**APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FOR PRESCHOOL CHILDREN WITH HEARING IMPAIRMENT IN OYO STATE**

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**Abstract**

*This study examined the application of information and communication technology (ICT) for preschool children with hearing impairment in Oyo State. The study adopted a survey type of descriptive research design. The study population comprised all the public preschools teachers teaching hearing impairment children in Oyo State. One hundred and fifty (150) preschools teachers were randomly selected as respondents for the study from the three senatorial districts of Oyo State. The instrument was titled Information and Communication Technology (ICT) Questionnaire for Preschool Teachers (ICTQPT). Data were analyzed using means and percentages. The findings of this study revealed that ICT tools are available for utilization in preschool for children with hearing impairment. our study showed that preschool-aged children with hearing impairments have available ICT tools for teaching and learning. The study also showed that preschoolers with hearing impairment are taught and learned using ICT technologies effectively. According to the study's findings, frequent power outages, high ICT facility costs, a lack of staff at preschools, and a lack of ICT integration into curricula are among the challenges facing the application of ICT for efficient teaching and learning of preschool children with hearing impairment. This study therefore recommends that there should be more provisions of ICT tools for teaching preschool children with hearing impairment and preschools teachers should be encouraged to use all ICT tools effectively for teaching children with hearing impairment preschools.*

**Keywords:** Technology, Preschool Children and Hearing Impairment

**Introduction**

Nearly all forms of learning have a foundation in hearing. A kid is predicted to respond to auditory stimuli at least a few weeks after birth (Gordon, Henkin, & Kral, 2015). However, the World Health Organization estimates that people with hearing impairment make up around 10% of the global population as of 2006. Communication, adjustment, and learning issues might arise when a person loses their hearing. As a catalyst for the development of an educational system, information and communication technology (ICT) can bring new teaching and learning techniques (Trucano, 2005). In order to participate in and profit from educational programs, many students with hearing impairments need to be familiar with and proficient in information and communication technology (ICT), according to a 2009 international conference on the topic held in Geneva (UNESCO, 2009). When the information age began, many industrialized nations seized the opportunity to use ICT in the instruction of students with disabilities. The cause of inclusive learning, particularly for students with hearing impairment, has benefited from the usage of ICT in industrialized nations (Mwatsaka, Awori, & Karugu, 2020).

 According to Mwatsaka et al. (2020), it's crucial for all educational institutions in the USA, for instance, to acknowledge the use of technology in educating students with hearing impairment. The implementation of inclusive education, particularly for students with disabilities, still faces numerous challenges in several situations, such as Eastern Europe, Asia, and Africa (Mwatsaka et al., 2020). To encourage the use of ICT in educating students with HI, Ireland has implemented the Technology Integration Initiative, the educating Skills Initiative, and the Schools encourage Initiative. The Teaching abilities Initiative makes sure that instructors of students with HI are properly trained and have the necessary abilities to instruct their students using ICT (Mwatsaka et al., 2020). It is inevitable that learning will incorporate information and communication technology (ICT) technologies. ICT has been shown to have positive effects on teaching and learning, including the creation of new, productive learning environments and benefits for both students and teachers. While some studies suggested that using ICT tools for learning enabled students to learn on-the-job training and prepared them for future work, others suggested that utilizing ICT tools for learning may simply increase students' motivation, engagement, and learning results. Being able to discover engaging teaching resources and media with the aid of ICT technologies has made it easier for instructors to create an enjoyable teaching and learning environment. ICT technologies are also useful for language acquisition (Puspawati, & Juharoh, 2020).

 Life now wouldn't be the same without technology. Today's media technology period is being swiftly embraced by information technology (IT), communication, and telecommunication. People's everyday lives have been impacted in many ways, particularly in terms of communication. As a consequence, through a variety of communication and telecommunication channels, the number of new media consumers in this period has rapidly expanded. Despite the fact that most people today have access to and use modern media, there are still some groups of individuals, such as the elderly, the impoverished, and those with disabilities who are unable to properly access or utilize this technology. Due to financial limitations and a lack of opportunity, many people are unable to enhance their quality of life and grow as persons. In many nations, this digital gap is a serious issue (Lersilp & Lersilp, 2019). The definition of ICT in this study relates to the rights of students with hearing impairments to use these devices for communication, education, and access to information.In many nations, this digital gap is a serious issue (Lersilp & Lersilp, 2019). ICT in this study refers to the freedom of students with hearing impairments to use these tools for communication, education, and information access.

 To improve, maintain, and develop the talents and potential of persons with disabilities, information technology for communication refers to tools, devices, hardware, software, or services designed expressly for such people or to its modification to fit their unique needs. For everyday tasks and independent life, IT reaches out and uses information and communication (Lersilp & Lersilp, 2019). Society now has access to unrestricted information and communication thanks to the globalization era. Humans now live in a digital world as a result of technology, whose quick growth has led to a lot of innovation that makes life more comfortable and convenient. There is no denying that technology has ingrained itself into everyday life. The fact that individuals are surrounded by technical devices like mobile phones, smartphones, and tablets is proof of this. With this technology, users may carry out tasks using just one device and without regard to time or location. Furthermore, the fierce rivalry in the domestic digital market drives prices down constantly, making mobile devices more affordable for those with limited incomes. According to a poll, the percentage of low-income households with mobile device ownership has increased from 2% to 20%, with their children's ownership rising from 22% to 65% (Lersilp & Lersilp, 2019). Because of this, the majority of individuals own and frequently use mobile devices.

 The ability to connect with and comprehend one another makes communication crucial since it is important for human life. In addition to spoken, written, and sign language, there are other forms of communication. The five senses—taste, smell, sound, touch, and sight—can be used as conduits for communication. Children with hearing impairments, however, are unable to hear or receive media needing a sound element if the person receiving the message has a sensory impairment (Lersilp & Lersilp, 2019). This limits the effectiveness of communication. Disabilities in speaking and listening cause communication to stall and make the impairment worse. In addition, modern technology developed via the establishment of basic media like the postal system during a time when there were no communication means. More specifically, communication over the telephone network has improved the quality of the media in terms of transmission speed, clarity, and connection to modern equipment, such as pagers, faxes, the Internet, and smartphones, making communication in various formats, such as audio, text, and pictures, more effective (Lersilp & Lersilp, 2019). Children and young people now rely on technology to communicate and express their ideas just as much as anybody else, and this includes using the Internet and mobile phones. As a result, communication through these mediums has become a part of daily life for these individuals.

 ICT benefits learners with hearing impairments by enhancing their learning potential and supplying them with tools to support their learning capacity, claims Salaudeen (2015). ICT improves the hearing-impaired children's abilities by enabling them to start studying with the aid of the proper digital materials. Teachers must thus adopt the new technological learning tools in order to successfully achieve these desired effects in the classroom (Handel & Harold, 2006). In Nigeria, like in other African nations, 30% of the deaf are ICT illiterate, demonstrating that the majority of deaf children never attended school or attended at a relatively late age due to lack of knowledge about the use of ICT in the classroom for students with hearing impairment (Mwatsaka et al., 2020). There are not many ICT instructors who are. Schoolchildren who are hearing challenged can use behind-the-ear, body-worn, eyeglass, or in-the-ear hearing aids that employ ICT. They also employ FM amplification devices (auditory trainers), which provide a direct connection between the student and the instructor, who wears a hearing aid. Other options include Telecommunication Devices for the Deaf (TDDS) (Mwatsaka et al., 2020), Captioned Television, Live Speech Captioning, Audio Loops, Cochlear Implants, and Infrared Systems.The study demonstrated that autonomous access to education may be increased for hearing-impaired students and that they can complete assignments at their own speed.

 For all the businesses assisting kids with hearing impairments, understanding the potential advantages and difficulties of adopting ICT is essential. ICT will offer hearing-impaired pupils a secure and welcoming environment. They may appear to be more powerful, be knowledgeable about the essential tasks, and need to contact with people much less than usual, which might have both positive and negative effects. ICT will help hearing-impaired students gain greater self-assurance in the job and enhance their home skills. Special needs students, particularly hearing-impaired students, use ICT for their learning process. They even start to feel comfortable using ICT. According to Puspawati and Juharoh (2020), ICT is now widely used in all aspects of education, including special education. The word processor, the internet, and games are the ICT tools that teachers most frequently use while instructing students who have hearing impairments, according to [a statement on the sorts of ICT utilized for hearing impairment pupils].Children with hearing loss can use software and hardware for text generation and speech synthesis as well as computers with specialized multimedia software, the internet, virtual learning environments (VLE), augmentative and alternative communication (AAC), and adaptive devices for students who have trouble using ICT devices.

**Statement of the Problem**

The advantages of using ICT for students who are deaf or hard of hearing may include improving pupils' literacy and communication skills since computers and multimedia software can give visual feedback which makes it easier for the students to understand auditory input, according to studies. Despite the advantages mentioned previously, it appears that preschoolers with hearing impairments are not receiving enough attention while using ICT for teaching and learning. It against this background that the researchers investigated application of information and communication technology (ICT) for preschool children with hearing impairment in Oyo State

**Research Questions**

Answers were provided to the following research question:

1. Which ICT tools are available for utilization for preschool children with hearing impairment in Benue State?

2. What is the level of utilization of ICT among teachers in preschool children with hearing impairment in Benue State?

3. What are the barriers that teachers face using ICT for preschool children with hearing impairment in Benue State?

**Methodology**

**Research Design**

The study adopted a survey type of descriptive research design. The study population comprised all the public preschools teachers teaching hearing impairment children in Oyo State. One hundred and fifty (150) preschools teachers purposively selected as respondents for the study from the three senatorial districts of Oyo State. The instrument for this study was a self designed. The instrument was titled Information and Communication Technology (ICT) Questionnaire for Preschool Teachers (ICTQPT). A twenty seven item/questionnaire divided into two sections was used to elicit information from the teachers on applications of Information and Communication Technology (ICT) to preschool children with hearing impairment. Section A elicits information about respondents bioda while Section B elicits elicits information the application of ICT in teaching and learning for preschool children with hearing impairment.. Research question one was constructed on a 2-point rating scale of Available (A) and Not Available (AV). Research question two was constructed on a 4-point rating scale of Always (A), Sometimes (S), Rarely ® and Never (N). Research question three was constructed on a 2-point rating scale of Agree (A), Disagree (D). The research was carried out with some research assistants in administering the instruments. The instrument after constructions was given to experts in the field of early childhood education and educational evaluation to critique. Their various suggestions were thus incorporated into the final draft of the questionnaire. This is to ensure the face validity of the instrument. The questionnaire was validated using the K-R 21 Formula; a reliability of 0.84 was gotten. The research instrument was therefore valid and highly reliable. The researchers administered the instrument with the help of fifteen research assistants. The researchers and the research assistants ensured proper completion of the instrument after which they were collected immediately to avoid loss or interference. Data were analyzed using means and percentages. Only mean scores of 2.50 and above were accepted as indications of acceptance while mean score below 2.50 was rejected.

**Data Analysis**

**Research Question 1:** Which ICT tools are available for utilization for preschool children with hearing impairment in Benue State?

**Table 1 Availability of Information and Communication Technology (ICT) in Preschools**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/NO** | **Items** | **Mean** | **Remark** |
| 1 | Desktop Computers | 3.10 | Agree |
| 2 | Digital camera | 2.61 | Agree |
| 3 | UPS | 2.70 | Agree |
| 4 | Electronic toys | 2.59 | Agree |
| 5 | Television | 2.82 | Agree |
| 6 | Cell phone | 3.71 | Agree |
| 7 | Video | 3.18 | Agree |
| 8 | Printers | 2.74 | Agree |
| 9 | Projectors | 2.65 | Agree |
| 10 | Internet Connectivity | 3,07 | Agree |

**Source: Field survey (2023)**

Result in Table 1 shows that all the 10 items were accepted by the respondents as the ICT tools available for teaching preschool children with hearing impairment with mean scores above 2.50.

**Research Question 2:** What is the level of utilization of ICT among teachers in preschool children with hearing impairment in Benue State?

**Table 2 Utilization of Information and Communication Technology (ICT) in Preschools**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/NO** | **Items** | **Mean** | **Remark** |
| 1 | Desktop Computers | 2.63 | Agree |
| 2 | Digital camera | 2.52 | Agree |
| 3 | UPS | 2.81 | Agree |
| 4 | Electronic toys | 2.64 | Agree |
| 5 | Television | 2.71 | Agree |
| 6 | Cell phone | 3.82 | Agree |
| 7 | Video | 2.59 | Agree |
| 8 | Printers | 2.63 | Agree |
| 9 | Projectors | 2.50 | Agree |
| 10 | Internet Connectivity | 2.07 | Disagree |

**Source: Field survey (2023)**

Result in Table 2 revealed that the respondents agreed that 9 items on ICT tools are well utilized teaching and learning preschool children with hearing impairment with mean scores above 2.50 except internet connectivity with mean scores of 2.07 which was reported to be underutilized.

**Research Question 3:** What are the barriers that teachers face using ICT for preschool children with hearing impairment in Benue State?

**Table 3 Barriers Confronting Information and Communication Technology (ICT) in Preschools**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/NO** | **Items** | **Mean** | **Remark** |
| 1 | Lack/inadequate ICT facilities in preschools | 3.14 | Agree |
| 2 | Lack of/frequent electricity interruption | 3.52 | Agree |
| 3 | Inadequate/poor information structures | 3.71 | Agree |
| 4 | High cost of ICT facilities | 3.63 | Agree |
| 5 | Lack/inadequate manpower in preschool | 3.83 | Agree |
| 6 | Poor ICT policy/project implementation | 3.21 | Agree |
| 7 | Non ICT integration into preschool curriculum | 3.57 | Agree |

**Source: Field survey (2023)**

Result in Table 3 shows that the respondents agreed that all the 10 items are the barriers that teachers face using ICT for preschool children with hearing impairment with mean scores above 2.50.

**Discussion of Findings**

The findings of **research question one** revealed that majority of the respondents agreed that ICT tools are available for utilization in preschools for children with hearing impairment. This result contrasts with that of Onoja (2022), who found that ICT tools were not sufficient to meet the demands of students with disabilities, especially those who were hearing challenged. According to research by AbdulGafar and Adesina (2020), there aren't many, if any, ICT teaching and learning tools in Almajiri schools. The lack of ICTs in Almajiri schools discourages efforts to introduce computer science and information technology to elementary schools as early as possible. For Almajiri youngsters, this is a severe disadvantage when compared to traditional schools.

 The findings of **research question two** revealed ICT tools are well utilized in teaching and learning of preschool children with hearing impairment. The results of this study are consistent with those of Baglama, Haksiz, and Uzunboylu (2018), who found that the use of technology in special education will make it simpler for teachers to do their jobs and for students who need special education to understand and use the developing technology, to keep up with the innovations, and to ensure that the courses show parallelism with technological developments.

 The findings of **research question three** revealed that the barriers confronting the application ICT for effective teaching and learning of preschool children with hearing impairment among others include frequent electricity interruption, high cost of ICT facilities, inadequate manpower in preschool and non ict integration into preschool curriculum. The results of this study are consistent with those of Baglama, Haksiz, and Uzunboylu (2018), who found that using technology in special education will make it simpler for teachers to do their jobs and for students who need special education to comprehend and use the developing technology, to keep up with the innovations, and to ensure that the courses show parallelism with technological developments.

**Conclusion**

In conclusion, our study showed that preschool-aged children with hearing impairments have available ICT tools for teaching and learning. The study also showed that preschoolers with hearing impairment are taught and learned using ICT technologies effectively. According to the study's findings, frequent power outages, high ICT facility costs, a lack of staff at preschools, and a lack of ICT integration into curricula are among the challenges facing the application of ICT for efficient teaching and learning of preschool children with hearing impairment.

**Recommendation**

This study therefore recommends the followings:

1. There should be more provisions of ICT tools for teaching preschool children with hearing impairment.

2. Preschools teachers should be encouraged to use all ICT tools more effectively for teaching children with hearing impairment in preschools.

3. Consideration should be giving to preschool children with hearing impaired individuals when developing ICT tools.

4, Workshops and seminars should be organized for preschool teachers on the use of ICT tools for preschool children with hearing impairment.

5. Consideration for employment should be given to preschool teachers with ICT skills and specialization on teaching hearing impairment children.

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