Roles of Information and Communication Technology Devices for the Education of Students with Visual Impairment in University of Calabar, Cross River State

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Abstract:- This study investigated the challenges of roles of information and communication technology devices for the education of students with visual impairment. In specific terms, a total of two research questions were posed to guide the study. Related literature was reviewed based on the areas discussed under the study. The research design adopted for the study was survey design that involves the collection of data to accurately and objectively describe the existing condition or phenomena. A census of the respondents was used in the study because the population was not large to for sampling. Therefore, the sample for the study was eight (8) students with visual impairment. The major instrument used for data collection was questionnaire. The data collected were analysed using simple percentages so as to answer the research questions formulated in the study.

The findings of the study revealed that the devices are very few in number and the available ones are outdated. The result further revealed that the available devices are also fragile which makes the devices to be very costly. The result of the analysis finally revealed that there are irregular power supply in the department and lack of proper maintenance. It is therefore concluded that there are identifiable challenges of accessibility and poor maintenance of ICT devices for the education of students with visual impairments in University of Calabar, Cross River State. The study was concluded and the result of the analysis also revealed that students with visual impairment find it difficult to access the ICT gadget. The result also showed that there is inadequate power supply and poor maintenance. Based on the findings, it was recommended among others that adequate devices should be maintained and made accessible.

I. INTRODUCTION

Evans (2007) students with visual impairments requires extensive support in terms of modern technologies and facilities to facilitate academic literacy particularly in reading and writing. Therefore there is urgent need to establish more writing centre for assignments and projects work as bold steps have been taken to enrol students with visual impairments.

Many writers like Vincent (2007), listed various kinds of information and communication technology product that needed to be available and having relevance to education of students with visual impairments includes: teleconferencing, e-mail, audio conferencing, radio broadcasts, talking web browsers, electronic Braille not taker, tape recorder, audio-casteless, television lesson, and CD ROMS etc.

Information and communication technology in special education requires the service of special technical teachers who can effectively communicate with the students with visual impairment and handle the devices effectively. Olukotun, (2004) stated that technology has positive impact on the lives of persons with visual impairment with reference to use of information, education and lifelong learning. This will help them to have great equal learning opportunities. Information and Communication Technology devices such as special software to present large print on normal or large monitors, computer based keyboards, screen magnifiers, refreshable Braille displays, Braille translation software, portable note takers, augmentative communicative devices etc. ICT gadgets have strengthened the learning out come of students with visual impairment Adetro, 2009; Zia and Mahmood, (2010) maintained that as a result of technological development taking place all over the world, the rate at which information grows couple with the challenges experience by the students with visual impairment, this makes electronic assistance necessary to aids their learning.

Access to ICT gadgets is expected to help in improving their educational needs as many students with visual impairments are prone to different challenges associated with poor utilization of ICT Devices, this situation might place negative learning performance unless the problem is being solve.

II.   PURPOSE OF THE STUDY

Potty, (2007) in a study on the influence of ICT on the academic performance of students with visual impairment in India revealed that note takers account for 70% to 75% of the academic success of students with visual impairment's academic performance by more than 20% which had helped them to top in mixed classes, competing favourably with sighted students, the author further explained that the reason for this is because note taking form a very important aspect of a students' day-to-day academic activity because the student will have nothing to read if he/she does not take down notes while the teacher is teaching especially in higher institution where teachers does not have the time to give hand outs or special notes.

Bodang (2005), in a test of technology assisted reading through the use of video magnifiers for low vision found out that video magnifiers accounted for 60% to 65% of students success in their academic performance. Only students with low vision or resident vision were able to benefit from the use of this technology.

According to the author, all teachers who taught students with low-vision using at least some form of video magnification equipment found out that their academic performance increased by 50%. It was apparent, through conversations with teachers, that video magnifiers and reading print go hand-in-hand for students' with visual impairments. There was, as in all fields, a continuum of perceived comfort with using these assistive technologies. The researcher therefore concluded that the use of video magnifiers significantly affects the academic performance of students with visual impairments.

According to Evans (2007) Information and Communication Technology can be used by student with visual impairment can be broadly divided into three categories which include; audio technologies, visual technologies and audio visual technologies. According to Nanjwan and Ikwen, (2016), audio technology refers to information and communication technology. They appeal only to the sense of hearing or visually impaired persons. Visual technologies refers to the residual vision of students with visual impairment and can be benefited by those with low vision or partial visual loss, while audio-visual technologies, refers to the information and communication technology that appeal to both the sense of hearing and sight of a visually impaired person. Information and Communication Technology (ICT) need to be utilised among students with visual impairments because it is expected to help in improving their educational needs.

Nanjwan and Ashi, (2013) agreed that students need to be assess to know their levels or degree of effect either mild, moderate, severe visual impairments. they are confronted with several challenges in life especially in the higher institutions where they may have limit independence studies gadgets. They may find it difficult to access and afford getting some ICT facilities and services.

The purpose of the study was to investigate the challenges of utilizing ICT Devices of information and communication technology devices in the education of students with visual impairments in University of Uyo. Specifically the study sought to investigate challenges arising from:
➢ Accessibility of ICT gadgets by the students' with visual impairments
➢ Maintenance of ICT gadgets by teachers and students with visual impairments?

III.   RESEARCH QUESTIONS

The following research questions were formulated in line to guide the study;
1. To what extent are assistive technology devices accessible for assisting the learning outcome of students' with visual impairments
2. To what extent are assistive technology devices maintained by the students' with visual impairments

IV.   RESEARCH METHODOLOGY

The research design adopted for the study was survey design. Survey research design involves the collection of data to accurately and objectively describe the existing condition or phenomena.

According to Awotunde, Ugodulunwa and Ozoji (2004) a research design is a plan that guides the researcher in structuring the collection, analysis and interpretation of data. This design was chosen because it can be used to study large and small population be selecting and studying samples chosen from the population to discover the relative incidence, distribution, and interrelations of sociological and psychological variables. Hence survey research is used for this study. The research area is University of Calabar, Cross River State.

The population of this study comprised of all students with visual impairment in university of Calabar, Cross River State. They are eight (8) in number, one (1) in guidance and counseling department, faculty of education, two (2) in faculty of law, and five (5) in early childhood and special education, faculty of education, total of eight (8) visually

impaired students in University of Calabar, Cross River State.

❖ All of the eight (8) students with visual impairments were used for the study.

The instrument used for data collection was utilising Information and Communication Technology questionnaire (UICT). It was made up of two sections, section A and B. Section A consisted of personal data of the respondents such as age, sex and level while section B consist of the items on information based on the variables of the study which include accessibility and maintenance of Information and Communication Technology devices, The questionnaire was on a 4 point Likert style scale which include:

➢ Strongly Agreed (SA) Agreed (A) Disagreed (D) Strongly Disagreed (SD)
➢ There are two version of the instrument the Braille and the printed version.

The questionnaire was validated and administered by the researchers to the respondents in their school. Each respondent was given Braille copy while the researchers used the printed copy. The items were read by the students along with the response options which the researcher having the print ticked accordingly this was done to them one after the other by the researchers. There was 100% return rate.

The data collected were analysed using frequency and percentages so as to answer the research questions formulated to guide the study.

V. RESULTS AND DISCUSSION

The results of the general descriptive data analyses of the variables are presented in the Tables

SN	Variables	Mean	SD
1.	Accessibility of ICT gadgets by the students' with visual impairments	11.25	3.92
2.	Maintenance of ICT gadgets by teachers and students with visual impairments?	11.13	3.98

Table 1:- Descriptive statistics of the research variables (N = 8)

The result in Table 1 revealed that the mean score obtained as regards the role of on education of students with visual impairment was 11.25 with a standard deviation of 3.92. The result further revealed that the mean score obtained as regards access and challenges faced by teachers of students with visual impairments was 11.13 with a standard deviation of 3.98.

❖ *Presentation of results*

Each of the research questions of the study was answered using descriptive statistics and the result is presented in tables.

➢ Research question one: To what extent are assistive technology devices accessible for assisting the learning outcome of students' with visual impairments?

Research question one was answered using frequency and percentages. To carry out the analysis, responses were grouped into four (Strongly Agreed, Agreed, Disagreed and Strongly Agreed) based on their responses to the items in the instrument. The results are presented in Table 2.

Statement	SD	D	A	SA	Mean
Irregular power supply in the department	-	2 (25.0%)	2 (25.0%)	4 (50.0%)	3.25
Lack of proper maintenance	1 (12.5%)	2 (25.0%)	2 (25.0%)	3 (37.5%)	2.88
There is high risk of carrying the devices about for classes	1 (12.5%)	1 (12.5%)	2 (25.0%)	4 (50.0%)	3.13
Steady network service	4 (50.0%)	2 (25.0%)	1 (12.5%)	1 (12.5%)	1.88

Table 2:- Access and challenges of ICT faced by teachers of students with visual impairment

The results as presented in Table 2 showed that two respondents representing 25.0 per cent disagreed that irregular power supply in the department while two respondents representing 25.0 per cent agreed and four respondents representing 50.0 per cent strongly agreed and this produced a mean score of 3.25. The result also showed that one respondent representing 12.5 per cent strongly disagreed that on the issue of lack of proper maintenance while two respondents representing 25.0 per cent disagreed and two respondents representing 25.0 per cent agreed while

three respondents representing 37.5 per cent strongly agreed and this produced a mean score of 2.88.

The result further showed that one respondent representing 12.5 per cent strongly disagreed that there is high risk of carrying them/it about for classes while one respondent representing 12.5 per cent disagreed and two respondents representing 25.0 per cent agreed while four respondents representing 50.0 per cent strongly agreed and this produced a mean score of 3.13. The result finally showed that four respondents representing 50.0 per cent disagreed

that steady network service is available while two respondents representing 25.0 per cent disagreed and one respondent representing 12.5 per cent agreed while one respondent representing 12.5 per cent strongly agreed and this produced a mean score of 1.88.

➢ Research question two: To what extent are assistive technology devices maintained by the students' with visual impairments.

Research question two was answered using frequency and percentages. To carry out the analysis, the responses were grouped into four (Strongly Agreed, Agreed, Disagreed and Strongly Agreed) based on their responses to the items in the instrument. The results are presented in Table 3.

Statement	SD	D	A	SA	Mean
They rarely make use of them due to poor maintenance	1 (12.5%)	1 (12.5%)	2 (25.0%)	4 (50.0%)	3.13
Some students do not have interest in using them due to poor maintenance	-	2 (25.0%)	3 (37.5%)	3 (37.5%)	3.13
Students with low vision have no interest in ICT training due to poor maintenance	4 (50.0%)	2 (25.0%)	1 (12.5%)	1 (12.5%)	1.88
Inadequate time allocation due to poor maintenance	1 (12.5%)	1 (12.5%)	2 (25.0%)	4 (50.0%)	3.13

Table 3:- Maintenance of ICT gadgets by teachers and students with visual impairments

The results as presented in Table 3 showed that one respondent representing 12.5 per cent strongly disagreed that they rarely make use due to poor maintenance of them while one respondent representing 12.5 per cent disagreed and two respondents representing 25.0 per cent agreed while four respondents representing 50.0 per cent strongly agreed and this produced a mean score of 3.13. The result also showed that two respondents representing 25.0 per cent strongly disagreed that some students do not have interest in using them due to poor maintenance while three respondents representing 37.5 per cent agreed and three respondents representing 37.5 per cent strongly agreed and this produced a mean score of 3.13.

The result further showed that four respondents representing 50.0 per cent strongly disagreed that students with low vision have no interest in ICT training due to poor maintenance while two respondent representing 25.0 per cent disagreed and one respondent representing 12.5 per cent agreed while one respondent representing 12.5 per cent strongly agreed and this produced a mean score of 1.88. The result finally showed that one respondent representing 12.5 per cent strongly disagreed that inadequate time is allocated to them due to poor maintenance while one respondent representing 12.5 per cent agreed and two respondents representing 25.0 per cent agreed while four respondents representing 50.0 per cent strongly agreed and this produced a mean score of 3.13.

VI. DISCUSSION OF FINDINGS

This section is concerned with the discussion of findings that emerged from the analyses. The discussion is presented according to the research questions.

➢ To what extent are assistive technology devices accessible by the students' with visual impairments?

The result of the analysis revealed that students' with visual impairment rarely have access to use the information and communication technology devices which makes them not to have interest in using them. The result also showed that the students with low vision have interest in ICT training but inadequate time is allocated to them.

Assistive technology is an umbrella term that includes adaptive and rehabilitative devices for persons with disabilities and also includes the process used in selecting, locating, and using them. Assistive technology promotes greater independence by enabling people to perform task that they were formerly unable to accomplish, or has great difficulty accomplishing, by providing enhancements to, or changing methods of interacting with, the technology needed to accomplish such tasks.

The finding is in accordance with Potty, (2007) who investigated the influence of ICT on the academic performance of visually impaired persons in India revealed that note takers account for 70% to 75% of the academic success of visually impaired student academic performance by more than 20% which had helped them to top in mixed classes, competing favourably with sighted students, the author further explained that the reason for this is because note taking form a very important aspect of a students' day-to-day academic activity because the student will have nothing to read if he/she does not take down notes while the teacher is teaching especially in higher institution where

teachers does not have the time to give hand outs or special notes.

The finding is also in line with the study by Collins (2009) who postulated that electronic Braille notetakers provide a powerful alternative to mechanical notetakers such as the Perkins Braille or slate and stylus contributes meaningfully to the academic performance of visually impaired persons. The author further explained that a typical type is maestro, an accessible PA, which used a text to speech technology adapted application and a tactile keyboard membrane over the PDA'S touch screen. It is compact provides essential functions through text and vocal means. To produce correctly formatted and coded Braille on a Braille embosser visually impaired students will need Braille translation software which is also one of the most widely available assistive technology for visually impaired persons.

The finding of this study also agree with Bodang (2005) who stated that a video magnifier can be used to enhance the academic performance of visually impaired students as it helps to improve their understanding of a lesson during teaching. The author further explained that a video magnifiers, or closed-circuit television (CCTV) system, use a stand-mounted or hand held video camera to project a magnified image onto a video monitor, a television (TV) screen, or a computer monitor. Camera with zoom lenses provide variable magnification level and focus are set after choosing a comfortable and functional working distance between the camera and the material to be viewed. Some systems use an auto-focus camera. Lower cost CCTVs often use cameras that have a fixed focus and cannot vary magnification or camera-to-target distance.

➢ To what extent are assistive technology devices maintained for assisting the learning outcome of students' with visual impairments?

The result of the analysis revealed that there are irregular power supply in the department and lack of proper maintenance. The result also revealed that there is high risk of carrying them/it about for classes and the network is not steady. Information and communication technology, in special education requires the services of special technical teachers who can effectively communicate with the students with visual impairments and handle those ICT devices effectively. Olukotun (2004) posited that teaching equipment are audio-visual aids used in the classroom by the teachers as well as the learners to enhance teaching and learning facilities on information technology (IT) effectively. He opined the use of such teaching facilities and equipment makes teaching and learning interesting and less burdensome.

The finding is in line with Evans (2007) and Nanjwan and Ikwen, (2016), who stated that information and communication technology that can be used by visual impaired persons can be broadly divided into three categories which include; audio technologies, visual technologies and audio visual technologies. According to him, audio technology refers to information and communication technology they appeal only to the sense of hearing or visual impaired persons, visual technologies that refers to the residual vision of visually impaired persons and can be benefited by those with low vision or partial visual loss, while audio-visual technologies, refers to the information and communication technology that appeal to both the sense of hearing and sight of a students with visual impairment.

VII. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

➢ *Summary of the study*

This study investigated the challenges of utilization of information and communication. The result of the analysis revealed that skills of usage are not easy for visually impaired students and there are no trained instructors to equip students with the needed skills. The result also showed that there is no training class on how to use each of the devices and some students with visual impairment do not have interest in making use of the devices. The result of the analysis finally revealed that there are irregular power supply in the department and lack of proper maintenance. Also, there is high risk of carrying them/it about for classes and the network is not steady.

➢ *Conclusion*

The study was concluded and the result of the analysis also revealed that students with visual impairment find it difficult to access the ICT gadget and they rarely make use of them which makes them not to have interest in using them. The result also showed that there is inadequate light and time.

➢ *Recommendations*

Based on the findings, it was recommended that:
1. Trained instructors should be made available to equip students with the needed skills.
2. Steady power supply should be provided for the students and the devices should also be properly maintained.

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