



## **Educational Technology: Abridging the Distance for Students with Learning Disabilities Through Electronic Learning**

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### **Abstract**

In most societies, the impacts of the mentally and physically disabled/challenged have not been given considerable attention. These challenged persons, who suffer from mental and physical handicaps, ranging from mental illness, intellectual disability, hearing impairment, mobility impairment - deformed legs, withered (emaciated or thin) hands or fingers, acquired brain impairment, medical impairment, vision impairment, and learning disability. Consequently, mobility and other impairments may be severely affected, which may require special aids or mobility device(s). Eventually, this may interfere with their opportunity to study in formal school set-ups. Citizens with these types of disabilities have suffered untold hardship in attempt to meet their social, political, educational, and other life realities. Academically, some have been deprived of admissions due to their physical and mental challenges, believing that they will not cope with the required academic demands in schools; or, that management cannot bear the responsibility of taking extra care for such individuals' special needs. They have received less attention, or completely being neglected in terms of their educational and other needs. As a result, these underprivileged individuals need special services or assistance that will aid their full participation in the society. Therefore, we are in a digital era where citizens are no longer constrained or restricted to a particular place or environment, and where most times, physical mobility may not be necessary to perform some duties. Thus, this paper examines the major challenges faced by this group of people, and how electronic education could specifically ameliorate their academic needs in our society by suggesting inclusive education, principally in Nigerian context, where admissions into educational higher institutions have become a nightmare in view of inadequate facilities. The authors systematically reviewed some related literature on the topic and suggested/recommended a number of measures that could be employed to solving the academic or learning needs of this group of neglected citizens in the society.

**Keywords:** Learning disabilities, Electronic learning, Electronic teaching, Special education, Distance education, and Inclusive education.

### **Introduction**

The use of digital technology in modern society has given a voice to the invisible, silence or the marginalized groups (Rodríguez<sup>1</sup>, García-Jiménez<sup>1</sup>, Massó-Guijarro<sup>1</sup>, & Cruz-González, 2021). Under normal circumstances, every citizen is entitled to any form of enjoyment or pleasure, or exercise on an equal basis with others, and of all human rights and fundamental freedoms in the political, economic, social, cultural, civil, and any other field. It includes all forms of discrimination, including denial of reasonable accommodation (UNESCO, 2014). In concord, and with reference to European citizen, Bjekic, Obradovi, Vucetic and Bojovi (2014) avowed that people with disabilities are entitled to the same human rights as all other citizens. This declaration not only applies to European citizens, but to all citizens anywhere in the world.

The overall importance of education in any society cannot be overemphasized. Education has been referred as the basic human right and the foundation for a more just and equal society (UNESCO, 2009). The United Nations (UN) and the European Commission Conventions on Human Rights declared that active participation of persons with disabilities in the society is one of the basic human rights (Vukomanovic, 2017). Globally, the persons with disabilities have been the most neglected group in the society. UNESCO (2014) noted that learners with disabilities at all levels of education – pre-school through to adult education – are vulnerable to exclusion from educational opportunities. Educationally, all citizens of a country should have equal chance to education irrespective of whether they are, or not physically handicapped.

Therefore, since education is the right of every person, there is need for nations worldwide to create an enabling environment, an accessible and adapted course for students with various disabilities to meet their educational requirements. Consequently, as outlined by the above scholar, this participation cut across the under-listed areas of human living or life.

1. Accessibility to available goods and services in the society.
2. Ensuring that they equally participation and enjoy all the benefits of being a citizen of a given society.
3. Ensuring equity by combating discrimination based on physical disability and promotes equal opportunities for all.
4. By providing significantly employment for persons with disabilities in the open labour market.
5. Ensuring inclusive and equal access to quality education, training, and lifelong learning for citizens with disabilities so that they can participate fully in society and improve their quality of life.
6. Ensuring social protection by promoting decent living conditions, combat poverty and social exclusion.
7. Ensuring equal access to health services and related facilities.
8. Ensuring external promotion and rights of people with disabilities in the larger society and international development programmes.

The above, as listed, have been the major challenges of the disabled persons, or people with special educational needs worldwide. Nonetheless, with constant advances in technology, the increasing

barriers in the application of Information and Communication Technologies (ICTs) in the education sector, many of these barriers have been bridged and more educational opportunities created for the disabled persons to overcome the challenges formally encountered in the conventional education systems (Vukomanovic, 2017).

It is paramount to know exactly persons with special educational needs. As observed by Bjekic et al (2014), in most European countries, which may not be different from other countries globally, many people with special educational needs usually include the following subgroups:

- (1) people with specific learning disabilities
- (2) persons with visual impairments
- (3) persons with hearing impairments
- (4) people with slower cognitive functioning
- (5) autistic people
- (6) people with neurological and other diseases
- (7) people with complex cognitive, emotional and social difficulties
- (8) people with multiple difficulties
- (9) people with speech and language disorders.

Nowadays, as expressed by Barrett (2011), e-education (e-learning and e-teaching is the central part of e-education) of students with disabilities, which is already on the increase. As a result, this paper looks at how this neglected group will be assisted with new technologies to give them the undeniable access to educational opportunities that were not attainable in the conventional educational institutions as other citizens in the society.

### **Literature Review**

Scholars have expressed dissatisfaction that despite the presence of Information and Communication Technologies (ICTs) in many Western countries for some decades, much of the research on integrating ICTs in education sector has always focused on benefits by children without disabilities (Lei and Zhao, 2007; Hayes, 2007; and Samuelsson, 2010). But with little empirical research in regards to how ICTs enhance the participation of children with physical disabilities in school activities has emphasized reasonable benefits (Hasselbring and Glaser (2000) & Brodin and Renblad (2009)

Nevertheless, available literature emphasized that ICT has the potential to enable children with physical disabilities to participate fully in everyday activities, e.g. access to the class curriculum (Hasselbring and Glaser, 2000; Brodin & Lindstrand, 2004). Dikumar (2018) in concord with the above scholars declared that the implementation of technologies in special education allows simplifying the communication and improve the academic skills of students with disabilities.

In the same vein, the World Health Organization (WHO) as well stressed that assistive technology device (ATD) is one of the strategies that could be used by children with disabilities to improve functioning and minimize the impact of environmental barriers to their participation in everyday life (Lidström & Hemmingsson, 2014). Priest and May (2000) reported that in a survey that teachers held the opinions that laptop computers increased quality, speed and ease of written output, which eventually improved self-confidence in students with mild motor impairment and also enabled equity with peers.

Really, educational technology is playing a very significant role in the education of the citizens, predominantly through the application of electronic teaching and learning. Bjekic, et al (2014) opined that electronic learning technology can promote the inclusion of students with various disabilities in education; this is a situation that is rarely seen before the 21<sup>st</sup> Century. In concord with the above scholars, Vukomanovic (2017) affirmation that with the increasing application of information and communication technology in education process, have created countless opportunities to overcome the barriers, usually encountered in the time-honoured educational systems. E-learning provides the possibility to apply an individual and inclusive approach in teaching and learning.

UNESCO (2011) and Bjekic et al (2014) as well affirmed that there is need for the implementation of electronic learning and teaching components in order to support the education of students with specific learning disabilities. This is because some subgroups of students with special educational do receive less attention.

It has also been observed that they are one of the most vulnerable subgroup of humans, whose educational needs are often being neglected in the society (Bjekic et al, 2014). Therefore, electronic learning opportunities of the educational systems are especially important for students with disabilities, as there are still barriers to physical accessibility of educational institutions in our today's society. Electronic education should therefore be employed by all levels of our educational institutions in order to add flexibility to the teaching and learning process that will be education. In support of this argument, Bjekic et al (2014) stated that here is need for inclusive education policy, which will definitely consider different subgroups with special educational needs.

In the same regard, (Fichten, Ferraro, Asuncion, Chwojka, Barile, Nguyen, Klomp and Wolforth (2009) have affirmed that the increased use of information and communication technologies in everyday life and development of adaptive hardware and software have allowed individuals with disabilities to do things that were difficult or impossible for them to do in the past. It is on this premise that Bjekic et al (2014) opined that this is the “digital natives” era, and the teachers should be ready to use positive aspects of spontaneous informatics and computer literacy of the students with whom they work. This therefore means that the teachers as well need to be retrained to meet the demands of the digital natives, which the physical challenged, are not excluded.

However, for a better understanding of the subject matter in this research work, there is need to concisely examine the conceptual meaning of major terms as discussed hereunder.

**Disability:** Disability is referred to as a growing concept, which results from the interaction between persons with impairments, attitudinal and environmental barriers that hinder their full and effective participation in the society on an equal basis with others; for instance, those with long-term physical, mental, intellectual or sensory impairments, which in interaction with various barriers may hinder their full and effective participation in society on an equal basis (UNESCO, 2014). Tugli, Zungu, Ramakuela, Goon and Anyanwu (2013) described disability as any form or shape is a phenomenon that has social, emotional and resource implications for individuals who are classified as functionally disabled.

**Electronic Teaching:** Precisely, Bjekic et al (2014) gave a conceptual meaning of the term “electronic teaching” as, “The system of learner activities and teacher activities in the instruction supported and shaped by the information-communication technology and electronic engineering solutions”. (P. 129).

**E-teacher:** E-teacher is used to describe the teachers in the school systems who teach by applying ICT according to e-learning principles (Bjekic et al, 2010).

**Electronic Learning:** This is also referred to as e-learning. Aparicio, Becao, and Olivaira (2016) defined electronic learning as an umbrella term in which technological tools are aggregated (combined) to provide students with a comprehensive learning environment. Similarly, Boahen (2013) refers to it as: “a modern way of having access to learning and teaching material or information at any given time and place with the use of available technology, and mostly done on the Internet or Intranet”. (p. 2). Additionally, in view of the broad field of e-learning, it is very difficult to give a comprehensive definition; hence, Salyers, Carter and Carter (2014) defined it as, “An integration of pedagogy, content, and technologies within a teaching and learning context” (P.315). E-learning has been describes as the use of information and communication technology to enable access to online learning\teaching resources (Alqahtani, 2016).

**Assistive Technology:** This refers to any hardware or software, used to increase, improve or maintain capabilities of persons with disabilities (Bouraoui et al., 2007). Assistive technology enables people with disabilities to perform tasks or assignments that are sometimes complex or impossible to do without technical aid, and helps them to achieve their scholar, professional and social inclusion. Computer stands out as one of the most important and constituent of assistive technology for students with disabilities. Barden (2017) defined it as various devices, equipment, and systems that are used to help students bypass, maintain, compensate, overcome, or enhance any learning deficits and capabilities of disabled students.

**Assistive Technology Devices:** This refers to tools, hardware and software that serve to adapt computers and other devices so that persons with disabilities can effectively use them. Examples are screen magnifying software, Braille alphabets, special keyboards or adapters for the keyboard

and the mouse (Vukomanovic, 2017). BATA (2011) as well suggests that it is “any item, equipment, hardware, software, product or service which maintains, increases or improves the functional capabilities of individuals of any age, especially those with disabilities, and enables them more easily to communicate, learn, enjoy and live better, more independent lives”. These devices are exclusively designed to assist and enable an individual’s participation, to a varying degree, in all occupational performance areas, but particularly in education, communication and play (Gillette, 2016; Chantry and Dunford, 2010; Rose, Hasselbring, Stahl & Zabala, 2015).

**Learning Disabilities:** Kabuta (2014) defined disabilities as “The consequence of an impairment that may be physical, cognitive, mental, sensory, emotional, developmental, or some combination of these. One disability could be a result of birth complications or it could develop along a life continuum as a consequence of a disease or accident.” (P.14).

**Distance Education:** Sloan Consortium, which conducts research on contemporary distance learning, defines distance education as “An online course as one with at least 80% of the course delivered online without face-to-face meetings.” (Dykman and Davis, 2008). Zandberg and Lewis (2008) defined distance education as “a formal education process “where the teachers and students are in different locations and courses are delivered via audio, video (live or prerecorded), or Internet or other computer technologies.” Kabuta (2014) however revealed that the above definitions were based or focus mainly on the current Internet-based online method of distance education and overlook the historic methods of distance education.

**Special Education:** Simith in Adima (1991) defined it as “that profession concerned with the arrangement of educational variables leading to the prevention, reduction or elimination of those conditions that produce significant defects in the academic, communication, locomotor or adjective functioning of children. While the National Policy on education (date???) defined it as “The education of children and adults who have learning difficulties because of different sorts of handicaps: blindness, partial sightedness, deafness, hardness hearing, hearing, mental retardation, deafness, social maladjustment, physical handicap, etc due to circumstances of birth, inheritance, social position, mental and physical health pattern or accident in later life.”

**Inclusive Education:** UNESCO (2009) defined inclusive education as a process of strengthening the capacity of the education system to reach out to all learners. As an overall principle, it should guide all education policies and practices, starting from the fact that education is a basic human right and the foundation for a more just and equal society”” (p. 8).

**ICT:** This is an abbreviation for Information and Communication Technology. UNESCO (2009) refers to it as the equipment and services related to broadcasting, computing, and telecommunications, all of which process, store, and transmit information through computer and communications systems.

**Inclusive education:** Refers to a process of adjusting the home, school and the larger community to accommodate persons with special needs (Okongo, Ngao2, Rop, & Nyongesa (2015).

### **Types of Impairment**

There is no gainsaying that there are individuals with physical disabilities irrespective of where they are positioned on the planet earth. This group of persons suffers from all sorts of human deprivations within their geographical delineations. It is worthwhile to identify some of these persons with the physical disabilities. Nonetheless, Desch (2008), WHO (2001), Almqvist (2005), Odabaşı (2009) and (2009) have identified some of these physical disabilities as discussed hereunder.

1. Children with motor impairment (e.g. cerebral palsy, acquired brain injury),
2. Speech (communication),
3. Visual (blind, low vision), and
4. Hearing impairment (deaf, hearing loss).

The scholars affirmed that several studies have shown that their participation in school activities is restricted when compared with children without disabilities.

### **Need for E-education for Students with Specific Learning Disabilities**

The power of information and communication technology (ICT) cannot be overemphasized. Fichten, et al (2009) has discovered the potentials of electronic learning in teaching and learning processes. The scholars stressed that e-learning technology can promote the inclusion of students with various disabilities. Lidström and Hemmingsson (2014) affirmed that ICT has the potential to enhance participation in educational activities for students with physical disabilities. Incorporation



teaching and learning processes in education will increase the students “digital skills” and give them unrestricted access to physically challenged students particularly in developing countries (Lidström and Hemmingsson, 2014).

Electronic teaching has offered opportunities for millions of citizens globally. Bjekic, Obradovic, Vucetic and Bojovic (2014) have offered a precise meaning of the term electronic teaching. This, the scholars declared thus: “It includes the system of learner activities and teacher activities in the instruction supported and shaped by the information-communication technology and electronic engineering solutions”. (p. 128).

ICT gives free access to education of students with special needs or difficulties as it as weell has significant impact on teachers and teaching processes. It also helps to reduce the social disparities between pupils, since they work in teams in order to achieve a given task (Bjekic et al, 2014). Students also assume responsibilities when they use ICT to organize their work. Fichten et al (2009) affirmed that e-learning technology can promote the inclusion of students with various disabilities. When e-learning is used in teaching persons with disabilities, the use of assistive technology becomes inevitable. Assistive technology as Vukomanovic (2017) declared includes tools, hardware and software that serve to adapt computers and other devices so that persons with disabilities can use them. The scholar further asserts that some of the examples are screen magnifying software, Braille alphabet, special keyboards or adapters for the keyboard and the mouse. As outlined by the above scholar, this participation cut across the under-listed areas of human living or life.

1. Accessibility to available goods and services in the society.
2. Ensuring that they equally participation and enjoy all the benefits of being a citizen of a given society.
3. Ensuring equity by combating discrimination based on physical disability and promotes equal opportunities for all.
4. By providing significantly employment for persons with disabilities in the open labour market.
5. Ensuring inclusive and equal access to quality education, training, and lifelong learning for citizens with disabilities so that they can participate fully in society and improve their quality of life.

7. Ensuring equal access to health services and related facilities.
8. Ensuring external promotion and rights of people with disabilities in the larger society and international development programmes.

There is need for the teachers' information and communication technologies (ICTs) competencies to meet the educational demands of students with specific learning disabilities. In this respect, some pertinent questions need to be asked.

1. Are the teachers awareness of the ICTs?
2. Are the teachers ready to use ICTs?
3. Can the teachers drill and practice with ICTs?

These significant questions need to be answered to better meet the demands of students with specific learning disabilities. As Schertler and Bodendorf (2003) observed, for the teachers to really assist the students with specific learning disabilities, they should be able to adapt to the electronic learning content and support communication between students and tutors. Bjekic et al (2014) has as well acknowledged that ICT is important supportive technology for education of students with disabilities.

### **Teachers' Roles for electronic education**

Recently, e-learning and e-teaching are playing significant roles at all levels of the education system. This has been affirmed by Saimi and Yamat (2021) as they opined that "in modern era, information and communication technology (ICT) competency has been getting a lot of attention in educational programmes and institution in most countries in the world." (p. 221). The scholars (Guillo & Guillo, 2017) cited an example in Philippines where National ICT Competency Standard has been established for teachers to show support to guarantee the significance of ICT competency in education among teachers and students. This programme, as the scholars declared demonstrates that Information and Communication Technology competency is highly required among teachers and to prepare them for future education, particularly as it concerns the education of persons with disabilities in our society.

Teachers, especially the digital immigrants are confronted with the modern generations of students, who are enriched with computers as their major medium of communication. As (Bjekiü, 2014) put

literacy of the students with whom they work. On this premise, Anderson and Weert (2002) emphasized that the duty of the teachers is to massively acquire and improve knowledge and skills of teaching electronically-enhanced courses and of guiding students' learning.

In addition, the scholars affirmed that the teachers have to teach in inclusive educational context. Bond & Castagnera (2006) informed that inclusion movement offers a variety of positive academic, social, and behavioral opportunities for students with special needs. In addition, the scholars further avowed that inclusive (comprehensive or all-encompassing) education policy considers different subgroups with special educational needs.

As per the teachers' role in electronic learning, Awouters et al (2008) identified three dimensions of the teachers' ICT-competencies, such as

- i. the teacher knows what learning activities ICT can be used in teaching (ICT awareness),
- ii. the teacher has the necessary skills for using hardware and software (ICT readiness), and
- iii. the teacher knows the pedagogical-didactical elements of ICT (ICT drill and practice).

The teachers' ICT integration and/or competencies as observed by Jimoyiannis and Komis (2007), imply that teachers' have –

- i. the knowledge of pedagogy that is applicable to the specific content,
- ii. the knowledge of how subject matter is transformed by the application of technology,
- iii. the knowledge of how technology can support pedagogical goals.

Similarly, Schertler & Bodendorf (2003) have as well broken the teacher activities in e-teaching scenarios into two major tasks, such as

- i. providing the content for the students, and
- ii. supporting communication between students and tutors.

These tasks, as further stated by the scholars pose problems to immigrant teachers, who are only familiar to the traditional methods of teaching until now. Therefore, modern teachers' e-teachers should be able to organize different types of e-learning and e-teaching scenarios. Salmon (2007) has also identified and emphasized on the importance of e-moderation in different teaching situations supported by the ICT. Pertaining to the teachers' roles in e-teaching, especially in the inclusive

e-tutors/e-moderators in e-learning. The central roles as identified by to the scholars are:

- (i). Content facilitator (ii). Metacognition facilitator (iii). Process facilitator (iv). Advisor (counselor) (v). Assessor (formative and summative) (vi). Technologist (vii). Resource provider.

While the peripheral roles are: (i). Manager and administrator (ii). Designer (iii). Co-learner (iv). Researcher.

### **Disability Students' Role for electronic Education**

Bjekic (2014) affirmed that e-learning can offer great opportunities to students with disabilities.

On that note, for students with disabilities to benefit from the dividends of new technologies, there is need for massive training of handicapped students to acquire computer literacy, which is the power engine of the new technologies.

### **Importance of Assistive Technology for Children with Disabilities'**

Achieving high educational goals by children with disabilities have always been very difficult in comparison with others normal children in view if numerous challenges they face, such as, discrimination, inequality and poverty in all ramifications of their life activities. This is due to the fact that they do not receive adequate educational opportunities to enhance their living. However, the development of assistive technology has changed the way disable children learn, as they presently feel equal with different social groups in the society. These new technologies have removed most obstacles hindering the educational goals and their way of life. They have received a chance to achieve the same educational success like other youths in contemporary society.

### **Summary**

There is no doubt that new technologies are reshaping almost all human activities on the planet earth. The use of ICTs in the education sector cannot be overemphasized in recent times, especially its adoption to meeting the needs of students with disabilities. This paper has discussed major terms as contained in the subject matter. It equally discussed some challenges, and how electronic education could ameliorate the academic needs of people with special disabilities in our society by providing inclusive education, chiefly in Nigerian context. The authors reviewed some related literature on the topic and suggested measures to solving the academic or learning needs of this group of neglected citizens. Additionally, the role of teachers' in an attempt to provide inclusive

education for the physically challenged was as well discussed. Similarly, the authors also stressed for massive computer literacy for children with disabilities in order to gain from the benefits inherent in technology education. Appropriate recommendations to enhancing the technological capabilities of the students with disabilities were not left out.

### **Conclusion/Recommendations**

Research has it that “students with certain biological and physical characteristics have traditionally been disqualified from accessing conventional education, with the supposition that educational institutions, such as universities were not the place for disabled students... (Riddell, Wilson, and Tinklin (2005). Barden (2017) argued that certain individuals being physically and mentally challenged, does not signify that they cannot perform well in the academics or professional life. With the advent of elearning, education is no longer a laborious work for disabled students. Research shows the implementation of technologies in special education allows simplifying the communication and improve the academic skills of students with disabilities (Dikusar, 2018). The use of technology in instruction has been recognized as most important for people with disabilities have been recognized by (Tugli, Zungu, Ramakuela, Goon and Anyanwu, 2013). There is no ambiguity that adoption of electronic education is being recognized nationwide, and its implementation in teaching-learning is constantly on the increase, and helps to breaking the barriers for people with disabilities, and as well providing access to the most relevant educational programs (Dikusar, 2018). Modern technologies, if properly applied, will break the barriers that impede persons with disabilities, and give them undeniable access to modern education and get the desired resources/information online (Dikusar), 2018). This group of persons with disabilities require assistance, support, including special services or caregivers, which are prerequisites for their full participation in society (Tugli, Zungu, Ramakuela, Goon & Anyanwu, 2013). Consequently, there is need for government at all levels, policy makers, educational planners, educationists’ and educational institutions to develop a web application that converts the traditional methods of studying, which was done physically in the presence of students into an electronic format that will enhance self-studies (Boahen, 2013). There is need for inclusive education policy via electronic

Government should, as a matter of urgency employ a variety of technological tools/devices to create equal access opportunity for all learners (Lorenz, 2016), and for the benefits of our citizens and that of the nation at large. Finally,, the government should as a matter of urgency provide some assistive technologies' for learning and in-class activities, such as Touch screen, Screen reader, Screen magnifier, Alternative keyboards, Voice recognition software, Text-to-speech, Braille embossed, refreshable Braille display, etc. (Dikusar, 2018). Sargrad (2018) also advocated that schools should address discrepancy in computer literacy, so that students, who are unacquainted with the use of computers, are not left behind.

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