

ICT POSSIBILITIES FOR PRIMARY AND SECONDARY EDUCATION IN AFRICA.

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ABSTRACT

Information and Communication Technology (ICT), is an essential aspect of the primary and secondary education system in Africa. It is a well-known fact that ICT improves the quality of learning and teaching curriculum in schools, while serving as an agent of change by bringing growth and development to the economy. The aim of this paper is to highlight the positive impact of ICT in primary schools across the African continent. It discovers that this new world order is under-utilized in schools as teachers prefer using the traditional way of teaching. The paper concludes that the governments should come up with appropriate ICT policies to improve the school systems and recommends the introduction of workshops and training for teachers at all levels of education.

Key words: ICT, Primary, Secondary, Education, Africa.

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1. INTRODUCTION

The advent of Information and communication technology (ICT) has changed many aspects of human life; from education, religion, business, military operations etc. This change is marked by increased speed and efficiency in meeting set goals through modern information dissemination systems. The internet, as a hub of information opens up limitless possibilities for growth and development for the advancement of humanity. By way of definition, Prait (2017) points out that although there is no single, universal definition of ICT, the term is generally accepted to mean all devices, networking components, applications and systems that combine to allow people and organizations such as: businesses, educational establishments, non-profit agencies, governments to interact in the digital world. One of the gains of the integration process facilitated by ICT is the development of an innovative approach to education. In line with this, the Linways Team (2017) reveals that information and communication technology (ICT) in education, supports, enhances, and optimizes the delivery of information for the purpose of adding value to both teaching and learning. This is not to say that traditional modes of teaching are totally useless. What ICT brings is an improvement on those aspects of

traditional teaching techniques that do not meet the realities of the 21st century. Padayachee (2017, p.56) further argues that “ICT integration is about providing pedagogically sound tools that promote new learning experiences, deep processing of ideas and increased student interaction with the subject matter.... The term ICT refers to digital tools that are delivered via computers and the internet such as web resources, e-learning technologies, multimedia programs, etc.... ICT integration in the classroom is the perfect confluence of content knowledge (i.e. knowledge of subject matter), pedagogical knowledge (i.e. knowledge of teaching and learning praxis), and technological knowledge (i.e. technical skills)”. This is to say that ICT can go a long way to enhance the quality of education. To further deepen our understanding, Owolabi (2013) discloses that the benefits of incorporating ICT into the learning process supersedes earlier modes of teaching because it brings together all the components of earlier mediums such as: chalkboards, textbooks, radio and television. Since ICT brings together all the components of traditional teaching and learning processes, teachers and students are provided with the wherewithal to tailor their goals in ways that will enhance efficiency in the educational sector. It is worrisome that African countries have not recorded sufficient progress in harnessing the full potential of ICT. This is worse for primary and secondary education on the continent where ICT facilities are way below standard when compared with countries in the western world. One of the reasons for this difference is marked lack of ICT infrastructure in Africa as opposed to what is obtainable in the western world. Mndzebele (2013) affirms that, in Africa, the introduction of computers into primary and secondary schools is a recent phenomenon. He further stresses that the high subscription rates and ICT infrastructure costs, poor service provision and the lack of basic infrastructure such as electricity act as barriers to the use of ICT in education.

In order to achieve success at this level of education, the usage and reliance of ICT which carries within its framework modern teaching and learning practices cannot be overstressed. This paper therefore seeks to explore the utilization of ICT in schools on the African continent. It also explores the possibilities available and what the way forward is with regards to ICT on the continent especially within the primary and secondary education sector on the African continent.

2. THE CONCEPT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Information and Communication Technology has a profound effect on the progress and development of human civilization. The tools used in ICT include computer programs, databases, communication networks, analysis and design methods of programming languages, artificial intelligence, knowledge bases, etc. It has long standing influence in almost all areas of human activity (Ashikuzzaman, 2014). According to the United Nations Development Programme (UNDP), in Mavellas, Wellington and Samuel (2016, p. 3), “ICTs are information handling tools. That is, a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. They include the ‘old’ technology of radio, television and telephone, and the new ICTs of computers, satellite and wireless technology and the internet. These different tools work together and combine to form a massive infrastructure of interconnected telephone services, standardised computing hardware, the internet, radio and television which reaches into every corner of the globe”. This means that the notion of ICT is a complex one and its use is quite varied especially when it comes to education. Ang’ondi (2010) takes this further by looking at the use of ICT from a different angle. She argues that ICT plays a major transformative role in the improvement of all aspects of national life; politics, business, economics, education social and cultural development. Ibenegbu (2018) in the same vein comments that ICT is a universal tool for globalization which brings people together within

a short space of time without the difficulties that accompany transportation and other logistics that are associated with the movement of people from one place to another. Since people are able to network seamlessly through the internet, the level of professionalism is raised in the academic community as academic professionals, share current information as they arise. This therefore implies the necessity of acquiring the necessary skills and knowledge in the application and practice of ICT for teachers and students. Jeffels (2009) concurs with this when he argues on the relevance of ICT on the global scale, when he posits that ICT is a global phenomenon, and children who are computer literate at an early stage of their lives might deal better with the modern world.

Researchers are of the opinion that the tools of ICT in schools are diverse and it is beneficial to both students and teachers. According to a survey conducted by UNESCO schools use a diverse set of ICT tools to communicate, create, disseminate, store, and manage information. In some contexts, ICT has also become integral to the teaching (UNESCO, 2018). While UNESCO explicates the benefits of ICT to teaching, Volman (2005) in Mikre (2011) looks at the use of ICT in education as it contributes to a more constructivist learning which increases the activity and greater responsibility of students to meet goals that are consistent with the demands of modern day society.

3. UTILIZATION OF ICT IN PRIMARY AND SECONDARY SCHOOLS IN AFRICA

Farrell and Shafika (2007) argue that several governments have taken the initiative to ensure that ICT is utilised effectively in the primary and secondary education sectors of their country. Most of these nations have taken the initiative to develop policies in this direction. Farrell and Shafika (2007) continue that there is a great deal of variance in ICT policies for education among the African countries. In some countries like South Africa there are clear policies guiding the use of ICT in schools, as well as the future of education within the nation as technology enhanced learning becomes the order of the day. North Africa on the other hand has also developed policies and have both resources and high bandwidth connectivity with Europe have ensured that they make considerable progress in the implementation of their ICT plans (Isaacs & Naidoo, 2003). Those countries that are steadily moving to sustainable economies (Mauritius, Ghana, and Botswana, for example) constitute another group making remarkable progress. Farrell and Shafika (2007) argue that perhaps the largest group is made up of those countries that are in transition from a sustained period of conflict and economic instability and are looking to ICT applications to help them meet myriad challenges—particularly the development of their human resource capacity. They are among the neediest in terms of assistance (Isaacs, 2005). However, there remains a group of countries that are still plagued with political instability and internal conflicts that make progress on the ICT for education agenda impossible. Farrell and Shafika (2007) continued that most countries have, or were in the process of, liberalizing their telecommunications policies to enable more competition and diversity of service providers in the industry. This wave has evident manifested across most African countries with a few exceptions. While this is having the effect of lowering the cost of access to information and telecommunication infrastructure, the costs of connectivity remain unaffordable for most education institutions (James, 2004). Furthermore, there are huge gaps between urban and rural schools in terms of access to ICT infrastructure. Access to a reliable supply of electricity is a general problem but is particularly severe in rural areas because of the difficulty of connecting to national electrical grids. UNESCO (2015, p. 12) posit that

One of the critical issues undermining ICT use in Africa, has been a lack of access to electricity According to UIS data, access to electricity in primary schools in many Africa nations, such as Burkina Faso, the Democratic Republic of Congo, Malawi and Tanzania, is

less than 20%. Data from Sierra Leone from 2012 on access to electricity in educational institutions indicates that only 3% of primary schools and 16% of lower secondary schools have access. Electricity at the household level is similarly bereft. They... estimate the 'direct connect' rates to electricity in Sierra Leone are only 5% (11% in urban areas; 1% in rural areas). In contrast, Botswana, Djibouti and South Africa have electricity in 75% of primary schools while both Seychelles and Mauritius have 100% access in primary schools, the latter being consistent outliers in UIS data.... Some form of access to electricity is a precursor for all ICTs, and therefore the widespread areas of energy poverty across sub-Saharan Africa represent a fundamental barrier to ICT use, not just in education, but for society in general.

Also Countries like Nigeria, Cameroon, Chad, and recently South Africa amongst others where access to stable electricity especially in the rural areas is a major challenge more and more schools are increasing finding it difficult to make use of ICT facilities even if they have them because of inadequate power. There is a general lack of human resource capacity to provide ICT training and equipment servicing, and there is also a lag between the availability of ICT infrastructure and the ability of agrarian societies to integrate it to benefit national development. Djibouti, for example, is at the forefront with a digital telecom network with two earth stations and the landing point for three undersea cables linking to Asia, the Middle East, and Europe (Farrell & Shafika, 2007). However, the country has yet to develop an ICT education sector policy and has generally not yet benefited from these assets.

Primary and secondary schools play an important role in providing ICT literacy education and developing information technology competencies, or cognitive and operational skills and attitudes necessary for the effective use of information and communication technologies (Rambousek, Stipek, Prochazks and Wildova, 2014). This means that, the introduction of ICT in primary and secondary education is the bedrock of learning everything about information technology and its utilisation. Although, few countries in Africa have fully adopted the use of ICT in impacting knowledge in both primary and secondary schools, some scholars are of the opinion that ICT has not been effectively utilized in Africa (Farrell & Shafika, 2007). This is because the level of ICT proficiency among African students is relatively low. Adomi and Kpangban (2010) concur when they argue that fifty five percent of students within the continent, including Nigeria, Algeria, Burkina Faso, Cameroon, Republic Of Congo, Egypt, Gabon, Lesotho, Mali, Mauritius, Mozambique, Rwanda, Senegal, South Africa and Uganda had no experience at all in using computers. Other findings of the study revealed that the typical African school environment provides neither opportunity nor training in using ICTs, and that 75 percent of responding teachers have no or very limited experience and expertise regarding ICT educational applications. Using Nigeria as a case study, the Federal Government of Nigeria, in the national policy on education (Federal Republic of Nigeria, 2004), recognises the prominent role of ICT in the modern world, hence the integration of ICT into the education curriculum. To actualise this goal, the document states that government will provide basic infrastructure and training at the primary school. In an attempt to improve computer literacy in the educational sector at the junior secondary school level, computer education has been made a pre-vocational elective, and a vocational elective at the senior secondary school (Adomi & Kpangban, 2010). The introduction of this in the national policy in 2002, after it was discovered that chalkboard and textbooks were still dominant in most classrooms of Nigerian and Algerian schools. Despite putting plans in place for computer literacy, there are constraining factors which still hinder the implementation of ICT in education. In Algeria, for example, the problem of poor infrastructure and connectivity issues in addition to limited learning materials pose serious challenges to the actualization of ICT based teaching and learning (Asongu & Odhiambo 2019). Oliver (2002) points out the necessity to migrate from the content-centred curricula to competence-based curricula. This movement is closely associated with improving the teacher-centred forms of delivery to student-centred forms (Samarakoon,

Christiansen & Munro 2017). This means that with the introduction of ICT, a rich environment that promotes and motivates learning is ensured. This position is supported by Kisirkoi (2015) who avers that the effective use of ICTs as a teaching and learning agent has been found to significantly increase student's achievement which promotes critical thinking and problem-solving skills. Kisirko explains that researchers are in agreement that the use of ICT in education as instructional media does not only enhance learning outcomes but, it is also crucial in preparing the youth for the challenges that come with globalization. More so, with the use of ICTs in schools, students gain the much-needed confidence to embark on meaningful research with their teachers and contemporaries (even with those in other countries) to solve technological problems (Kisirkoi, 2015).

In Africa, the provision of ICT facilities poses a big challenge as many schools lack the bare necessities for an ICT based learning. As Mndzebele (2013) remarks, what has helped schools to have computers are foreign donors and aid from companies that donate ICT facilities as a form of their corporate social responsibility project. With the help of non-governmental organisation and other foreign bodies, ICT have made its grounds in Africa. Mndzebele locates the problem which schools in the continent wrestles with within the area of implementation. In an attempt to find a way out of this unpleasant scenario, Rambousek, Stipek, Prochazks and Wildova (2014), propose that computer-based applications for learning such as word processing, be used in place of papers. Furthermore, teaching aids which incorporates slides and projectors should replace the old order of writing boards in the classroom. Also, the prospect of virtual learning was mentioned as a way of not only bridging the gap between students and teachers in different parts of the world but also expanding the scope of learning beyond the walls of a classroom.

4. POSSIBILITIES OF ICT IN PRIMARY AND SECONDARY SCHOOLS

Samarakoon et al (2017) argue that the opportunities and possibilities for ICT in primary and secondary schools in Africa is quite great. More and more schools are increasingly using 3G internet for educational purposes, albeit informally. However, such usage has considerably in formal teaching and learning with more and more schools seeing the creation of computer labs with internet access. The increasing availability of mobile phones and tablet PCs have considerably increased the possibilities for ICT in primary and secondary education in Africa. Porter, Hampshire, Milner, Munthali, Robson, Lannoy, Bango, Gunguluza, Mashiri, Tanle and Abane (2016) argue that it would appear that smartphones may be better poised to overcome the urban-rural digital divide as compared to more capital, energy and labour intensive (maintenance) technologies such as computers in the drive to improve ICT usage in primary and secondary schools. Since it is easier and cheaper to access, purchase and maintain smart phones or tablets PCs, they are increasing become a viable option especially in rural Africa. Attention should be given to the fact that Children are prone to learn faster and gain more knowledge when they are still in the primary or secondary level. Therefore, the introduction these ICT wares (software and hardware) as pedagogical tools in the teaching and learning process will help in broadening student knowledge as these are the formative stages of learning. In this regard, Ziki et al (2014) emphasizes the need to make ICT based learning a priority in primary and secondary schools in order to help students get acquainted at an early age. Their position is hinged on the premise that expertise and perfection is reached through proper education at an early age.

Another critical element that is associated With ICT is its all-inclusive nature which allows children with health challenges; such as Down syndrome or dyslexia to have the opportunity to learn (UNESCO, 2015). Innovation in the ICT will enable researchers and teachers to prepare

effective and efficient teaching and learning modules for students with special needs. UNESCO (2017) stressed that schools must be equipped in a number of ways to deal with the ramifications of special needs cases. ICT have the potential to transform special needs children's learning experiences from one of negligence to a robust and complete learning experience. To transform the learning experience of special needs students, Mishra, Sharma and Tripathi (2010) describes a range of specialised software and hardware solutions for communicating, accessing and inputting data/ information to/from web applications that are useful. The applications and tools are:

- Specialised keyboards, such as Braille
- Braille
- Conversion of local language to Braille
- Screen readers
- Touch screens
- Eye tracking
- Talking word processors
- Screen magnifiers

Subsequently, with the use of these tools, students with special needs are not left behind and they also have the opportunity to learn like their counterparts without disabilities. The use of digital and audio libraries makes it easy for pupils and students with special needs to access educational materials through the help of their teachers. Eid (2008) argues that students with intellectual, hearing or reading disabilities, impaired sight, dyslexia and other disabilities are now able to follow educational courses; via digital and audio libraries, accessing their material, content and resources via the internet.

Higgins (2017) further discussing the possibilities of ICT for basic education argue that pupil's attainment is bound to increase with the continuous use of ICT. This is because when using ICT, they spend more time working at or, practising the skill being studied and tested. He however noted that computers can therefore help by; increasing the amount of time pupils spend on activities, by increasing pupil's motivation and engagement when doing these activities and, by providing practice modules at an appropriate level. For instance, through the use of the virtual library and language application exercises, students are given the opportunity to develop correct words pronunciation and general language proficiency. ICT gives pupils and students the opportunity to carry out individual study aside what is taught in the classroom. Autonomous learning through virtual libraries is possible with the help of the parents or tutors who serve as guides. Mathevula and Uwizeyimana (2014) explained that student's learning autonomy will enable children to exert more choice over how they approach study, requiring less direction from teachers. This is why Primly (2012) suggests that, it is necessary to foster autonomous learning through technology in the language classroom to arouse the interest of the students, to give importance at school/college level. In the same vein, Mathevula and Uwizeyimana (2014) noted that the teacher's role will become more of a guide or moderator rather than a director.

CONCLUSION

This paper attempted to chronicle the use of ICT in primary and secondary schools in Africa. It articulated the challenges relating to the use of ICT and the possibilities or possible future which ICT can necessitate for education on the continent. It also attempted to show the critical stake of ICT in the growth and development of societies with particular emphasis on education. The paper stressed that the utilisation of ICT at the primary and secondary levels is critical if the current low standard of education in Africa is to be improved to a globally competitive level. It

was however discovered that the potential of ICT have-not been fully utilised due to a variety of reasons.

In addition, the reliance and inability of teachers to make a change from the traditional method of teaching has made ICT impact slow especially in areas with ICT facilities. Part of the problem is what Rambousek et al (2014) allude to as they stress the need for the development of problem-solving skills in students in addition to critical thinking. These can be achieved if students are shown how to effectively harness the power of information that is available on the internet for academic purposes. For the best results, African governments must show commitment to the development of education in primary and secondary schools by way of infrastructural investments in ICT facilities. In addition to infrastructural development, African governments should enact policies that are tailored to provide the enabling environment for ICT based education to thrive. In line with this, the paper recommends that, governments should come up with appropriate ICT policies and workshop training programmes for teachers at all levels of education. This means that teachers will become familiar with ICT policies thereby gaining knowledge on how to improve the standard of education in their respective countries.

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