HAPTIC AND MOBILITY ASSISTIVE TECHNOLOGIES AS CORRELATE TO UTILIZATION OF INFORMATION RESOURCES BY PEOPLE WITH SPECIAL NEED IN UNIVERSITY LIBRARIES IN SOUTH- SOUTH, NIGERIA.

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Abstract

The study examined assistive haptic and mobility technologies as correlate to utilization of information resources by people with special needs in university libraries in South- South, Nigeria. Two (2) objectives, two research questions and two hypotheses guided the study. Literatures were reviewed based on the specific objectives of the study. The population of the study consisted of 94 people with special needs in university libraries in South- South, Nigeria. Accidental sampling technique was used to select the respondents. The study adopted a correlational design. Questionnaire was used for data collection and all the 94 copies of the instrument were found valid for analysis. Hypotheses were tested at 0.05 level of significance. The study was analytical using mean and standard deviation for research questions and PPMC for hypotheses. The findings of the study revealed that: There is a positive and strong relationship between haptic assistive technologies on utilization of information resources by people with special needs with a correlation coefficient value of (r=.842), and is statistically significant at 0.05 alpha level [(p=.000) (p<0.05)]. There is a positive and high relationship between mobility assistive technology on utilization of information resources by people with special needs with a correlation coefficient value of (r=.710) and is statistically significant at 0.05

alpha level [(p=.000) (p<0.05)]. Based on the findings of the study, it is recommended amongst others; university libraries should embrace assistive technologies so as to enhance effective and prompt utilization of information resources.

Key words: Haptic, Mobility, Utilization, Information Resources

Introduction

The university library regardless of its size remains a veritable institution charged with the sole responsibility of information generation, organization, dissemination, preservation conservation and use. However, the library performs these multi-tasking roles through the deployment of technological and non-technological tools and machineries. As custodian of information, it is charged with the responsibilities of articulating, promoting, and developing the community's information literacy through the provision of information resources and services. (Opuku, 2011). Today, University libraries are being redefined as places to get unrestricted access to information in many formats and from any source irrespective of the person involved or located where the information is sorted out from.

Special need persons are those who are disabled physically, intellectually, sensory impairments, medical conditions or mental illness, and these impairments being permanent or transitory. The common disabilities include blindness, deafness, deformity, loss of limbs, mental illness, and mental retardation, muscular, nervous and sensory disorders. However, those with special; needs are broadly categorized into four namely physical disability, visual impairment, hearing impairment and mental retardation. Visually impaired are people with vision defects. Those included in this category are people who had never had visual function, those who had normal vision for some years before becoming gradually or suddenly partially or totally blind, those with disabilities in addition to visual loss. The hearing impaired are people whose auditory capacity is limited. The degrees of hearing impairment, include hard-of-hearing, congenitally deaf, adventitiously deaf, pre-lingual deafness and post-lingual deafness. Mentally retarded are those whose ability and adaptation in the society are below average.

Assistive technologies can have a remarkable effect on empowering persons with special needs accompanied with the internet that provides great opportunity for connections to a range of people regardless of their location. Also, it enable students with special needs to become more efficient and independent in completing their tasks and their overall performance. Arguably, Ennis-Cole & Smith (2011) believe that assistive technology (AT) can supplement compliance to' 'level the playing field' 'and bridge the digital divide for students with special needs. It can also aid students with disabilities, remarkably in overcoming or bypassing their learning challenges in libraries. Friend (2009) exposed that less than 5% of the information materials available to these persons are accessible to them. These technologies can be in several forms, of which it could be classified according to its aid mechanism. For instance, haptic, mobility aids, cognitive aids, tactile tools, auditory tools, and web-based resources, amongst others (Islim & Cagiltay, 2012).

University libraries desire is to achieve optimal productivity and render effective services. This could only be achieved only when the library management is conversant with the various assistive technologies for people with special needs. These technologies could be necessary in the utilization of information resources by people with special needs. The study therefore sought to survey haptic and mobility assistive technologies on utilization of information resources by people with special needs in university libraries in South-South, Nigeria.

Statement of the Problem

Academic institutions admit students with special needs, but little is done to meet their information needs as far as their course work and other research activities are concerned (Abdulraham, 2016). The scenario appears more worrisome when viewed against the background that university libraries once served as the knowledge hub of information for different categories of users, but now is in a selective state. This development revolves round a lot of factors ranging from the university libraries not having any policy on access and use for students with special needs, library personnel not having the requisite training to assist people with special needs, the physical structure of libraries are manifestations

that much emphasis is placed on the able-bodied persons rather than the physically challenged persons (Igwe, Echem & Owate, 2021). However, ensuring equal access and use to information resources by different category of users rely on adoption of haptic and mobility technologies in university libraries and awareness among the special needs students about the information resources which are useful for them. This is because technologies have emerged as a powerful platform in education field which when lacked limits those with special needs from utilizing information resources in university.

More importantly, in order to leverage the new opportunities that assistive technologies are presenting in many areas; it offers independence by enabling people with special needs to perform tasks which they were formerly unable to accomplish. These technologies are necessary for the utilization by people with special needs to become proficient enough to help them participate in educational and employment opportunities offered to their able-bodied users. The challenge is how to harness these technologies for the lives of these library users (people with special needs). More so, insufficient fund for acquisition and maintenance of these technologies. However, the availability of haptic and mobility technologies in libraries cannot be over emphasized, but the complex nature and use of some assistive devices is worrisome. It therefore, becomes imperative to survey haptic and mobility assistive technologies on utilization of information resources by people with special needs in university libraries in South-South, Nigeria.

Objectives of the Study

The main objective of the study is to determine the relationship between haptic and mobility assistive technologies on utilization by people with special needs in university libraries in South-South, Nigeria. The specific objectives were to:

1. Identify the relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria.

2. Ascertain the relationship between mobility assistive technology and utilization of information resources by people with special needs in

university libraries in South- South, Nigeria.

Research Questions

The study was guided by the following research questions

1. What is the relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South- South, Nigeria?

2. What is the relationship between mobility assistive technology and utilization of information resources by people with special needs in university libraries in South- South, Nigeria?

Research Hypotheses

The following hypotheses were formulated to guide the study.

1. There is no significant relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South- South, Nigeria.

2. There is no significant relationship between mobility assistive technology and utilization of information resources by people with special needs in university libraries in South- South, Nigeria.

Literature Review

Assistive Technology (AT) is a rubrics term that refers to assistive, adaptive rehabilitative devices, products, or equipment for helping people with disabilities was the discovery and development in the early 1800s being a universal system for reading and writing to be used by people who are blind or visually impaired by Louis Braille. The technology allows the user to accomplish learning tasks and access the environment, resources, and information more independently without limitation either in terms of distance, place, physical disability or time. Sensory Solutions, 2017). assert that assistive technology or adaptive technology (AT) is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities; it can be a computer software career readers and communication programs and also includes the process used in selecting, locating, and using them. Assistive technology, also known as Adaptive Technology refers to technology used to maintain, increase or improve the abilities of individuals with disabilities. Assistive technology includes

computer programs or electronic devices. It doesn't have to be high-tech; but it should serve the purpose of "assistance". These technologies are dedicated to helping disabled people overcome their disability and assist them to compete in an even basis with their non-disabled peers in the work place.

Such technology enables people with disabilities to accomplish daily living tasks, assist them in communication, education, work or recreation activities, in essence, "AT" primary purpose is to maintain or improve an individual's functioning and independence to facilitate participation and to enhance well-being (UNESCO, 2020). AT promote greater independence by enabling people to perform tasks they were formerly unable to accomplish, or had great difficulty accomplishing, by providing enhancement, or changing methods of interacting with the technology needed to accomplish such tasks and related services which are made specifically to serve the purpose or adapted and used to serve as technical assistance for people with special needs. In the works of Abulubo (2002) citied in Ugwuanyi & Obiyo (2017) concurred that AT helps to enhance student's self-discovery and motivate them in institutions of learning. Similarly, there are also several types of assistive technology categories to be considered when choosing device.

Haptic aids assistive technologies are low tech tools. The word haptic from the Greek (haptikos) means pertaining to the sense of touch" and comes from the Greek verb haptesthai meaning "to contact" or "to touch". Haptic devices allow users to feel virtual objects and create computers-generated Haptic Virtual Objects (HVOs), which can be touched and manipulated with one's hands and body. This technology has opened up new areas of participation and activity for people with disabilities that were inaccessible few years ago and it is vital to ensure that users are able to use these enabling technologies to meet the information needs. The use of haptic technology is beneficial for a range of tasks associated with the process of learning. Haptic this is the science of applying touch, sensation and control to interaction with computer applications. Haptic display technology attempts to solve the problem of allowing students to feel the forces acting on objects within virtual reality simulations by presenting force (kinaesthetic) or tactile feedback to the user.

With respect to haptic stimulation in the kinaesthetic realm researchers have made notable progress; however, there has been weak advancement in creating a haptic device that interfaces with superficial touch, from, e.g., the finger tips through cutaneous (skin based) stimulation. Human haptic, machine haptic, and computer haptic are three different areas of haptic technology (Srinivasan, 2001). When an object is touched by an operator, interaction forces are imposed on their skin, and consequently the sensory systems convey information to the brain and haptic perception is generated. In response, the brain provides commands that activate the muscles, resulting in hand or arm movement. This principle is called the human haptic system (Saddik, 2017). Specifically, human haptic relies on kinesthetic information and tactile information. 'Kinesthetic feedback is a different kind of feedback, which also plays a significant role in the field of haptic.

Typically, a haptic system includes:
- Sensors:
- Actuator (motor) control circuitry.
- One or more actuators that either vibrate or exert force:
- Real-time algorithms (actuator control software, which will call a player) and a haptic:
- Application programming interface (API), and often a haptic effect authoring tool:
- The immersion API is used to program calls to the actuator into your products operating system (OS).

A person with visual impairment do not have the same condition, ranges from low vision to total the haptic and auditory senses for example are more suitable for intuitively extracting meaningful patterns from big data. The evolution of Haptic is summarized in generation:

- **First generation:** Use of electromagnetic fields which produce a limited range of sensations. Haptics enable people use their sense of touch in various applications.
- **Second generation:** Touch-coordinate specific responses allowing the haptic effects to be localized to the position on a screen or touch panel, rather than the whole device.
- **Third generation:** Delivers both touch-coordinate specific responses

and customizable haptic effects.

- **Fourth generation:** Pressure sensitivity, how hard you press on a flat surface can affect the response. (Swetha, et al. (2018).

Mobility devices are categorized as high tech tools and used to increase the mobility levels of people with mobility limitations. (those having difficulty walking, or who are unable to walk). These devices include but are not limited to crutches, walking frames, rollators, canes and manual and powered wheelchairs. More so, Stindt, Reed & Obukowicz (2019) highlighted that the assistive technologies such as 1) Walking devices - Crutches/Walker 2) Grab bars and rails 3) Manual wheelchairs 4) Powered scooters, toy cars or carts 5) Powered wheelchairs with joystick or other control and 6) Adapted vehicles for driving and can be used to enable mobility. All these technologies help people with special needs to solve their and achieve their information problem. For becoming a culturally responsible person, it is very important to achieve success in the globalized or modern world.

However, there are lists of advantages which mobility aids devices (MADs) offer in the management of persons with disability, such as it helps to improve the fit between the competency of persons with disability and the demands of the environment, helps to compensate for disabilities, improves the autonomy, self-confidence, productivity, and overall quality of life of people living with disabilities in a cost-effective way (Wasson, Gall & McDonald, 2019) citied in Ezeukwu, et al. (2019). Hence the increasing use of assistive devices (mobility aids). In addition, these aids can help reduce lower-limb loading and thereby alleviate joint pain or compensate for weakness or injury. More so, mobility aids can improve balance control by providing mechanical advantages as well as somatosensory feedback. By enabling users to stand up and walk, mobility aids can also lead to physiologic benefits such as prevention of osteoporosis and cardiorespiratory deconditioning, enhanced circulation (venous return), and improved of renal function; An additional psychosocial benefit is that the mobility aid may make it possible for older adults or people with other impairments to maintain their occupational skills.

Mobility aids benefactors include; cerebral palsy, developmental

disabilities, diabetic ulcers and wounds, difficulties maintaining balance, fractures or broken bones in the lower limbs, gout, heart or lung issues, walking impairment due to brains, visual impairment or Blindness, amongst others. Preferably, the physically or mobility impaired may require reading aids such as microform projectors, closed circuit television, prism spectacles, book rests, page-turners. Although not all library authorities will need to purchase these, their availability and use should be known. The second requirement is to take care in planning library accommodation. Public buildings should have one entrance without steps and lifts and doorways; lifts and doorways should accommodate wheel chairs. Ramps should be provided and floor surface should be non-slip. Many of these people are capable of all tasks but walking. Depending on the cause of the disability, other (or additional) voluntary muscles may be affected. For example, a person with disability may not be able to hold a book or turn pages. Spinal cord injuries, muscoskeletal disorders such as arthritis, and some developmental disabilities such as cerebral palsy are common causes of motor impairments (Reddy, 2019) as citied in Assie (2021).

The challenge for academic libraries in Nigeria is to find out what services and accessibility needs disabled (Mobility) students have and to ensure that these needs are met. Rubin (2001) also gave tips for serving patrons with motor impairments as follows

- Keep clear pathways for people using wheelchairs and canes.
- A wheelchair (or Scooter or Walker) is part of the personal body space of its user. Do not touch it (or push it) without permission.
- Do not carry a patron unless it is an emergency evacuation situation or the person requests it.
- Place yourself at the patron's eye level by sitting or crouching.
- Speak directly to the patron rather than through his/her attendant or trained dog.
- Do not assume speech or other disabilities.
- Ask the person how you can help.

- Be patient, a person with mobility impairment may need extra time to complete a task.

- Treat him or her with respect

All these are necessary if we must provide library and information services that will meet the needs of the physically or mobility impaired student in Nigerian university libraries. Therefore, mobility aids are necessary to select accurate, relevant and current information resources instead of being limited in the utilization of information.

Methodology

The study adopted correlational survey. The correlational survey examines the degree, patterns and strength of relationship between two or more variables being studied rather than explore causal relationship between them (Creswell, 2013). Thus, the correlational design provides clues for the proper understanding of patterns of relationships among variables in the study. It is considered appropriate for this study since the research is about relationship and aimed to determine the relationship between haptic and mobility assistive technologies (independent variables) on utilization of information resources by people with special needs (dependent variable).

Ninety-four (94) people with special needs from six (6) federal and six (6) state universities in south-south, Nigeria constituted the population of the study. The choice of the categories is justified by the fact that only people with special needs could ascertain the relevance attached to assistive technologies and such users need this equipment to facilitate access to the utilization of the information resources in the library. Therefore, the accessible population of the study is 94 people with special needs in the six (6) federal and six (6) state university libraries in South-South. They are Akwa Ibom state University, Library (7), Ambrose Alli University, Library (6), Cross River State University, Library (6), Delta State University, Library (6), Federal university of petroleum resources, library (8), Ignatius Ajuru University of Education library (5), Niger Delta University Library (6) Rivers State University, Library (11), University of Benin, Library (10), University of Calabar (13), University of Port Harcourt, Library (9), and University of Uyo, Library (7).

Questionnaire was used as instrument to gather data from the

respondents. The researchers developed a questionnaire titled "Haptic and Mobility Assistive Technologies on Utilization of Information Resources by People with Special Needs in University Libraries Questionnaire (HMATUIRPSBULQ)". It comprises two (2) sections. Sections A and B. Section A contained information on demographic data and Section B focused on the dependent variable. Each of the items was assigned a 4-point rating scale of Strongly Agree (SA) - 4 points; Agree (A) – 3 points; Disagree (2) – points; and Strongly Disagree (SD) – 1point. The researchers with the help of research assistants in each of the institutions studied administered the questionnaire. All the 94 copies of the instrument administered to the respondents were found valid and used for the analysis. The data was analyzed using Mean Scores and Standard Deviation in answering the research questions. The Pearson Product Moment Correlation (PPMC) was used to test the null hypotheses at 0.05 level of significance. This was computed using the Statistical Package for Social Science (SPSS) software version 23. The decision to accept or reject was based on the mean rating of 2.50, this implies that any item with a mean of 2.50 and above was accepted while any item with a mean below 2.50 was rejected.

Results and Discussion

Data Presentation

Research Question 1: What is the relationship between Haptic Assistive Technology on Utilization of Information Resources by People with Special Needs.

Table 1   Haptic Assistive Technology utilize by People with Special Needs

S/N	Item	SA	A	D	SD	x	±	Decision
1	The sensor module (i.e. radio frequency identification 'RFID' create awareness for people with special needs through context information and environmental context information	56	27	7	4	3.4	3.4	Agree

2	Actuator help to achieve physical movement by converting energy, often electrical, air, or hydraulic, into mechanical force.	39	29	20	6	3.0	3.3	Agree
3	Tactile information creates feedback for object and pattern identification and recognition	30	40	14	10	2.9	3.2	Agree
4	The touch module enables people with disability to perform normal function of listening to environmental sounds.	54	40	4	0	3.6	3.6	Agree
5	Kinesthetic feedback create awareness or sense of touch created from muscle tensions with the help of sensory receptors	39	30	15	10	3.0	3.4	Agree
	Weighted Mean		3.18>2.5 3.3 **Agree**					

The result from table 1 shows that haptic assistive technology utilized by people with special needs. It revealed that item 4 has a mean score of 3.6 and standard deviation of 3.6. This indicate that the touch module enables people with disability to perform normal function of listening to environmental sounds. Item 1 has a mean score of 3.4 and standard deviation of 3.4. This indicates that the sensor module (i.e. radio frequency identification 'RFID') create awareness for people with special needs through context information and environmental context information. Item 2 has mean score of 2.9 and standard deviation of 3.3. This indicates that Actuator help to achieve physical movement by converting energy, often electrical, air, or hydraulic, into mechanical force. Item 5 has mean score of 3.0 and standard deviation of 3.4. This indicates that kinesthetic feedback create awareness or sense of touch created form muscle tensions with the help of sensory receptors to people with special needs. Item 3 has mean

score of 2.9 and standard deviation of 3.2. This indicates that tactile information creates feedback for object and pattern identification and recognition. The weighted mean of 3.18 which is greater than the criterion means of 2.5 indicates that haptic assistive technology help people with special needs to utilize information resources in university libraries.

The findings of the study revealed that there is a significant and positive relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in south-south, Nigeria; the result of the hypothesis also indicates that there is a positive and high relationship between haptic assistive technology and utilization of information resources by people with special needs in university libraries in south-south, Nigeria. This finding is consistent with the opinion of Er (2018) he stated that the application of haptic technology by people with disabilities will not only help them to feed information to the computer but can help them receive information from the computer in the form of a felt sensation on some part of the study.

Research Question 2: What is the relationship between Mobility Assistive Technology on Utilization of Information Resources by people with Special Needs in University Libraries in South-South, Nigeria.

Table 2 Mobility Assistive Technology by People with Special Needs

S/N	Item	SA	A	D	SD	x	±	Decision
1	Walking devices (crutches, walker, canes) increase the activity and independence of special people with walking disabilities	57	37	0	0	3.6	3.6	Agree
2	Wheelchairs provide wheeled mobility with an appropriate seating system for the user to move around.	34	51	4	5	3.2	3.5	Agree
3	Walking sticks support balance and weight bearing through the	30	35	10	19	2.8	3.2	Agree

	legs.							
4	Crutches aid provide support to assist users who have difficulty with elbow, underarm or forearm support to move around.	39	30	14	11	3.0	3.4	Agree
5	Walking frames provide support to assist people who have difficulty in walking due to balance problems, pain or injury.	40	37	10	7	3.1	3.5	Agree
	Weighted Mean	3.14>2.5 3.4 **Agree**						

Table 2 shows mobility assistive technology on utilization of information resources by people with special needs in university libraries in south-South, Nigeria. It is revealed that Item 1has mean score of 3.6 and standard deviation of 3.6. This implies that walking devices (crutches, walker, canes.) to increase the activity and independence of special people with walking disabilities. Item 2 has mean score of 3.2 and standard deviation of 3.5. This implies that wheelchairs provide wheeled mobility with an appropriate seating system for the user to move around. Item 4 has mean score of 3.0 and standard deviation of 3.4. This implies that crutches aid provide support to assist users who have difficulty with elbow, underarm or forearm support to move around. Item 3 has a mean score of 2.8 and standard deviation of 3.2. This implies that walking sticks support balance weight of people with walking disabilities and helps the bearing through the legs. The weighted mean of 3.14 revealed that mobility assistive technology assist people with special needs (walking disabilities) to utilize information resources in university libraries in South- 0South, Nigeria.

The findings of the study revealed that there is a significant and positive relationship between mobility assistive technology and utilization of information resources by people with special need in university libraries in south- south, Nigeria; the result of the hypothesis also indicates that there is a positive and moderate relationship between mobility assistive

technology and utilization of information resources by people with special needs in university libraries in south-south, Nigeria. This finding corroborates the assertion of Salminen, Brandt and Samuelsson (2000) who described the value as rightly showed that mobility devices (MADS) improve user's activity and participation and increase mobility. This implies that mobility assistive technology is imperative in the utilization of information resources as to walking devices (crutches, walker, canes), increase the activity and independence of special people with walking disabilities, wheelchairs provide wheeled mobility with an appropriate seating system and rely on the user or an assistant to move around, walking frames provide support to assist people who have difficulty waking due to balance problems, pain and injury, crutches aid with elbow, underarm or forearm support a single felted with a tip and through the legs, walking sticks support balance or weight bearing through the legs, and by enabling users to stand up and walk; compensate disability, and create equal opportunities for people with disabilities, as well as provide more support for people with strength, endurance and postural issues.

Hypothesis Testing
Hypothesis one: There is no significant relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria.

Table 3: Pearson Product Moment Correlation (PPMC) on the relationship between haptic assistive technology on utilization of information resources by people with special need.

Variables	N	X	SD	R	p-value	Decision
Haptic Assistive Technology		13.81	2.497			
Utilization of Information Resources	94			.842	.000	Rejected
		14.00	2.597			

The result in Table 3 shows the summary of Pearson Product Moment

Correlation (PPMC) on the relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria. The result establishes a positive and strong relationship between the two variables with a correlation coefficient value of (r=.842). An additional explanation specifies that there is a significant relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria as [(p=.000) (p<0.05)]. The null hypothesis one which states that there is no significant relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria was rejected and the reverse hypothesis upheld. Thus, there is significant relationship between haptic assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria.

Hypothesis two: There is no significant relationship between mobility assistive technology on utilization of information resources by people with special needs in university libraries in South-South, Nigeria.

Table 4: Pearson Product Moment Correlation (PPMC) on the relationship between mobility assistive technology on utilization of information resources by people with special need.

Variables	N	X	SD	R	p-value	Decision
Mobility Assistive Technology		14.02	3.111			
Utilization of Information Resources	94			.710	.000	Rejected
		14.00	2.597			

The result in Table 4 shows the summary of Pearson Product Moment Correlation (PPMC) on the relationship between mobility assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria. The result establishes a positive and high relationship between the two variables with a correlation coefficient value of (r=.710). An additional explanation specifies that there is a significant relationship between mobility assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria as [(p=.000) (p<0.05)]. The null hypothesis two which states that there is no significant relationship between mobility assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria was rejected and the reverse hypothesis upheld. Thus, there is significant relationship between mobility assistive technology and utilization of information resources by people with special need in university libraries in South-South, Nigeria.

Conclusion

The modern educational system and library environment is hopefully, expecting more innovations in the method of enhancing knowledge accessibility and utilization. This is in addition to the improved reading and learning system which has integrated various assistive technologies into the service delivery system such as haptic, mobility assistive technologies. Notwithstanding, dealing with the improved library environment that has brought in service delivery for all users through haptic and mobility assistive technologies as a necessity for utilization of information resources.

Recommendations

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

1. That there is a positive and strong relationship between haptic assistive technology and utilization of information resources by people with special needs in university library in South-South should continue to use haptic assistive technology, so as to enhance effective and prompt utilization of information resources.

2. That there is a positive and high relationship between mobility assistive technology and utilization of information resources by people with special needs. This could be done by constantly utilizing mobility assistive technology facilities for information resources utilization.

References

Abulubo, .B. (2005). *The exceptionally Children's Handbook of Special Education*. Fab Educational.

Abdelrahman, O.H (2016). Use of Library Technology and Services by the Virtually-Impaired and the Blind in the University of Khartoum. *DESIDC Journal of Library and Information Technology, 36*(2) 93-97.

Assie, R.A (2021). Availability of assistive technology devices for students with visual impairment. Evidence from the University of Cape Coast. *Global Scientific Journals, 9*(2) 413-434.

Creswell, J.W (2013). Qualitative inquiry & research design: Choosing among five approaches (3rd ed.). Thousand Oaks, CA: Sage publications.

Er, I.R (2018). Haptic Technology: A Touch Revolution. *International Journal of Advance Research in Science and Engineering (IJARSE), 7*(3) 1476-1483.

Ezeukwu, A.O, Uchenwoke, C.I, Edeh, S.S, Okezue, O.C, Okemuo, A.J, Ogbueche, C.M, Uduonu, E.M., Okpala, B.C & Amah, E.C (2019). Factors affecting the use of mobility aid devices among young adults with mobility disability in a selected Nigerian Population. *Disability and Rehabilitation: Assistive Technology*, 25. 1-6

Frend, .J (2009). School Library Media Specialist Collaboration with Special Education Personnel in Support of Student Learning. *Evidence-Based Library and Information Practice, 4*(2), 37-55.

Glenor, S (2016) *What Do Prisoners Read?* Prison Library and Collection Development<< OLOS Columns.

Haliso, Y. L (2009). *Availability and utilization of information and communication technology and job performance of academic librarians in South-Western Nigeria. (Unpublished doctoral dissertation) University of Ibadan, 132.*

Igwe, K.N., Echem, M.C & Owate, C.N (2021). *Application of Digital Technologies for Innovative Information Services in Libraries.* In Akidi, J.O, Igwe, K.N and Ujoumunna, J.C (eds). Libraries in the era of Digital Technologies: Essays in Honour of Professor Amanze. O. Unagha, Zeh Communications Limited. 11-28.

Islim, O. F., & Cagiltay, K. (2012). *Disability and assistive technology.* In 6th International Computer & Instructional Technologies Symposium, October 4th - 6th 2012 Gaziantep University. 1–5.

Opuku, A. (2011). Assistive technologies in libraries and the classroom. *Library Hi Tech News, 34*(10), 22-23.

Peschers, G (2015). Books Open Worlds for People Behind Bar, Library Services in Prison as   Exemplified by the Muster Prison Library Germany. Library in the Year 2007.   *Library Trends 50*(3) 520-543.

Rubin, K.H. (2001). *The Play Observation Scale* (POSO)). Unpublished Manual, University of Maryland.

Saddik, A.E (2017). The potential of Haptics Technologies. *IEEE Instrum. Meas Mag, 16*, 10-17(CrosRef).

Ugwuanyi, C. F., Okwor, R. N. & Ezeji, E. C. (2011). Library space and place: Nature, use and impact on academic library. *International Journal of Library and Information Science, 3*(5), 92-97.

UNESCO (2020). *World declaration on higher education for the twenty-first century: Vision and Action.* New York. https://www.unesco.rg/education/eduprog/wche/declaration.eng.htm.