EFFECTS OF INFORMATION AND COMMUNICATION TECHNOLOGY FOR TWO WAYS COMMUNICATION ON STUDENTS WITH HARD OF HEARING IN OTANA INTEGRATED SCHOOL, JOS, PLATEAU STATE

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Abstract - This paper was designed to find out the effects of information and communication technology for two-way communication on students with hearing impairment in Otana Integrated School. The purpose of the study was to determine the availability of ICT facilities for two-way communication among students with hearing impairment; determine the main ICT used for two 0way communication and determine the challenges faced by students in the use of ICT facilities in Otana Integrated School. Descriptive research design was used for the study. The population of the study consist of fifteen (15) students with hearing impairment. A researcher made questionnaire comprising of fifteen items was used to generate data for the study. Three research questions and one hypotheses were formulated to guide the study. Simple percentage and mean were used to analyze the data collected from the study while Analysis of Variance ANONA was used to test the hypothesis at 0.05 level of significance. The findings showed that there is a positive correlation between the use of ICT and academic performance of students with hearing impairment in school subjects.The major challenges are those of electricity supply and the cost of maintaining the facilities.It was recommended that ICT facilities, internet connection and power supply should be make available and functional for students' two-way communication.

Key words: ICT, Commuication, children, hearing impairment, academic achievement

I. INTRODUCTION

The education of children with hearing impairment has over the years generated a lot of interest from experts in the field of special education. The concerned is on the best approach to improve the education of children with hearing impairment all over the world. Apparently, the government stated that teaching in the nation's educational institutions shall be practical, activity based, experimental and information technology supported. This constituted part of turn around strategies for ensuring quality delivery not only in basic education [1], but also at all levels of education in the country.

Sign language is a language that is used by people with hearing impairment, to communicate. It is a language that uses manual symbols to represent ideas and concept. According to [2], it is term used to describe the language used by deaf people in which both manual signs and finger spelling are employed. But experts in the field of deaf education such as [2][3] have modified and invented different types of sign language which used to be traditional in nature being challenged by scientific and technological development in the few decades to the end of the 20th Century and since the beginning of the 21st Century. This new development has brought changes into all aspect of communication in educational system of the hearing impaired.

Supporting the above assertion, the government has also proposed adequate infrastructure and development of capacity for effective utilization for information technology in order to enhance reaching –learning process in the educational institutions [4] which Otana Integrated School is a beneficiary. Thus, ICT opens a new avenue for communication attainment among students with learning impairment. Hearing impairment is the inability of the organ of hearing to function for the ordinary purpose of life. According to [5], hearing impairment is an umbrella term used to describe all aspects of disorder affecting the auditory system. Kauffman and Hallanhan cited in [5], the conference of the Executive of the American School for the Deaf described hearing impairment as a genetic term indicating a hearing disability that may range in severity from mild to profound. This include the subset of deaf and hard of hearing. Conceptually, children with hearing impairment are those whose hearing sensitivity are defective to benefit from normal vernal communication. The severity of the hearing impairment varies in terms of degree and nature of hearing loss.

Information and communication technology have become a subject of great concern to mankind and indeed for the sustainability of all forms of development. The technologies are now integral to the fabric of Nigerian society, communicating with other devices and people of performing information, processing and other tasks far beyond the imagination and capacities of an isolated individual. Information and communication technology as being design by the Information Technology Association of America (ITAA) is "the study design development, implantation, support or management of hard ware." These deaf with the use of computer software toconvert, store, protect and transmit [6]. The introduction of information communication and technology in the educational system of children with hearing impairment has opened a significant trend in education. The new ICTs according to [7], have accelerated the trend toward the deconstruction of the educational process and the unbundling of the functions performed by the traditional educational institution. Similarly, the National Policy on Education seek amongst other things, that the mind should be trained in understanding the word around and the acquisition of appropriate sills and competence to live in and contribute to the development of the society. To achieve these laudable objectives, the federal government in line with the recent technological development worldwide, has taken a laudable step by introducing computer education into the curriculum of both primary and secondary schools.

The challenges are that even when special education is seen as the kind of educational services modified to meet the needs of special children/hearing impaired which entails special method: appropriate materials and special trained teachers. Negligence of the use of information technology among special needs children (hearing impaired) who are expected to participate in and to lead the country to a rapid innovation become an issue of debate.

Two-way communication is a form of transmission in which both the sender and receiver transmits information. According to [8], both the sender and receiver listen to each other, gather information and are willing to make changes to work together in harmony. Therefore, it is an inter-personal communication by focusing on the eyes of the person speaking: making eye contacts, reading body language and responding appropriately with comments, question to confirm main points and accurate understanding which are peculiar for teaching and learning strategies for children with hearing impairment. In view of these, it is worthwhile effort to examine the effect of information and communication technology for two-way communication of students with hearing impairment.

II. STATEMENT OF THE PROBLEM

The problem of this study is to examine the effect of information and communication technology for two-way communication on students with hearing impairment, in Otana Integrated School. This is because children with hearing impairment have deficiency in both expressive and receptive communication skills hereby unable to complete the stages of cognitive development needed for successful academic performance. In effect, huge cognitive skills deficit among children with hearing impairment is a common phenomenon.

Studies have shown that children with hearing impairment poor performance might be caused by factors one of which is a method of teaching by Nigerian educators for children with hearing impairment which do not take into consideration the means of communication that will appeal to all the senses of children with hearing impairment. According to Abang [9] it has been observed that for about 46 years that the special educators for children with hearing impairment started using American Sign Language (ASL) to teach these children. There has been consistent poor academic performance.

It is believed that this sign language made may not afford them the opportunity to interact or relate well with their peers and families as well as improve their academic work. All this stage, one way wishes to find out if these technologies are available in theOtana Integrated School System. If they are available, the next question is how effective they are put to use in order to have the requisite two-way interaction so as to develop the arithmetic relationship between the learner and the teachers or the Otana Institution and or among the learners.

Most research in technology integration has been criticized for being theoretical and adhoc driven more about the avoidance of the technology rather than the demand of pedagogy and subject matter. One approach that attempt to address this concern is a framework aimed forward successful technology interaction.

Based on this development, there is a need to examine whether Information and Communication Technology (ICT) could affect two-way communication for students with hearing impairment.

III. PURPOSE OF STUDY

The purpose of this study is to determine the effect of information and communication technology on two – way communication for students with hearing impairment in Otana Integrated School. Specifically, the study intends to:

1. determine the extent of availability of ICT facilities for two-way communication for student with hearing impairment.
2. identify the main ICT used for two-way communication for students with hearing impairment.
3. Determine the challenges faced by the students with hearing impairment in the use of ICT facilities in Otana Integrated School.

IV. RESEARCH QUESTIONS

The following research questions have been formulated to guide the study:

1. What is the availability level of ICT facilities for two-way communication for students with hearing impairment in Otana Integrated School?
2. What are the main ICT facilities used for two-way communication for students with hearing impairment?
3. What are the challenges faced by students with hearing impairment in the use of ICT facilities in Otana Integrated School?

V. HYPOTHESIS

To guide this study, one hypothesis was postulated and tested a 0.05 level of significance:

1. There is no significant difference in hearing impairment mean scores of availability of ICT facilities and ICT facilities usage for two-way communication.

VI. LITERATURE REVIEW

This section will review relevant literatures under the following sub-headings: Concept of Concept of Children with Hearing Impairment, Symptoms of Hearing Impairment, academic achievement of children with hearing impairment. Concept of information and Communication Technology, types of information and communication technology and their relevance in the education of special needs children, Concept of two-way communication. Other issue are technologies for two-way communication.

a. Children Population with hearing Impairment

Children with hearing impairment are those who lost hearing sensitivity regardless of when and how it was sustained. This heterogeneous group of individuals according to [10-12] can be subdivided further on the basis of a number of distinguish features. Traditionally, five descriptive variables have served over the years to distinguish various subgroups within the general population possessing hearing impairment. These include degree of hearing loss, age of onset of hearing impairment, type and nature of loss, etiology of hearing loss, and the parental home background of the children with hearing impairment.

Degree of hearing impairment refers to extend to which hearing problem affects an individual. According to [13-15], the degree of hearing impairment is typically described in terms of hearing thresholds level (HTL) for auditory pure tones. All sounds can be described in terms of physical parameters: 1 frequency 2, intensity and 3 time. Type and nature of loss, there are four different types of hearing impairment, depending upon the site of leisure. The four types are conductive, sensorineural; mixed and contrast [15-16]. Age at onset refers to the age of which a hearing impairment is sustained. Two important reference point are birth and the establishment of language(usually about 2 or 3 years of age and later). Etiology, making of the causes of hearing impairment often resulted in one or more additional problem. As many as 25% of those deformed as the deaf population have one or more additional complicating handicaps [17] [20].

b. Symptom of Hearing Impairment

1. Being lonely
2. Bring one ear ahead while listening or speaking to loudly or softly
3. Unclear speech
4. Appears to have problem paying attention or concentrating in group discussions.
5. Sharing missing gaps in place of words ending like ed, ing, ly
6. Individual who keep radio, TV, Tape recorder at high volume
7. One who does not respond to a question asked from behind or distance.

c. Academic Achievement

Mastering the use of ICT among special needs children become a concern for global competition and its sustainable development. To realize this potential, the current educational should focus on developing special needs children physical infrastructure, and on the isolated experimentation and piecemeal implementation to help in addressing these enabled policies, institution services, infrastructures, and participating social learning among the children by:

1. Empower individuals such as the hearing impaired who are increasingly frustrated by their lack of control over their lives to make something out of it.
2. It can connect peers for problem solving exchanges.

Hearing improves children can be connected with an expert teacher who can instruct them in their areas of difficulty.Research across the decades regarding the academic achievement of children with hearing impairment has been remarkably consistent. Academic achievement reported across the globe is germane to grant retardation. The retardation is largely attributed to the consequences of hearing impairment which is capable to hinder linguistic access to curriculum content.

William [18] asserted that academically children with hearing impairment recorded poor achievement. It was discovered that the more severe the hearing loss, the poorer the academic achievement. Language achievement was not encouraged because there was a significant retardation in linguistic ability. They have serious difficulty in both encoding and decoding information.

Similarly, the average adult with hearing impairment is grossly under-educated. This is for the most part, an indictment of the educational system which has failed to develop the intellectual capacity of deaf children and to some extent acknowledgement of the tremendous impediment to academic learning presented by performed hearing loss.

d. Concept of Two-way Communication

Two-way communication is a form of transmission in which the sender and receiver, transmit information. It is an interpersonal communication which is between two or more people [21]. According to [8], both the sender and receiver listen to each other gather information and are willing to make changes to work together in learning. Their intent is to negotiate a mutual satisfactory situation. Two-way communication is not as simple as one may think. This is because both the sender of the message and the receiver must be in a position to understand each other. One can improve two-way or interpersonal communication by focusing on the eye of the person speaking, making eye contact, watching body language and responding appropriately with comments, questions, paraphrasing and summarizing to confirm the main facts and understand accurately. The question now are these achievable in the method of communicating the hearing impaired using technologies in two-way communication? The answer according to Jeff [22] depends on the effectiveness and appropriateness of the technology ensuring effective two-way communication. Thus, this are achievable depending on how effective ICTs are employed for use to students with hearing impairment.

e. Technologies for Two-way Communication

Advances in technologies have given rise to further progress into improved access to information and educational activities especially in hearing impaired system of education where the new types of learning help people to obtain education without significantly altering their life-style. This means that learning can now take place in the field or farm, as well as in the school using internet, mobile phones/devices. ICT is not new, nor it is limited to transferring weightless bits at the speed of light across the internet. Computers are now regarded as a very versatile ICT tool which varies in the kinds of applications and complexities of output available. The device has continued to enlarged in transforming the educational practices including those of the hearing impaired. As ICTs for education are becoming more and more sophisticated, so also the possibilities for qualities education for learners across national boundaries are increasing [19].

f. Concept of ICT

Information and Communication Technology is a technology that supports activities involving information. Such activities include gathering, processing, storing and presenting data. It involves collaboration and communication. Educationally, the key activities involved knowledge, experience and products. According to Peace [8], now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy [6] states that. These deal with the use of computer software to convert store, protect, process and to transmit.

VII. METHODOLOGY

a. Population

The population for this study was made up of all secondary school students comprising male and female in Otana Integrated School. The choice of

hearing impaired students was because they are the key beneficiaries of ICT facilities in the school. Also, based on the fact that the students have similar cognitive dysfunction and have restriction access to some curriculum content.

Out of which a sample of thirty (30) hearing impaired students were used for this study. The sample size is made up of 8male (n=15) and 8 female (n=15) hearing impaired students respectively. The sample was made up of equal gender to endure homogeneity of variance.

b.   Instrument

The instrument used for data collection is in (15) fifteen item questionnaire developed by the researcher tagged 'The use of ICT for Two-way Communication Questionnaire (TUICTTCQ)'. It has three sections to cover the three research questions. The instrument used a four (4) point Likert scale of Highly Available (HA), Available (A), Low Availability (LA) and Not Available (NA) to massive the availability level of ICT facilities for two-way communication. The major ICT facilities used and challenges for two-way communication used Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) as response options.

c.   Validity and Reliability

Validity
In order to ensure that the instrument for this study measure exactly what they are purpose to measure, its face content and criterion validity be subjecting the instrument to critical assessment by research supervisor and one other expert in measurement and evaluation. They helped determine the knowledge, understanding and application of the instruments in line with research questions and hypothesis.

Reliability
To ascertain the consistency of TUICTTCQ, it was trial-tested using students of Open and Distance Learning from Enugu Study Centre who are not participant of the study. Data collection were analyzed using test-re-test, the reliability coefficient of 0.76 was recorded.

d.   Method of Data Collection

The researcher personally shall undertake the process of data collection by visiting the designated school for the study, after obtaining a letter of introduction from the supervisor. The letter soliciting for the cooperation of the respondents and management. The researcher shall administer the questionnaire to the students. A period of one week will be devoted to data collection and administration.

e.   Method of Data Analysis

Data collected from the field were subjected to descriptive and inferential statistics. The descriptive statistics of frequency, percentage and means while the inferential statistics of Analysis of Variance (ANOVA) were used to analyzed the hypothesis at 0.05 level of significance.

Table -1 Analysis of Covariance of Participants in treatment and Control groups

Sources of Variation	Sum of Squares	DF	Mean Squares (MS)	F	P
Covarites	1278.816	1	1278.816	113.48	<0.05
Treatment	144.770	1	72..3500	6.42	<0.05
Model	1575.561	6	262.594	23.30	<0.05
Residual	597.283	23	11,269		
Total	2172	29			

Significant 1t P< 0.05

Table 1 shows that there is a significant main effect of treatment participants learning outcomes in ICT (Fab, 42, P<0.5). The indicates that the treatment has significant effect on the learning outcomes mean score of participants in all the groups used for the study. Thus the null hypothesis is rejected.

Table - 2 Multiple classification analysis of post-test scores according to experience and the control group

Grand mean 39.567 Variable + Category	N	Unadjusted Deviates	Adjusted for Inadequate + Covariance Dev n bet
Treatment group			
1. ICT	15	3.73	3.75
2. Conventional	15	-41.27	-41.47
		-70	.72
Multiple			.583
Squared			-763

The adjusted scores show that the ICT group screw higher frictions by the Conventional group.

Table - 3 Mean and standard deviation scores of the ICT and Control groups

Treatment	Mean	SD	N
ICT	43.30	4.73	15
Control group	35.30	2.79	15

Table 3 shows that subject, expose to ICT had the highest mean score of (43.30) follows by control group 35.30 respectively. This indicates that ICT was effective than the conventional method in enhancing leaving outcomes in the participant.

VIII.   DISCUSSION

Findings for research question showed that the availability level of ICT facilities is high enough to facilitate two-way communication in Otana integrated school. This result is consistent with the findings of [23] which showed that there is a positive correlation between the use of ICT and academic performance of students with hearing impairment in school subjects. Similarly, [24] found a significant impact on students attitude towards internet as it improves their knowledge as a result of accurate instructional delivery.

On the main technologies used for two-way communication for students with hearing impairment in Otana integrated school for the handicaps, findings revealed that technologies such as WhatsApp, Facebook, telephone, you-tube and text messages are not different from those used across the globe. These platforms are therefore used for assignment, chats, email and posts.

The finding shows that Otana integrated student have some challenges in using ICT facilities for two-way communication and interaction. The major challenges are those of electricity supply and the cost of maintaining the facilities. This is not different from the reports of [21, 25-28] who agreed that Otana integrated school students and online face some challenges, in using ICT facilities for two-0way communication and interaction among themselves, their teachers and their institutions.

IX. RECOMMENDATIONS

Otana integrated school for the handicap children, is an educational institute that is equipped with effective two-ways communication and learning facilities which are ICT driven. Teachers must be train and retrain to enable them respond to students' feedback through ICT facilities. ICT facilities, internet connection and power supply should be make available and functional for students' two-way communication.

X. CONCLUSION

Meaningful communication and interaction for effective learning among students with hearing impairment involves the sender (teacher) and the receiver who understood the message (hearing impaired). By implication, each party is able to express itself. It was evidence that Otana integrated school is well equipped with two-ways communication facilities despite the challenges of poor power supply, slow internet network connectivity and cost of facilities maintenance.

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