# Technology Integration in Teaching-Learning Process: The Benefits, Challenges, and the Prospects

By

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**Abstract**

Technological advancements of the 21st century have changed almost all aspects of human activities, and the education industry is not excluded. Most countries around the world are focusing on approaches to integrate Information and Communication Technology (ICT) in teaching-learning and to improve the quality of education by emphasizing competencies, such as critical thinking, decision-making, and handling dynamic situations that may arise within the environment. Consequently, there is a need for technology integration in all areas and levels of the Nigerian education system, as research has it that the use of Information and Communication Technologies (ICTs) effectively enhances teaching and learning processes. Consequently, both teachers and learners/students need to develop technology skills or competence for effective teaching and learning processes to take place in modern classroom environments. Therefore, the purpose of this write-up is to advocate and emphasize the adoption of ICTs to support teaching and learning by discussing the inherent benefits of this learning technique in the education sector for intending adopters. The paper also tried to explain some salient terms/phrases for a better comprehension of this mode of instruction. It further stressed the need for technology presence in schools to enable teachers and students to have hands-on experience and expertise to cope with the demands of the new instructional strategy. The authors additionally discussed the pitfalls inherent in this new method of instruction and made some vital suggestions to minimize these challenges/problems.

**Keywords:** Digital literacy, Technology integration, Computer-assisted instruction, Virtual learning, and ICTs.

## Introduction

Education is viewed as the backbone of every nation, and the introduction of ICT in the education sector has profound implications for the whole education process, especially in dealing with key issues of access, equity, management, efficiency, pedagogy, and quality (Kundu, 2018). Information and communication technology (ICT) is a force that has changed many aspects of the way we live in the 21st century. Globally, technology integration in schools is given a high priority, especially in the developed world. This has been affirmed by Bansal (2016). The scholar stated that in developed countries (i.e., Britain, USA, and elsewhere), there has been a steady embedding of digital and networked technologies in the classroom, with the widespread use of interactive whiteboards, virtual learning environments, educational computer games, and increasing reliance on the internet application, including email and e-learning.

In the same manner, Kundu (2018) also acknowledged that integrating ICT in teaching-learning is high on the educational reform agenda of many countries, and that modern education is no longer restricted to the classroom, but the development of technology has brought out the whole world outside the classroom. Additionally, Fife & Pereira (2003), in concord stated that most countries around the world are focusing on approaches to integrate ICT in learning and teaching to improve the quality of education by emphasizing competencies, such as critical thinking, decision-making, and handling dynamic situations.

Therefore, there is no doubt that teachers', particularly in developing societies, like Nigeria find it particularly challenging, if not impossible to integrate technology into the teaching-learning process, even when the technologies are available and easily accessible to them. Most digital immigrant teachers are resistant to innovative ideas or technology adoption in modern classroom environments. Presently, there is an increase in the use of technology for instructional purposes at all levels of the education system, and teachers and other educators are constantly improving the effectiveness of technology used to facilitate learning. Leaders/stakeholders in the education industry, at both the state and local levels, are expected to increase access to educational technologies, and secondly develop plans to effectively utilize these technologies in the classroom setting (Davies & West, 2014).

Lidstrom & Hemmingsson (2014), Ghavifekr, Kunjappan, Ramasamy& Anthony (2016), Bariu (2020) and Adarkwa (2021) noted that nations around the globe have recognized the fundamental role, which Information and Communication Technologies (ICTs) are playing in all facets of human endeavour and the education sector. For instance, it has been widely believed that intelligent tutoring systems could be used to enhance teachers' ability to teach and test students (Davies & West, 2014). As a result, it has become imperative for every teacher and student/learner that wants to be successful in the education process to become technologically literate and skilled to meet the present digitalized instruction in the contemporary education system.

This write-up highlights and/or advocates for the need for the integration of technologies in the education system, while outlining the major benefits and challenges of ICTs integration in teaching and learning processes based on current literature. The authors further discussed the prospects of these technological devices/tools in the education sector, while making necessary suggestions or recommendations for policy-makers and key stakeholders to ameliorate the challenges or problems to better integrate ICT in teaching and learning in the future.

Nevertheless, there is a need to conceptualize the meaning of major terms or phrases for a better comprehension of the subject matter.

**Technology:** To many, technology is synonymous with computer equipment, software, and other electronic devices. This definition, according to the U.S. Department of Education (2010) and Woolfe (2010) is rather narrow. However, technologies are viewed as tools used by individuals in carrying out their tasks (Tripathi & Jigeesh, 2015). Leask (2013) has also conceptualized technology as the multiple technological resources that teachers use in the school setting to support teaching and learning.

**ICT/ICTs:** An abbreviation for Information and Communication Technology (ICT), while ICTs refers to Information and Communication Technologies (ICTs). Information and Communication Technology has been used by academic researchers since the 1980s. According to Thakar (2015), the term became popular after it was used in a report to the UK government by Dennis Stevenson in 1997 and the revised National Curriculum for England, Wales, and Northern Ireland in 2000.

ICT refers to a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information (Bizi & Shittu (2014) and Kundu (2018). It is a combination of devices and technology resources, which are used to manipulate and correlate information (Kaware & Sain, 2015). ICT is a system that gathers different information or data to communicate over some distance with the help of modern technology Kundu (2018). ICT has also been defined as Information and communication technology (ICT) as all devices, tools, content, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realizing the goals of teaching, learning, enhancing access to and reach resources, the building of capacities, as well as management of the educational system. ICT will not only include hardware devices connected to computers, and software applications, but also interactive digital content, internet, and other satellite communication devices, radio and television services, web-based content repositories, interactive forums, learning management systems, and management information systems Kundu (2018). They will also include processes for digitization, deployment, and management of content, development, and deployment of platforms and processes for capacity development and creation of forums for interaction and exchange (Euller & Seufret, 2003).

**Digital Literacy:** Oriji (2021), in his book titled: "*Computer Basics for Beginners: A Textbook for Tertiary Institutions*", conceptualized "Digital literacy" as the skills required by individuals to function effectively within the community or society; it is the individual's ability to find, evaluate, and compose clear information through writing and other broad range of devices, such as Laptops, Smartphones, Tablets, et center; it is the ability to use information and communication technologies to accomplish tasks. Martin and Grudziecki (2015) emphasized

that in the electronic-permeated society that is increasingly unpredictable and uncertain, digital literacy becomes not only a key factor in enabling participation in education, as well as employment and other aspects of social life but also a means of gaining some understanding of the world.

**Computer-Assisted Instruction:** Computer-assisted instruction (CAI) is a narrower expression and most frequently refers to drill and practice, tutorial, or simulation activities offered either by themselves or as supplements to traditional, teacher-directed instruction. Computer-assisted instruction is one example where programme learning has been combined with powerful media and technology to produce expensive and impressive learning systems. A computer-assisted instruction provides individualized instruction/tutoring, motivates, encourages, or inspires students to go through a unit or course through its varied presentation modes and by immediate instant feedback, and encourages learners to proceed with the lesson.

**Virtual Learning:** The term or phrase *"Virtual learning"* is frequently associated with online courses or online environments. It is a learning experience that is enhanced via the use of computers and/or the internet. It refers to an environment where students study a digital-based curriculum taught by instructors that lecture online through video or audio techniques. This instruction can take place either in a self-paced (asynchronous) environment or in a real-time (synchronous) environment (https://www.vedamo.com/knowledge/what-is-virtual-learning/).

**Technology Integration:** Technology integration has been narrowly defined as the use of computer equipment, software, and other electronic devices in the classroom. However, Davies, Sprague and New (2008) conceptualized technology integration as the effective implementation of educational technology to accomplish intended learning outcomes; any tool, piece of equipment, or device-electronic or mechanical—that can be used to help students accomplish specified learning goals. It includes both instructional technologies, which focus on those technologies teachers employ to provide instruction, and learning technologies, which focus on technologies learners use to accomplish specific learning objectives.

**Online learning:** Online learning has been defined as a teaching and learning process between teachers and pupils that involves various digital mediums, such as 'WhatsApp', 'Zoom', and 'Google Classroom' (Basar, Mansor, Jamaludin, & Alias, 2021).

**Information and Communication Technology Tools**
Many people have heard of the ellipsis (abbreviation) "ICT", but have not asked what constitutes it. Technology tools cover all electronic and digital devices such as computers, the internet, and other multimedia technology (Zakaria & Khalid, 2016). As discussed earlier, they are technological advancements or electronic devices of the 21st century used for the advancement of human society. Information & Communication Technology is recognized as an important catalyst for social transformation, and also an important tool for education (Kundu, 2018). According to Wikipedia Internet (2010), these technologies include computers, the Internet, email, web-based PC, Mobile phone, wireless sets, projectors, interactive boards, broadcasting technologies (radio and television), and different interactive boards. Oriji (2021), Hastur and Dogan, 2016), and Pittas and Adeyemi (2019) have succinctly listed some of the ICTs tools as listed hereunder. They are:-

(1). Laptops/Personal computers (2).Multi-media projectors (3).Video conferencing software (4).Televisions (5).Radios (6).DVDs (7).CDs (8).Interactive whiteboard (9).Scanners (10).Printers (11).Intranet (12).Email (13).Videophone systems (14).Tele and video conferencing devices (15). Wireless application protocols (WAP) (16). Microwaves (17).Cell phones (18).Video cassettes (19).Audio cassettes (20).Satellites (21).Internet, including its tools (WhatsApp, YouTube, Twitter, Blogs, Skype, Google, Google Docs, Google spreadsheets, Yahoo, etc.) (22). Androids tablets (Pittas &Adeyemi, 2019), (23). iPhones, iPads, iPods (23) MS PowerPoint, MS Word, MS Excel, Mobile phones, SMS text, websites, etc. This list cannot be exhausted in this write-up.

Information and Communication Technology tools have become both the backbone of the information age, as well as an important catalyst and tool for inducing educational reforms that change our students into productive knowledge workers (Bonk et. al, 1989).

Uses/Benefits of Technology Integration in Education
Presently, even as Kundu (2018) perceived, the most dominant pedagogy in most schools in Nigeria is still teacher-centered and rote learning-based. The scholar further observed that neither teachers nor students are well prepared to adopt the student-centered pedagogy in an ICT-rich environment. In concord with the above scholar, Pittas and Adeyemi (2019) assert that only a small percentage of teachers integrate technology into teaching.

Consequently, there is a need to move away from the traditional mode of instruction to 21st Century method where ICTs are taking the major role.

There is no gainsaying that the utilization of ICT has made a significant contribution and improvements in the quality of education. The use of ICT promotes a favourable learning environment because the use of multimedia makes the learning environment within the classroom lively and suitable to the needs and requirements of the students (Kaur, 2015). Gray, Thomas, & Lewis (2010) noted that the quality and availability of educational technology in schools, along with the technological literacy of teachers and students, have increased significantly in the past decade.

There is no gainsaying that the dictate to integrate instructional technology into the teaching and learning practice stems from 2 under-mentioned fundamental beliefs, as imagined by McMillan-Culp, Honey, & Mandinach, (2005) and the U.S. Department of Education (2010). These are:-
(i). that learning can be enhanced through the use of technology
(ii). that students need to develop technology skills to become productive members of society in a competitive global economy (McMillan-Culp, Honey, & Mandinach, 2005; U.S. Department of Education, 2010).

Kaur (2015) asserts that through ICT, schools can bring about improvements in the quality of education at a lesser cost. In other words, the use of ICT is economical. ICT integration, especially computers, helps in recording and processing students' information, which could be stored as software and also printed on paper. Students' results are compiled with the use of ICTs, such as Microsoft Excel and Word. Educational technology enables teachers to perform their teaching jobs faster and timely exchange of information between students and parents. ICTs allow students to monitor and manage their learning without direct intervention. ICTs enhance critical thinking, and creativity, help in solving simulated real-world problems, work collaboratively, engage in ethical decision-making, and adopt a global perspective towards issues and ideas. (https://www.google.com/search?q=Prospects+of+ICT+use+in+Education+pdt+2016   -2022&client=firefox-b-d&ei=-UFJY6KzKLSM9u8P0JyE0AQ)

ICTs use in education has made it possible to find solutions for complex real-world problems, therefore, an effective tool for the emerging learning paradigm, which encourages self-directed and active learning, where flexibility and interactivity in the teaching-learning come to play. ICTs use in education enhances or facilitates mobile learning and inclusive education, as it becomes universal as opposed to fixed and time-bound. Research and scholarly communication are some of the benefits. The use of ICT in the education sector enhances the effectiveness of education and also aids literacy movements. (https://www.google.com/search?q=Prospects+of+ICT+use+in+Education+pdt+2016-2022&client=firefox-b-d&ei=-UFJY6KzKL SM9u8P0JyE0AQ

ICT integration enhances the modes of communication, especially during online distance learning where most communication is written. Through the use of ICT, not only students but also other individuals can augment their communication skills. The main type of communication that gets enriched through the use of ICT is written communication. Individuals can communicate with each other through emails and messages (Patra, 2014). It has been hypothesized that in near future that we will experience a paperless society. Currently, what it means is that there will be less paperwork within and outside the education environment. The digitalization of most activities makes learning less costly. For instance, a little data can enable you to download the whole of the encyclopedia Americana and Britannica, and such could be sent to another person via digital means without paying an extra cost. If the volumes of these encyclopedias were to be printed, you could imagine the cost per volume. Invariably, the use of ICTs saves cost and even time.

ICT in education improves engagement and knowledge retention. When ICT is integrated into lessons, students become more engaged in their work. ICTs used by teachers better teaching and learning methods, enhance data and information security, and easy student management (https://www.google.com/search?q=Prospects+of+ICT+use+in+Education+pdt+2016-2022&   client=firefox-b-d&ei=-UFJY6KzKLSM9u8P0JyE0AQ) This is because technology provides different opportunities to make it more enjoyable in terms of teaching the same things in different ways. Again, Hammami (2016) indicates that ICT bridges all forms of knowledge and literacy, and intersects places of learning, including schools removing the traditional barriers that existed before its advent in terms of access to books, writing, and databases among others. ICTs enable easy access to electronic information resources, such as electronic periodicals (e-journals, e-magazines, and e-newspapers). Others include CD-ROMs, mailing lists, and databases (Akpojotor, 2016 &Nazir, 2015).

Ibieta, Hinostroza, Labbe& Claro (2017) stated that ICT had great potential for enhancing collaborative activities among students and for developing highly relevant generic skills. It encourages collaborative teaching and learning; according to Drossel, Eickelmann & Schulz-Zander (2017), collaborative teaching and learning cover ICT lessons integration, sharing, digital resources, and computer use during lessons. It also includes ICT-enabled school administration, electronic information resources access, and collaborative teaching and learning (Rana, Greenwood, & Fox-Turnbull, 2019).

On school administration, Thakral (2015), Nwigbo, and Madhu (2016) have outlined the importance of it. These scholars reported that ICT helped in the management of large quantities and types of data, hence saving time and energy. As further reported, such tasks included organizing assessments, the maintenance of library functions, the preparation of reports, and the organization of events. Additionally, teachers easily maintained grade books, compiled data bank of exam questions, carried out online inspection and correction of students' work (projects) on their computers, keeping records, chronicles, and archives of all the above-mentioned events and proceedings with fast retrieval and easy access to any entry. Further, in schools, as mentioned by Selwood (2004), ICT-enabled administration is used for activities, such as supervision, monitoring attendance, continuing professional development, pupil contacts, and colleagues' contacts.

Teachers' Job performance is fully enhanced with the use of ICTs. Steinberg & Garrett (2016) declared that teachers' job performance involved designing lessons, providing instructions based on those lessons, and designing and implementing classroom management strategies to maximize the efficacy of instructional lessons within a classroom's environment. Theoretically, as perceived by Hanif and Pervez (2004), the job performance of teachers involves their effective participation in classroom teaching, management, discipline and regularity, and interpersonal relations.

ICTs provide independent learning platforms for students, and the students have the opportunity to learn anywhere and anytime, and at their convenience; enhancing e-learning and learning management system (LMS). Web-based LMS tools connect students, educators, scholars and researchers, and education personnel. Again, it will enhance data and information security. Data/information can be stored in the cloud, CDs, CD-ROMs, and flash drives. It enables easy management of students, minimizes cost, and saves time for teachers, students, and school management. With the use of ICTs, teachers can teach better with images, videos and graphics while delivering lessons and educators can create engaging, interesting, and well-designed classroom activities. It also promotes and improves the digital culture in schools, colleges, and universities (https://www.edusys.co/blog/what-is-ict-in-education).

The use of ICTs in education provides different platforms for teachers to deliver their lessons to learners/students. In this case, lessons could be provided online via web-based platforms, CD-ROMs, memory cards, and flash drives. It could also be delivered through synchronous and/or asynchronous communication modes. With the help of technology, transformations are facilitated from teacher-centered to student-centered instruction (Kaur, 2015). Technology renders an important contribution to supporting and augmenting cross-disciplinary research and teaching programs. ICTs promote collaboration and integration between research and development units within industries and higher educational institutions (Pandya, 2016).

Sharma, Bassi, D. & Sharma (2011) reported that ICTs helped in keeping learners/students updated and enhancing teachers' capacity, and ability to foster live contact between the teacher and the student through e-mail, e-learning, web-based learning including the internet, intranet, extranet, CD-ROM, TV audio-videotape. When students are used to technology, they will effectively use the Internet for academic learning and other activities, such as listening to music, watching movies on YouTube, playing games, reading stories, observing pictures and images of various objects, and other places, which ordinarily will not be available to students. Students in higher educational institutions could also use the internet to look for jobs and other opportunities to enhance their career prospects. The Internet is commonly used for all purposes.

The use of ICTs in the education sector has solved lots of problems. Technologies render an important contribution to helping individuals with learning disabilities to implement their assignments appropriately. Learners/students with learning and physical disabilities, such as speech, hearing impairment, and the crippled, can enroll in online distance education and gets their certificates without seeing the teachers and stepping into the school(s). This is one of the beauties of technology in education, rendering significant contributions to helping students/learners to achieve their educational goals. The other achievement of ICTs in teaching-learning is that it favours introverted students. Some students, who could not stand up in class to ask questions and express themselves in any other form, can effectively communicate with their teachers through email, or any of the social media platforms, such as WhatsApp, Facebook, YouTube, Telegram, etc. (Kapur, 2019).

Teachers make use of ICTs for many purposes. They make use of the internet to augment their understanding and generate awareness in terms of academic subjects and concepts. They use the Internet to download relevant materials for their lessons and research works, enhance their lectures and promote a better understanding of the concepts among students. Furthermore, through the use of ICTs in lectures and class discussions, students can develop interest and motivation toward learning (Kapur, 2019). You may wish to know that students are usually more excited or inspired when they learn with any of the technological devices than the conventional modes of teaching-learning.

The use of ICT in education will give teachers and students free and unlimited `access to digital libraries. Digital or electronic libraries are institutional or public libraries that contain literary materials that are hosted on the Internet and available to those that have access to the Internet. In concord, the research conducted by Pittas and Adeyemi (2019) revealed that the majority of the respondents (students) believe that technology is good for learning because they get 'fast access to information, 'learn and search new things, and 'get new and quick information. Similarly, many students stated that technology 'makes learning better.

On the effectiveness of technology for teaching, Pittas and Adeyemi (2019) revealed that the majority of teachers acknowledged that technology motivates students, provides quick access to students, and technology resources make learning easier and faster. On the part of the students, the majority of the students revealed that they use technology to conduct research for their projects, read, and use technology to do their homework, and prepare presentations.

Generally, research revealed that the significant majority of students (90.9%, N=199) indicated that technology is good (effective) for learning; students enjoy learning with technology; they learn better with technology, complete tasks/assignments, and monitor activities, and makes learning easier (Pittas &Adeyemi, 2019).

### Challenges of ICTs Integration in Teaching-Learning Process

The virtual learning approach has many positives to its credit, but efforts to organize online education are always faced with new challenges following the changing desires that accompany it (Mirfani, 2019). Therefore, many challenges need to be overcome to make the approach more effective in teaching-learning practice. Further, studying these obstacles to the use of ICT in education may assist educators to overcome these barriers and become successful technology adopters in the future. Evidence from the pieces of the literature shows that ICT has tremendous potential to enhance the quality of education at all levels of educational institutions. However, there are always two sides to a coin, which are never the same. Kundu (2018) has lamented that there are so many barriers that pose serious challenges to the effective implementation of ICT tools. ICTs like any other technology ever invented, come with certain limitations or drawbacks. Andiema (2015) has also observed that opportunities for realizing the benefits of using ICT in education face several challenges in developing countries, especially in Africa. The author stressed that access to ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 students against the ratio of 1:15 students in the developed countries. The scholar further stressed that even when schools have adequate access to educational technologies, teachers and students do not always use them for instructional purposes (Davies & West, 2014). Some of the challenges are described hereunder.

Users of ICT tools are usually confronted with misleading and misguiding information downloaded from the Internet. The Internet is full of inappropriate information uploaded by anybody irrespective of the person's academic status. Much of the information uploaded on the net is never evaluated as opposed to most print materials that pass through peer reviews. Therefore, to use any literary information gotten from the net, it must be properly and critically evaluated, and the appropriateness and effectiveness of such available resources ascertained before use.

Another issue is the country's electricity supply, which is described as being epileptic and inconsistent. This has created a significant obstacle to Nigeria's ICTs application/integration in schools. Okwueze (2015) stated that power supply is a crucial factor to consider for the effective adoption of ICTs in education. The inappropriate or unstable power supply poses a lot of challenges in the use of ICTs in teaching-learning practice. Because of this, most government agencies rely on generators, which can sometimes be insufficient to effectively power ICT equipment.

System breakdown is yet another of the challenges rendering teachers' and students' use of most digital services impossible. Most times, it is very difficult to find professionals to keep the systems in order. Therefore, the maintenance factor is a very big challenge in technology integration in Nigeria. Again, unstable internet access

and unavailability of ICT integration support staff were identified as some of the main challenges encountered in ICT use (Asamoah, Asiedu, & Buadi, 2022).

Further, one major challenge facing the integration of ICTs in the education sector is corruption. According to Omeire & Omerie (2014), the tendrils of the hydra-headed monster known as corruption have been a contributory factor in the effective integration of ICTs in the education sector. The use of ICTs like other government policies in Nigeria has seen much of its implementation halted due to the pervasiveness of corruption. This is because most of the funds provided for ICTs purchases are found in private pockets, thereby frustrating the goal of ICTs integration in schools. Therefore, corruption is one of the obstacles confronting the effective integration of new technologies in Nigerian schools.

Risk of cyber-attacks and hacking are very prevalent in this information age. Data/information on a system could be hacked by Internet hackers or fraudsters, and this may cause lots of harm to the entire education system. In another dimension, teachers require experience to handle ICTs to deliver a successful lesson to the students. Lack of specific knowledge and skills about technology integration and attitudes and beliefs toward technology hampers technology integration in our educational institutions of learning (Kundu, 2018). This situation poses lots of problems for digital immigrant teachers, who are either resistant or unwilling to any innovative process. Once more, the expensive nature of computers and internet connectivity cannot be overstressed. The cost of purchasing computers and internet connectivity is very high, making it very impossible to purchase enough computers and Internet facilities for teachers and students alike (https://www.edusys.co/blog/what-is-ict-in-education).

Other key obstacles are inadequate access to technical facilities and insufficient training and support in terms of using ICT (Kundu, 2018). Bingimlas (2009) also found that even though many teachers have strong desires for integrating ICT into teaching-learning; they encountered significant barriers, such as lacking confidence and competence or having a negative attitude and inherent resistance. The self-directed learning aspect of ICTs adoption in learning poses lots of problems for students. This type of learning is not good for indiscipline and indolent students. These students may usually procrastinate on academic assignments given to them due to a lack of motivation because no person directs, guides, or forces them to read or perform assignments given to them by their instructors. Therefore, this type of learning is relevant to students/learners who are disciplined, dedicated, and motivated to study without expecting someone to monitor or force them to study.

In addition, Pittas and Adeyemi (2019) in their research confirmed that curriculum design, network issues, and time constraints, among others, are some of the factors hindering technology integration in teaching-learning. In the case of "time", as reported by the scholars, the research revealed that the overwhelming majority of teachers do not have time to integrate technology into the teaching-learning process. On technology issues, Pittas and Adeyemi (2019) also confirmed that the limited/availability of technology networks was the next popular factor for teachers not integrating technology.

Furthermore, other factors mentioned were distractions, bad network connection, not enough time given to complete tasks, and not having adequate technology (Pittas and Adeyemi, 2019). Other factors mentioned affecting students' use of technology are distractions, bad network connection, not enough time given to complete tasks, and not having adequate technology (Pittas &Adeyemi, 2019). Mac Callum, Jeffrey and Kinshuk (2014) observed among other factors impacting teachers' adoption of mobile learning as learners' ICT anxiety. This means that once somebody is nervous or tensed before embarking on a particular thing, event, or action, it will likely contribute to the person's failure.

Technological problems for students are yet another problem posed by adopting technology in the classroom. Some students are not familiar with the use of technologies for online learning because they have difficulty acquiring new technology, and take less of acquiring the technological skills; hence, find it very difficult to easily integrate technology into their learning process.

Additionally, student-perceived isolation is yet another challenge facing online learning students, as most of them are socially distanced from each other. Since students are naturally used to face-to-face interaction with their teachers, this method must be intentionally built into online classes to reduce the alienation of students/learners (Oriji and Ochuba, 2019).

Time commitment is another challenge among students involved in online programmes. Effective time management is one of the criteria for successful and efficient online programmes. Most students in this mode of

instruction that cannot manage their time will find it not easy in online programmes because they will be procrastinating and will not meet their assignment deadlines.

Prospects for ICTs Use in Education

There is no gainsaying that what is bad will one day be good; or what is wrong will one day be corrected. There is likely to be an improvement on the integration/use of ICTs in Nigerian schools. This idea has been highlighted by Hennessy, Harrison, &Wamakote (2010) when the scholars expressed their optimism on the improvement of ICT connectivity in developing countries, of which Nigeria is no exception. The scholars further declared that schools are increasingly getting equipped with computers for teaching, learning and administrative purposes. A good example could be drawn in America, where the role of technology in the world of education has been ever changing, as most recently, technology has been a new phenomenon to help motivate, differentiate, and allow students to achieve and excel in ways that they have never been able to before.

Many educators and scholars (Johnson, 2003; Harris, Al-Bataineh & Al-Bataineh, 2016) have also come to understand that, if technology is used correctly, it has the ability to "invoke dream in the minds of visionary educators who saw endless potential for altering traditional notions of teaching and learning. If America's Presidents, Bill Clinton and George W. Bush will see the need for fundamental change in education to keep American students in competition with technology with other students from around the world, and also calls upon the Department of Education to create a national strategy to involve technology into all educational programs at both the state and local school systems, then, Nigeria and other developing worlds will equally follow the same step to educate millions of Nigerian citizens that are out of school (Harris, Al-Bataineh& Al-Bataineh, 2016).

Again, many developing countries of the world have started decreasing the digital divide among them, and also between students in urban and students in rural areas on the use of technologies in classroom environments.

**Summary**

All levels of educational institutions have definite learning objectives and goals, which they seek to achieve. But the main purpose of learning objective of every educational institution is to ensure that teaching and learning processes are organized in such a manner that they may lead to effective growth and development of students, and they are able to augment their knowledge and understanding in such a way that they are able to successfully accomplish personal and professional goals, which are defined as particular knowledge, skills, abilities and behavioural traits that individuals possess. This paper concisely conceptualized some salient terms or phrases relevant to the topic and exposed teachers and students/learners alike to the significance of Information and Communication Technologies (ICTs) in teaching-learning practice, and the inherent challenges associated with the integration. The authors further discussed the prospects of the ICTs' tools that will definitely power the futuristic education in this part of the globe. Generally, an attempt has been made in this paper to address the inevitability, and the significance of ICTs in the enhancement of quality of education, both in Nigeria and elsewhere.

**Conclusion**

Teachers' use of ICTs in teaching-learning is very helpful. There is no doubt that the use of ICTs in schools has helped to improve school resources, school context, and school process improved understanding of subjects, and increase interaction and teamwork. The teacher's use of technology to prepare their lessons enables them to carry out their tasks in a convenient, manageable, and well-organized manner. Kapur (2019) declared that teachers render a significant contribution to the education sector; consequently, it becomes necessary for them to possess adequate ICTs information, knowledge, and competence in terms of modern and innovative methods of delivering instruction. This is so because electronic information resources access is very essential for teachers' job performance; teachers need to access electronic information or skills that are useful for teaching and research in preparation for their lessons. It also helps to obtain good teaching aids and allows them to even read newspapers and visit other literary materials online. The use of ICT provides greater opportunities for effective communication between teachers and teachers, teachers and students, and students and students which has never been achieved before now. The authors have identified the fundamental benefits and major barriers or challenges of ICT integration, as well as the prospects of this instructional mode in the Nigerian education sector. The necessity of studying the barriers of ICT in teaching and learning environments is very important, as the knowledge will provide guidance for ways to enhance technology integration (Schoepp, 2005), and in addition encourage better use of ICT in the teaching-learning process. Furthermore, Kundu (2018) emphasized that the policy recommendations were also made based on the current scenario, aimed at providing policy-makers, teachers, and other key stakeholders with possible approaches to overcome barriers and successfully integrate ICT into the teaching and learning process in the future.

**Recommendation**

Asamoah, Asiedu, &Buadi (2022), Gberevbie, Ayo; Iyoha; Duruji&Abasilim (2015), and Mugizi and Amwine, 2020) have made the under-listed suggestions to improve the use of ICTS in teaching-learning process in the education sector.

1. The Nigerian government should keep investing in ICT infrastructure. Nigerian government should as a matter of necessity provide ICT facilities in schools to meet today's education needs. Most common technological devices, such as computers, projectors, Android phones, printers, and scanners, among others should be provided to enhance teachers' effectiveness in school. As Kundu (2018) put it, investment and financial support--- are needed in both rural and urban areas.

2. Training should be provided for both teachers and students for the most used hardware and software in daily classroom activities. This has been supported by Lisenbee (2016), as the author stated that teachers need to be given adequate training, which will increase their self-confidence in the use of new technologies.

3. Some researchers believe that an appropriate level of school strategic planning is needed to enhance the successful integration of ICT in classrooms (Baylor & Ritchie, 2002). Teachers would be more willing to integrate ICT into teaching and learning when schools underpin and strengthen the importance of using ICT in daily teaching.

4. Expansion of internet access points in various schools. There is a need to install Internet facilities in classrooms, hostels, and offices for effective use in teaching and learning. This will motivate students and even students.

5. Stakeholders in the education sector, including the Ministry of Education, Directors of schools, and head teachers should promote teachers' access to electronic information resources.

6. There is a need for an evaluation system at both the school and the government levels to find out how well the integration process works in schools. At the school level, an evaluation system should be built to measure teachers' performance in ICT integration; while at the government level, evaluation systems can measure the gap between different states and help policy-makers better distribute resources equitably (Kundu, 2018).

7. Government must develop the necessary infrastructure in areas, such as energy power supply. Teachers should be encouraged and trained to effectively integrate technology into the instruction they provide. In-services should be provided for teachers. It is on record that until now, the number of qualified teachers still cannot support the development of ICT in Nigerian school education (Kundu, 2018). Teachers should be made to attend conferences, and seminars to regularly update their knowledge because new educational technologies and software emerge daily. In another development, teachers' roles, as Kundu (2018) suggested should change from authority models to active mediators, because they are the key factors affecting the usage of ICT in education because they are organizers, guides, and coordinators in teaching and learning. It is however believed that how well the teachers can engage themselves in these roles can determine how effective ICT is integrated into classrooms. The teachers should understand the essence of constructivist learning and encourage students to use ICT in self-directed learning and collaboration activities (Kundu, 2018).

8. The poverty level of Nigerian citizens is one of the problems hunting the integration of ICTs in teaching-learning. Teachers' poverty level is a contributing factor. Nigerian government sometimes cannot provide every ICT stool needed for teachers' jobs. This is so because some of the ICTs tools, such as computers and Android phone that enables Internet connectivity, which can facilitate classroom activities cannot be purchased by teachers due to the meager salaries they receive from the government.

9. Research has shown that teachers' negative attitudes and lack of confidence in ICT use can seriously pose challenges to ICT integration in schools, hence teachers' education should be carried out in a conducive and less-threatening environment, as this will allow teachers to gain competence in using ICT for teaching and learning in a confident manner (Teo,2008). Teacher education in ICT integration can also improve teachers' understanding of ICT and equip them with the latest teaching and learning theories. In totality, therefore, teacher education should reconsider its training approaches in ICT integration (Kundu, 2018).

10. The quality and quantity of online-based educational resources should be improved by education stakeholders by building resource-sharing platforms; (Kundu, 2018) stressed that ICT integration can never be achieved without easily accessible online resources and resource-sharing platforms that will teachers with basic Internet access to get teaching materials with high quality, such as videos, pictures, and curriculum instructions. Teachers in remote areas can get training in teaching pedagogy, while

teachers in urban areas can learn from their peers with better teaching skills and from online learning groups to communicate and learn from each other (Kundu, 2018).

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