USE OF INFORMATION TECHNOLOGY TO HELP STUDENTS WITH DISABILITIES AND SPECIAL NEEDS

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***Abstract*---Millions of students in Nigeria cannot fully benefit from a traditional education program because they are handicap or in have disabilities that hinder their ability to participate in typical classroom environment. Technology can be used to improve teaching and learning processes in this age of rapid technological advancement. Integrating technology in learning, particularly in higher education, can empower both instructors and learners to improve the quality of education as well as the expected learning goals. The purpose of this paper is to investigate the current educational technologies used in some tertiary institutions in Nigeria and their impact on the learning of students through the following aspects: the adoption of educational technologies in teaching and learning processes by tertiary institutions affects students with the impact of educational technologies. The teaching of academic staff also faces challenges in the adoption of teaching and learning educational technologies. Computer-based technologies can play a particularly important role for these students. Computer technology can not only facilitate a wider range of educational activities to meet a variety of needs for students with mild learning disorders, but there is now adaptive technology that can enable even students with severe disabilities to become active learners in the classroom with their peers without disabilities. The result shows that technology has a positive impact on learning process.**

Keywords: Information Technology ICT, Educational technologies, Technology acceptance Disabilities, Nigerian Tertiary Institutions, E-learning

I. INTRODUCTION

This article provides an overview of the role that Information technology ICT can play in promoting the education of children with special needs within the regular classroom. The Association for Educational Communications and Technology (AECT) defines educational technology as " the study and ethical practices of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources " [1].For example, use of computer technology for word processing, communication, research, and multimedia projects can help the three million students with specific learning and emotional disorders keep up with their nondisabled peers. Computer technology has also enhanced the development of sophisticated devices that can help the two million more severely disabled students overcome a wide range of limitations that impede participation in the classroom from speech and hearing impairments to blindness and severe physical disabilities. Many teachers, however, are not adequately trained on how to effectively use technology in their classrooms, and the cost of technology is a serious consideration for all schools. Technology can be used by all educators who want to incorporate technology in their teaching as well as educational

administrators [2]. Thus, while computer technology can act as an equalizer by freeing many students from their disabilities, the barriers to inadequate training and cost must first be overcome before wider use can become a reality.

Today's children are the first generation of the "digital age." They are being raised in a society that is changing rapidly as a result of the influx of new computer-based technologies that provide more pervasive and faster worldwide links to commerce, communication, and culture. The dramatic changes over the past decade have prompted the Presidential Committee of Advisors on Science and Technology. Many educators believe that the new computer and communication-based technologies have much to offer education and that infusion of technology into school settings will bring profound changes [3]. Many people applaud the integration of computer-based technologies into the classroom for typically functioning students. Fewer individuals recognize the great number of benefits that computer-based technologies may afford children with disabilities. This article focuses on the role that computer technology can play in promoting the education of children with special needs within the classroom. It begins with an overview of children's different types of disabilities and special needs, and an introductory discussion of how technology can help meet those needs. Several more detailed sections follow, describing how particular computer applications and devices make it possible for students with disabilities to be educated in a regular classroom alongside their nondisabled peers. The final section provides a discussion of the barriers to more widespread use of the promising technologies—barriers that must be overcome if schools are to provide greater opportunities for students with disabilities to learn more effectively in regular classroom settings

Children with Special Needs—Who Are They?

Over the past 20 years, the number of students with disabilities has been steadily increasing at a faster rate than both the general population and school enrollment. Many educators perceive technology as a tool for improving the presentation of material for making lessons more fun for the learners and for making administration more efficient. Effective technology use deploys multiple evidence-based strategies concurrently (e.g. Adaptive content, frequent testing, immediate feedback, etc.), as do effective teachers [4]. Today, approximately one of six students in schools in Nigeria cannot benefit fully from a traditional educational program because they have a disability that impairs their ability to participate in classroom activities. Federal law defines students with special needs as those who, because of a disability, require special education and related services to achieve their fullest potential. According to the most recent government statistics, more than 5 million students ages 5 to 18 were receiving special education services during the 1997–98 school year. As shown in Figure 1, students' disabilities ranged from speech and language impairments to mental retardation, and more than half were described as having a specific learning disability due to a psychological disorder. Children with disabilities vary with respect to the type and number of disabilities they have, and their disabilities vary in cause, degree, and the effect they have on the child's educational progress. Although children with disabilities are a very diverse group, data

describing the demographic characteristics of students with disabilities suggest the following:

- More than half of all students receiving special services are males.
- Most are in elementary or middle school.
- Most have no obvious disability; they have problems that are primarily academic, emotional, social, or behavioral.

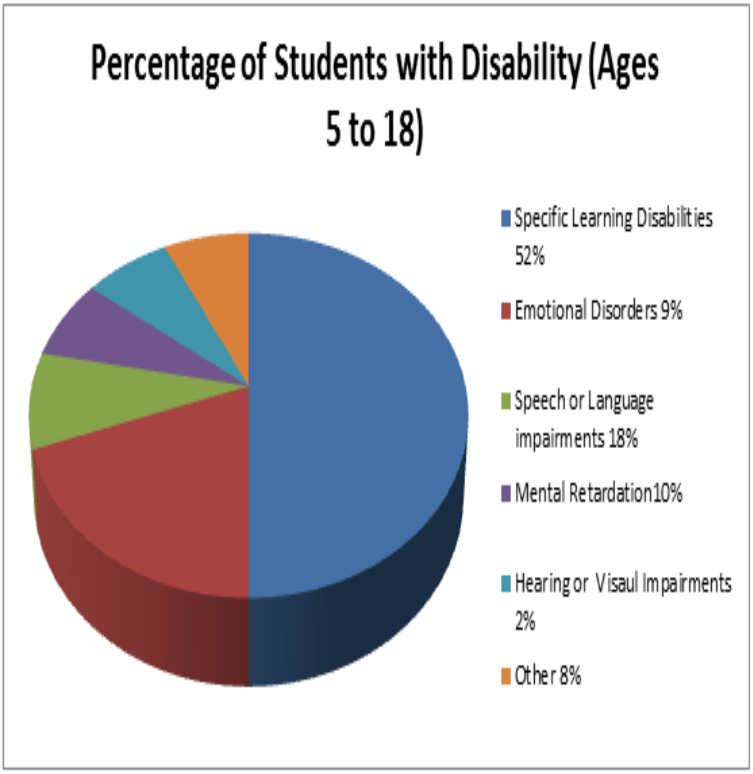
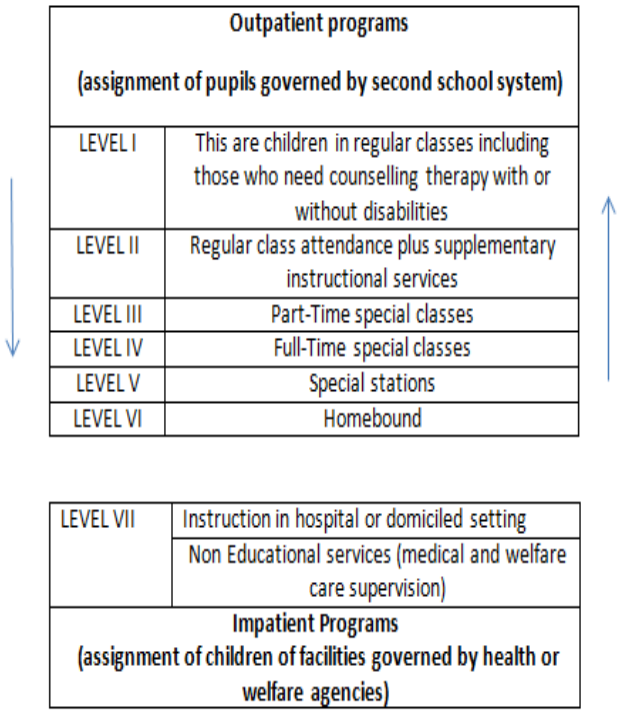


Fig.1. Percentage of students with disabilities

Federal law requires special education services to be provided to all children with disabilities. In Fig.1 Students qualifying for special education services are entitled to a specially designed individual education program at no cost to the parent. This program must meet the child's unique needs, including any necessary changes to the place of instruction–whether it is the classroom, a physical education setting, the home of the child, a hospital, or another institution. Furthermore, special education certifications entitle students to receive all related services (such as occupational therapy and physical therapy) necessary to meet the young person's individual learning needs.

Continuum of least Restricted Environments



Outpatient programs (assignment of pupils governed by second school system)	
LEVEL I	This are children in regular classes including those who need counselling therapy with or without disabilities
LEVEL II	Regular class attendance plus supplementary instructional services
LEVEL III	Part-Time special classes
LEVEL IV	Full-Time special classes
LEVEL V	Special stations
LEVEL VI	Homebound

LEVEL VII	Instruction in hospital or domiciled setting
	Non Educational services (medical and welfare care supervision)
Impatient Programs (assignment of children of facilities governed by health or welfare agencies)	

Fig.2. Continuum of least restricted Environments

Federal laws also specify that students with special needs are to receive their education in what is called the least restrictive environment (LRE), on a continuum with regular education classes on one end and residential institutions on the other see Fig.2. In recent years, demands have increased for serving all students with special needs in the regular classroom, no matter how severe the disability. This approach, called full inclusion, has placed more and more students with disabilities in regular classrooms, requiring teachers to find ways to make the education of these students as appropriate as possible

II Technologies for Students with Mild Learning and Behavioral Disorders

Students with learning disabilities and emotional problems account for almost 60 percent of all children receiving special services in schools today and their numbers are increasing every year. These students often have persistent learning and behavioral problems at school, problems that can only become apparent after teachers work with the students for weeks or months. Such students are likely to receive a broad label stating that their academic and social progress is unsatisfactory due to a disability and their problems often persist despite the efforts of a teacher to meet the needs of their students in the regular program. Most children with mild learning disabilities spend at least part of their school day in the regular classroom, although many of these students find it difficult to keep up with their nondisabled peers and their teachers often find it difficult to spend substantial amounts of time giving them individual attention. Technology has proven to be an effective way for these students to engage in basic drilling and practice, simulations, exploratory or communication activities tailored to their individual needs and skills. The research that examines the potential benefits of computer-based instruction is based on basic theory of learning and is the same for all students, including those with and without minor disabilities. This research shows that the use of technology can enhance the acquisition of skills and knowledge of content by a student when using the computer to deliver well-designed and well-managed instruction. The ultimate goal of a teacher is to help students develop knowledge and skills that can be used in real-world settings. Many computer-based applications–such as the Internet, communication technologies, CD-ROM

reference materials and multimedia presentation tools–can provide opportunities for students to use their skills to engage in real-world projects [7]. The following sections examine several types of computer activities that, when integrated into classroom instruction, appear to have significant benefits for students with mild disabilities: word processing and word prediction software, communication and networking technologies, and the use of hypertext and multimedia projects [8].

Word Processing Software

The attributes of word processing that result in its effectiveness as a learning tool for children with special needs are generally the same attributes that make it effective in general for children. For example, the ease of revising text, producing clean and readable text, and feeling a sense of authorship are often referred to as attributes of word processors leading to improved writing. Researchers have found that students are more willing to edit their work on a word processor than on handwritten drafts to make necessary corrections. The word processor also frees students from the more tedious tasks associated with the editing process which allows them to spend more time on the content of their written products.

Word Prediction Software

Word prediction software is another example of computer-based technology that can make it easier for students to communicate with written language. Used in conjunction with traditional word processing programs, this software reduces the number of keystrokes needed to type words and provides spelling assistance to students of different abilities. For example, a list of words appears in one application that starts with the letter a student presses on the keyboard of the computer. The list is updated as additional letters are added to the sequence to limit the words to the sequence entered. The student simply selects the word to insert it into the written text when the desired word appears on the computer screen. Students with mild learning disabilities benefit from the support provided by word prediction software when trying to produce written documents. To avoid frustration with the act of writing, students with communication deficits often avoid using longer words and complex thoughts. But word prediction software allows students with mild learning disabilities, as well as those with mild communication and motor impairments, to express their words and ideas in the vocabulary that reflects their thinking more closely than in the most spell-friendly vocabulary. Students with mild learning disabilities are thus better able to compete academically in regular classroom settings with word prediction software.

Communication Technologies

Using computers for Internet communication and networking activities can expand the learning environment beyond the walls of the classroom and enable students with disabilities to access and send information literally around the world, just like other students. However, improved systems of access and delivery do not necessarily lead to improved instruction. On the contrary, improved learning depends on the quality of instruction and not on the medium through which it is delivered. Communication technologies become a powerful learning tool only if they offer opportunities for students to gather a wide

range of resources and information and then exchange their thoughts and ideas in collaborative learning environments.

Technologies for Students with Speech and Language Disorders

Communication with other people is one of life's most important aspects. Speech and language impairments address problems in communication and related areas such as oral motor function [9]. Of course, effective communication is important in classrooms where teacher-student or peer-to-peer exchanges are a vital part of the learning process. But communication requires at least two individuals to send information and the other to receive it, and problems arise when a break occurs at either end of this chain, which is common among students with communication disorders Two general types of communication disorders qualify a student for special education services: speech disorders and language disorders. A speech disorder occurs when the articulation, voice quality, or fluency patterns of the speaker impair the ability of the listener to understand the speaker's intent. A language disorder occurs when either the message's sender or receiver cannot use the communication language's sounds, signs, or rules.

Table I; Devices to assist students

Devices to Assist Students with Hearing Impairments
• **Hearing Aids**: The hearing aid is a user-used (listener) miniature public address system. It works best in quiet, structured settings where the speaker is only a few feet away and there is minimizing extraneous noise. Hearing aids are usually available in four styles: body-worn, back-ear, eyeglass, and in-ear. Children of school age use post-auricular hearing aids most often, which are designed to fit unobtrusively behind the ear. Hearing aids can benefit almost all people with hearing loss, including "nerve loss"
• **Frequency-Modulated (FM) Amplification Systems**: The FM transmission device, also known as an auditory trainer, creates a direct connection between the teacher wearing a microphone and the student wearing a hearing aid. Background noise is reduced in this system and it is free for teachers and students to move around the room. Teachers and students have been using FM systems in the classroom for more than 40 years, and they are still one of the most commonly used auditory enhancement devices in schools due to their versatility and portability for use in or outside the school building.
• **Audio Loops**: Another kind of amplification system is the audio loop. It was introduced in an attempt to meet the need to control the sound level of the voice of the teacher, to maintain consistency in auditory signals between home and school, to deal with background noise more effectively, and

to provide maximum mobility in a classroom. An adaptation of the FM device described above, through a specially equipped hearing aid, the audio loop directs sound from its source directly to the listener's ear. Sound can be transmitted via a wire or radio waves connection. Audio loops can be built into a room's walls or created to only surround a section of seats in a room.

- **Infrared Systems:** Infrared systems are invisibly transmitting clean, clear sound to hearing impaired listeners. They provide better hearing in public places without the hassle of wires and cords, and they suffer less from interference from pagers and other external radio signals, but they may have limited accessibility due to issues of line-of-site or distance between the transceiver and the emitter. However, as costs decrease, the popularity of infrared systems increases.

- **Cochlear Implants:**. The implant, which is surgically placed beneath the skin, bypasses the damaged parts of the inner ear and stimulates nerves that have not been stimulated before. Signals are sent continuously when sound is present in the environment, but special circuitry in the speech processor reduces unwanted background noise. A cochlear implant is a relatively new device designed to give people with deep hearing impairments sound information. While hearing aids and other aids are designed to amplify sound, an implant can actually allow the wearer to hear previously indistinguishable sounds.

- **Telecommunication Devices for the Deaf (TDDs):** The TDD, which allows a person without hearing to make or receive telephone calls, is today's most widely used telecommunications device. To display incoming or outgoing messages, the TDD is attached to a phone and resembles a small keyboard with a screen. To record a permanent copy of the conversation, some TDDs have a paper printout. To use a TDD, the user types a message on the keyboard, which is automatically converted into tones and transmitted to another TDD over the phone line, converting the message back into a text form. Although these technologies are not typically used in the classroom environment, for both academic and social reasons, they allow students with disabilities to interact with each other outside the school environment, just as their non-disabled peers do. In this system, both the sender and the receiver of the message must have access to the technology.

- **Captioned Television:** Captioning refers to adding text to a visual display in which the words spoken are viewed as text. The early form of captioning was viewed primarily as subtitles for foreign film translation. Two types of captions are available, open and closed. Open captioning is rarely used as it cannot be switched off and is therefore unpopular with the general public. Conversely, closed captioning is very common and on all modern televisions it can be turned on or off by the user. Since 1993, all television manufacturers have been required to place built-in decoders in their products to provide access for educational and recreational purposes

to people with hearing impairments to closed-captioned television programs and videos. Because consumers buy more than 20 million televisions each year, this technology is available to the majority of classrooms and private homes in this country.

- **Live Speech Captioning:** Live speech captioning is another variation of this technology that enables people with hearing impairments to access words as they are spoken. This technology works in much the same way as steno keyboards used to record court proceedings. Usually a stenographer enters information when captioning is used in educational settings as the teacher talks and the text is displayed on a computer monitor. This technology has proven to be very useful for students with hearing impairments who attend college classes or public lectures

A large percentage of broadcast television is currently captioned, providing equal access to public information and entertainment for individuals with hearing impairments. But while most programs on national networks and cable television channels –as well as thousands of films and documentaries –are captioned, as of 1998 fewer than 10% of educational videos were captioned. Increased captioning could expand opportunities for students with hearing loss and improve reading instruction.

III Challenges Facing the Adoption of Educational Technologies in Teaching and Learning

Although, ICT has the potential of improving educational methods and the quality of teaching and learning, the advantages of ICT are often under-realized [10]. Educational technology is still not being applied sufficiently, mostly for the following reasons: lack of school equipment, the necessary resources and insufficient qualification of teachers for the implementation of these technologies [5]. Some other challenges identified by various researchers are:

- **Inertia**: Some teachers in Nigerian higher institutions are showing acts of unwillingness to accept the new technological advancement. They feel

satisfied with the age long method of instruction (the traditional method) [6]

- **Cost**: The cost of integrating educational technologies in teaching and learning can be expensive, due to the high cost of the ICT equipment and facilities. Some Nigerian tertiary institutions cannot afford to put in place those ICT facilities due to the cost. However, in some cases, some tertiary institutions can afford them; but they do not see investing such huge amount of money in educational technology as a way to improve teaching and learning. Thus, inadequate funding becomes the bane of our educational development in this regard. Without adequate funding, curriculum innovation in the model currently being discussed will be a mirage.

- **Unavailability and Inaccessibility of ICT Facilities**: Many teachers do not have access to ICT facilities in Nigerian tertiary institutions because they are not present in expected quantity or not even in existence at all. Lack of access to ICT facilities like computers and internet can seriously impede what teachers can do in the classroom as regrades to the implementation of its program.

- **Computer Literacy**: Lack of adequate computer literacy by both students and teachers is also another challenge in using educational technologies. As stated earlier, some teachers are not willing to accept technology in teaching; they prefer to use the old traditional method of teaching. They lack adequate skills to access computer and internet, thereby being a very big challenge in integrating educational technologies in their teaching.

- **Lack of adequate power supply**: Power supply can also be a challenge, due to the instability of power supply diesel generators for power supply. Not all tertiary institutions can afford to buy generators, talk less of buying the diesel to power on the generators

CONCLUSION

Current research results have shown that Educational Technology has a positive impact in enhancing student performance and overall processes of teaching and learning. Nevertheless, Nigeria Higher should be prepared to buy updated software and hardware and set up the necessary ICT infrastructure to support the effectiveness of student learning and academic staff. Therefore, before institutions decide to adopt certain Educational Technologies, strategic planning needs to be developed in which their vision and mission should be identified and integrated into their strategy along with the needs of teaching and learning processes. The Nigerian government should also recognize the technology's importance in improving learning. Government should fund higher institutions with a budget specifically for the introduction of educational technology.

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