaces to accommodate assistive technologies as information service delivery tools for people living with visual disabilities. As de Witte, et al. (2018) found, assistive technologies must efficiently respond to users' different needs.

Regarding the approach that academic libraries should adopt in procuring assistive technologies, the study found that users' involvement is a prerequisite with a majority of the respondents, thus indicating that the library should consult with those categories of students who suffer from one form of visual disability or the other before procuring the assistive technologies. This is in line with the finding by Bhardwaj (2018). The reason for the inclusion of the students is to ensure the selection of the most suitable assistive technologies and avoidance of wastage of money and effort. It is a fact that lecturers at the departmental and faculty levels and academic librarians struggle with ensuring inclusive education for PLWDs. Lyner-Cleophas, et al. (2014) recommend establishing an autonomous disability unit to be directly placed under the supervision of the office of the registrar or deputy vice-chancellor. The deputy vice-chancellors (academics and administration) should be involved in overseeing the activities of the disability unit in a bid to encourage inclusive education and universal access to information for students living with a disability. Findings from this study thus provide further evidence on the need for librarians to fulfil their moral and legal obligation in advocating the provision of assistive technologies. These results are valuable in planning assistive technologies in academic libraries in Nigeria and other developing countries.

7. Conclusion

Library clientele with visual disabilities should be provided with assistive technologies to enhance unrestricted access to information in the most suitable formats. The types of technology-based services

rendered to this group of students should transcend basic services such as document scanning and Internet access to screen readers, compliant WEB OPAC and access to the library website. Visually disabled students require support on assistive technologies to help them overcome some of the impediments, if not all, to equality of access to information in electronic format, especially now that academic libraries no longer keep resources only in the print format. For library stakeholders to make informed decisions about assistive technology provision in the library, it is suggested that they need to explore avenues for liaising regularly with students living with a visual disability on their assistive technology needs for information access.

8. Recommendation

Finally, this study also recommends support for a Disability Support Services Unit in academic libraries, which is to be located within the Readers Services Department. The unit should employ or assign a librarian to be the Disability Services Librarian and beheaded by the same officer. The Disability Services Librarian serves, advocates for, and supports the delivery of inclusive library services through assistive technologies.

9. Limitations of Study

The study's major limitation is the small sample drawn from four institutions only and its focus on just students living with a visual disability (i.e. those with low vision and total loss of vision). This sample does not seem to be representative of the population of visually challenged students in Nigerian higher institutions, thus making it difficult to generalise the results of the study. Results can only be generalised if tested among a larger population where all the universities in Nigeria offering admission to visually impaired students are taken into consideration. Using a mixed-method approach for data collection would also have been better in obtaining in-depth information from respondents. Further studies should explore the extent to which students who are totally blind or have low vision are satisfied with assistive technology service providers in academic libraries.

10. Implication of Findings

The study serves as a guide to library stakeholders and policymakers within tertiary institutions on providing assistive technologies for library clientele with visual disabilities.

References

Agbanu, N. A., CLN, N. G. N., & CLN, I. R. O. (2019, August). *Availability and Extent of Use of Public Library Services among People with Disablities in Professor Kenneth Dike E-Library Awka* (KDL). In 2019 Conference Publications.

Akano, O. F. (2017). Vision health disparities in blindness and visual impairment in Nigeria: A review of the Nigerian National Blindness and Visual Impairment Survey. *African Vision and Eye Health, 76*(1), 1-5. Retrieved from https://hdl.handle.net/10520/EJC-cc8e6653c

Bhardwaj, R. K. (2018). Information Access Mechanism for Visually Impaired Students in Higher Educational Institutions: A Study. *DESIDOC Journal of Library & Information Technology, 38*(6). doi:10.14429/djlit.38.6.13603

Borg, J., Lindström, A., & Larsson, S. (2011). Assistive technology in developing countries: a review from the perspective of the Convention on the Rights of Persons with Disabilities. *Prosthetics and orthotics international, 35*(1), 20-29. doi:10.1177/0309364610389351

Chaputula, A. H., & Mapulanga, P. M. (2016). Provision of library services to people withdisabilities in Malawi. South African Journal of Libraries and Information Science, 82(2), 1-10.

Clarke, D., & Sawyer, J. (2014). *Girls, disabilities and school education in the East Asia Pacific region.* New York: United Nations Girl's Education Initiative.

de Witte, L., Steel, E., Gupta, S., Ramos, V. D., & Roentgen, U. (2018). Assistive technology provision: towards an international framework for assuring availability and accessibility of affordable high-quality assistive technology. *Disability and Rehabilitation: Assistive Technolog y, 13*(5), 467-472. doi:10.1080/17483107.2018.1470264

Eligi, I., & Mwantimwa, K. (2017). ICT accessibility and usability to support learning of visually-impair ed students in Tanzania. *International Journal of Education and Development using ICT, 13*(2). Retrieved from https://www.learntechlib.org/p/180638/

Eneya, D., & Mostert, B. J. (2019). The application of the social model of disability and Wilson's model of information behaviour towards effective service delivery for students with disabilities within an academic library context. Inkanyiso, 11(1), 69-79.

Hill, H. (2013). Disability and accessibility in the library and information science literature: A content analysis. *Library & Information Science Research, 35*(2), 137-142. doi:10.1016/j.lisr.2012.11.002

Ijadunola, M. Y., Ojo, T. O., Akintan, F. O., Adeyemo, A. O., Afolayan, A. S., & Akanji, O. G. (2018). Engendering a conducive environment for university students with physical disabilitie s: assessing availability of assistive facilities in Nigeria. *Disability and Rehabilitation: Assistive Technology, 14*(4), 354-360. doi:10.1080/17483107.2018.1449017

Irvall, B., & Nielsen, G. S. (2005). *Access to Libraries for Persons with Disabilities: Checklist. IFLA Professional Reports, No. 89.* International Federation of Library Associations and Institutions. PO Box 95312, 2509 CH, The Hague, Netherlands.

Kaunda, N., & Chizwina, S. (2019). Providing access to students with print disabilities: The case of the North-West University in South Africa. *Journal of Access Services, 16*(1), 6-20. doi:10.1080/15367967.2018.1547641

Khetarpal, A. (2014). Information and communication technology (ICT) and disability. *Review of market integration, 6*(1), 96-113. doi:10.1177/0974929214560117

Kumar, S., & Sanaman, G. (2015). Web challenges faced by blind and vision impaired users in libraries of Delhi: An Indian scenario. *The Electronic Library, 33*(2), 242-257. doi:10.1108/EL-03-2013-0043

Lyner-Cleophas, M., Swart, E., Bell, D., & Chataika, T. (2014). Increasing access into higher education: insights from the 2011 African Network on Evidence-to-Action on Disability Symposium-Educa tion Commission. *African Journal of Disability, 3*(2), 1-3. Retrieved from https://journals.co.za/doi/abs/10.4102/ajod.v3i2.78

Majinge, R. M., & Stilwell, C. (2013). Library services provision for people with visual impairments and in wheelchairs in academic libraries in Tanzania. *South African Journal of Libraries and Information Science, 79*(2), 38-50. Retreived from https://journals.co.za/doi/abs/10.10520/EJC147964

Majinge, R. M., & Stilwell, C. (2014). Ict use in information delivery to people with visual impairment and on wheelchairs in tanzanian academic libraries. *African Journal of Library, Archives & Information Science, 24*(2), 151.

Majinge, R. M., & Stilwell, C. (2015). 'I don't want to be carried like luggage': disability and physical access to Tanzanian academic libraries. *Mousaion, 33*(1), 80-102. Retrieved from https://journals.co.za/doi/abs/10.10520/EJC173000

Masumbika, N. M., Chipo, M., & Mercy, K. (2022). The conceptualisation of the Provisioning of Assistive Resources for Patrons with Visual Impairment within Academic Libraries in Zimbabwe. Library Philosophy and Practice, 1-12. Retrieved from https://www.proquest.com/docview/2632217183?pq-origsite=gscholar&fromopenview=true

Mates, B. T. (2011). *Assistive technologies in the library.* Chicago: American Library Association.

McCarthy, T., Pal, J., & Cutrell, E. (2013). The “voice” has it: screen reader adoption and switching behavior among vision impaired persons in India. *Assistive Technology, 25*(4), 222-229. doi:10.1080/10400435.2013.768719

Mutula, S., & Majinge, R. M. (2016). Information behaviour of students living with visual impairments in university libraries: A review of related literature. *The Journal of Academic Librarianship, 42*(5), 522-528. doi:/10.1016/j.acalib.2016.06.019

Ndiweni, M., Machimbidza, T., & Mutula, S. (2022). Factors influencing library use by students with disabilities in Zimbabwe: The case of United College of Education (UCE). Library Philosophy and Practice, 1-28.

Nyangweso, M. (2018). *Disability in Africa: A cultural/religious perspective.* East Carolina University. ResearchGate. net, 437-460.

Ogwezzy, M. C. (2019). The Promotion and Protection of Rights of Persons with Disability in Nigeria: An Analysis of the Applicable Theories, Statute and Treaty Laws. Sri Lanka J. Int'l L., 27, 171.

Okonji, P. E., & Ogwezzy, D. C. (2019). Awareness and barriers to adoption of assistive technologies among visually impaired people in Nigeria. *Assistive Technology, 31*(4), 209-219. doi:10.1080/10400435.2017.1421594

Okonji, P. E., Okiki, O. C. & Ogwezzy, D. (2018). Perceived importance and difficulty of online activities among visually impaired persons in Nigeria. Assistive Technology, 1-7.

Oliver, M (1990) The cultural production of impairment and disability. In: Leonard, P (ed.) The Politics of Disablement. London: Macmillan Education, 12−24.

Oliver, M. (2013). The social model of disability: Thirty years on. Disability & Society, 28(7), 1024-1026.

Osadebe, N. E., Onuigbo, L. N., & Ewa, B. O. (2019). Library services for students with visual impairment in selected universities in Nigeria. African Journal of Library, Archives and Information Science, 29(1), 29-45. Retrieved from https://go.gale.com/ps/i.do?id=GALE%7CA598461212&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=07954778&p=AONE&sw=w&userGroupName=anon%7E372ab769

Oyelude, A. A. (2017). Assistive technologies in libraries and the classroom. *Library Hi Tech News, 34*(10), 22-23. doi:10.1108/LHTN-10-2017-0072

Pradhan, S., & Samanta, M. (2018). Use of Assistive Technology in blind schools of West Bengal: A comparative study. *Library Philosophy & Practice.* Retrived from https://eds.p.ebscohost.com/abstract?site=eds&scope=site&jrnl=15220222&AN=133873706&h=UL2%2fD26U2tFb%2fC%2fONL37zE%2fZdUQUMUwHPg9GmEBLIEkygI87Dm86sPCcwzMouxoJEulMLGZYGzVQqpL8rMtfLA%3d%3d&crl=c&resultLocal=ErrCrlNoResults&resultNs=Ehost&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d15220222%26AN%3d133873706

Queirós, A., Silva, A., Alvarelhão, J., Rocha, N. P., & Teixeira, A. (2015). Usability, accessibility and ambient-assisted living: a systematic literature review. Universal Access in the Information Society, 14(1), 57-66.

Rayini, J. (2017). Library and Information Services to The Visually Impaired Persons. *Library Philosophy & Practice.* Retrieved from https://eds.p.ebscohost.com/abstract?site=eds&scope=site&jrnl=15220222&AN=127910767&h=acOmJEtUFVNY63Osknls%2bRJ3jcgDc9BaHZoaFycRkcJ9D5LJNj1QidcoHlDqJqvfe5OSwsIMwSLXzQc7Egs40Q%3d%3d&crl=c&resultLocal=ErrCrlNoResults&resultNs=Ehost&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d15220222%26AN%3d127910767

Savatia, E. M., Ikoha, A. P., & Karum, S. M (2016). Specialised ICT Tools for Use by Visually Challenged Students in Kenyan Public Universities. *International Journal of Trend in Research and Development, 3*(6), 161 -167.

Seyama, L., Morris, C. D., & Stilwell, C. (2014). Information seeking behaviour of blind and visually impaired students: A case study of the University of KwaZulu-Natal, Pietermaritzburg Campus. Mousaion, 32(1), 1-22.

Spencer, N. L., Peers, D. & Eales, L. (2020). *Disability language in adapted physical education. Routledge Handbook of Adapted Physical Education, (pp. 131−144).* London: Routledge

Tinerella, V., & Dick, M. (2005). Academic reference service for the visually impaired: A guide for the non-specialist. College & Research Libraries News, 66(1), 29−32.

Tripathi, M., & Shukla, A. (2014). Use of assistive technologies in academic libraries: A survey. *Assistive Technology, 26*(2), 105-118.

Zaid, Y. A. (2018). Inclusive Education Policy as Platform of Library Services for Students with visual Impairment in Nigerian Universities: Lessons from the United States of America. *Nigerian Libraries, 51*(1), 52-73.

Zia, M. W., & Fatima, F. (2016). Digital library services for visually impaired students: A study of the University of Karachi. Pakistan Journal of Information Management and Libraries, 12(1), 1-6. Retrieved from http://journals.pu.edu.pk/journals/index.php/pjiml/article/viewArticle/823

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