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Application of Information and Communication Technology in Educating Pupils with Special Needs and the Challenges of the 21st Century

***Indabawa, S.M., & Yusuf, H.**
Department of Curriculum and Instructional Technology, Federal College of Education (Technical) Bichi

***Corresponding author email: sulaimanmindabawa@gmail.com**

Abstract
This paper examines the dynamics that came due to application of information and communication technology (ICT) in educating pupils with special needs such as the disabled, the gifted and talented and the disadvantaged group. It also finds out the challenges facing the application of ICT in teaching pupils with special needs in the 21st century. The paper showed that application of ICT has great and significant impact on the quality and quantity of education received by pupils with special needs. ICT facilitates learning and development of pupils with special needs in many ways. The paper on the other hand highlights many factors that prevent the full application of ICT in primary education system for pupils with special needs in the 21st century, which consists of poor infrastructure, inadequate resources, manpower, and so on. Finally, the paper gives some recommendations in order to achieve full utilization of ICT facilities in the 21st century, such as governments at all levels should increase funding to primary education systems for pupils with special needs and that teachers in primary school level should be given appropriate training on integration and application of ICT in the education of pupils with special needs, and these recommendations if implemented will of course result in greater improvement and impact in the education of pupils with special needs in Kano State

Keywords: Information and Communication Technology (ICT), Primary, Challenges, Prospects, Special Needs.

Introduction

Information and communication technology (ICT) is playing vital roles in teaching and learning process especially in teaching pupils with special need due to their conditions and special learning need. Information and communication technology refers to a deviserve set of technological tools and resources used to communicate and create, disseminate, store and manage information. These technologies include computers, internet broadcasting technologies (radio and television) and telephone. Special needs education (SNE) on the other hand is that kind of education services given to meet the needs of special need children such as the blind, hearing impaired, gifted, learning disabled, physical handicap and these with other health problems such as special methods appropriate materials, specially trained teachers, adoption and modification of the programme to the needs of pupils with special needs.

Obani (2005) sees special needs children (SNC) as those who experiences difficulty with their daily activities compared with their age. The need for ICT in special needs education in Nigeria cannot be over emphasized. ICT provides the skills needed to pupils with special needs. Each category of pupils with special needs have ICT devices can help them achieve their learning needs. For instance, learners with hearing impairment used behind the Ear Aid (BTE), in the Ear Aid (ITC). Information and communication technology devices for learners with visual impairment such as kurzwiel reading machine, tape recorder, speech compressor, the talking chock, braille coach, braille sense etc.

There are also many devices for learners with learning disabilities, gifted and talented, physical and health impaired. This paper therefore discuss the prospect and challenges of (ICT) in educating pupils with special needs in primary school in the 21st century such as disabled, the gifted and talented and the disadvantages group.

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It also examine many factors that prevent the full application of ICT in primary school for pupils with special needs. Finally, it gives some useful recommendation in order to achieve full utilization of ICT facilities in school.

ICT and Special Needs Education

The term ICT is generally accepted to mean technologies that allow people and organizations to take advantage of the digital world. It is sometimes used synonymously with Assistive Technology (AT). However, ICT is used to represent a broader, more comprehensive list of all components related to computer and digital technologies than AT (Ferguson and Pratt, 2017). Students with special needs usually have unique learning needs due to their physical and sensory disabilities, learning difficulties and also those with emotional and behavioral difficulties. According to national policy on special education, NPE (2013) children with special needs are categorized in to three such as the disable, the gifted and talented and the disadvantages group. According to United Nations Educational Scientific and Cultural Organization (UNESCO) asserts that the keyways in which ICT can support educational opportunities for students with special needs are as follows:

a) Identifying preliminary level of personal development (experiences and skills) that is to say the starting point of a student.
b) Assisting in personal development by shaping new skill or updating existing ones.
c) Improving access to information.
d) Over-coming geographical or social isolation via communication support and networks and also improving the image/perception of an area by enhancing motivation and awareness regarding the ICT benefits in special needs education.

According to Lindstrom et al. (2012), students with special needs should be placed on an individual plan that would be beneficial to each student and focus on the aim of ICT usage. In addition, there is need to examine students' needs in terms of computer-based devices and also ensure students digital skills are fully utilized nearly from purpose of ICT communication devices in teaching student with special needs

Purposes of Communication Technology Devices in Teaching Students with Special Needs

Information and communication devices have many uses in teaching and learning, a few among them are:

1. Through communication technologies images can easily be used in teaching and improve the retentive memory of students.
2. Through communication technologies, teachers can easily explain complex instructions and ensure comprehension.
3. Through communication technologies, teachers are able to create interactive classes and make the lesson more enjoyable, which could improve students' attendance and concentration.

Forms of Information Communication Technology for Pupils with Special Needs

A) Communication Devices for Learners with Hearing Impairment

Hearing impairment general term used to describe disordered hearing. It describe any condition that reduces the hearing activity of an individual and makes it impossible for him/her to perceive and interpret auditing signals (sound). There are different devices that assist learners with hearing impairment, depending on the degree of hearing loss. Some of these devices are puts on the ear, some behind the ear, some inside the ear, some in the canal of the ear and some are implanted in the cochlear. Communication technology devices for students with hearing impairment as revealed by Danlami and Isa (2019) include the following:

Ubiduo Deaf Communication Device:

1. This is a communication device that enables deaf or hard of hearing to communicate instantly with anyone face to face when the interpreter is not available. The communication is done through the device on it screens, without using sign language, gestures, lip reading, finger spelling, or partial expression. The two screens will be dismantled and each person will hold one for chatting.

Behind -the- Ear Aids (BTE)

2. This is a device mostly used by Children. It components are contained in a plastic case which sit behind the ear. The case is connected to an ear mold by a piece of clear plastic tubing. BTE hearing aid may be used by people with any degree of hearing loss and can be very flexible for use with a telephone or assistive listening devices.

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In- the -Ear Aids (ITE)

3. In the Ear aid device is smaller than the Behind-the- ear aid device. It components fit inside of the plastic case which is made to fit the user's ear. The ITE hearing aid is not always the most appropriate choice for pediatric amplification because the aid must be replaced as the child grows.

B) Communication Technology Devices for Learners with Visual Impairment

Learners with visual impairment differ in their level of seeing. Some have low vision, partial sightedness and total blindness. In view of this, the communication technologies devices for learners with visual impairment according to Danlami and Isa (20019) are of different type as follows:

Kurzwiel Reading Machine

1. This machine converts the printed page into synthesized speech by means of special automated scanning system and a mini computer. A book or magazine is placed face down on the glass top of the machine.

Tape Recorder

2. Many People with visual impairment rely largely on tape recorders. Either a cassette recorders or open-reel recorder can be used in variety of ways depending on the needs, assignments, and preferences of the blind persons. Large amounts of information can be recorded on tape rapidly and less expensively than the same information converted into Braille. Often blind employees can get volunteers to do something of this recording or another reader can record it when it is convenient for the visually impaired person to be doing something else.

3. Speech Compressor

This device may be attached to a tape recorder, and it causes the elimination of pauses between syllables and words, thus speeding up the rate at which the speaker speaks. The device has the advantage over the variable speed control on a tape recorder, which include:

i. It does not change the pitch of the voice and, therefore, is more pleasant of listening.
ii. More speed variation can be, accomplished with this method before the speech becomes unintelligible. One visually impaired person who is employed to convert legal briefs into simple concise statements works primarily with tape-recorded materials and then dictates or types her finished product. Attaching a speech compressor to her tape recorder increased her productivity by nearly 50%.

C) Communication Devices for Learners with Learning Disabilities

Children with learning disabilities are those individuals who show a wide range of discrepancy between their performance and the expected outcomes, in reading, writing and arithmetic.

According to Sadiya (2008), the following are some information and communication devices for learners with learning disabilities:

1. Desktops Publishing and Art Design

These can offer a lot of writing skills with different tools that can help them to gain confidence academically and improve their status.

2. Multi-Media

Students with learning disabilities benefits from multi-media in different ways such as encouraging students' creativity and allows them to present information in an exciting manner.

3. Computer Managed Instruction (CMI)

This is designed as learning programmes that is managed by the computer with facility to instruct students to complete certain assignment. Learners can go back to continue their customized programmes for further instruction.

D) Communication Technology for the Gifted and Talented Learners

Gifted and talented are taught using software due to their intellectual superiority according to Danlami (2020) include:

1. Reference software

This software is designed to present wide range of information in a multi-media, graphics, video sequences. This type of software includes encyclopedias; students may have opportunities to access and retain information, which can be presented in variety of ways.

2. Explanatory software

Gifted students like to explore the environment in which they live or belong. With this software, gifted students would be put into the real life setting using a combination of graphics and digitized speech. The simulation requires the user to face challenges, make decision and provide opportunities in sequence to overcome obstacles. This can help to meet the needs of individuals in a class or in a given situation. Students who are gifted can also explore modeled environment without constraints.

E) Communication Technology Devices for Pupils with physical and health impairments

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Children with physical and health impairment comprises of children with neurological disorder, orthopedic disorders and health impairment. Pupils with physical and health impairment have trouble due to injuries in motion, physical strength, coordination and communication with instructional materials. Sadiya (2008) identified the following as communication Devices for this category of pupils with physical and health impairment;

1. **Access software tools:** These software can be used either to compliment a wide range of peripherals while others can be used on their own.
2. **Switches Access software:** The software can be used by students with physical disabilities, the mouse, or keyboard can be used due to limited manual control. In this case, switches can be used in conjunction with a scanning system e.g. a grid with a number of words can increase speed, when the user hits the switch, the word is highlighted at that moment and quickly transfers it to a word processor. It may be slow, but sentences can be gradually built up and read back to the students.

Assistive Technology Software

Assistive technology software is used for helping people with special needs for studying and gaining knowledge. The few assistive technology software used by people with disabilities as opined by Gabriel (2013) are:

1. **Dragon Naturally Speaking (Voice Recognition Software):** Dragon naturally speaking software is a voice recognition programme that allows a user to navigate through and transcribe speech into text on, computer programmes such as Microsoft, word excel and internet explored. This software can be used to teach children with special needs e.g. dyslexic child.

Challenges of Using ICTs in Teaching Pupils with Special Needs

Several factors affect the use of ICTs in teaching children and adults with special needs. The factors according to Danlami and Isa (2019) include:

1. High cost of the devices: The ICT devices are very expensive which makes it difficult for children with special needs to possess them. Parents of these children could not afford the cost of buying them.
2. Socioeconomic status of parent: Due to socioeconomic status of parents of some children with special need, the access and use of information and communication devices becomes very difficult to this category of learners.
3. Lack of computing and technological skills: This is another factor that affects the use of information and communication technology in teaching learning process. Most of teachers of children with special needs are lacking technical Knowhow of ICT devices and way of operating them. This has brought set back in using ICT devices in imparting knowledge to this category of children by using ICT devices.
4. Lack of awareness: Most of the students with special needs are not aware about the usage of information and communication devices. Because of this factor, many of them resort to old method of learning.
5. Lack of training: Most of teachers of children with special lack training on information and communication devices. This factor also affects teaching learning process of children with special needs,

Suggestions

The following recommendations are therefore proffered;

1. The adoption of effective use of ICT for students with special needs should be encouraged at all levels of education.
2. There is need to carry out in-depth research studies on the use and application of ICT devices for various categories of students with special needs.
3. Government should train every special education specialist in computer applications and teacher training institutions should make computer literacy a compulsory requirement for special teachers in the regular schools.
4. Adequate funds should be provided and made available for proper procurement and maintenance of already existing ICT devices
5. The government, school administration, NGOs, professionals in special needs education as well as other stakeholders are expected to collaborate and work as a team to identify the various areas of needs of different categories of persons with special needs and also select technologies that will be appropriate and beneficial to them.
6. Special education teachers should be adequately trained to understand the use and applicability of ICT devices to various categories of persons with special needs, make appropriate adaptations, make useful suggestions and recommendation on best ICT devices to parents, provide maintenance services as well as adapting instructional strategies that will promote effective learning.

Conclusion

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The education of students with special needs should be given the opportunity to maximally benefit from teaching and learning instructions. The use of ICT is designed to establish equal access to learning opportunities and to support those with special learning problems. With the daily and continuous expansion of ICT in Nigeria, there is need to make these devices accessible to students with special needs. ICT will foster enhanced teaching and learning experiences as well as improving the general academic performance of students with special needs in Nigeria.

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