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RESEARCH ARTICLE

INCLUDING THE EXCLUDED: THE PROVISION OF ASSISTIVE TECHNOLOGY DEVICES FOR STUDENTS WITH VISUAL IMPAIRMENT BY UNIVERSITY LIBRARIES

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ABSTRACT

This paper x-rays the importance of assistive technology devices (ATDs) in university library for the teaching and learning of students with visual impairments. The introduction of technology has benefited the sighted however not leaving out students with visual impairments. Lack of vision significantly affects learning and it must be stressed that the education goals for students with visual impairments are essentially the same as those for all the students, therefore, the need to provide means of ensuring easy and convenient means for students with visual impairment to learn by the university libraries**.** The availability of Braille materials in the university library only ensures a system of reading and writing by touch for students with visual impairments but do not additional teaching and learning opportunities for students with visual impairments. However, the demand of this information age in ensuring that students with visual impairments live up to education expectation as the sighted students has led to the imperativeness of assistive technology devices (ATDs) in the collections of the university library. Academic progression of students with visual impairments who opted for university education cannot be fully realized without adequate equipment and professionals. Assistive technology devices facilitate the learning of subjects and basic skills needed for a meaningful living of students with visual impairments. The study recommended that efforts should be made by the university library to ensure proper integration of Braille and ATDs in their collection for the teaching and learning of students with visual impairment. Also, managements of universities, parents and stakeholders must ensure that these ATDs are made available in schools for students with visual impairments.

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INTRODUCTION

The university library plays a vital role in the attainment of the goals of university education through appropriate, accurate, and timely provision of information. The university library is a major component of university education. The activities of the university library is central to the achievement of objectives of university education all over the world and it provides support services to the university in order to meet the information needs of both staff and students. The basic responsibility of the university library is to provide relevant print and electronic resources for the teaching, learning and research activities for both students and staff of the university community (Adeniran, 2011; Oyedum in Krubu and Osawaru, 2011). This is why the university library is referred to as the heartbeat of university education. According to Eze and Uzoigwe (2013), behind the vision and mission of the university is the university library. The impact of university library in the generation, storage, preservation, dissemination and utilization of knowledge is highly unquantifiable. Even in the face of emerging technologies such as the internet, the university library is still highly relevant. No programme can scale through accreditation without the input of a standard and well equipped university library (Okogwu and Akidi, 2011). This is an indication that the quality of the university library is vital to the reputation of the university and no academic excellence can be achieved by university without a good library as a backup to teaching and learning. The university library servers many users, they include: lecturers, students and non-teaching staff in the university as well others who through letters of introduction from their various institutions may have the need to use the university library. The university library provides information resources both in print and electronic to its users to aid their academic activities. Though, forming a small population among the users of the university library are students with one disability/impairment or another, more of concern to this paper are students with visual impairments. Impairment generally refers to any loss or abnormality in an

anatomical structure, physiological or psychological function of an organ. Students with visual impairment are those students who have severe reduction in vision that interferes with their ability to be educated through the use of print. Therefore students with visual impairments need to be educated with assistive technology devices (ATD) such as: MP3, computer with job access with speech (JAWS), tape recorder, scanner with optical character recognition software. Others are Kurzwell Reading Machine, e-mail, fax, computer, video conferencing, internet, MP3 players (Creative line of player, the Microsoft Zune, the Sony Walkman, E-reader, i-pods, Amazon Kindle, etc.), auditory devices (e-book, digital book, tactile-audio systems, word-prediction software, talking dictionary, etc.) and the world wide web which can be provided by the university library. Korir (2015) says visual impairment makes it difficult for students with visual impairment to learn through vision based experiences, observation, imitation and exploration which are the major methods through which sighted students acquire knowledge.

Visual impairment may occur when any part of the optical system is defective, diseased or malfunctions. A visual impairment resulting from defective part may occur at birth, these may include: missing parts (absence of Iris; absence of the eye itself), defective systems (dislocation of the lens; holes in the retina; drainage systems that are stopped up) and hereditary conditions (refractive errors due to eyeballs that are too short or too long); improperly shaped corneas; albinism. To Brakes and Linden (2010), disease can be pre-natal (injury to the fetus in utero), at birth or post-natal (damage during or after birth), or adventitious (acquired later i.e disease that developed gradually such as diabetes and some types of retinal diseases). Malnutrition can also lead to defective parts as well as body diseases.

Visual impairment can also occur when the central nervous system is damaged, the brain not only governs and coordinates the optical systems but also interprets the visual stimuli sent to it by the eyes. Sometimes the brain-based impairment is mild (poor visual perception) and sometimes it is severe (cortical visual impairment or CVI). Okoro and okafor (2009) identified the common conditions of visual impairment to include: retinopathy of prematurity (ROP), neurological visual impairment or cortical visual impairment, retinoblastoma, amblyopia, strabismus, common vision problems known as refractive errors, myopia (nearsightedness), hyperopia (farsightedness), astigmatism, albinism, optic nerve hyperplasia, optic nerve atrophy. Gold (2000) confirmed that no other sense can stimulate curiosity, combine information, or invite exploration in the same way, or as efficiently and fully as vision. Students with visual impairments can and do succeed, but at different rates and often in different sequences. Vision is a primary sense upon which most traditional education strategies are based. A child with a severe vision loss can directly experience only what is within their arms' reach and which can be safely touched as well as what can be heard. However, Standevan (2013) opined that students with visual impairment and sighted students have the same mental processes, cognitive functioning, the same word organsiation, acquisition of social skills, communication skill, word expansions and the same academic expectations but differ in ways and strategies of exploring reading materials because of the barriers created by loss of vision and vision based experiences. The same effort however may produce different results. It must also be stated that the educational goals for students with visual impairment are essentially the same as those for all the students. The goals are: effective communication, social competence, employability and personal independence. In order to accomplish these goals, students with visual impairment require specific interventions and modifications of their educational programmes. An appropriate means to do this is through the provision and use of assistive technology devices (ATDs) by the university library for students with visual impairments. Willings (2009) noted that assistive technologies (ATDs) help students with visual impairment to overcome learning difficulties in their classes. Eguavoen (2016) describes assistive technology devices (ATDs) as an umbrella term which involves that use of any communication devices or application, encompassing, mp3, radio, television, cellular phones, computer network hardware and software, satellite systems and so on, as well as the various services and application associated with them, such as video conferencing and distance learning.

According to the European Commission (2006), the importance of assistive technology devices lie less in the technology itself but in its ability to create greater access to information and communication in undeserved population. Many countries around the world have established organizations (i.e libraries) for the promotion of assistive technology devices (ATDs), because it is believed that unless the less technologically advanced nations have a chance to catch up with the increasing technological advances in developed countries, will not only serve to exacerbate the already-existing economic gap between technological "have" and "have not" areas but as well affect the teaching and learning of students with visual impairments. Willings (2009) further explained that assistive technologies devices (ATDs) are adaptive devices or services that increase participation, achievement or independence for students with visual impairment. Assistive technology devices help students with visual impairment to increase their access to general curriculum and improve their academic performance. The use of assistive technology devices is importance and must be thoughtfully selected. Also, careful consideration must be taken to know which will be appropriate to meet individual students with visual impairment's learning needs. Nilaya (2016) enumerated that assistive technology devices use can enhance the ability of students with visual impairment to access information and achieve better performance in their academic activities. Some of the assistive technology devices listed by Nilaya (2016) include: Braille embossers (a specilaised tactile printer), advance close-circuit television (CCTVS: devices that enlarge written or printed text), scanners and optical character recognition software (technology that scans printed text and provides the user with speech output), computer screen readers, compact disc (CDS), and multiple hardware and software innovations. Martin (2012) affirmed that assistive technology devices currently offer a wide range of options in teaching and learning among students with visual impairment: he further listed other interesting ways of learning for students with visual impairment, like learning over Skpe, one to one lessons partially over the internet, where students could solve grammatical exercise on their computer and send results by email, pronunciation and conversion exercise. California Department of Education (2006) noted that no matter how good and fascinating an assistive technology device may be, it must be backed by the knowledge of Braille because much of the best assistive technology combines speech and Braille and requires knowledge of Braille code by the visually impaired students.

Braille is a tactile writing system, where each character is represented by a combination of one to six raised dots. A dot may be raised at any of the six positions to form 64 possible subsets. Differently from visual processing, which enables simultaneous and parallel perception or text, the tactile modality offers a successive input and imposes a sequential nature of reading. According to Carollo (2013), Braille is a system of reading and writing by touch used by students with visual impairments, he explains that Braille consists of arrangements of dots which are made up letters of the alphabet, numbers and punctuations marks. The basic Braille symbols are called the Braille cell and consists of six dots arranged in the formation of a rectangle, three dots high and two across. Other symbols consist of only some of these six dots. The six dots are commonly referred to by number according to their position in the cell.

Imperative of assistive technology devises use for teaching and learning of students with visual impairments: Many factors have accounted for the popularity of assistive technology devices over Braille in the recent time. There is however ongoing debate on the usefulness of Braille over assistive technology devices for teaching of students with visual impairments. California Department of Education (2008) sees Braille as a redemptive hope for persons with visual impairment, while, Alazzi (2008) adjudged Braille as problematic, obsolete and archaic, and should be as a matter of urgency be replaced or at best be archived as a historic item for posterity. Agesa (2014) noted that Braille is a slow medium by which a good reader can cover only a small fraction of the material that can be read by a seeing reader in the same amount of time. The slowness according to Agesa (2014), reduces the information and experiences which the students with visual impairments can derived from reading as such, students with visual impairments are not only limited in their experiences but also in their acquisition of knowledge through reading.

There is also a shortage of qualified teachers who can teach the use of Braille. There is also the problem of use of Braille as many of the subjects and teaching consists of pictorial representations of many concepts or object but in using Braille, teachers cannot use images, drawings or pictures or anything implying the visual codes as whiteboard to teach (Aiazzi, 2008; Hurt, 2012). There are no Braille materials that describe pictures; therefore students with visual impairments do not experience immediate contact to various learning resources as the sighted. Aiazzi (2012) also stated that Braille books are expensive, difficult to find, bulky and that no matter how fast a reader may be, he needs more time to understand what he has read and therefore less problematic media should be used by students with visual impairments. However, many writers agree that the combination of students with visual impairment knowledge in Braille and assistive technology devices use is good. Jaroslaw (2009) noted that students with visual impairments with Braille skills and a good level of proficiency in ATDs are better able to compete and succeed in the real world. Eniola (2000) opined that a combination of Braille and ATDs is required for teaching persons with visual impairments. Some ATDs that are useful for teaching and learning by students with visual impairment include: Kurzwell Reading Machine, e-mail, fax, computer, video conferencing, internet, MP3 players (Creative line of player, the Microsoft Zune, the Sony Walkman, E-reader, i-pods, Amazon Kindle, etc.), auditory devices (e-book, digital book, tactile-audio systems, word-prediction software, talking dictionary, etc.) and the world wide web. The following are the opportunities presented by the use of ATDs for teaching and learning for student with visual impairment if the university library provides them:

- They help in the development of digital proficiency of students with visual impairments as required of todays' citizens.
- ATDs promote the inclusion of students with visual impairments improves their academic performance and facilitates school task and social interaction in the school environment.
- ATDs facilitate the learning of school subject and basic skills needed for a meaningful living among students with visual impairments thereby contributing to the development of their immediate environment and the society at large.
- They enable personal learning and self-help for students with visual impairments as many of the ATDs are sound enabled and thus, enables communication and interaction between students and the device. Examples include: talking calculator, talking phones, talking time, text-to-speech software like JAWS among others.
- ATDs have provided students with visual impairments great potential to participate more fully in their everyday activities.
- ATDs have helped students with visual impairments to develop strategies to improve functioning and minimize the impact of environmental barriers to their participation in everyday life.
- ATDs can be used by students with visual impairments to adjust volume, pitch, speed of reading, choose voices (male or female), skip from headlines to headline, read text passages, analyse the phonetic structure of words, reconstruct words by putting together a string of synthetic phonemes thereby ensuring understandability of the message by them.
- ATDs provide opportunity to record lectures, books and other study materials for later study by students with visual impairments.
- ATDs enable students with visual impairments to submit their assignments and classwork's in audio format.
- ATDs help to reduce and limit the distractions from the surroundings to students with visual impairments. The use of headphones by students with visual impairments while using the speech output system can reduce and eliminate distractions from the surroundings.
- ATDs with verbal description of the visual elements displayed on the screen enables students with visual impairments to automatically hear the description of all the visual elements, providing these students an opportunity for better socialization and knowledge building.
- ATDs with capacities of modification of display or printer output, computer-generated symbols, text and graphic and text enlarger monitor or printers can be useful for students with low vision.
- ATDs also provide students suffering from low vision ability and that are light sensitive the opportunity to adjust the color of monitor and revising monitor from black to white screen, thereby improving accessibility and readership.

- Printed materials can be read out to students with visual impairments by scanners with optical character recognition and can also be stored automatically on the computers for these students, where it can be read using speech synthesis or printed in large print.

Conclusion and recommendation

The university libraries with the advent of information and communication technology now house online resources to facilitate the teaching and learning of students. In ensuring that sighted students are satisfied by the library the university, the library also has a function of satisfying students with visual impairments that may be running their academic programmes in the university. The most appropriate intervention strategy to compensate for visually impaired students is to encourage Braille reading and writing and the use of assistive technology devices (ATD). The university alongside housing Braille materials which limit some essential learning opportunities to students with visual impairments should house assistive technology devices (ATDs) to compliment Braille use. While Braille reading raised the self-esteem, independence and feeling of competence by students with visual impairments, ATDs are capable of improving their independent learning and academic performance. It is therefore recommended that university libraries should be encouraged to acquire assistive technology devices (ATDs). The university should also employ qualified teachers/librarians who can teach Braille to make up for the small number of qualified teachers to the large number of blind students in the university. Managements, parents and stakeholders of Nigerian universities should actively contribute to the availability of assistive technology devices (ATDs) to students in the university library in order to aid their teaching and learning.

REFERENCES

Adeniran P. 2011. User satisfaction with academic library services: academic and students perspectives. *International Journal of Librarianship and Information Science* 3. 10:0 209-216.

Agesa, L. 2014. Challenges faced by learners with visual impairment in inclusive settings in Trans-Nzoia Country. *Journal of education and Practice*, 5. 29.

Alazzi, AM. 2008. Teaching English to blind and visually impaired pupil. http://www.hitmag.co.uk/jano81stud02.rtf.

California Department of Education, 2006.The Braille reading standards. Adopted by the California State board of Education.

Carollo, S. 2017. Is Braille relevant in the 21st Century workplace? *American Foundation for the Blind*. www.Afb.org/blog/career.

Eguavoen, E.O. 2016. ICT utilization as correlates of academic performance among students with visual impairment in Lagos State, Nigeria. *European Scientific Journal,* 12.1.

Eniola, M.S. 2000. General introduction to special education: professional Practice. Ibadan: Centre for External Studies University of Ibadan.

Eze J. U. and Uzoigwe C. U. 2013. The place of academic libraries in Nigerian university education: contributing to the education for all initiative. *International Journal of Library and Information* Science 5.10: 432-438. http://www.academic journal.org/IJLIS.

Gold, O. 2002.Finding a new path: Guidiance for parents of young children who are visually impaired or blind.The Canadian National Institute for the Blind.

Jaroslaw, W. 2009.Assistive technology for students who are blind or have low vision. *Assessing Students' Need for Assistive Technology*.

Korir, B.C. 2015. Challeneges encountered by students with visual impairments and teachers in an integrated school environment: a case of integrated schools in Kericho District, Ainamoi Diviison, Kenya.

Krubu D. E. and Osawaru K. E. 2011.The impact of ICT in Nigeria University libraries. *Library Philosophy and Practice.*1-18.

Martins, 2012. Literature review of information technologies adoption mode at firm level. *The Electronic Journal of Information System Evaluation,* 14.1: 201. (Ppllo). *Academic publishing international Ltd*.

Okogwu F. I. And Akidi J. O. 2011.The role of the library in the accreditation of Nigerian universities' academic programmes. *Nigerian Libraries* 44 2: 89-97.

Okoro, F. I and Okafor, U. F. 2009.Ocular screening among pupil in public primary school in Edo State of Nigeria. *Pakistan Journal of Nutrition*, 8.9.

Willings, C. 2009. Teaching students with visual impairment. Retrieved on 12 April, 2018 from http://www. teachingvisuallyimpaired.com.

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