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Usability of Assistive Technologies for the Learners with Hearing Impairment in Federal College of Education

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ABSTRACT

The study was geared towards the usability of assistive technologies for learners with hearing impairment. Descriptive research of the Survey design was adopted. The sample comprised of one hundred and ten hearing impaired students of Federal College of Education (Special) Oyo. An adopted checklist and a structured questionnaire were utilized in collecting data while simple percentages, mean standard deviation, and t-test was used to analyze the data collected. The results of the study indicated that assistive technologies in FCE (SP) Oyo are generally available and functional; the use of assistive technologies among the learners with hearing impairment in FCE (SP) Oyo is high. Also, the result indicated that learners with hearing impairment in FCE (SP) Oyo have a positive attitude towards the use of assistive technologies. There was no significant difference between male and female learners with hearing impairment in the use of assistive technologies in FCE (SP) Oyo. It was recommended among others that learners with hearing impairment should be encouraged to adopt the ultimate use of assistive technologies.

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1. INTRODUCTION

Education connotes knowledge acquired through a learning process. It is the transmission of skills, knowledge, and attitudes from generation to generation. Education refers to activities and resources that support learning. Education is the most essential ingredient in the development and empowerment of individuals, and inclusion in education irrespective of the varied socio-economic differences and the differences in 'abilities' and 'disabilities' undoubtedly makes this foundation much stronger (Praisner, 2003; Ahmad, 2014).

Special education is an approach designed to serve exceptional students who either have physical disabilities, developmental disorders, or challenges with learning or who are gifted. Boyd (2017) indicated that special education is for special needs in a way that addresses the students' differences and needs. He added that ideally special education as a process should involve individually plan and systematically mentioned arrangement of teaching procedures, adaptive equipment, and materials accessible settings and other interventions designed to help learners with special needs achieve a higher level of personal self-sufficiency and success in school and community that would be available. If the students are only given access to typical classroom activities.

Special education (also known as special needs education, aided education) is the practice of educating students with special educational needs in a way that addresses their differences and needs. Ideally, this process involves the individually planned and systematically monitored arrangement of teaching procedures, adapted equipment and materials, and accessible settings. Olawuyi (2010) defined special education as an individually planned and systematically monitored arrangement of physical settings, special equipment materials, teaching procedures, and other interventions designed to help children achieve the greatest possible personal actualization and academic success.

Inclusive education, more than mainstreaming the learners with special needs, is also concerned with identifying and overcoming all barriers for effective, continuous, and quality participation of all in education and also providing a 'Least Restrictive Environment' (LRE) to satisfactorily afford children with disabilities a meaningful educational benefit, together with others, in an accessible physical and human environment (Gal *et al*., 2010; Ramchand & Dummugudem, 2014; Ahmad, 2015).

Disability, hence, is seen to arise out of 'activity limitations' and 'restrictions' placed upon 'participation' that are resulted from the interaction between the body structure and function limitation, and an unaccommodating environment (Gal *et al*., 2010). Disability is the outcome of the interaction between a child with impairment and an environment with barriers that hinder his or her participation on an equal basis with others. Assistive technology can reduce or eliminate such barriers. However, obtaining such technology is not always possible due to product and service-related barriers.

Assistive technology refers to the devices and services that are used to increase, enhance and maintain, the abilities of a student with a disability (Dell *et al.*, 2008). Yusuf *et al*. (2012) opined that some certain ICT applications have been shown to have positive effects on the educational development of students exhibiting a great variety of special needs (blind, deaf, learning disabled students, and so on). Technology in the classroom provides multiple opportunities for students to gain knowledge. They also reported that research indicated the positive effects of technology itself (O'Hara & Pritchard., 2008).

Hearing-impaired children are more inclined to use assistive technology than children with other disabilities. Medical measures of curing hearing impairment also rely on assistive technologies. Considerations in the use of assistive technologies revolve around the need,

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use, age, cost, level, and disability of an individual. Assistive devices are helpers and necessary for each individual with a disability according to his/her use and settings. Assistive technology is a lifelong partner and supporter for the person who uses it, to make things possible at any level of intellectuality (Bouck *et al*., 2012). Assistive technology can be grouped into low technology and high technology devices. Low and high technology assistive devices have been used by persons with disabilities for years. Low technology and high technology interventions are used for the persons to overcome their social and educational gaps (Gitlow *et al*., 2011). Assistive Technology for Students with Hearing Impairments Word processing and educational software may help hearing-impaired students in developing writing skills. Alternatives to audio output can assist the hearing-impaired computer user, in place of using a standard keyboard and mouse. Advanced speech synthesizers may act as substitute voices, providing a compensatory tool for students who cannot communicate verbally (Ewa, 2013).

Low technology devices are assistive equipment available at a low price. These devices deal with mild and moderate levels of disabilities to help individuals to use their residual abilities effectively. High-technology devices are sophisticated, complex, expensive, and more functionalized in comparison to the former, used to assist students with impairments. Their performance is more effective, reliable, convenient, and relatively inexpensive (Seok & DaCosta, 2013).

Bouck *et al*. (2012) opined that AT is helping persons regardless of their disability to accept their life challenges and overall working to enable their independence in every aspect of leading a functional life. Assistive technology seeks to improve the student learning experience by aiding student engagement and retention, helping produce graduates with the skills required to compete in the global environment, encouraging innovative teaching and personalizing learning that promotes reflection. Assistive Technology is an integrated interactive learning environment. Assistive Technology (AT) is any device or gadget that will help increase, maintain, or improve the functional capabilities of individuals with disabilities.

Assistive Technology includes mobility devices, hardware, software, and peripherals that help assist in accessing computers or other information technologies. AT is important in education because it helps bridge skills with goals. AT is the technology that enables our students with disabilities to be successful. Assistive technologies (AT) enable older and/or disabled people to age as long as possible in place by supporting them in various tasks and activities of daily living. AT ranges from low technologies such as walkers or bookholders to high technologies, for instance, alarm systems. This ranges from low-tech like grip for a pen, to more advanced items like hearing aids and glasses, to high-tech devices such as Braille's and computers with specialized software for helping persons to read (Petty, 2012).

Assistive technologies are of different types like low technology and high-tech devices. Low- and high-tech assistive devices have been used by persons with disabilities for years. Low tech and high-tech interventions are used for the persons to overcome their educational and social obstacles (Gitlow *et al*., 2011). Assistive Technology is an interdisciplinary field of knowledge comprising of products, resources, methodologies, strategies, practices, and services (Petty, 2012). Globally, there exist a plethora of researchers in academic journals regarding the use of assistive technology in special needs education. Very few have examined the application of assistive technologies for students with disability (Farrell & Shafika, 2007; Borg *et* al., 2011; Yusuf *et al.,* 2012).

Keller (2010) opined that AT may be available but selecting the right device to meet an individual's needs requires technical skills and a better understanding of the individual's functional capabilities. In other words, merely being aware of the AT's existence is not enough

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but the ability to procure and use it. In another development, education and training can take place with the use of online resources such as video, audio materials, and text delivered real-time in an asynchronous mode through closed captioning television and computer software. They can translate spoken words into documents.

The attitudes of the students with disabilities regarding the use of assistive technology are one of the deciding factors in its selection and sustainable usage and if the process is perceived by them to be too cumbersome and time-consuming there are chances of considerable resistance from the students, which with regular training should be positively modified to aid in efficient learning. Attitudes of the hearing impaired towards the use of assistive technology devices may also include auditory fatigue, experiential shortage, language deficiencies, lack of engagement and attention (Lyon *et al*., 2001).

Dhindsa and Shahrizal-Emran (2011) revealed that female students had a strong belief in the equality of both sexes in using technology activities. Thus, shows that there is a gender difference in using technology for learning. Females are less likely to be attracted to computer courses than are males because computer courses are a traditionally dominant activity for males, and thus females lose interest in using technology for learning (Li & Kirkup, 2007). Even though females may be interested in using technology for learning, most female students have less confidence when compared to males (Comber & Colley, 2007). Another study found more females than males indicated that computers are useful, but females found it less enjoyable to learn to use computers than did males (Kaino, 2008). Many other studies found that females are less confident in using technology and more anxious to use it for learning (Kirkpatrick & Cuban, 1998; Dhindsa & Shahrizal-Emran, 2011).

Disability is the outcome of the interaction between a child with impairment and an environment with barriers that hinder his or her participation on an equal basis with others. Assistive technology can reduce or eliminate such barriers. However, obtaining such technology is not always possible due to product and service-related barriers such as lack of awareness, lack of governance, lack of human resources, funding mechanism, and so on. On the other hand, in a survey carried out by Agba *et al*. (2010) on the availability and use of assistive technology devices among specially challenged persons in Nigeria, the result revealed the assistive technology devices commonly used by students with hearing impairment in the education setting in Nigeria are the hearing aids and conventional cell phones.

Strategies for providing assistive technology need to consider the principles of availability, accessibility, affordability, adaptability, acceptability, and quality. Proposes a set of recommendations and actions to ensure every child with a disability has access to quality assistive technologies so that they can flourish and become productive members of society. Some recommended key actions are: Estimate needs and map resources; Adopt legislation, policies, and strategies; provide funding and increase affordability; set up assistive technology service provision systems; ensure supply of quality assistive products; train personnel; and establish partnerships.

With effective integration of assistive technology into the regular classroom, students can have the provision of multiple means to complete their work, with greater independence in performing tasks that they were formerly unable to accomplish or could accomplish with greater differently; through suitable enhancement or changed methods of interaction with the technology, needed to accomplish such tasks. The proper implementation of assistive technology in the classroom to assist students in tasks they otherwise might not be able to compete requires training for the student and teachers. If teachers are not trained properly then assistive technology may not be implemented properly, or may not be implemented at

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all. Therefore, this study focuses on learners with hearing impairment and their attitudes toward using assistive technology in the classroom.

To compensate for various disabilities and subsequent challenges individuals with disabilities have relied on assistive technologies for centuries. To be successful in today's technologically advanced society, special education teachers need to adopt and use the tool for necessary training in assistive technology. Therefore, teachers for students with disabilities are to provide effective and efficient instruction in assistive technology (Smith *et al*., 2009).

Several researchers such as Yusuf and Fakomogbon (2008) and Yusuf *et* al., (2012) observed that Nigerian special education teachers are aware of Assistive technologies and also have a positive attitude towards the use of Assistive technologies. For Special needs education to attain its objectives and goals it is imperative to research into whether special needs schools' teachers have access to assistive technologies. Furthermore, it is equally important to look into the usability of assistive technology for learners with hearing impairment.

In a school setting, a deaf person needs the attention of teachers and administrators with adequate knowledge of Special education, because the hearing-impaired person has health challenges, they usually lack behind when compared to the "normal" or hearing students. Numerous studies have been carried out on the availability of Assistive technology, with the emphasis that has been placed on the use of assistive technology integration in the classroom, it is important to look at how teachers can meet this demand. It can be overwhelming for an educator to use and integrate the assistive technologies available if they do not receive the proper training or time to become familiar and comfortable with us.

Therefore, this study intends to assess the usability of assistive technology for learners with hearing impairment in FCE (SP.) Oyo, Oyo State.

The following research questions were raised to guide this study.

(i) What are the available assistive technologies for the learners hearing impairment at FCE (SP) Oyo?
(ii) What are the uses of assistive technologies by the learners with hearing impairment in FCE (SP) Oyo?
(iii) What are the attitudes of learners with hearing impairment towards the use of assistive technologies in FCE (SP), Oyo?
(iv) What is the influence of male and female learners with hearing impairment towards the use of assistive technologies in FCE (SP), Oyo?

The following hypothesis was formulated and answered based on the research questions: H01 (There is no significant difference between male and female learners with hearing impairment in the use of assistive technology in FCE (SP), Oyo, Nigeria).

2. METHODS

Descriptive research of the survey type was adopted for this study. This method was considered the most suitable design for this study because it involves selecting a chosen sample from a large population. The population for the study comprises of all the Learners with hearing impairment in Federal College of Education (FCE) (Special), Oyo, while the research was targeted at hearing impaired Learners in FCE (SP), Oyo. However, one hundred and ten hearing impaired learners were purposively selected for the study. While stratified random sampling was used to classify the students' based on their Gender, the instrument used in this study was an adapted checklist from Yusuf *et al.* (2012) and a structured

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questionnaire. The checklist was used to determine the level of availability of assistive technologies. The instrument was validated by three Educational Technology Experts, from the University of Ilorin. The experts' comments, suggestions, and corrections were used to produce a final draft of the instruments. The instruments were administered to the respondents. The obtained data were analyzed using descriptive and inferential statistics, in analyzing the data obtained, descriptive statistics such as simple percentage, mean, standard deviation was employed to answer the research questions while a t-test was used to test hypothesis 1. This hypothesis was tested at a 0.05 level of significance

3. RESULTS AND DISCUSSION

Table 1 reveals that t= 0.886, p> 0.05. The result of the t value of 0.886 resulted in a 0.378 significance value, which is greater than α= 0.05 of the level of significance. As a result, the null hypothesis, which stated that there is no significant difference between male and female learners with hearing impairment, was not rejected. This implies that there is no significant difference between male and female learners with hearing impairment in the use of assistive technologies for learning.

Table 1. t-test of male and female learners with hearing impairment in the use of assistive technologies for learning.

Gender	N	Mean	SD	Df	t	Sig (2-tailed)	Remark
Male	58	1.55	0.506				
				109	0.886	0.378	Not Rejected
Female	52	1.45	0.501				

The study revealed that most of the assistive technologies in FCE (SP) Oyo are available and functional. It was also revealed that most of the learners with hearing impairment uses assistive technologies both in the classroom and at their leisure. The result of the findings also reveals that the learners with hearing impairment in FCE (SP), Oyo have a good attitude towards the use of assistive technologies. The result further indicated that nearly all the students with hearing impairment in FCE (SP), Oyo, Nigeria, believed that assistive technologies help them to function well in the classroom and add value to their learning experiences. Furthermore, a significant difference was not found between male and female learners with hearing impairment towards the use of Assistive Technologies. This implies that students' gender does not influence their Use of Assistive Technologies for learning.

4. CONCLUSION

Based on the potentialities that are embedded in all fields of life most importantly in the education sector, therefore this study had come up with obvious evidence that assistive technological devices for learners with hearing impairment are available and functional in FCE (SP) Oyo. The researchers concluded that learners with hearing impairment in FCE (SP) Oyo make use of available assistive technological devices which has the potential to affect their learning. The researchers also concluded that the findings in this study show that learners with hearing impairment have good attitudes towards the use of assistive technology devices in FCE (SP) Oyo. Most importantly, the study also concluded that learners with hearing impairment have no significant difference between males and females in using assistive technological devices. The study, therefore, recommended that school managements should encourage the use of assistive technologies by the learners with hearing impairment for FCE

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(SP) Oyo most especially the available but not functional equipment and Hearing-impaired learners should be encouraged to adopt the ultimate use of assistive technologies.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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