Internet-Based ICTs and their Importance in Nigeria's Education System

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Abstract

ICT has made a very profound and remarkable impact on the quality and quantity of teaching, learning and research in educational institutions (Ajayi & Ekundayo, 2009). A lot more has been written on the importance of (Information Communication Technology) ICT in education, highlighting the need for the integration of ICTs in the education sector for example (Olaore, 2014). In Nigeria, numerous articles have been published stating the need for the government to integrate ICTs in the different levels of Nigerian Education, a quick example is Aduwa-Ogiegben & Iyamu (2005). Adomi & Kpangban, (2010) wrote about the applications of ICTs in Nigerian Secondary Schools and emphasized on how beneficial ICT applications will be in improving Nigeria's Educational System and giving students a better education. With all that has been done in making us grasp the importance of ICTs in education and implement it at various levels of our schooling system, Nigeria is yet to fully integrate ICTs effectively in the Education Sector. To tackle this particular issue and bring about the effective use and applications of readily available ICTs, this paper aims to examine some basic tools and platforms that every student and teacher can get their hands on for free on the Internet. This paper will introduce some Internet-based ICT tools that can be used to the benefit of the Nigerian teachers and students, and to apply them in our school systems and improve the quality of education in Nigeria.

Keywords: Information and Communication Technologies, Education in Nigeria, Internet-based ICTs, Effective application of ICTs.

1. Introduction

Information and Communication Technologies (ICT) are electronic technologies used for information storage and retrieval (Adomi & Kpangban, 2010). ICTs play important roles in our daily lives so much such that it is almost impossible to go a day without actually using any sort of ICT like mobile phones, personal computers etc. ICT is one of the most important driving forces promoting economic growth in the economy (Olaore, 2014). Every country and every economy has accepted this fact but many countries in Africa find it hard to integrate it in developing many sectors of the economy, especially education. This is primarily, in most cases, due to the reluctance of the teachers to adapt to the changing trend (Oluwole, 2015). Many efforts have been made in making ICT a priority in the country's education system. This is partly to the number of papers published and surveys carried out by experts in the field of ICT. Others include the recent improvements in some sectors of the economy in trying to bring ICT in the forefront of affairs. But the challenges are also massive, ranging from the mode of teaching to reception of ICTs by the teachers, (Idowu & Esere, 2013) expressed some of these challenges in length. The difference in curriculum and infrastructure between the private schools and the government schools has led to imbalance in the adoption of ICTs in the country, (Osunwusi & Abifarin, 2013) did an extensive experimental research to support this. Some schools have embedded ICT into the curriculum, and demonstrate high levels of effective and appropriate ICT use to support teaching and learning across a wide range of subject areas; however, some other schools are in the early phase of adopting ICT and some have not even started (Olaore, 2014).

Very clearly, ICTs have the transformative power to change the nature and quality of learning in a connected, Internet age; so, how can we effectively use them and get the best of the available ICTs (Simataa, 2016). How can students and teachers get the best out of the cheap and available tools and platforms on the Internet to improve the quality of education in Nigeria? These are all important questions that motivated the writing of this paper.

Almost 1.5 million Nigerian students and 27 Nigerian Federal Universities have been linked to the internet by the Ministry of Communication Technology (MCT) through its collaboration with the Ministry of Education and the World Bank's STEP-B project, according to the Minister Dr. Omobola Johnson (Samson, 2015).This is a milestone in the Nigerian education system as it shows the efforts been made to expose students to ICTs and the Internet. Over one thousand five hundred (1,522) secondary schools have been equipped thereby introducing an estimated 1,458,880 million students to ICTs, according to the minister. She also revealed that the National IT Development Agency (NITDA) initiated Tertiary Institutions Access Project (TIAP) had

provided desktop computers, printers, and wireless network facilities to selected tertiary institutions across the country (Samson, 2015).

From an optimist's perception, these are some massive achievements on the government's part. But the challenges still remain, how can the students get the best out of these technologies. How can the teachers get the best out of the same technologies? Majority of the teachers lack ICT exposure and experience, making it impossible for them to effectively use these technologies to teach the students. Lack of qualified ICT personnel. Most institutions lack computer literate teachers and ICT experts that would support and manage the Internet connectivity and/or application of computing in the teaching-learning process (Idowu & Esere, 2013).

With the recent COVID-19 pandemic which has ravaged and crippled various sectors of the world with probable long-lasting consequences, some African countries like Nigeria had to shut down both primary and tertiary education institutions as part of the virus containment measures. This has given educational institutions no other option than to look towards the use of ICT to carry out their lectures and communicate with students. However, this has greatly highlighted the gap between educational institutions in Nigeria and countries with far better ICT infrastructure, educational instructions within the country with better infrastructure and implementations than others which makes for the majority, and also students within the same university who experience challenges due to financial status to afford internet or network strength with regards to urban or rural developments. Despite the struggle to implement and utilise ICT, the eductional Institutions lack major capacity to implement with only the few Open University capable of handling distance learning for a more mature student-base. (Mohamedbhai, 2020)

2. Challenges in Effective Use of Internet-based ICTs in Nigeria and Some Suggested Solutions

There are a number of challenges facing the effective use of ICTs in Nigerian Schools that this paper can only explain a few. On top of the list is the unfortunate case of the lack of well-trained teachers in the field of ICT (Adeoye, Oluwole, & Blessing, 2013) and the unwillingness of some to adapt to the technological advancement in the education system (Oluwole, 2015). Additionally, due to the lack of ICT-trained personnel and teachers in Nigerian schools, the few ICT facilities in some of these schools are not well maintained nor are they effectively used. There is a lack of skilled manpower to manage available systems and inadequate training facilities for ICT education at the tertiary level (Idowu & Esere, 2013).

Funding is another constraint in the development and use of ICT in Nigerian Education System. Due to low funding, more urgent and important survival needs by the institutions (Idowu & Esere, 2013) are met first. Another major challenge most users of ICT face in Nigeria is the problem of uninterrupted electricity supply. Power supply all over the country is epileptic (Adeoye, Oluwole, & Blessing, 2013). Last but not least is the issue of political influence. The policies in place are a bit outdated and do not favor the use of ICTs in the Nigerian educational system. Recent studies, unfortunately, show low levels of computer integration in the school system (Osunwusi & Abifarin, 2013).

These are just a few of the constraints that are faced by the Nigerian Schools and higher Institutions in the use of ICT to improve the Nigerian Education. Below are some suggestions on why there is a need to tackle such challenges.

2.1. Teacher trainings and empowerment on ICTs

Majority of the teachers in Nigerian Schools have very little to no ICT literacy. There is a need for teacher training in order to improve skills in ICT usage. Some surveys have been carried out here in Nigeria (Habiba, 2013), (Jegede, 2009) and some abroad (Toit, 2015), (Wang, McPherson , Hsu, & Tsuei, 2008) that shows how profitable this could be. Until recently, the National Information Technology Development Agency, NITDA has been inactive in her role as the ICT regulatory body of the nation (Oyelekan, 2008).

The government should increase funding for the entire educational sector with emphasis on ICT. This will help improve the level of ICT facilities in the schools (Ajayi & Ekundayo, 2009).

Schools, Institutes and Universities also need to do their best in making sure their staff and students get at least the basic ICT knowledge and skills. It is unfortunate that most staff of Higher Institutions in Nigeria are technophobe and reluctant to take the leap in making use of technology in teaching (Oluwole, 2015). There is this fear of using technology and every small thing will be taken to the ICT unit, this is quite relatable from our experience working at the National Institute of Construction Technology (NICT), Uromi. All these can be changed by simply training and empowering employees in the use of ICT in the workplace.

There is also the fact that some schools have facilities that should be regularly used but due to the lack of technical skills of the teachers and instructors, (Idowu & Esere, 2013) briefly pointed this out under one of the challenges to ICT education in Nigeria. This automatically makes them not able to make use of those facilities in teaching the students.

2.2. Regular Maintenance and Supervision of Facilities

Many a times there is complaint of funding in many sectors of the economy, but the blatant truth in most cases is the wastage and mismanagement of resources (Baba & Abubakar, 2015), (Garba, Olaleye, & Jibrin, 2016), (Mbachu, 2013) as well as the absence of supervision. There ought to be regular maintenance of the facilities available and better supervision in order to use them efficiently.

2.3. Funding

The high cost of Internet and other ICT facilities is a problem which has been discussed at lengths in many articles (Adeoye, Oluwole, & Blessing, 2013), (Oyelekan, 2008), (Ajayi & Ekundayo, 2009), (Adomi & Kpangban, 2010), to mention a few. This has hindered the extent to which most people access some important contents (like videos) online. Online video tutorials are easily one of the simplest ways that one can learn new things nowadays. Secondary schools in Nigeria are not given adequate funds to provide furniture, relevant textbooks and adequate classrooms let alone being given adequate funds for high-tech equipment (Aduwa-Ogiegben & Iyamu, 2005).

The funding that most schools and universities get in Nigeria is not enough for them to get top quality ICT facilities as (Adeoye, Oluwole, & Blessing, 2013) discussed the constraints in effective utilization of ICT. The percentages of Nigerian education budgets between 2008 and 2016 shows that Nigeria has not significantly impacted on education as a sector to influence national development (Ololube, 2016). This makes it almost impossible for the students and teachers to have any sort of practical experience with the basic ICTs. The government should increase funding for the entire educational sector with emphasis on ICT. This will help improve the level of ICT facilities in the schools (Ajayi & Ekundayo, 2009).

2.4. Epileptic power supply

As every Nigerian will testify, Electric Power Supply has always been a major factor hindering the development of virtually every sector of the economy. (Noko, 2016), explained how the different sectors of the economy are being affected by this. The epileptic nature of the power supply makes it hard for students to get the best out of the ICTs at their disposal. Schools and Institutes spend millions of Naira every year in order to power up Generators and alternative sources of power just to make sure that studies and other administrative works are not interrupted. A very good example is the findings by (Dada, Daniyan, Azeez, & Adaramola, 2016). Efforts have been made and plans are in place to make sure that regular power supply is achieved, but the unfortunate truth is that everything is slow and the same problems arise regularly.

The issue of maintenance of the Electric equipment like the transformers, electric poles and the wires, is a problem that needs to be handled in order to reduce the costs of buying new equipment every few months. This, we believe, is one of the factors that influences the increase in the cost of electricity tariff.

3. Integrating ICT curriculum in all levels of schooling system

The earlier school children and pupils are introduced to ICT the earlier they will be able to better understand the concept behind ICT and be able to make it a tool in their learning process. Many educators believe that ICT can help children develop their competencies even before they go to school (Kalas, 2010). Very few Schools in Nigeria have practical ICTs at primary level. Pupils pass through from primary schools without ever seeing or using a computer system in school. This has a major impact in the students' ability when they are lucky enough to find themselves in Secondary Schools with ICTs.

There is a need for the Ministry of Education and the Senate to make sure that Information Technology is taught at all levels of schooling. This means reviewing the policies as well as the curricula that exist. This is not going to be an easy job and cannot be achieved quickly, but as the popular saint goes: "a journey of a thousand miles start with a single step".

3.1. Internet-based ICTs to Improve Quality of Education

There are different ICT tools and platforms that can be used to enhance and improve the quality of education in Nigeria. Students and Teachers can use them individually or collectively to make the task of teaching and learning easier and more interesting. This paper looks to bring some very common internet-based technologies that are used every day by the majority of the students and teachers all over the country, and shed more light on how these technologies can be used in improving the education system works in Nigeria. The following are just some examples of such technologies.

3.1.1. YouTube and other video hosting sites

YouTube (www.youtube.com) is synonymous to online video. Anytime we think of online videos, the first place we think of going is YouTube. YouTube - the third most visited website in the world, has an average of 1billion users and almost 5 Billion

videos are watched on YouTube every day (Donchev, 2017). It is the largest and the best video hosting site that users can easily visit and view any video of their choice; and with a Google account, a user can upload videos or make a live presentation.

(Meenakashi, 2013), wrote that the use of videos came across as the most effective ICT component in their teacher interviews. It was stressed by those using and wanting to use videos in educations that creativity in presentation is just as important as the use of innovative media

Any teacher, Instructor or student needing to learn any topic can visit YouTube and search using a related keyword and hundreds of videos will pour out for the user to select and view the video most related to his or her enquiry. (Frdlingcr & Owens, 2009) in their research pointed out YouTube being more than just for entertainment but proved its relevance as a learning tool.

3.1.2. Chat rooms as study groups (Facebook, WhatsApp etc.)

Almost everyone knows Facebook, and with over a billion active users, it is hard to find a student in Nigeria that does not have a Facebook account. Facebook has numerous uses, one of which is connecting with friends and other people from around the world.

There are pages and groups that can be created, and we come across a lot of pages; be it advertisement of a particular product or a school page or group, or a celebrity fan page. These are all avenues where users interact with thousands of other users across the world. If we can create a study page or group and invite the students in that class or faculty, a lot of discussions can take place and every member of that group will have a chance to partake in such discussions.

A Lecturer or teacher may decide to create a group for the course he/she is teaching and make it an open group where students taking that course can join and get regular feedback from the teacher. Assignments can be discussed, ideas exchanged, and questions can also be asked, especially by those that shy away from asking questions in the classrooms.

3.1.3. Google Education Suite and other Education Search Engines

The mission of Google is to organise the world's information and make it universally accessible and useful. Google works beyond searches for educational research. Google provides a learning application for schools and students for effective learning.

G Suite is a technology for learning. It is easy to use and free for schools. G Suite is a solution built for teachers and students.

G Suite for Education is a suite of tools that can help you to increase opportunities for critical thinking, communication, collaboration and creativity, all while supporting the learning objectives that you have for your students. (Bell, 2017)

G Suite for Education core services for learning includes Google Classroom, Gmail, Google Drive, Calendar, vault, Docs, Sheets, Forms, Slides, Sites and Hangouts.

The Google classroom is an application designed to help students and teachers communicate, collaborate, organise and manage assignments, grade and give feedback.

The Google Form is an application that allows students and teachers to publish online surveys and quizzes that collect response information in real time to enhance academic research.

Google Scholar provides a broad search for scholarly literature across many disciplines and sources like articles, theses, books, abstracts and court opinions. This is an awesome Google product designed for scholars who confine their search result to the academics or education result filters. The basic url for Google search for education is www.scholar.google.com.

Other search engines include google.com, bing.com, yahoo.com; all these are powerful tools that students and teachers can use to lookup course contents and materials. Today everything has gone digital, gone is the days where research can only be done by reading hard copy documents. Anyone looking for materials on a research topic or assignment can simply go online and visit any of the search engines and input his/her query and hundreds of links will be made available.

3.1.4. School Websites and Study Portals

Virtually every Higher Institution in Nigeria has a website, and for those that don't, well, they need one. A school website is important in this case because students have a place to go when they are online to see what is going on in the school. Any update can be uploaded on the site and students, teachers and visitors can have access and get to know the school better. News on conferences, training and workshops can also be uploaded so students can attend and take part.

Universities websites are important in the decision process to select which university a student would attend as they are easily the go-to-place to obtain information about the institution (Shimmel, Motley, Racic, Marco, & Eschenfelder, 2010).

There is a need to better understand what constitutes an effective website that provides a school with an avenue for delivering innovation in teaching and learning, and complements how a school operates (Taddeo & Bernes, 2016).

A study portal is a website where students can upload and download documents. It is normally a sub domain of the main school website. Here students can download notes and assignment questions uploaded by the teachers, and they can upload the finished assignments or project. Every student will have to be granted a username and password in order to have access to the portal unlike the main school website. In such a portal, every user has their own personalized page/account where all registered subjects/courses are displayed.

Many higher institutions of study in Nigeria have school websites and academic portals inclusive. This is far underutilized due to some academic features that are not available on some of the portals. Features like Admission management, attendance tracking, curriculum management, academic reporting, classroom management, assessment management, hangouts, online forms for surveys etc.

Nigeria primary and secondary schools have few usages on schools' portals. Junior's schools outside Africa have fully embraced the study portals.

There are free open source portals for schools online. This open source portal can be customised easily to suit the needs of any school.

OpenSchool is a free school portal that is available online and offline for schools.

3.1.5. Library Website and Database (And Collaborations with Other Top University Library Database)

Every top University is supposed to have a library website. This is where students can have access to some books, past year question papers, journals and research papers. Here, there are also records of the books in the library and their availability. Like the study portal, for a student to get access to the Library website, there is a need for login details to be granted to each student.

There is also the need for schools and Universities to collaborate with other schools so as to make available the database of the collaborated schools to all sets of students. This will help students and teachers have access to books and journals that are far from their reach. Teachers can have access to research papers and even make collaborations in writing of books and publications with teachers from other schools.

3.1.6. Lecturer Portals

In advanced countries, Lecturers have personal websites or portals where their students can access course and research materials. Such portals can prove to be very important in helping students to have more access to their teachers and course materials. Lecture notes and handouts, book recommendations, additional readings, videos and video links, lecture schedules, course outline, class cancellations and schedules, assignments, test results, all can be uploaded to the portal.

4. Conclusion and Recommendation

The discussions in this paper have shed some light on some of the challenges that the Nigerian Education sector is facing. The challenges discussed above are just some of the major factors that have to be tackled and rectified in order to best integrate Internet-based ICTs in the country's education system. For many Schools, Universities and other Institutes the most important factor is funding, while some is training and others could be power. Nonetheless there is a real need for the government to do her part in making sure that these needs are met. Given this, the following recommendations are thus made.

The government should make new and improved policies concerning the importance of ICT in the country's education system. Not stopping there alone, policies on how to implement these policies practically is another major task that the government cannot afford to relax on. Funding, as seen from the discussion in the previous part of this paper is a major drawback. The education sector is underfunded and the government should increase funding as this will enable the effective implementation of ICT and also provide funding for ICT facilities. Training of Teachers and Instructors should be made mandatory in every level of the education system in the country. With such training in ICT and Computer skills, teachers will be empowered with the practical know-how needed to groom the next generation and also use some of the Internet-based ICTs to teach and make learning easier and more interesting. Internet access should be made available to all Schools and Universities all over the country. This will make it easier for all parties involved to "get with the trend" of the information age.

5. Further works

We plan to do an extensive study of 100 schools divided into two groups: high computer literacy schools and low computer literacy schools. The aim of this study will be to determine (1) challenges these school have with using ICTs (2) what current

ICTs they are using for education purposes (3) how they are using these ICTs (4) Those not using why (5) What benefits these ICTs have produce to those using (6) to see if there are needs for local solutions of Educational ICTs. We also intend to compare the effectiveness of free / relatively free ICT tools as mentioned in this work against paid services.

For further study, the **Table (1)** below depicts areas we intend to observe in order to further establish relationships between ICT adoption influencers. These areas include; the level of ICT literacy of the schools divided into Low and High, the educational level levels (primary, post primary and tertiary), why the use the ICT tools they use, considering their constraints in decision making as regards the tools, and what are the challenges they faced when using the selected tools.

Table 1: A study table to compare ICTs used by low and high computer literacy schools in Nigeria, why they are being used and the challenges faced.

		ICTs currently used	Why	Challenges faced
Low computer literacy schools	Primary			
	Post primary			
	Tertiary			
High computer literacy schools	Primary			
	Post primary			
	Tertiary			

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