Special education students exploitation of assistive technology for learning

(scientific paper)

Amos Ochayi Onojah, Adenike Aderogba Onojah, Oladiran Kayode Omoniyi, Tawakalit Bukola Alaka

Abstract: *Assistive technology refers to technology used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible. This study examined special education students' exploitation of hearing assistive technology for learning. The study was a descriptive research. Sample comprised of 250 hearing impaired students of Federal College of Education (Special) Oyo. Stratified random sampling technique was used for the selection of sample. Data was analysed using frequency count and a simple percentage to answer the research questions while inferential statistics of t-test, Kruskal Wallis and Jonckheere-Terpstra Test were used to analyse the two hypotheses. The findings of the study revealed that Telephone adaptations, TV decoder, TV amplifier, Computer, Personal amplification, FM Amplification system, Infrared amplification system, Induction loop systems, Telecommunication Device for the Deaf (TDD), Hearing Aid, and Audiometer are mostly available to the respondents. There was no significant difference between students' utilization of assistive technologies for learning based on gender and academic level. The study concluded that special education students utilize available assistive technology for learning. This implies that assistive technology for learning could assist the performance of special students. It was therefore recommended that schools should employ Educational Technologists that can facilitate effective use of assistive technology tools to supplement classroom teaching.*

Keywords: *special education students, exploitation, assistive technology, learning, gender*

1 Introduction

The process of education is one which involves a number of activities on the part of several people, including the teacher, the pupil, parents, the government and every citizen of the country. Education in Nigeria is based on a 6-3-3-4 system, which in-

volves three levels of institutional learning processes; primary education, secondary education and tertiary education (Abdullah, 2014). Formal education is designed with fixed aims and objectives and provided according to the curriculum. It has fixed time table, examination system and discipline (Sarma, 2018). Formal education usually takes place within the four walls of the school, where a person learns basic, academic, or trade skills. This takes place at early childhood, primary, secondary and tertiary levels. Informal learning takes places at home, work, and through interactions and shared relationships among members of society in form of language acquisition, cultural norms, and manners. In informal learning, there is often an elderly person, a peer or expert, to guide the learner and it has no curriculum (Rogoff, Callanan, Gutierrez, & Erickson, 2016). Non-formal education is any organised systematic educational activity carried outside the framework of the established formal system. Non-formal education is provided at the convenient place, time and level of understanding or mental growth of children and adult (Sarma, 2018).

Special Education is also defined as a formal special educational training given to people (children and adults) with special needs, who fall into the categories: the disabled, the disadvantaged and the gifted (Federal Republic of Nigeria (FRN), 2013). The special education general curriculum program is both demanding and rewarding. It is designed to provide the future special education educators with the knowledge and pedagogical skills that will allow them to provide intensive and explicit individual and small group instruction to students with disabilities. Advocating for more technology use in teaching and learning is ineffectual without the context of how it could result in improved learning outcomes, why it could result in less effortful teaching or learning skill, and if it would result in better communication with or engagement of students (Eden, 2015). Just like a car parked may not be active until it is been driven, also learning technology without its usage remains dormant and its influence will not be felt. Thus, there is need to always put the engine of education in action or else it will just be parked on a stand still without crusade. Graduates from the programme are recognised for their academic performance and leadership skills as well as their abilities to provide intensive and explicit instruction and to plan and maintain positive behaviour supports for students with disabilities (Nolan, 2019).

Technology has opened many educational doors to children, particularly with disabilities. With technology, an individual who is physically unable to speak can communicate with spoken language. Using a portable voice synthesizer, a student can ask and respond to questions in the 'regular' classroom. Invention and use of assistive technology are based on the fact that there is always some degree of residual hearing left in everyone with hearing impairment, which can be amplified in manner similar to how a loud speaker boosts sounds to make them loud enough for hearing people to hear properly (Ademokoya, 2016). Information and communication

technologies (ICT) have expanded the assistive technology field to new dimensions, opening new doors, broadening horizons and enabling autonomy for many individuals with special needs. Technologies for special students with disabilities range from simple spellcheckers to more complex speech recognition systems and educational software (Scherer & Stefano, 2017). Technology desires to help students or young people to develop deep subject knowledge and understanding (Moynihan, 2014). The increase in the use of technological know-how to improve educational access and methods is becoming key to the growth of all areas. Effective and reliable technology can dramatically strengthen teaching and learning (Telkom, 2015)

Assistive technology has been defined by numerous scholars but all are pointing to the same thing. Assistive technology is technology used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible. Assistive technology can include mobility devices such as walkers and wheelchairs, as well as hardware, software, and peripherals that assist people with disabilities in accessing computers or other information technologies. Radabaugh (2014) opined that for most people, technology makes things easier, and for people with disabilities, technology makes things possible. Assistive technology often refers to devices that help a person to hear and understand what is being said more clearly or to express thought more easily. Assistive technology could also be described as a device that helps a person with hearing loss or a voice, speech or language disorder to communicate (Johnson, 2015). Assistive technology can provide equality between visually impaired individuals and their sighted peers within the emerging information society. With the aids of the appropriate technological devices, visually impaired persons can independently access, process, store and transmit the same information handled by sighted people (Hogg, Minihan & Sullivan, 2015).

The primary purpose of utilizing assistive technology in the teaching and learning process for special needs students is to make teaching more effective and to facilitate a speedier learning process. It should, however, be put into cognizance that utilizing assistive technology in the process of teaching and learning is not an end in itself. Microsoft, (2012) stated that, an increasing number of people with disabilities are participating in sports, leading to the development of new assistive technology among which are prosthetics device. Disability is not liability nor incapability because there is ability in disability. Accordingly, the opportunity offered other students to learn can also be rendered to the special students so that the bridge between learning gap can be bridged and the goal of education for all becomes a reality. Nigerian universities are to adopt e-learning to change the old strategies and ways they deal with educational program's execution through the utilization of e-learning which is driven by educational modules via the PC and the web (Eze, Chinedu-Eze, & Bello, 2018). Use of ICT in education could be for the purpose of making teaching-learning

technique convenient and interesting. Judicious use of ICT technologies together with new functions and roles of education personnel can bring about more efficient and effective teaching learning-process (Reetika, 2017).

Gender is the range of characteristics pertaining to, and differentiating between masculinity (male) and femininity (female) (Soetan, Onojah, Alaka, & Aderogba, 2020). Litt (2013) findings indicate that boys seem to report higher levels of ICT literacy than girls. The United Nations Children Education Fund (UNICEF, 2013) stated that people with disabilities are faced with extreme disparities and daunting challenges to the enjoyment of academics, social and community participation in low-income and middle-income countries. Female users typically prefer visual platforms. Men, on the contrary, like more text-oriented ones. Abdulazeez (2014) stated that gender issues has been associated with ability, skill and competence of teachers and students to use instructional resources but without any definite conclusion because the findings vary per research. Indeed, Facebook and Instagram have a larger female user base, whilst online discussion forums such as Reddit or Digg depend on more male users (Aleksandra, 2016). Gender is implicated in blended learning education in a range of different ways. One set of problems relates to the relative participation rates of boys and girls in programmes of science, technology and vocational education (Edgar, 2016).

1.1 Statement of the Problem

There are a lot of disabled students who have the right to get the best education as their normal peers. These students deserve the same right with their normal peers in the Nigerian education system (FRN, 2013). Students with disabilities usually have the same level of mental capability as the normal hearing students in terms of studying but are only lacking other capability and not intelligence level (Soetan, Onojah, Alaka, & Aderogba, 2020). Although, availability of technologies for the special students is germane but its utilization is also very important because without its usage, it is similar with 2019 benz car parked without anyone driving it. Technology offers the opportunity for access to up-to-date research reports and knowledge globally which can be accessed through proper utilization of different search engines (Nwokedi & Nwokedi, 2017). Thus, this study intends to investigate the exploitation of assistive technologies by special students for learning.

1.2 Purpose of the Study

The purpose of this study was to examine special students' exploitation of assistive technology for learning. Specifically, the study;

i. assess the type of hearing assistive technology available to hearing impaired students,

ii. examine the assistive technology that are being exploited for hearing impaired students,
iii. determine the influence of gender on students' utilization of assistive technology for learning,
iv. determine the influence of academic level on students' utilization of assistive technology for learning.

1.3 Research Questions

The study provided answers to the following research questions:
i. What are the types of hearing assistive technology available to hearing impaired students?
ii. What are the hearing assistive technologies that are functioning for hearing impaired students?
iii. How does gender influence special students' utilization of hearing assistive technology for learning?
iv. How does academic level influence special students' utilization of hearing assistive technology for learning?

1.4 Research Hypotheses

The following hypotheses was tested in the study:
H_{01}: There is no significant difference between male and female hearing impaired students' utilization of hearing assistive technology for learning.
H_{02}: There is no significant difference among special students' exploitation of hearing assistive technology for learning based on academic level.

2 Methodology

This section focused on the methodology that was adopted in carrying out the study on respondents' special students' exploitation of assistive technology for learning. This section was arranged under the following sub-headings: research design, population, sample and sampling techniques, research instrument, validation of research instrument, procedure for data collection and data analysis techniques.

2.1 Research Design

This study adopted descriptive research design of quantitative survey type. This enabled the researcher to collect information as it exists without any form of manipulation.

2.2 Population, Sample and Sampling Techniques

The total population of the hearing impaired students across all levels at the Federal College of Education (Special) Oyo was 405 students. A sample of 250 hearing impaired students of the institution was randomly selected for the study. Male and female of hearing impaired students from all levels in the Federal College of Education (Special) Oyo was considered.

2.3 Research Instrument

The study was carried out using researcher-designed questionnaire to gather necessary information from respondents. The questionnaire titled "Students' Utilization of Hearing Assistive Technology for Learning" contains three (3) sections. Section A seeks information about demographic data of the respondents such as gender, level and department. Section B elicits information on types of hearing assistive technology available to Hearing Impaired (HI) students and the expected mode of response was Likert-type response-mode of Available, Not Available but Section C elicits information on the hearing assistive technology which Hearing Impaired (HI) students utilize for learning and the mode of response was Utilized and Not Utilized.

2.4 Validation of Research Instrument

In order to ensure the face and content validity of the questionnaire, it was given to three experts in the Department of Educational Technology. Their comments and corrections were used to produce the final draft. The questionnaire was later administered on the study sample.

2.5 Procedure for Data Collection

A letter introducing the researcher to the college authority was obtained and presented to the head of institutions. The researchers personally visited the college of education to administer the questionnaire. Permission was sought from the administrator of the college of education concerned. The researcher personally collected the questionnaire from the students for data analysis. The ethical issues were duly considered. No students were forced to complete the questionnaire. Participation in the study was made voluntary, and information given by respondents was treated with utmost confidentiality.

2.6 Data Analysis Techniques

The data obtained from the questionnaire was coded and subjected to inferential and descriptive statistics. Percentage, frequency count and mean were used to answer the research questions, t-test statistics was used to test research hypotheses one while

Kruskal Wallis was used to test hypothesis two. Data collected was coded using Statistical Package for Social Sciences (SPSS) version 25.0 windows.

3 Results and Findings

3.1 Demographic Information

Table 1: *Percentage Distribution by Gender*

Gender	Frequency	Percentage (%)
Male	121	48.4
Female	129	51.6
Total	250	100.0

Table 1 revealed that female students have the highest frequency and percentage of 129 which is 48.4%, while male students were 129 (51.6%).

Table 2: *Percentage Distribution by Level*

Level	Frequency	Percentage (%)
NCE 1	80	32.0
NCE 2	110	44.0
NCE 3	60	24.0
Total	250	100.0

Table 2 revealed the educational level of the students. It is observed that 80 (32%) of the respondents were in NCE 1, 110 representing 44% of the respondents were in NCE 2, while 60 respondents representing 24% were in NCE 3.

3.2 Research Question 1

What are the types of hearing assistive technology to hearing impaired students?

Table 3: *Respondents Response on the Types of Hearing Assistive Technology*

S/N	Hearing Assistive Technologies	Available (%)	Not Available (%)
1	Alert/Signal systems	104 (41.6%)	146 (58.4%)
2	Telephone adaptations	168 (67.2%)	82 (32.8%)
3	TV decoder	196 (78.4%)	22 (21.6%)
4	TV amplifier	192 (76.8%)	58 (23.2%)
5	Computer	202 (80.8%)	48 (19.2%)
6	Personal amplification	201 (80.4%)	49 (19.6%)
7	FM Amplification system	189 (75.6%)	61 (24.4%)
8	Infrared amplification system	180 (72%)	70 (28%)
9	Induction loop systems	152 (60.8%)	98 (39.2%)
10	Telecommunication Device for the Deaf (TDD)	218 (87.2%)	32 (12.8%)
11	Hearing Aid	199 (79.6%)	51 (20.4%)
12	Audiometer	189 (75.6%)	61 (24.4%)

Table 3 revealed results on respondents' types of hearing assistive technology. It indicated that Alert/Signal systems was available to 41.6% representing 104 respondents while 58.4% representing 146 respondents revealed that the item was not available. Item 2: indicated that 67.2% representing 168 respondents revealed that the item was available while 32.8% representing 82 respondents revealed that the item was not available. Item 3: indicated that 78.4% representing 196 respondents revealed that the item was available while 21.6% representing 22 respondents revealed that the item was not available. Item 4: indicated that 78.6% representing 192 respondents revealed that the item was available while 22.4% representing 58 respondents revealed that the item was not available. Item 5: indicated that 80.8% representing 202 respondents revealed that the item was available while 19.2% representing 48 respondents revealed that the item was not available. Item 6: indicated that 80.4% representing 201 respondents revealed that the item was available while 19.6% representing 49 respondents revealed that the item was not available. Item 7: indicated that 75.6% representing 189 respondents revealed that the item was available while 24.4% representing 61 respondents revealed that the item was not available. Item 8: indicated that 72% representing 180 respondents revealed that the item was available while 28% representing 70 respondents revealed that the item was not available. Item 9: indicated that 60.8% representing 152 respondents revealed that

the item was available while 39.2% representing 98 respondents revealed that the item was not available.

Item 10: indicated that 87.2% representing 218 respondents revealed that the item was available while 12.8% representing 32 respondents revealed that the item was not available. Item 11: indicated that 79.6% representing 199 respondents revealed that the item was available while 20.4% representing 51 respondents revealed that the item was not available. Item 12: indicated that 75.6% representing 189 respondents revealed that the item was available while 24.4% representing 61 respondents revealed that the item was not available**.** From the findings, it can be established that Telephone adaptations, TV decoder, TV amplifier, Computer, Personal amplification, FM Amplification system, Infrared amplification system, Induction loop systems, Telecommunication Device for the Deaf (TDD), Hearing Aid, and Audiometer were mostly available to the respondents.

3.3 Research Question 2

How do special students exploit hearing assistive technology for learning?

Table 4: *Respondents Response on the functioning of Hearing Assistive Technology*

S/N	Hearing Assistive Technologies	Utilized (%)	Not Utilized (%)
1	Alert/Signal systems	104 (41.6%)	146 (58.4%)
2	Telephone adaptations	140 (56.0%)	110 (44.0%)
3	TV decoder	129 (51.6%)	121 (48.4%)
4	TV amplifier	102 (40.8%)	148 (59.2%)
5	Computer	156 (62.4%)	94 (37.6%)
6	Personal amplification	131 (52.4%)	119 (47.6%)
7	FM Amplification system	112 (44.8%)	138 (55.2%)
8	Infrared amplification system	119 (47.6%)	131 (52.4%)
9	Induction loop systems	101 (40.4%)	149 (59.6%)
10	Telecommunication Device for the Deaf (TDD)	156 (62.4%)	94 (37.6%)
11	Hearing Aid	163 (65.2%)	87 (34.8%)
12	Audiometer	173 (69.2%)	77 (30.8%)

Table 4 revealed result on respondents' exploitation of hearing assistive technology. It indicated that 41.6% representing 104 respondents stated that the they utilize Alert/Signal systems while 58.4% representing 146 respondents revealed that they do not utilize it because it was not functioning. Item 2: shown that 56% representing 140 respondents revealed that the they exploit telephone adaptation for their learning while 44% representing 110 respondents revealed that they do not use it for learning.

Item 3: indicated that 51.6% representing 129 respondents revealed that they use TV decoder while 48.4% representing 121 respondents revealed that they do not. Item 4: indicated that 40.8% representing 102 respondents revealed that the TV amplifier is been utilized by them for learning while 59.2% representing 148 respondents revealed that they do not use TV amplifier. Item 5: indicated that 62.4% representing 156 respondents revealed that the they have a functioning Computer which they use to aid their learning but 37.6% representing 94 respondents don't use it.

Furthermore, item 6 shown that 52.4% representing 131 respondents revealed that Personal amplification was functioning and utilized while 47.6% representing 119 respondents revealed that the item was not utilized by them. Item 7: indicated that 44.8% representing 112 respondents revealed that the FM Amplification system was utilized by them while 55.2% representing 138 respondents revealed that the item was not utilized by them. Item 8: indicated that 47.6% representing 119 respondents revealed that the Infrared amplification system was adopted by them while 52.4% representing 131 respondents indicated that the item was not utilized. Item 9: indicated that 40.4% representing 101 respondents revealed that they use Induction loop systems for their learning while 59.6% representing 149 respondents revealed that they do not utilize the item.

Item 10: indicated that 62.4% representing 156 respondents revealed that the Telecommunication Device for the Deaf (TDD) was functioning and utilized by them while 37.6% representing 94 respondents revealed that they do not use the item. Item 11: indicated that 65.2% representing 163 respondents revealed that they exploit the Hearing Aid while 34.8% representing 87 respondents revealed that they do not use the hearing aid due to its unavailability. Item 12: indicated that 69.2% representing 173 respondents revealed that the item Audiometer was functioning and being utilized while 30.8% representing 77 respondents revealed that the item was not utilized by them.

From the findings, it can be summarized that Telephone adaptations, TV decoder, Computer, Personal amplification, Telecommunication Device for the Deaf (TDD), Hearing Aid and Audiometer were the assistive technologies mostly exploited for learning by the respondents.

3.4 Hypothesis One

There is no significant difference between male and female special students' exploitation of hearing assistive technology for learning

In an attempt to determine whether there was any significant difference between male and female special students' exploitation of assistive technologies for learning, independent t-test was used for the null hypothesis as shown in Table 5.

Table 5: *T-test on male and female special students' exploitation of hearing assistive technology for learning*

Gender	N	Mean	SD	Df	T	Sig. (2-tailed)	Remarks
Male	121	3.1054	0.4598	248			
					0.119	.617	Accepted
Female	129	3.0299	0.6610				

Table 5 showed that degree of freedom (df) = 248, t = 0.119, p = 0.617. This means that the hypothesis was accepted. This was as a result of t-value of 0.119, resulting in significant p value of 0.617 which was greater than 0.05 alpha level. The hypothesis was accepted. There was no significant difference between male and female special students' exploitation of hearing assistive technology for learning.

3.5 Hypothesis Two

There is no significant difference among special students' exploitation of hearing assistive technology for learning based on academic level.

In an attempt to determine whether there was any significant difference between special students' exploitation of hearing assistive technology for learning based on academic level, Kruskal Wallis was used for the null hypothesis as shown in Table below.

Table 6: *Kruskal Wallis Analysis on special students' exploitation of hearing assistive technology for learning based on Level*

Level	N	Mean Rank	Chi Square	df	Asymp. Sig
NCE 1	80	126.47			
NCE 2	110	118.80	0.694	2, 249	0.707
NCE 3	60	122.92			
Total	250				

Table 6 showed that degree of freedom (df) = 2,249, $X^2 = 0.694$, p = 0.707. This means that the hypothesis was accepted. This was as a result of chi square value of 0.694, resulting in significant p-value of 0.707 which was greater than 0.05 alpha level. The hypothesis was accepted. There was no significant difference among special students' exploitation of hearing assistive technology for learning based on academic level. Jonckheere-Terpstra Test was further used to examine the direction of the differences if any.

Table 7: *Jonckheere-Terpstra Test on the Direction of differences on Exploitation based on Academic Level*

Jonckheere-Terpstra	Exploitation
Number of Levels in Academic Level	3
N	250
Observed J-T Statistic	8693.000
Mean J-T Statistic	9031.500
Std. Deviation of J-T Statistic	550.927
Std. J-T Statistic	–.614
Asymp. Sig. (2-tailed)	.539

a) Grouping Variable: Years of Experience

4 Discussions

The results from the findings clearly indicated that Telephone adaptations, TV decoder, TV amplifier, Computer, Personal amplification, FM Amplification system, Infrared amplification system, Induction loop systems, Telecommunication Device for the Deaf (TDD), Hearing Aid, and Audiometer are mostly available to the respondents. This view was supported by Rehabtool (2014) which revealed that with the development of digital and wireless technologies, more and more devices are becoming more available to help people with hearing loss or a voice, speech or language disorder to communicate more meaningfully and participate more fully in their daily activities. According to Deafweb (2010), hearing assistive technology is an assistive technology designed to improve hearing by making sound audible to a person with hearing loss. It helps hearing impaired students at home and school.

From the findings, it is indicated that Telephone adaptations, TV decoder, Computer, Personal amplification, Telecommunication Device for the Deaf (TDD), Hearing Aid and Audiometer are mostly utilized by the respondents. This is in support by Ologe (2014) who observed that structure and functioning of hearing apparatus are always complex and prone to damage or diseases that may end up incapacitating the hearing acuity of disables people. Bakare (2013) described hearing impairment as absence of normal hearing. Hearing impairment is the type of impairment that affects person's auditory and may be as a result of congenital or adventitious injury. Assistive technology coupled with auditory oral training have accounted for the huge success recorded in recent times, on enabling persons with hearing impairment to regain hearing, use speech and learn effectively.

Also, Smaldino, Russel, Heinich and Molenda (2005) asserted that if teachers incorporate assistive learning devices in the special education classrooms, they will be able to meet the needs of all learners. The primary purpose of utilizing assistive technology in the teaching and learning process for special needs students is to

make teaching more effective and to facilitate a speedy learning process. Kpolovie and Awusaku (2016) submitted that ICT is a science of production and utilization of computer equipment, subsystems, software and firmware for automatic analysis, acquisition, storage, manipulation, management, movement, transformation, control, display, interchange, transmission and retrieval of data, quantitative and qualitative information most appropriately to meet human need. It should, however, be put into cognizance that utilizing assistive technology in the process of teaching and learning is not an end in itself. It cannot entirely replace old fashion interaction between the teacher and the students in the classroom settings (Smaldino, et al, 2005).

There is no significant difference between male and female special students' exploitation of hearing assistive technology for learning. In similar finding, Osuafor and Ofor (2015) reported that there was no significant difference between male and female lecturers on utilization of e-learning facilities in teaching in colleges of education. Herath and Hewagamage, (2015) reported that there was no significant differences on overall ICTs usage of the academic staff based on gender. But, Kpolovie and Awusaku (2016) reported that gender has no significant influence in the attitude of lecturers towards ICT adoption in research both in federal and state institutions. There was no significant difference between special students' exploitation of hearing assistive technology for learning based on academic level.

5 Conclusion

The study concluded that special education students utilize Telephone adaptations, TV decoder, Computer, Personal amplification, Telecommunication Device for the Deaf (TDD), Hearing Aid and Audiometer as assistive technologies mostly exploited for learning irrespective of their gender and academic level (NCE 1, NCE 2 and NCE 3). If these technologies are effectively utilized, the gaps in students learning might be spanned. Bicycle, car and airplane could journey the same and arrive at the same destination but time of arrival, conveniences and experiences differ, so its with the use of assistive technologies for learning.

References

Based on the findings of this research, the following recommendations are made:

1. Government should establish educational resources centers where students can have access to available assistive technology tools to enabled self-study.
2. Students should be allowed to use assistive technology equipment services in the school, if they cannot be allowed to use it in their dormitories.
3. Curriculum planners should assist in designing strong minimum standards that support the integration assistive technology for learning.

[1] Abdullah, D. (2014). The Political Will and Quality Basic Education in Nigeria. *Journal of Power, Politics and Governance*.

[2] Ademokoya, J. A. (2016). *With Advancing Age, Ear Infections are Inevitable.* Vanguard.

[3] Aleksandra. C. (2016). Social Media Psychology. *Gender and Social Media.* Retrieved from https://socialmediapsychology.eu/2016/10/22/gender-and-social-media/.

[4] Bakare, A.O. (2013). Socio-demographic variables as predictors of psychological well-being amongst the adolescents with hearing impairment in Southwest Nigeria. *IFE PsychologIA: An International Journal*, 21(1), 245–259.

[5] Eden, D. E. (2015). *Educause Center For Analysis And Research.* Louisville.

[6] Edgar, W. J. (2015). Centre for Studies in Science and Mathematics Education, University of Leeds, U.K. *Gender and Science & Technology Education*. Retrieved from http://www.unesco .org/education/educprog/ste/newsletter/eng_n1/gender.html.

[7] Edmunds, R., Thorpe, M., & Conole, G. (2012). Students attitude towards and use of ICT in course study, work and social activity: A technology acceptance model approach. *British Journal of Educational Technology*, 43(1), 71–84.

[8] Eze, S. C., Chinedu-Eze, C. V., & Bello, A. O. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: a study of M-University. *International Journal of Educational Technology in Higher Education*, 15(34), 145–152. Available at https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-018-0116-z.

[9] FRN. (2013). *Federal Republic of Nigeria: National Policy on Education*. NERDC Press.

[10] Herath, C. T., & Hewagamage, C. (2015). Analysis of ICT usage for the teaching and learning process by the academics. *International Journal of Computer and Information Technology*, 04(05), 803–808.

[11] Hogg, M., Minihan, J., & Sullivan, J. (2005). *Adaptive, Assistive and Instructional Technology for Literary Instruction.* Retrieved From: http://webhostbridgew.edu/kobush/strategies.

[12] Johnson, M. (2015). *Assistive-Technology*. Mayer-Johnson: Retrieved from: http://www.mayer-johnson,com/categories/assistive-technology.

[13] Kpolovie, P. J., & Awusaku, O. K. (2016). ICT adoption attitudes of lecturers. *European Centre for Research Training and Development*, *4*(5), 9–56.

[14] Microsoft. (2012). *Types of Assistive Product*. Retrieved From: http://www.microsoft.com/enable/at/types.

[15] Moynihan, D. (2014). The Education Foundation. In T. I. view. Retrieved from http://ww w.ednfoundation.org/wp-content/uploads/TechnologyEducation_systemview.pdf.

[16] Nolan, Y. (2019). *Special Education: General Curriculum*. Methodist University. Engage. Enrich. Empower: Retrieved from https://www.methodist.edu/academics/programs/spe.

[17] Nwokedi, V. C., & Nwokedi, G. I. (2017). Assessment on use of search engines by lecturers in the Faculty of Medical Sciences, university of Jos, Nigeria. *Journal of Applied Information Science and Technology*, 10(2), 23–32.

[18] Osuafor, A. M., & Ofor, N. A. S. (2015). Influence of gender and subject specialization on science Educators' use of e-learning facilities for teaching in Nigerian colleges of education, *International Journal for Cross-Disciplinary Subjects in Education*, 5(4), 2649–2655

[19] Reetika, B. (2017). Effectiveness Of ICT In Education. Retrieved from https://www.f ranchiseindia.com/education/Effectiveness-of-ICT-in-Education.1015.

[20] Rogoff, B., Callanan, M., Gutierrez, K., & Erickson, F. (2016). The Organization of Informal Learning. In *Review of Research in Education*.

[21] Sarma, A. (2018). What are the various types of education? In *Types of Education and Law.* Dibrugarh University: https://www,quora.com/what-are-the-various-types-of-education.
[22] Scherer, M., & Stefano, F. (2017). *Assistive Technology Assessment Handbook.* CRC Press, Taylor and Francis Group.
[23] Soetan, A. K., Onojah, A. O., Alaka, T. B., & Aderogba, A. J. (2020). Hearing Impaired Students' Self-Efficacy on The Utilization of Assistive Technology in Federal College of Education (Special) Oyo. *International Journal for Cross-Disciplinary Subjects in Education*, 11(1), 4658–4666. Published by Infonomics Society.
[24] Telkom. (2015). *Technology in Education Start Today*. Retrieved from Considerations and Trends for the Education Sector: http://www.telkom.co.za/today/media/downloa ds/Education.pdf.
[25] UNICEF. (2013). The State of the World's Children 2013. In *Children with Disabilities: United Nations Children's Fund.* New York.
[26] Van Deursen, A. (2012). Internet skill-related problems in accessing online health information. *International Journal of Medical Informatics*, 81, 61–72.

(reviewed twice)

Amos Ochayi Onojah
Department of Educational Technology
Faculty of Education
University of Ilorin, Ilorin
Nigeria
e-mail: haymoresonojah@yahoo.com

Adenike Aderogba Onojah
Department of Educational Technology
Faculty of Education
University of Ilorin, Ilorin
Nigeria
e-mail: temiladeadenike2015@gmail.com

Oladiran Kayode Omoniyi
School of Education
Federal College of Education Special
Oyo, Nigeria
e-mail: diranomoniyi@gmail.com

Tawakalit Bukola Alaka
Department of Educational Technology
Faculty of Education
University of Ilorin, Ilorin
Nigeria
e-mail: tawakalitalaka@unilorin.edu.ng