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Technology, quality learning and student disabilities: Challenges for

Dr Williams Emeka Obiozor, Nnamdi Azikiwe University, Awka-Nigeria

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Technology, Quality Learning and Student Disabilities: Challenges for Nigerian Teachers in the 21st Century

Williams Emeka Obiozor, Ed.D.
Assistant Director, Frederick Douglass Institute for Academic Excellence,
Bloomsburg University of Pennsylvania, USA.
Email: obiozor66@yahoo.com, wobiozor@bloomu.edu

Introduction

The state of Nigerian education system requires a cursory appraisal with progressive ideas to rejuvenate the art of technology, pedagogy and andragogy in all levels; raise the standard and quality of teacher instruction and student learning, as well as graduate skilled and qualified citizens to man several private and public establishments in the country. Such highlighted expectations are in line with different sections of the Nigeria’s philosophy of education which is based on the development of the individual into a sound and effective citizen whose training would facilitate the understanding of the world; the acquisition of appropriate skills and the development of mental, physical, social abilities and competencies as equipment for the individual to live in and contribute to the development of the society (NPE, 2004).

The government and stakeholders in education at the federal, state and local levels have continuously struggled with reforming the Nigerian educational system to be more effective, in order to create an atmosphere of individual student achievement and school success, comparable to global trends (Obiozor & Pang, 2008; Obiozor, 2010). The educational training, individual skill acquisition and overall institutional success in contemporary Nigerian colleges and universities must be supported with modern technology – classroom technological tools and resources, assistive technological devices for exceptional students and other forms of educational technology materials utilized by contemporary teachers.

A major challenge for the Nigerian education system lies on possessing the ability to provide high quality curriculum (involving technology, content and effective curriculum, instruction and assessment procedures) for students in early childhood, primary, secondary and higher education levels. Unlike Nigeria, developed nations like the United States, Britain, Germany and France have utilized technology to aid learning in the public schools system, and have achieved great success in the process. Quality teaching and learning backed by modern educational technology tools and resources would facilitate in the graduation of highly skilled individuals whose contributions would assist in the quest for a technologically developed Nigeria.

Furthermore, the provision of effective technology-based teaching and learning in Nigerian public schools, tertiary and higher education system would enhance competitive global learning and development. Such learning could be accessed through various media, like the multi media electronic technology, classroom devices, the web and Internet, computer applications and online assessment and research resources for all students and teachers, including assistive devices for exceptional students. These are among the learning and disability challenges which Nigerian education stakeholders face in the 21st Century.

According to Omotayo (1997), the Nigerian university system enjoyed general support from the Federal Government of Nigeria in the 70s, which were years of oil boom. Nigeria experienced a sharp decline in oil revenue in the 1980s, as a result of the world oil glut and poor internal management of resources. Since all the federal universities depended heavily on the government for their funds, the economic downturn took its toll on these institutions. Omotayo further reported that
the effect was so bad that the basic needs for teaching, technology and research could not be met and the universities soon became a shadow of their past. Most institutions of higher learning in Nigeria lack the much needed modern, sophisticated, computerized equipment and technological tools for teacher training, and students as well.

In this regard, teacher training with outdated technology tools in Nigeria has to be addressed and replaced as the country reflects on her 50 years of independence. Lamenting on the poor technology facilities at the University of Nigeria, Offorma (2009) revealed that since the inception of the Faculty of Education in 1961, most equipment and facilities in the Faculty were manufactured by Ford-USA, and purchased in the 1960’s, (Faculty Procurement Document, 2009). Offorma further stressed that the machines are outdated and can no longer serve or satisfy the demands of the 21st Century technology and achieving knowledge based economy. Moreover, the spare parts of the broken down machines and equipment are no longer existent in the market. These technology gadgets are no more relevant to the current technological needs and demands of the new millennium.

It is then beyond ones imagination on how such a nation’s first indigenous institution and other Nigerian universities in similar situation could be training and graduating 21st Century technology compliant individuals needed in the contemporary Nigerian economy and global market. Therefore, in rethinking teacher quality in this information, communication and technology (ICT) age, and in celebrating the 50 years of Nigeria’s independence; the stakeholders of Nigerian teacher education should rethink, reconsider and recognize the need for technology and quality learning in all educational levels, as well as begin to focus more attention on equipping teachers and students with global technology skills and resources within and outside the classrooms.

In recognition of the relevance of technology and quality learning in the public schools system in Nigeria, the students with disabilities equally require appropriate assistive technology devices, tools, resources and related services to aid their learning, job skill development, life skills training and transition into adulthood, and the community by special education teachers/qualified professionals.

The Issue of Learning and Disabilities

The concept of learning involves acquiring knowledge, ideas, experiences, skills and practical application of what is learned within and outside the environment to better the individual’s life and community. The North American educationist John Munro explained that learning is deliberate and purpose oriented, and learners perceive desirable outcomes. Munro added that a major problem for contemporary education involves encouraging students to engage in learning; stressing that a key aspect of individual difference in learning is that some students

(a) are not interested in learning
(b) don't feel challenged to learn
(c) are not motivated to learn.

The highlighted situation above may be as a result of how the students are taught, the instructional resources available, or depends on several issues the individual student may be encountering cognitively or otherwise. This calls for concerted efforts by the stakeholders in understanding learning, especially the classroom teacher who must motivate student learning through instruction with various media, devices and applying effective strategies to encourage individual learning success.

According to AARP (2009) when we learn, we organize, shape, and strengthen our brains. In their opinion, AARP said that humans are learning machines who learn on a daily basis from birth.
with their brains capturing varied experiences and encode them into a web of nerve connections. Through the functional interactions of the brain and other biological systems in the body, humans apply all they learn and attain their goal in life. Imagine individual students with cognitive disorder or the following 13 categories of disabilities, namely:

- physical, emotional, learning, autism, traumatic brain injury (TBI), deaf and hearing loss,
- visual impairment, other health impairments, specific learning disabilities, speech or
- language impairments, traumatic brain injury, visual impairments including blindness (Gargiulo, 2009).

What do you think would be the students’ experiences in the teaching-learning process without assistive technology? It is obvious that students with disabilities require specialized and individualized instruction, experiential learning with therapeutic services, including the utilization of appropriate technology tools and assistive technology devices to facilitate their daily interactions within the environment.

There are great expectations for contemporary Nigerian teachers of students with learning disabilities and related areas to utilize technology, apply student-centered teaching techniques and differentiated instructions in their classrooms. For the students with disabilities, the effort would aid in effective transition from early childhood, elementary, junior, senior classroom settings, to postsecondary education options (maturing into adulthood) and community integration. What these students learned at school, determines the shaping of their future, and the future of the nation. This is because as youths; they are the future leaders of Nigeria.

Aside from the acquisition of adaptive behavior, job skills, and general life skills, students with disabilities are faced with daily academic and social challenges within the classroom, around the school premises, in the home and community settings. The ability to cope with life at home, the school and the community, rests on parent and teachers, for the preparations of their future. Every support counts for these exceptional students, and such support facilitates positive problem solving process for the student when he or she experience feelings of denial, frustration, anger, anxiety, shame and low self-esteem brought about by either the peers or environment.

In the light of the above, quality learning for students with disabilities in Nigeria, requires an understanding of the student disabilities by the classroom teacher, trained in the field of special education; and equipped with the appropriate skills and technology gadgets to work with students in the inclusion or special classrooms. Through appropriate assessment and evaluation of the student by such professional, coupled with the application of appropriate intervention strategies and placement options with assistive technology devices, the teaching-learning transaction would become meaningful. Students with disabilities are expected to acquire and use information through various media and technology; thus, their ability to communicate, interact and be productive individuals within the community.

The 21st Century teachers worldwide have the task and mandate of facilitating the realization of such goals for every student through quality teaching-learning transactions using up-to-date technology, guided by effective curriculum that reflects global education, and access to national research materials and resources. In Nigeria, training for students with disabilities have not been effective and very rewarding due to poor special education provisions, ineffective planning and implementation strategies by the Federal Ministry of Education and related agencies (Obiozor & Pang, 2008; Obiozor, 2010). All these issues discourages school enrollment by many students with disabilities. In addition, families of students with physical motor development, visual impairments, audibility and speech impairments, among others, may find it difficult to encourage public school
attendance and community integration of these individuals with special needs because of the absence of supportive facilities within the environment.

In essence, quality teaching and effective learning process for students with special needs require a lot of time, motion, patience and attention. The student learning and training must be practical, hands-on experiences/activities to facilitate the acquisition of relevant knowledge, skills, attitudes and values (Offorma, 2009). Therefore, quality learning for students with disabilities would take place successfully in a technology-enabling environment where students are supported with appropriate services and teacher application of effective instructional strategies using technology resources; including the provisions for assistive devices, classroom technology tools and resources.

**Technology and Individuals with Gifts and Talents**

Technology in education assists teachers and students to improve on their academic, work and related activities. Talented and gifted students in Nigeria need appropriate curriculum, content and technology devices (just like those with disabilities) to facilitate effective learning. Potential skills, intelligence, creativity, and talent have been central to the various definitions of giftedness, according to Heward (2009); and students who fall in this category of giftedness possess multiple intelligences – linguistic, logical-mathematical, bodily-kinesthetic, spatial, musical, interpersonal, intrapersonal, and naturalist. It is pertinent to note that gifted and talented students operate above average ability, engage in task commitment and creativity (Lindsey, 2008); therefore, teachers must identify their strengths and apply technological principles and practices in the classroom to challenge them in the daily teaching-learning activities.

Nugeni (2001) researched on a broad spectrum of issues using technology with gifted students, and found out that as many as 8 of every 10 new jobs may involve information technology. Nugeni pointed out that an effective learning environment for the gifted students should be learner centered; support independence; reflect an open attitude to support new ideas, innovation, and exploration; focus on complexity; use various grouping techniques; utilize a flexible structure; and incorporate high mobility. She stated that the integration of technology provides gifted students with opportunity to be active in their own learning; to work at their own pace and ability level; to create innovative products; to eliminate repetitive learning; to be empowered to take on new roles as risk-takers, leaders, or facilitators; to practice using tools with real-world application; to do independent research; to explore topics in greater depth; to think critically about real-world situations; and to collaborate with others as problem solvers. It is, therefore, essential that students learn to be adaptable and flexible, to assume responsibility for learning, and to think critically (Lindsey, 2008). Nugeni further reported that some of the focus of technology with gifted students incorporates Internet usage (e.g., research, online mentoring, electronic mail, listservs, virtual publishing, distance learning) and multimedia presentation tools, which result in creative products that include videos, slide shows, newsletters, and a variety of types of presentations given via the computer (Lindsey, 2008). Nugeni cautioned, however, that teachers of gifted students should not let technology become the focus of the educational experience. It is merely a tool through which curriculum content is communicated.

**Concept of Technology-Based Teaching and Learning**

This section is influenced by the *engagement theory* which according to Kearsley & Shneiderman (1999) is intended to be a conceptual framework for technology-based learning and teaching. The fundamental idea underlying engagement theory is that students must be meaningfully engaged in
learning activities through interaction with others and worthwhile tasks. While in principle, such engagement could occur without the use of technology, Kearsley & Shneiderman believe that technology can facilitate engagement in ways which are difficult to achieve otherwise. Examples include, use of videos in the classroom, overhead projectors, PowerPoint slides, and computer devices to enhance student understanding of the course content. In the light of the above, students with disabilities require educational technology, assistive technology devices, hands-on activities, collaboration and interactive learning in the least restrictive environment, consistent with constructivist approaches. Kearsley & Shneiderman further explained that all student activities involve active cognitive processes such as creating, problem-solving, reasoning, decision-making, and evaluation. In addition, students are intrinsically motivated to learn due to the meaningful nature of the learning environment and activities.

Kearsley & Shneiderman (1999) reminded us to note that the focus of engagement theory on meaningful and real-world learning activities is consistent with a more general trend in education. For example, the U.S. Department of Education and U.S. Department of Labor jointly fund the National School to Work program (see http://www.stw.ed.gov) aimed at helping young people make the transition from school to careers and lifelong learning. In the process of the lifelong learning, technology resources and devices are provided for students within and outside the classroom to facilitate student engagement and experience; understanding of the program content and student achievement. Such domain may be relevant to the engagement theory.

Furthermore, the Nigerian policy on education recognizes the need for student engagement in the teaching-learning process, as well as the application of technology in the education system. The NPE (2004:42) document promised the following:

At the very early phases of the education system, efforts shall be made to inculcate an attitude for and appreciation of the role of technology in society. To accomplish this, students shall be made to appreciate the dignity of labour by using their hands in making, repairing and assembling things”.

In the Special Education policy, the NPE emphasized the need for technology training for professional teachers and students, with the integration of exceptional students, provision of assistive technology, equipment, resources and materials, e.g. Braille for the visually impaired, speech synthesizers, hearing aids, wheel chairs and prostheses for the physically handicapped, typewriters, audio-visual equipment, internet facilities for the gifted and talented, among others.

It is pertinent to note that the integration of technology into every aspect of the teaching-learning process has become the trend for global education. Public school teachers in developed and developing societies are expected to embrace the use of technology and technological tools in the teaching-learning process. This expectation is equally applicable to the use of technology in educating children or students with special needs via special education programs. Igwe (2005) rightly pointed out that children are presently in a world that is changing in all spheres: scientific and technological, political, economic, social, and cultural. The emergence of the 'knowledge-based’ society is changing the global economy and the status of education (Unesco 1998). Nigeria must tag along in the quest for a literate community with productive citizens trained in different technological fields to emerge as a technologically-driven society.

These new possibilities could exist largely as the result of two converging forces, according to Igwe (2005) stating: First, the quantity of information, much of it relevant to survival and basic well-being, is exponentially greater than that available only a few years ago, and the rate of its
growth is accelerating. A synergistic effect occurs when important information is coupled with a second modern advance, the new capacity to communicate among people of the world. The opportunity exists to harness this force and use it positively, consciously, and with design, in order to contribute to meeting defined learning needs. This requires substantial public and private sector investments in software research and development, hardware, and refurbishing schools. Without international co-operation and assistance, the poorest countries could fall still further behind. Parents and the public at large, in the industrial countries at least, are unlikely to accept the notion that education should be less well equipped with the new technologies than other areas of social and economic activity (Hawkins 1998).

New outlook, motivation, structure, skills, attitudes, and knowledge of modern technological teaching tools and resources are required in Nigerian public schools for quality and effective teaching to take place. Teachers must be technologically-trained, motivated and challenged to teach with the appropriate classroom technological gadgets and resources as it is practiced in developed societies. Contemporary theories of motivation notes the importance of being challenged for motivation: “activities must be optimally challenging to be interesting and to promote intrinsic motivation” writes Deci & Ryan (1992, page 11); pointing out that in schools, the facilitation of more self-determined learning requires classroom conditions that allow satisfaction of three basic human needs—the innate needs to feel connected, effective, and agentic as one is exposed to new ideas and exercises new skills. Teaching with technology devices in the classroom would greatly support this academic process.

**Significance of Assistive Technology for Students with Disabilities**

Lahm & Elting (1989) gave a detailed account of the essence of adaptive assistive technology for students with disabilities; thus:

Today, a nonverbal child speaks with the help of an electronic communication aid. A student with learning disabilities masters math facts using a computer game. A child with vision problems can benefit from an inexpensive device that enlarges printed words on the computer screen. And for more severe vision problems, there are speech synthesizers that can be used with computers to convert typewritten words or text into an electronic voice. For the child who has a physical disability, there are special devices that will allow him or her to input information into the computer without using the conventional keyboard. This can be done through the use of a single switch or some type of voice recognition system. There are other alternative input devices that can be used simply by touching the computer screen or touching points on a touch-sensitive tablet that correspond to the points on the computer screen. Computer and other technologies have expanded and enriched lives and given many children with disabilities options not imagined a decade ago.

There is a wide array of assistive technology, so too are there many decisions, choices and options for families and professionals. Steinhoff, Jordan & Babbit (2009) highlighted the significance of adaptive input and output devices available to individuals with disabilities which could enable them to cope and perform different activities within their community — school, home, playground, neighborhood, etc.

Examples, the sip-and-puff switches, eye movement and eye gaze systems, head movement systems, manual switches, light-sensitive systems, movement- or voice-activated systems, and pressure-sensitive systems. Graphic tablets, like pens,
eliminate the need using the keyboard to input data. Also, a number of external touchpads or gridpads (e.g., Critique’s Easy Cat TouchPad) can be used instead of a mouse to access and run programs. Voice input devices permit the user to issue commands and inputs text and data by voice rather than manually inputting the commands. Sophisticated systems can translate speech into text, computer-generated speech, and video sign language (e.g., icomunicator). There are also screen magnification programs, designed for individuals who are blind or have low vision, have as their primary purpose the magnification of images on the standard computer screen (CRT).

Classroom Technology Tools & Resources for Exceptional Students

Technology in education and technology resources should be accessible to all training institutions, irrespective of student abilities or disabilities. Although utilized more in developed nations, Nigerian school authorities could take advantage of the varieties of high-tech assistive and adaptive technology products, augmentative and alternative communication devices, computer access equipment, multilingual speech synthesis and voice recognition software for students with disabilities to use at school, home and workplace. There is also a great selection of virtual on-screen keyboards, voice-enabled communication boards, as well as cognitive rehabilitation tools adapted to the special needs of individuals with disabilities or exceptionalities.

Parentpals.com Special Education Guide, a United States-based advocacy group on disabilities and learning support provided examples of the technology tools and methods to facilitate learning for exceptional children in the school environment. Burkhart (1993) stressed on the advantages of encouraging the use of adaptive assistive technology to teach children with disabilities. For instance,

- improves self-concept and self esteem
- provides motivation
- reduce frustration and behavior problems
- increase participation in daily life
- facilitates learning by making learning interactive instead of passive
- changes expectations of others for child's potential

Descriptions of Assistive Technology Products (courtesy of microsoft.com)

Alternative input devices allow individuals to control their computers through means other than a standard keyboard or pointing device. Examples include:

- **Alternative keyboards**—featuring larger- or smaller-than-standard keys or keyboards, alternative key configurations, and keyboards for use with one hand.
- **Electronic pointing devices**—used to control the cursor on the screen without use of hands. Devices used include ultrasound, infrared beams, eye movements, nerve signals, or brain waves.
- **Sip-and-puff systems**—activated by inhaling or exhaling.
- **Wands and sticks**—worn on the head, held in the mouth or strapped to the chin and used to press keys on the keyboard
- **Joysticks**—manipulated by hand, feet, chin, etc. and used to control the cursor on screen.
- **Trackballs**—movable balls on top of a base that can be used to move the cursor on screen.
- **Touch screens**—allow direct selection or activation of the computer by touching the screen, making it easier to select an option directly rather than through a mouse movement or keyboard. Touch screens are either built into the computer monitor or can be added onto a computer monitor.

**Braille embossers** transfer computer generated text into embossed Braille output. Braille translation programs convert text scanned-in or generated via standard word processing programs into Braille, which can be printed on the embosser.

**Keyboard filters** are typing aids such as word prediction utilities and add-on spelling checkers that reduce the required number of keystrokes. Keyboard filters enable users to quickly access the letters they need and to avoid inadvertently selecting keys they don't want.

**Light signaler alerts** monitor computer sounds and alert the computer user with light signals. This is useful when a computer user cannot hear computer sounds or is not directly in front of the computer screen. As an example, a light can flash alerting the user when a new e-mail message has arrived or a computer command has completed.

**On-screen keyboards** provide an image of a standard or modified keyboard on the computer screen that allows the user to select keys with a mouse, touch screen, trackball, joystick, switch, or electronic pointing device. On-screen keyboards often have a scanning option that highlights individual keys that can be selected by the user. On-screen keyboards are helpful for individuals who are not able to use a standard keyboard due to dexterity or mobility difficulties.

**Reading tools and learning disabilities programs** include software and hardware designed to make text-based materials more accessible for people who have difficulty with reading. Options can include scanning, reformatting, navigating, or speaking text out loud. These programs are helpful for those who have difficulty seeing or manipulating conventional print materials; people who are developing new literacy skills or who are learning English as a foreign language; and people who comprehend better when they hear and see text highlighted simultaneously.

**Refreshable Braille displays** provide tactile output of information represented on the computer screen. A Braille "cell" is composed of a series of dots. The pattern of the dots and various combinations of the cells are used in place of letters. Refreshable Braille displays mechanically lift small rounded plastic or metal pins as needed to form Braille characters. The user reads the Braille letters with his or her fingers, and then, after a line is read, can refresh the display to read the next line.

**Screen enlargers, or screen magnifiers**, work like a magnifying glass for the computer by enlarging a portion of the screen which can increase legibility and make it easier to see items on the computer. Some screen enlargers allow a person to zoom in and out on a particular area of the screen.

**Screen readers** are used to verbalize, or "speak," everything on the screen including text, graphics, control buttons, and menus into a computerized voice that is spoken aloud. In essence, a screen
reader transforms a graphic user interface (GUI) into an audio interface. Screen readers are essential for computer users who are blind.

**Speech recognition or voice recognition programs**, allow people to give commands and enter data using their voices rather than a mouse or keyboard. Voice recognition systems use a microphone attached to the computer, which can be used to create text documents such as letters or e-mail messages, browse the Internet, and navigate among applications and menus by voice.

**Vocalize** is a talking communication board for people with speech impairment or severe communication difficulties. An innovative speech assistant that is developed with speech impaired persons to enable them to speak in a friendly human voice using standard computer equipment. It's simple to learn and very easy to use. This breakthrough product features an ergonomic on-screen keyboard and high-quality multilingual text-to-speech output.

**Text-to-Speech (TTS) or speech synthesizers** receive information going to the screen in the form of letters, numbers, and punctuation marks, and then "speak" it out loud in a computerized voice. Using speech synthesizers allows computer users who are blind or who have learning difficulties to hear what they are typing and also provide a spoken voice for individuals who cannot communicate orally, but can communicate their thoughts through typing.

**Talking and large-print word processors** are software programs that use speech synthesizers to provide auditory feedback of what is typed. Large-print word processors allow the user to view everything in large text without added screen enlargement.

**TTY/TDD conversion modems** are connected between computers and telephones to allow an individual to type a message on a computer and send it to a TTY/TDD telephone or other Baudot equipped device.

**Captioning technology**: Captions are words displayed on a television screen that describe the audio or sound portion of a program. Captions allow viewers who are deaf or hard of hearing to follow the dialogue and the action of a program simultaneously.

**Auditory Learning gadgets**
Special education teachers trained in auditory learning are experts in the improvement of the auditory learning environment in our schools to enable ALL children an equal opportunity to hear and learn. This need is critical due to the substandard classroom acoustics (per ASHA and ANSI) that fail to satisfy the immature auditory capabilities of ALL children, even those with normal hearing. Educators have always incorrectly assumed that children can hear the same as an adult; yet in fact, a child's auditory capabilities are not fully developed until age 15 requiring a louder signal (the teacher's voice) and a quieter environment. Additionally, approximately one third to one half of ALL children have some sort of hearing problem that puts them at an even greater risk for learning. The result is that ALL children are being denied an opportunity to hear and learn (http://www.parentpals.com). Children with this kind of disability in Nigeria require such assistive devices, including hearing aids, Cochlear implants.

Public schools could utilize and integrate a simple cost-effective technology known as a Classroom Sound Enhancement System (SES). This technology works by using an infrared wireless
microphone to amplify the teacher's voice and ceiling speakers to evenly distribute that voice around the classroom. In essence, every child gets a "front row seat" allowing an equal opportunity to hear and learn.

**One Hand Typing and Keyboarding** (Half Qwerty Half Keyboards)
Half QWERTY is for the user who recently was an excellent typist with two hands. Half Qwerty uses the skills that have been acquired after many years of typing with two hands. Half Qwerty allows the remaining strong hand to do what it has always been trained to do, on the side of the keyboard on which it has always typed.

Each of those keys on that side does double duty. They type the key they would normally type, then, when one of the keys on the opposite side is needed, the user holds down the space key, and key does the other letters from the other side of the keyboard. Originally a software, now sold as keyboards instead. Advantages of using Half Qwerty (from their advertisements)

- *If the user was an adept two handed typist before losing the use of a hand, Half Qwerty shortens the learning time compared with the cord one handed keyboards.*

Furthermore, the one handed keyboard could be used for a student with physical disability or writing deficiency (learning disability) although critics for this teaching tool discourage such use. The argument is that after the first week of use, 99 percent of all of those keyboards will live in closets and never be used. WORSE, the child thinks it is their fault. A terrible tragedy! Allow them to learn on the same keyboard you are using today. That is what they want - to be great typists, and compete and play with their friends. Using a one-handed keyboard makes them type slower and feel disabled ([http://www.parentpals.com](http://www.parentpals.com)).

**iPod**
The *iPod* is a combination pocket touch computer, portable digital media player and hard drive from Apple Computer. Students can surf the web, email and play games. Games for iPod touch are made to take advantage of its built-in technologies such as the accelerometer, Multi-Touch, Wi-Fi, and Bluetooth wireless technology. The result is truly immersive gameplay — whether the exceptional
child is playing alone or with others in multiplayer mode. It facilitates interactions and great source of therapy for students with emotional, learning, communication, physical disabilities, etc. The fun of iPod touch never ends.

**Other Classroom Technological Devices** (Linsey, 2008)

**Light Pens**
These are input devices used with specialized software to draw images in color directly on the display screen of the monitor (CRT). They can be also be displayed by professionals and exceptional individuals who have problems using the computer keyboard to run programs by pointing the light at objects or instructions on the monitor screen. For example, pointing at a picture of a trash basket will clear the screen and create a new file.

**Wordprocessors/Desktop Publishers**
Desktop publishing programs are specialized word processors that allow the user to design newsletters, posters, banners, fliers, greeting cards, or other documents.

There are also Videos, Overhead projectors, Slide projectors, PowerPoint slides and other computer application devices which teachers and students could use in the teaching-learning transaction. Computers are important in education because they force us to reconsider how people learn, how they are empowered, and what the nature of learning and useful information is. We cannot avoid the presence of computers in our schools because they are forcing educators to re-evaluate the very nature of what and how we teach (Gulley, 2003).

**The 21st Century Challenges**

Many Nigerian instructors at different levels of education are faced with integrating educational technology into teaching, especially on the acquisition of skills for accessing and utilizing classroom technology devices or on operating a set of modern instructional equipment, particularly computer equipment, electronic gadgets, instruments, machines, and other modern teaching devices. The 21st Century global technology trends, research and training developments pose great challenges for teacher education, educational administration and technology in Nigeria. There are inadequate educational technology tools, technology resource materials, devices and infrastructures, outdated technology curricula and assessment methods, poor human and financial resources in the educational sector, lack of access to vital technology information and resources for learning in the public schools; are some of the major issues institutions in Nigeria are confronted with on a daily basis. This is in spite of developments in Nigerian economy, information and communication technology, which have opened new doors for professionals in different segments of the society.

In discussing the Availability and Use of Information and Communication Technology (ICT) in Six Nigerian University Library Schools (another significant place where the use of ICT for student instruction needs improvement), Abubakar (2010) advised Nigeria to strive to transform the teaching-learning process via properly harnessing and integrating the efficacy of information and communications technology into library education and training. Such project would assist the educational sector in facilitating access to quality technology books, materials and resource materials in Nigerian schools. Abubakar further stressed that the advent of the electronic mail, PCs on every desk, the Internet and its application to education have produced amazing results; while Hawkins (2002) notes that knowledge and information have become the most important currency for productivity, competitiveness, and increased wealth and prosperity. Nations have placed greater
emphasis on developing their human capital with technology; and governments around the world are focusing on strategies to increase access to technology and improve the quality of education.

Furthermore, technology in education as vocational training tools is significant for the rehabilitation and graduation of qualified skilled exceptional individuals in various sectors of Nigerian economy via technical education, business and industrial skill training programs. The vocational, technical and skill training institutions in Nigeria require up-to-date machineries, technology equipment, experts and computer laboratories for industry trainers and vocational educators to use technology to enhance the training in specific job skills. The availability of needed technology resources facilitates the preparation of students for the world of work, and helps them to train and perform in many jobs or professions. There are equally challenges with the development of hands-on practical curriculum, appropriate technology content and effective instructional delivery to students in Nigeria - a country with epileptic electric power supply, poor school facilities, ill-equipped teachers and inadequate technology resource base.

Furthermore, the support for an effective and implementable disabilities and special education legislation pose a challenge to the government of Nigeria unlike in the United States where it is very strong. People with disabilities, along with their families and advocates, including disability service providers in the USA pressured upon the Congress to pass effective disability laws; as well as emphasized the importance of technology and support services in technology for people with disabilities. It is the reverse in Nigeria since families and advocates of children with disabilities have limited access to the elected representatives, policy makers and government officials. Besides, government agencies, corporate and non-governmental organizations in Nigeria are not committed to the cause of special needs people. In the light of the above, three major problems are identified:

- People with disabilities and those involved with them, such as parents, siblings, friends, teachers, counselors, and employers, lack knowledge of and training in the use of technology and support services or the benefits that such technology and services would provide.
- Funding for technology and support services is uncoordinated, severely limited and primarily dependent on a personal source of assistance or aggressive action by an individual to make it available from a nonpersonal source.
- There is no comprehensive system in place to help people with disabilities acquire technology, to ensure that such technology is appropriate or customized to meet an individual’s unique needs or circumstances, or to provide training in, upgrading, replacement, or repair of such technology (The Technology-Related Assistance for Individuals with Disabilities Act of 1988).

**Recommendations**

Nigeria should emulate developed nations to formulate effective policies and laws to support students/persons with disabilities and provision of special education services. In drafting the legislation, local and state government support for individuals with disabilities must be clearly emphasized. There should be federal support for the development of statewide programs in technology-related assistance to people with disabilities. Assistive technology device, assistive technology service, individual with disabilities, and technology-related assistance, should be top priority in the government laws on disabilities and special education services. This is an excellent process of utilizing national funds and resources to support the citizens.

The federal government should allocate adequate budget for science and technology research development projects. There should be technology awareness and development collaboration amongst the stakeholders in education, sponsored by multinational oil corporations in Nigeria, local
government and state authorities, for the training of skilled technicians, engineers, electronic computer experts, petrochemical technologists and allied manpower needed in Nigeria’s industrial growth. The United States of America have a brilliant package for her citizens when she signed into law the *Technology-Related Assistance for Individuals with Disabilities Act of 1988, P.L. 100-407.* The National Institute on Disability and Rehabilitation Research (NIDRR), Office of Special Education and Rehabilitative Services, U.S. Department of Education, are responsible for administering the legislation. The primary purpose of the legislation has been to assist states in developing and implementing statewide programs of technology-related assistance for meeting the needs of individuals with disabilities. The program has enabled individuals with disabilities to acquire assistive technology devices and services. Furthermore, all states in America have the opportunity to get federal assistance for developing and establishing their statewide program.

Provision of adequate funds to develop and promote technology is vital to the growth of Nigeria’s manpower and industrial base. The Education Trust Fund (ETF), Petroleum Trust Fund (PTF) and National Universities Commission (NUC) intervention projects should focus more on equipping all institutions of higher learning with technological equipment to meet the needs of all courses/fields; mandate private institutions to provide standard technology tools for professional training and acquisition of the students and trainees.

Government should ensure the provision of constant supply of electricity to power the technologies, including the need to provide enabling environment for practical laboratory trainings and research in ICT products with the goal of manufacturing computer software and hardware products locally, effectively design technology-related teaching tools and programs for industrial development.

Ensure quality assurance standards, and inculcation of National consciousness and patriotism through programmes organized for staff (Offorma, 2009). In this area, appropriate policies safeguarding technology procurement, administration, services, instruction, procedures and practices must be geared towards the promotion of mastery and skills acquisition. It must encourage students to exercise control and choice in their learning by developing self-regulatory behaviors, learning how to learn, monitoring their learning progress and generally becoming more independent as learners.

Library Schools in Nigeria have to some extent some IT facilities which they use for a variety of activities. However, there is the need for the acquisition of more ICTs because the existing ones seems not to be adequate especially the Internet facility (Abubakar, 2010). In order to meet the demands of higher education, Akindoijutimi, Adewale, and Omotayo (2010) acknowledged that the government intervened through various programmes which have helped university libraries; however, the authors reported that some of these interventions have not been beneficial, as in the case of central book purchase. Future interventions must involve the end users—librarians and library administrators, so that the best results can be achieved. This is the era of e-books, Internet, web and online library technology which should be explored in full by all Nigerian university libraries.

The public institutions should connect, consult and collaborate with other international special education centers and public schools in developed nations and tap on their advancement in classroom technological devices and assistive technology for students with disabilities. This venture would assist in harnessing the 21st Century technology for inclusion, technical education and skills training in Nigeria. The United States, for instance, have resources and skilled professionals with advanced technological experiences and application which would provide resources for skills and knowledge acquisition necessary for the advancement of both general education and teacher training.
in Nigeria in the 21st century. The federal, state and local government education authorities should support the advocacy for teacher and student skill training development in the field of science and technology through the provision of funds, incentives and resources.

Conclusion

The world is constantly changing and ways in which we function at home, work and school are also changing. The speed at which technology has developed plays a major role in these changes. From e-mail to on-line classes, computers are definitely influential in our lives, and can enhance the learning process in schools in various ways. With the increasing popularity of computer technology, it is essential for administrators to support and encourage computer technology in our education systems (Gulley, 2003). Nigeria has the capacity to fund and promote technology education, quality learning and enhancement of learning for all students, but ignorance and corruption has contributed to the neglect of these sectors. It is imperative for the government to review its education policies, fund the provision of technology tools, equipment, resources, and quality technical support to the technology sector.

Alabi (2004) concludes that the most important assets in every form of university education are the faculty and students, and notes that if quality people are not put at the centre of the process of giving and receiving knowledge, the process is bound to fail. Technology has the power to improve teaching and learning. It is a new age, a time of exciting discoveries and unexpected challenges, where the real excitement for teachers (as well as students) lies in hands-on exploration of the newest gadgets and techniques (Roblyer, Edwards & Havriluk, 1997). Modern technological tools and resources are highly required in Nigerian institutions to facilitate quality learning for all students. As Gulley (2003) puts it, computer technology is a positive supplement to bridge the gap between education and the technological world in which we live. Computer-assisted technologies in schools offer students greater access to information, an eager motivation to learn, a jump-start on marketable job skills and an enhanced quality of class work. Nigeria should improve in these areas in order to be complaint with global education and market trends.
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