

**ASSISTIVE TECHNOLOGY AND INFORMATION UTILIZATION AMONG VISUALLY
IMPAIRED PUBLIC LIBRARY USERS IN THREE EASTERN STATES OF NIGERIA**

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ABSTRACT

This study examined the assistive technology and information utilization among visually impaired public library users in three eastern states of Nigeria using a descriptive research design. The population of the study comprised 21 visually impaired users. These include all the visually impaired users (people that are short-sighted and the blind) of Abia, Imo and Anambra States public libraries. The figure was obtained by making a preliminary visit to the libraries and inspecting the circulation files of the circulation desk of the libraries. Census sampling technique was used to select all the 21 visually impaired users of the Abia, Imo and Anambra States public libraries. A questionnaire served as a data collection tool. It was validated by senior university lecturers in Library and Information Science, Ignatius Ajuru University of Education, Rivers State, Nigeria for content and face validity; the corrections made was effected in the instrument. The data collected was tested using Cronbach Alpha reliability testing method and 0.86 reliability coefficient was realized which shows that the instrument for the study was reliable. Results showed that the relationship between the use of braille and information utilization among visually impaired was high strong and positive ($r = 0.781$); use of talking books and information utilization among visually impaired public library users was a high strong and positive relationship with ($r = 0.781$); relationship between the use of large print and information utilization among visually impaired public library users in three eastern states in Nigeria was high strong and positive ($r = 0.352$). The study therefore conclude that assistive technology integration into teaching and learning should extend beyond the classroom to include the library as to enhance information utilization among the visually impaired. It was recommended amongst others that the State Public Library Board (SPLB) should make budgetary provision for the purchase of braille in her collection development in all her branches as to enable the visually impaired users use available information resources to improve on themselves and their environment.

Keywords: *Assistive technology, information utilization, visually impaired, public libraries.*

INTRODUCTION

Man in the constant search for knowledge to attain development, has found information as a vital tool for solving problems and the library overtime has been one of most reliable avenues for accurate information resources. Libraries are knowledge-based institutions primarily concerned with making timely and accurate information resources accessible to it users. This is because libraries represent a structure that house a collection of services and resources and sometimes alludes to an alternative meaning of an aggregation of useful material, published or audio-visual content that serves a common use and bringing together people and ideas; enhancer of knowledge and serves as a laboratory for sustained knowledge growth.(Kalu & Nduluka, 2018). Remarkably, libraries perform their roles in providing knowledge from not merely stored and preserved sources in the four walls of library but plays dominant roles in extracting knowledge and information from books and non-book materials, so as to bring resources closer to users, enable access to information and general knowledge by making available several library resources, services and technologies. Technology makes things easier for people with disabilities, technology

makes things possible (Kanwal, 2023). Assistive technology (AT), is important for learning and access to library resources, overtime, cannot be overestimated in terms of its educational benefits to learners with disabilities as it has proved to be of help in increasing, maintaining or improving their functional capabilities. People with disabilities live and learn everywhere. They must appraise the reasons why they are not seeing these categories of people in their facilities.

A Public library is people oriented institution established to provide free access to information resources and services on educational, cultural, recreational, social, political, scientific, environmental, technological needs of members of the public irrespective of age, gender, status, qualifications, socio-political, cultural affiliations. That is why it is often described as the 'peoples University' which support learning and education for all. According to Aiyebilehin, et al (2018) public libraries are agencies that promote education and eliminate illiteracy among the people by providing educational, social and political information to the people in a particular community. Such a loadable institution which is open for all categories of persons in the society including those with disabilities must embrace technologies in the delivery of it services as this will enhance it inclusiveness. Assistive technology is playing major roles in helping schools and other knowledge agencies to promote inclusive services for persons with disabilities and the public library cannot be left behind.

The provision, application and use of assistive technologies in libraries have raised questions among researchers over the years. The principal reason for providing assistive technology in libraries is to enable physically challenged students to have unhindered access to the rich collection of the library for their personal development as well as meeting academic goals. Assistive technology for the visually impaired can provide the means for a blind or partially sighted person to overcome barriers such as the need to read print, use a computer, take notes and communicate both on paper and electronically. Video magnifiers and electronic readers, Optical Character Recognition software, magnification software, speech output systems and electronic Braille devices all have a part to play in a solution for a visually impaired individual. These computer-related aids and equipment are commonly known as "assistive," "adaptive," "access," or "enabling" technology. Often people will use a combination of the above technologies to enable them to read electronic print. For example, they may use speech output predominantly with Braille output to verify unusual spellings or language. Magnification may be used to explore a page, with speech output to read out more text-rich parts of the page (Ahmed & Naveed 2020).

Kumar and Sanaman (2014) explained that Assistive Technology (AT) it is "a device or a computer-based accommodation that helps an individual with special needs to work around or compensate for a disability and enhancing individual ability". Assistive Technology is seen as tools that help a student or individual with a disability to perform a task that he or she otherwise would not be able to perform or to increase the efficiency with which the task is performed. Magnifiers and Magnification software, electronic readers, optical character recognition software, speech output systems, electronic Braille devices, and accessible entrances all provide a solution for a particular individual with a disability, and those computer-related aids and equipment are commonly referred to with the terms "assistive", "adaptive", or "enabling technology".

Assistive technology (AT), is important for learning and access to library resources, overtime, cannot be overestimated in terms of its educational benefits to learners with disabilities as it has proved to be of help in increasing, maintaining or improving their functional capabilities. Today's technologies could dramatically change the lives of students with disabilities, enabling them to access the library, participate in learning activities alongside their peers, personalize their learning, and achieve their full potential. Assistive technology is important for students with disabilities, but there are those who say the system should be supported for all students, and this system or framework is referred to as Universal Design for Learning (UDL) (Amador, et al, 2019).

Assistive technologies can exist as hardware and software devices that can help physically challenged people with special needs to overcome the challenges of learning and information that they might be facing. This informed the need for the researcher to carry out this study on assistive

technology and information utilization among visually impaired public library users in three eastern states of Nigeria.

Problem Statement

In today's global society, information is very important to the survival of human beings all over the world including the physically challenged persons. Generally, the public library is for every member of the society including those who have different intellectual, physical, sensory, or emotional abilities. Libraries are known to be the major custodian of information as it holds various information resources that would be of great benefits to suit the needs of the challenged users.

The physically challenged are faced with difficulties of getting access to library information resources in most libraries. Also most information materials in the library are not in the appropriate accessible formats for the visually impaired, there are lack of resources such as assistive listening system, closed caption television decoders, sign language and oral interpreters, computer-assisted real time captioning and visible warning signals in most public libraries and how can these assistive technology help the physically challenged particularly the visually impaired to utilize information resources are all problems this study seeks to investigate.

Research Objectives

The main objective of this study was to find out how assistive technologies promote information utilization among visually impaired users in public library in three eastern states of Nigeria. Specifically, it was meant to:

1. examine the relationship between the use braille and information utilization among visually impaired public library users in three eastern states in Nigeria.
2. establish the relationship between the use of talking books and information utilization among visually impaired public library users in in three eastern states in Nigeria.
3. identify the relationship between the use of large print and information utilization among visually impaired public library users in three eastern states in Nigeria.

Research Questions

The study attempted to find answers to the following research questions.

1. What is the relationship between the use of braille and information utilization among visually impaired public library users in three eastern states in Nigeria?
2. What is the relationship between the use of talking books and information utilization among visually impaired public library users in three eastern states in Nigeria?
3. What is the relationship between the use of large print and information utilization among visually impaired public library users in three eastern states in Nigeria?

Review of Related Literature

Braille and Information utilization by visually impaired library users

The term "Braille" refers to a written system for the blind that uses raised dot patterns that can be touched to form the characters. Braille is the language used when writing and printing books for blind or visually impaired individuals. Braille is a system of touch reading and writing for blind persons in which raised dots represent the letters of the alphabet. It is a code in which several languages can be read and translated in to enable those that are visually impaired get the needed information by placing their palm on it and moving the palm. Anis, (2017) opined that libraries are providing inclusive information service to visually impaired users through the help of the braille and this should be encourage by ensuring more professional books are translated into this format to accommodate individual. According to AFB (American Foundation for the Blind) braille is produced by a machine known as a braille writer. It's quite different from a typewriter because it has only six keys, a space bar a backspace and a line spacer while a typewriter has above fifty keys. The six main keys are numbered to correspond with the six dots of a braille cell because

most braille symbols contain more than a single dot, combinations of the braille writer keys can be pushed at the same time.

Braille is the main medium through which reading and writing is made possible for the visually impaired and it is the first digital form of writing. It simply refers to a tactile script, based on a combination of one to six dot frame. The Braille system therefore is a method designed and developed for the visually impaired people to read and write. Opara, et al (2015). A braille enables a blind person to write just the same way a sighted person can use print. She posits that braille was invented by Louis Braille in 1829 and has been used for reading and writing among the blind from then till date. Braille Scanning Software is Optical Braille Recognition (OBR) is a Windows software program that allows users to read single as well as double-sided braille documents on a standard A4 scanner. This software solution is incredibly useful to blind and visually impaired individuals, as it allows them to access text, they would otherwise be unable to read. This programme scans a braille document, analyses the dot pattern, and then converts it into regular text quickly and easily. The translated text can be viewed on the user's computer screen, making it easy to read and understand. OBR is a great tool to help people with visual impairments access text that would otherwise be inaccessible. In a study carried out by Benson (2011) on the use of braille among blind library users in Eastern Nigeria adopted descriptive survey research design. And result showed that the use of braille help the blind to use the available information materials in the library. It was established that the use of braille significantly influence the use of information by visually challenged library users.

Talking Books and Information utilization by visually impaired library users.

Talking Books are audio books that may be downloaded as e-books from the internet, CD-ROM s, DVDs, and cassette tapes. The majority of the Visually Impaired prefers these books. Talking Software enable the visually impaired use internet access and to teach blind people how to use computers, a regular PC is transformed into a talking. Talking Typing Teacher Pro Talking Typing Teacher Pro is a specialized typing tutorial software designed to provide visually impaired individuals with a comprehensive and accessible way to learn keyboarding skills and develop their typing speed. This program includes complete guidance and practice lessons that are specifically designed for the needs of visually impaired students. Angel PRO is a specially designed talking assistive technology 237 device for the visually challenged that could be utilized in the digital library to issue and read e-books in various formats, including DAISY. This device is compact in size. It provides easy navigation for Go to Page, and Headings, with levels for chapters, sections, and phrases, as well as the beginning of the book, end of the book, time intervals. Ryles (2017) carried a study on the impact of talking book on access and use of information resources by visually impaired users. A positive correlation was found between the use talking books and employment rates as well as in their income. Individuals with strong skills were more likely to be employed and held higher-paying jobs. This literacy was associated with higher levels of exposure to technologies and social inclusion.

Kearney, (2011) described daisy book as the emerging world standard of digital talking books for people who are blind or have a print disability. Daisy books are designed to serve everyone from the blind Braille reader with no sight at all to a person who is dyslexic with perfect vision but a limited ability to read. Many libraries provide popular books in large-print and talking book formats for visually impaired readers. Talking books usually involve someone reading text into a tape recorder, and the reader uses a cassette player to listen to the book. Recently, however, talking books are also becoming available as digital speech files for playback on PCs equipped with a sound card. The problem from a blind or visually impaired student's point of view is that there are relatively few textbooks or field study guides available in this format.

Large Print and Information utilization among visually impaired library users.

The large print keyboard is specially designed and developed for low vision users who face difficulties with standard-size keyboards due to their vision impairment. It is available in high-contrast keys, either in yellow or white, with a large black letter. A study by Munin and Yu, (2017) on the use large print and other adaptive equipment for supporting disabled users. The study revealed that adaptive equipment such as large print, talking books and other hearing are very important as it promote learning among the challenged learners. The study revealed that there is dearth of adaptive technology equipment to support the blind and deaf library users except very few old to support those that has mobility challenge. Prisma magnification device for low vision prisma is a full-colour video magnifier with a stylish stand and integral table that allows a tremendous range of magnification in a small package. Users can choose between full colour or enhanced reading modes. Using the large focus control on the top, you can raise or lower the camera and zoom in or out. You can take prisma anywhere because it uses a standard TV.

It has large, oversized letter characters and commands keys in a bolder font. It offers increased visibility with easy-to-see yellow key caps and large print black letters. It enables users to give input to the computers conveniently. It also provides a faster response and excellent typing experience. It is compatible with Windows and Mac operating systems on a yellow-coloured key and offers better visibility to low-vision persons. It provides an excellent typing experience and enables. It has an extra row of dedicated hotkeys for accessing the Internet and media commands that allow VIPs to control their media player and browse the Internet with just one key touch. It also has a keypad for doing calculations faster and easier to those who have trouble seeing ordinary keyboards. It has an ergonomic design and provides a smooth typing experience to low vision persons. It is compatible with Windows, Mac OSX and macOS 56 (Zaid, 2018).

Theoretical Review

The Theory of Connectivism

This theory of connectivism was developed by George Siemens in 2005 and improved on by Stephen Downes in 2007. It is the theory that integrate learning into social networking, hence it has been referred to as learning theory for the digital age. The central idea of this theory states that knowledge sharing is like a form of creating connections between nodes in a computer networking process. For a network to function properly there must be a proper connection between all the nodes and these connections enable the establishment of flow of network which in turn provide more effectively and efficiently than when a single node works. It means that knowledge is interdependence, interconnected and does not work in isolation.

Importing the above ideology into knowledge management and acquiring, it is expedient to know that knowledge no longer work as an internal, individual activity but a collective effort being collaboratively shared and distributed. Contemporary knowledge is not all about content but connection, idea sharing, contributions from others among others. Therefore, believing that none should be left behind because of any challenged or difficulties, technological provisions are available to help in ensuring knowledge, skills that will transcend through learning are accessible to all and sundry. This theory is relevant and connected to this work in different ways, assistive technologies are like the nodes of the computer that transmit network into the computer for it effective functioning. Assistive technologies serves as nodes that transmit learning activities to the physically challenged, it enable them to acquire, flow and assimilate what is been studied. Assistive technology here are liken to intermediaries, a transmitting cable or a connecting node that connect the visually impaired to their desired learning resources.

Methods

This study adopted a correlational research design. This choice was considered appropriate for the because the research was meant to determine the relationship between the use of assistive technologies and utilization of information among visually impaired public libraries users in three eastern states in Nigeria. This is in line with Okwu (2022) assertion that correlation is a powerful

and widely used statistical tool that helps to understand and quantify relationships between variables. It serves as a foundation for more complex analyses and decision-making processes, making it indispensable in research and various practical applications. The population of the study comprised 21 visually impaired users. These include all the visually impaired users (people that are short-sighted and the blind) of Abia, Imo and Anambra states public libraries. The figure was obtained by making a preliminary visit to the libraries and inspecting the circulation files of the circulation desk of the libraries. Census sampling technique was used to select all the 21 visually impaired users of the Abia, Imo and Anambra States public libraries. The reason for adopting the census sampling technique is because the population is small and easily accessible. A questionnaire was employed for data collection. The draft of the questionnaire was validated by two senior Library and Information Science lecturers at Ignatius Ajuru University of Education, Rivers State, Nigeria for content and face validity; the corrections made was effected in the instrument. The instrument was read to the respondents by the researcher and research assistant (librarian) in the respective public libraries and their responses was recorded accordingly. The instrument consisted of sections 'A and B'. Section 'A' contained information of respondents' demographic data while section 'B' address the items on the research questions. The data collected was tested using Cronbach Alpha reliability testing method and 0.86 reliability coefficient was realized which shows that the instrument for the study was reliable. The researcher and research assistant administered the questionnaire to the respondents in Abia State as users from the Special Education Centres for the Blind Afara-Ukwu in Umuahia who are registered with the library was contacted and were all present for interaction with the researcher. Nineteen (19) copies of questionnaire were completed and found usable for the study, which was mail back to the researcher. The data collected was analyzed using inferential statistics, specifically Pearson Product Moment Correlation (PPMC) to determine the strength and direction of the relationship between the variables in the research questions and the hypotheses was tested at 0.05 alpha.

Results

This part of the study presented a tabular display of the fallouts of the research based on the research questions earlier posed to guide the study

Research Question 1: What is the relationship between the use of braille and information utilization among visually impaired public library users in three eastern states in Nigeria?

Table 1: The relationship between the use of braille and information utilization among visually impaired.

Variable		Braille	Information utilization
Braille	Pearson Correlation	1	.781**
	Sig. (2-tailed)		.000
	N	19	19
Information utilization	Pearson Correlation	.781**	1
	Sig. (2-tailed)	.000	
	N	19	19

n=19

Table 1: shows the summary of the Pearson Product Moment Correlation on the relationship between the use of braille and information utilization among visually impaired public library users in three eastern states in Nigeria? The table shows that the relationship between the use of braille and information utilization among visually impaired public library users in three eastern states in Nigeria was high strong and positive ($r = 0.781$).

Research question 2: What is the relationship between the use of talking books and information utilization among visually impaired public library users in three eastern states in Nigeria?

Table 2: The relationship between Talking books and information utilization among visually impaired public library

Variable		Talking books	Information utilization
Talking books	Pearson Correlation	1	.551**
	Sig. (2-tailed)		.000
	N	19	19
Information utilization	Pearson Correlation	.551**	1
	Sig. (2-tailed)	.000	
	N	19	19

n=19

Table 2: shows the summary of the Pearson Product Moment Correlation on of the relationship between the use of talking book and information utilization among visually impaired public library users in three eastern states in Nigeria. The table shows that the relationship between the use of talking books and information utilization among visually impaired public library users in three eastern states in Nigeria was a high strong and positive relationship with ($r = 0.781$).

Research question 3: What is the relationship between the use of large print and information utilization among visually impaired public library users in three eastern states in Nigeria?

Table 3: The relationship between Large print and information utilization among visually impaired public library Users

Variable		Large print	Information utilization
Large print	Pearson Correlation	1	.352**
	Sig. (2-tailed)		.001
	N	19	19
Information utilization	Pearson Correlation	.352**	1
	Sig. (2-tailed)	.001	
	N	19	19

n=19

Table 3: shows the summary of the Pearson Product Moment Correlation on of the relationship between the use of large print and information utilization among visually impaired public library users in three eastern states in Nigeria. The table shows that the relationship between the use of large print and information utilization among visually impaired public library users in three eastern states in Nigeria was high strong and positive ($r = 0.352$).

DISCUSSION

The study examine the relationship between the use braille and information utilization among visually impaired public library users in three eastern states in Nigeria. The study showed a correlation coefficient of $r = 0.78$ and is statistically significant at 0.05 ($r = 0.78$, $P = 0.05 > 0.000$). The null hypothesis which states that there is no significant relationship between the use of braille and information utilization among visually impaired public library users in three Eastern States of Nigeria was rejected and its alternative accepted. This result agreed with the result of the study conducted by Benson (2011) on the use of braille among blind library users when he discovered that the use of braille promote the use of information materials among those with visual impairment. Also this result is consonance with the result Fituma and Asmerom (2024) who ascertained that the use of braille brought hope to people with visual challenges as it enable them read and understand written words but however lamented the scarcity of braille and it librarians in most University libraries. This result is not a surprise to the researcher because the importance of braille to people with visual impairment is known all over.

The study establish the relationship between the use of talking books and information utilization among visually impaired public library users in in three eastern states in Nigeria. The study agrees that visually impaired public library users has a correlation coefficient of $r = .55$, indicating a

moderate positive relationship and was statistically significant at 0.05 ($r = 0.55$, $P = 0.05 > 0.000$). The null hypothesis was rejected and it alternative accepted. This result corroborate with the finding of Ryles (2017) on the impact of talking book on access and use of information resources by visually impaired users. It was designed to investigate how it helps their communication skills, employment and income and showed that there is talking books helps the visually impaired to read audio books improve on their knowledge and boast their income. The study identify the relationship between the use of large print and information utilization among visually impaired public library users in three eastern states in Nigeria. The results shows large print and information utilization among visually impaired public library users in three eastern states in Nigeria has a correlation coefficient of $r = .35$, and was statistically significant at 0.05 ($r = 0.35$, $P = 0.05 > 0.001$). This study is in line with the study of by Munin and Yu (2017) on the use large print and other adaptive equipment for supporting disabled users in the central library, university of Malaya with a population of 40 users with different types of disabilities were examined. Descriptive design was used, questionnaire and personal interview were used. The study revealed that adaptive equipment such as large print, talking books and other hearing are very important as it promote learning among the challenged learners. The study revealed that there is dearth of adaptive technology equipment to support the blind and deaf library users.

CONCLUSION

The findings of the study has reaffirmed that assistive technology are devices, equipment or system that helps the challenged individuals to perform tasks that would otherwise be difficult or near impossible to do. These are simply products, equipment, and systems that enhance learning, working, and daily living for persons with disabilities. The study therefore conclude that assistive technology integration into teaching and learning should extend beyond the classroom to include the library as to enhance information utilization among the visually impaired.

RECOMMENDATIONS

Given the findings of the study, the following suggestions were made:

1. The State Public Library Board (SPLB) should make budgetary provision for the purchase of braille in her collection development in all her branches as to enable the visually impaired users use available information resources to improve on themselves and their environment.
2. The public library management should ensure that there is the deployment of talking books that is the audio-version of all printed materials acquired in the library and the necessary computers and other technologies that will facilitate the use of talking books. This will make utilization of information easy for the visually impaired users
3. There should be the provision of large prints to help those with short-sight use the information resources available in the public libraries.

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