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Role of Information Communication Technology in Literacy Education in Kenya

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Abstract

The use of Information Communication Technology (ICT) in literacy education is critical to ensuring that Kenya is able to create individuals with raised self-esteem, equipped with skills that will enable them to derive socio-economic benefits of greater workforce productivity as well as those associated with lifelong learning. Consequently, incorporating ICT in literacy education may help to develop the kind of citizenry required in the information society; improve learning outcomes in education; and enhance the quality of life in general. However, despite the enthusiasm exhibited in exploiting ICTs potential in education use in Kenya, the acquisition of learning outcomes in literacy are still low. Key impediments include access, funding, inadequate ICT facilities, high cost of development of interactive e-learning content, high Internet costs in the region, as well as unaffordable infrastructural maintenance costs occasioned by the dynamic natures of ICTs. In addition, the inadequate capacity of teachers has been an obstacle to making ICT a medium of instruction or a tool to support management processes. As well, the absence of ICT Curriculum at Early Childhood Development (ECD) and primary levels does not help cultivate a computing culture early in life. Thus, in order for meaningful impact on literacy education to be realized, the ICT investment programmes in education in the country should be refocused and redirected to the ECD and primary levels of education as the starting point, and henceforth be concentrated on some five variables identified widely as likely to create the desired results, namely: enhancement of teaching and learning; raising access to literacy education; training of teachers; localizing content; and creating a literacy-conducive environment. This paper explores how ICT can contribute to making literacy education more effective and the challenges that require to be overcome in order to achieve this.

Key words: *Information Communication Technology, Literacy Education*

Introduction

More than ever, the advent of the knowledge economy and global economic competition compel governments to prioritize educational quality, lifelong learning and the provision of equal opportunities for all. Education policymakers widely accept that improved access to information and communication technology (ICT) in education can help individuals to compete in a global economy by creating a skilled work force and facilitating social mobility. They emphasize that ICT in education has a multiplier effect throughout the education system, by enhancing learning and providing students with new sets of skills; by reaching students with poor or no access to education (especially those in rural and remote regions); by facilitating and improving the training of teachers; and by minimizing costs associated with the delivery of instruction (UNESCO Institute for Statistics, 2013).

Beyond the rhetoric and of equal if not greater importance to policymakers, are basic questions about the role that ICT plays in basic educational outcomes, including retention and learning achievement. There are those that argue that ICTs are merely a delivery mechanism for teaching and learning, while it is the foundational pedagogy which matters (Clark, 1983; 1994). Others, however, contend that computers and other ICTs may possess properties or affordances that can directly change the nature of teaching and learning (Kozma, 1991; 1994; Dede, 1996). For instance, it is believed that ICT can help to bring abstract concepts to life using images, sounds, movement, animations and simulations. In any case, a better understanding of ICTs and their impact on student outcomes are priorities in all countries, regardless of level of economic development.

According to UNESCO (2006) in spite of the vital importance of literacy in terms of its benefits for individuals, communities and nations, a vast number of people remain illiterate. While progress has been made over the past years towards achieving universal literacy, the poorest and most marginalized groups of people have yet to be reached. UNESCO (2006) further note that recognizing this situation, in 2002 the United Nations declared the decade between 2003 and 2012 the “United Nations Literacy Decade”. The aim of the Decade was to bring literacy to all. Thus, with this reality as well as the realization that the use of ICT has continued to expand exponentially, bringing unprecedented opportunities for achieving greater educational access and success, attention should henceforth be paid to how ICT could contribute to increasing access to literacy and improving the quality of literacy education.

Kenya is a signatory to achieving the Sustainable Development Goals (SDGs) by 2030. The Government’s commitment to provide formal education is best evidenced by the considerable investments made in the basic education sector. The introduction of Free Primary Education (FPE) and Free Day Secondary Education (FDSE) has enhanced access to education for both boys and girls. However, acquisition of learning outcomes in literacy, numeracy and essential life skills are still low. The basic education sub-sector has continued to experience many challenges which include: high pupil/student-teacher ratio, overcrowded classrooms, occasional teacher and pupil/student absenteeism, high drop-out rates, high repetition rates, increased number of orphans due to diseases such as HIV and AIDS, inadequate infrastructure, weak governance and financial management, inequitable deployment and weak management of teachers, and gender and regional disparities. The most pronounced disparities exist in arid, semi-arid areas and pockets of poverty in rural and urban areas (MOE, 2018).

It is also noteworthy that in some schools, parents have employed untrained teachers to ameliorate the shortage of teachers negatively affecting the quality of teaching and learning. There are other challenges in providing an education which takes account of spiritual, social, security, moral and cultural practices that impede access, equity and relevance. To address these challenges, the Government has committed to adopt the following policies:

- i. Continue to provide free and compulsory primary and day secondary education;
- ii. Reform the Basic Education Curriculum; and
- iii. Implement automatic transition and transfer between grades and across levels of Basic Education.

To implement these policies, the Kenya Government has devoted to employ among other strategies, the integration of ICT into the education system (MoE, 2018).

The Environment of ICT use in Education in Kenya

In terms of ICT use in education, Kenya has made some significant efforts and initiatives. The country for instance drafted an ICT policy in January 2006. The policy objective sought to encourage the use of Information Technology in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning as well as enhance institutional management (Republic of Kenya (RoK), 2006a). Some of the strategies proposed in the growth and implementation of ICT in education were that the government would:

- i. Promote the development, sharing and integration of E-learning resources to address the educational needs of primary, secondary and tertiary institutions.
- ii. Enhance the dissemination of E-learning initiatives through provision of affordable infrastructure.

The ICTs in Education Options paper for the Ministry of Education, Science and Technology (MOEST) discussed the ways in which ICTs could be leveraged to support and improve the delivery of quality education for all Kenyans (Republic of Kenya, 2006b). The ideas presented here responded to the educational priorities outlined in Sessional paper No. 1 of 2005 and the Kenya Education Sector Support Program (KESSP). The KESSP provided a roadmap for investment in E-learning and suggested provisional budgets to support educational activities. E-learning was identified in the following investment programs:

- i. Primary Teacher In-service Training: This program aimed at in-servicing teacher trainer on E-learning methodologies so that teachers could be equipped with the skills on how to integrate ICT in education.
- ii. ICT in Education investment program: This program outlined the strategies and policies that would foster E-learning delivery systems, build the necessary capacity and promote the development of required ICT infrastructure and institutional management systems (Republic of Kenya, 2005).

The Ministry of Education in collaboration with the private sector through the Kenya ICT Trust Fund developed a National ICT Strategy for Education and Training aimed at making ICT integration possible at all levels of education and training. The strategy outlined how Information and Communication Technology would be adopted and utilized to improve access, quality and equity in the delivery of education services in Kenya. It identified the strategic pillars

for sector ICT implementation as: Establishment of a policy framework; Digital equipments; Connectivity and network infrastructure; Technical support; Harnessing emerging technologies; Digital content development; Integration of ICTs in education; Training (capacity building including professional development); Research and development; Partnership and resource mobilization; Legal and regulatory framework and monitoring and evaluation (Republic of Kenya, 2006b).

In terms of ICT initiatives, the government, the private sector as well as most of the Kenyan educational institutions have invested heavily in ICT projects. Ndirangu and Kabira (2012) observe this by noting that key mega projects witnessed include the Kenya Education Network (KENET) Bandwidth Expansion Project at a cost of US\$ 12 million and the East African Marine Cable System at a cost of about Ksh. 6 billion. These authors add that institutions are buying computers, increasing bandwidth and connectivity, as well as enhancing their other infrastructure to harness the potential of ICT use in education activities. The issue of ICT investment in education in Kenya notwithstanding, the focus of this sector over the last 10 years has been mainly on e-government and ICT skills development with investments made mainly at the secondary school and university levels (MOE, 2018). Furthermore, despite the many initiatives and efforts to leverage use of ICTs in educational institutions in Kenya to support teaching and learning, the acquisition of learning outcomes in literacy are still observed as low.

Use of ICT to Promote Literacy Education

A definition of functional literacy adopted by UNESCO's General Conference in 1978 states that "A person is functionally literate who can engage in all those activities in which literacy is required for effective functioning of his (or her) group and community and also for enabling him (or her) to continue to use reading, writing and calculations for his own and the community's development" (UNESCO, 2006). The benefits of literacy are thus varied, ranging from the individual benefits of raised self-esteem to the socio-economic benefits of greater workforce productivity.

The right to education as recognized by the Universal Declaration of Human Rights includes the acquisition of literacy, numeracy and other basic skills as a foundation for lifelong learning. Lifelong learning is a central principle of the international post-2015 education agenda. In its Position Paper on Education Post-2015, UNESCO proposes that "flexible lifelong and life-wide learning opportunities should be provided through formal, non-formal and informal pathways, including by harnessing the potential of ICTs to create a new culture of learning" (UNESCO, 2014a).

This paper therefore focuses on five areas that have widely been identified as being vital for ICT to be utilized in literacy education if any meaningful transformation is to be realized in education access, quality, relevance and equity. These are: enhancing teaching and learning; raising access to literacy education; training of teachers; localizing content; and creating a literacy-conducive environment.

Use of ICT in Teaching and Learning

The proliferation of ICTs is changing the role of the teacher as a dispenser of information in the traditional pedagogy to a mentor; the library as a building in a particular place stocked with books and other printed materials, to online store of information accessible from virtually any distance in the world by those connected to the internet; and knowledge as a privileged preserve of the loyals and the rich, to a consumption good to be accessed by all human beings of the world. The availability of ICT thus provides teachers and students with access to up-to-date educational resources (Lawler, & Wims, 2007). This has greatly increased the quality of what is learned. Students are provided with the current market skills required by their careers of interest. This has the potential of reducing disparities between the skills acquired by graduates and the requirements of the labour market.

ICT can support various types of interactions ranging from learner-content, learner-learner, learner-teacher, and learner-interface (Chou, 2003; Moore, 1989). These types of interactions make the learning process more engaging and learners actively involved in teaching and learning process. The learning interactions are also likely to make instructors demonstrate the component behaviours used to define quality instruction as supported by Feldman (1976). These components include clarity, knowledge, intellectual stimulation, organization, and enthusiasm. Use of ICT is likely to bring about learner-centred approaches to teaching and learning. These approaches are supported by Freire's liberation theory of 1970's that stressed the importance of dialogical approach to education. Thus, ICT supported instruction provides a pedagogical shift that encourages interaction between the teachers and learners. When used well, ICT can facilitate a two-way information flow between teachers and learners. It also facilitates production of ICT-literate, versatile, adaptable workforce and students, skills that are consistent with the human capital theory on education (Hawkins, 2002). Augmenting the skills of the workforce in this way has the potential to benefit the economy at large, and improve the individual student's earnings and employment potential.

In the enhancement of literacy education, especially in the process of learning, the use of ICT can give an advantage of multimodality (Snyder, Jones & Bianco, 2005). This refers to a combination of pictures, texts, and sounds to stimulate more senses on human cognitive, and make the learning process more effective. For instance, the use of technologies, such as computers and projectors, television and video can deliver the combination of words, images and audio in the form of animation to improve reading comprehension and escalate literacy learning. These technologies can deliver learning materials in an entertaining way, make it more compelling thus motivate the audience to engage in the learning process, stimulating discussion and critical thinking (Restyandito, Chan & Lestariningsih, 2013).

In a practical case, the use of radio to supplement a printed course material in India was found to make the lesson lively and interesting. Furthermore, the use of visual stimuli (printed material) coincided with audio stimuli (radio program) was proven to be more fruitful in enhancing the skills of vocabulary and sentence construction (Chatterjee, 2004). Additionally, radio use in learning can also assist information processing and memory (Eggen & Schellenberg, 2010).

Darter and Phelps (1990) argue that the use of computer assisted instruction (CAI), such as computer and multimedia programs can improve the uptake of literacy skills. The two note that "Immediate feedback reinforces correct responses or points out errors needing correction. These advantages are applied to the teaching of reading and offer a multitude of possibilities for assisting students in optimum reading development.", hence learners of literacy can proceed more quickly and effectively. Thus, the use of multimedia can satisfy the principles of interactive learning, such as situated learning, practice and feedback, learning from mistakes, and learning by doing. In addition, computers can be fun to use, especially for people who have never used them before, thereby encourage users to continue learning and thus accelerate the retention of literacy by students, as found in literacy education programs in Egypt (Samie, 2005).

Mobile phones, tablets and personal computers are the other technologies that are further extending their reach and offer a high value with regard to literacy teaching and learning, especially when an internet connection is available. Smartphones and tablets are the most recent generation of ICTs, and are outperforming other technologies, because of their independence from landlines and because they provide the opportunity to include interactive learning features (UNESCO, 2014 b).

Some studies have revealed the effectiveness of using mobile phones in empowering the illiterate people. Aderinoye, Ojokheta and Olojede (2007) demonstrated the use of mobile phones as one approach to improve the literacy rate among Nigeria's nomadic population by implementing a mobile learning system. A similar study was conducted by Sampangi, Viswanath and Ray (2010) in India. Banks (2012) created a smart phone interface, enabling illiterate users to share ideas and vital information about farming and agriculture. While, Raza et al. (2013) explored how telephone-based services might be mass adopted by low-literate users in Pakistan, by using fun and interesting speech-based services. These studies have illustrated that mobile devices have the capability to present novel innovations in the area of learning and education.

The advance development of mobile technology also brings through some advantages like that of a computer. Kumar et al. (2012) explored the use of two speech recognition-enabled mobile games to assist children in rural India to read and understand words. These researchers found that the use of such technology could increase the process of training, as it enabled the users to be more active (productive training) rather than merely receptive of vocabulary training. Trinder, Magill and Roy (2005) brought out some advantages of using mobile device in educational context, such as the immediate readiness of the device anywhere and anytime where the use of computer or laptop is not useful, hence users can take advantage of a few moments' useful studying time. Furthermore, these authors also highlight that the ability of exchanging data between mobile devices will encourage communication and collaboration between learners.

ICT and Access to Literacy Education

The use of web-based learning, educational television and radio programs as well as use of audio-visual materials may address the problem of literacy accessibility especially because these ICT tools bring education services to people who could not come to schools or educational institutions. They also would provide teachers with resources they would otherwise not have had to engage their students (Ndirangu & Kabira, 2012). It is a reality that some social, political, cultural, and geographic factors can hinder someone to access literacy education. ICT, therefore, can help overcome these obstacles. For example, a course delivered via radio/television program and through the internet can be accessed

by anybody regardless of their social status, cultural background or geographic locations (Almeida, 2004; Iqbal, 2004) as well as gender issues (Dighe & Reddi, 2006).

For persons with disabilities, Wadi and Sonia (2002) state that technology provides essential support enabling them to participate in the educational system. They observe that visual Technology can be used by people with visual disabilities to enlarge print materials; voice synthesizers can enable individuals with muscular dystrophies to communicate; special computer software can be used to ameliorate learning disabilities or to enhance the memory of individuals with traumatic brain injury; keyboard adaptations enable individuals with motor disabilities to write, and the internet can connect home bound individuals to classrooms.

More recently digital ICTs such as computers, tablets, e-books, and mobile technology have spread at great speed and also found their way into the teaching and learning of literacy skills. The large spectrum of ICTs, which can be applied to different contexts, includes satellite systems, network hardware and software as well as videoconferencing and electronic mail. Each one of these technologies opens up new possibilities to develop literacy skills from the safety of one's home and offers a virtually unrestricted access to learning materials (Kim et al., 2012).

ICT and Training of Teachers

A successful approach to introducing ICTs in the teaching and learning of literacy recognizes the central role of facilitators, educators or teachers who do not only need to be convinced of the benefits of ICTs and sufficiently trained in its pedagogical use, but also should be actively involved in the early stages of planning and developing such learning systems (UNESCO, 2014b).

Qualified and trained teachers represent the key to quality teaching and learner motivation. However, in many countries professional expertise is limited and thinly distributed, particularly for the provision of literacy education (UNESCO, 2006). While ICT cannot be substitutes for teachers, ICT can supplement and support teachers by reducing their workload and enhancing their lessons. In addition, ICT can be used as effective and affordable tools in the professional development of teachers. For example, television, video and DVD technologies can be used to show examples of best practice teaching methodologies. Similarly, computers and computer programs can be used to train teachers in certain subjects. Also, teleconferencing can be used to enable interactive training over long distances, making in-service training affordable and simpler for teachers working in remote areas (Jose de Almeida, 2004).

The issue of teacher training is certainly complex because it is important to consider several components to ensure the effectiveness of the training. These include time for training, pedagogical training, skills training, and an ICT use in initial teacher training. Correspondingly, research by Gomes (2005) concluded that lack of training in digital literacy, lack of pedagogical and didactic training in how to use ICT in the classroom, and lack of training concerning the use of technologies were obstacles to using new technologies in classroom practice. Providing pedagogical training for teachers rather than simply training them to use ICT tools is an important issue (Becta, 2004). Cox et al. (1999) as cited in Bingimlas (2009) argue that if teachers are to be convinced of the value of using ICT in their teaching, their training should focus on the pedagogical issues. Pre-service teacher education can help teachers to experiment with ICT before using it in classroom teaching (Albirini, 2006). This would make them have confidence when using ICT. However, beside the need for pedagogical training, it is still necessary to train teachers in specific ICT skill. Schoepp (2005) claims that when new technologies need to be integrated in the classroom, teachers need to be trained in the use of these particular ICTs.

ICT and Localizing Content

ICT can enable the rapid and cost-effective creation and distribution of socially, culturally and linguistically appropriate learning content. For example, word-processing software can be used to modify literacy education material that has been developed elsewhere, to make it available in local languages and on locally-relevant subjects. Similarly, desktop publishing technology is useful in creating local teaching and learning materials and it eliminates the problem of outdated learning content in many countries since it makes production of printed matter much timely and relevant (UNESCO, 2014b).

Computers can be used in a number of other ways to create learning content for literacy education. For example, the development of interactive computer programs for literacy learners, which are based on local themes and subject matter. Such learning materials can be easily and cheaply distributed via CD-ROM (UNESCO, 2006). A good case in point is the Malay Nursery Rhymes CD-ROM. In recognition of the need to foster the continued reading and knowledge of Malay literature, including children's nursery rhymes, and recognizing the lack of children's CD-ROMs

and software in the Malay language, the National Library of Malaysia initiated a project to create and distribute a CD-ROM containing Malay nursery rhymes. A multimedia CD-ROM was created which presents the nursery rhymes in an interactive format, enabling children to engage creatively and freely with the material. Due to the interactive nature of the CD-ROM, it is an interesting and entertaining resource for children's reading and writing classes. Unlike a textbook, a CD-ROM can fit volumes of information into a light and small package. This technology has enabled the creation of a relatively cost-effective product which can be disseminated easily and cheaply throughout Malaysia (Asia-Pacific Cultural Centre for UNESCO).

ICT and Literacy-Conducive Environment

For literacy to become widespread in a society, written material should also be readily available in daily life and accessible to all. Such an environment cultivates opportunities for coming into contact with, and creating written material and thereby reinforces and promotes the development of literacy skills (UNESCO, 2006).

ICT can be utilized to help make written information part of everyday life. For example, television can be a tool for bringing written material into daily life when text is screened in conjunction with images on the television screen, such as subtitles on television programmes. Similarly, short message service (SMS) technology, which allows subscribers to use their dial pads to type and send text-based messages through their mobile phone, encourages the development of skills in reading and writing and is therefore a means by which written material, and literacy skills, can become a part of everyday life.

Desktop publishing technology is another tool for creating a literacy-conducive environment, as it can facilitate production and distribution of local newspapers and can enhance information-sharing. Also, the relatively low cost of creating printed matter using desktop publishing can increase the quantity of circulation of print materials, thereby increasing the opportunities for access to written material. A vast range of information, books, and other written text is available on the Internet and can be accessed at any time and from anywhere that has the infrastructure set up to provide it. The Internet therefore has great potential in terms of enabling people to have everyday access to written material. Community learning centres (CLCs) and other information hubs have become a common way of cultivating sharing of knowledge and learning. With the introduction of ICT, particularly Internet connection, these CLCs are serving as a means to cultivate literacy by providing free or low-cost access to written material as well as courses in reading and writing skills (UNESCO, 2005c).

Challenges to the Use of ICT in Literacy Education

The great potential of ICTs for learning is challenged by some limitations. For instance, to the older generation it is difficult to catch up with ICT skills, and thus they are at risk of being left behind. In addition, a lack of literacy skills is often connected to poverty, which may restrict access to and the efficient use of those technologies. Meanwhile, despite growing use of mobile phones and personal computers, access to the internet is restricted in many parts of the world (UNICEF, 2012). The strategies for using mobile learning to accomplish Education for All (EFA) goals and of mainstreaming mobile learning include building strong multi-sector partnerships to foster widespread uptake, linking mobile analytics to learning theory, training teachers in mobile learning design and promoting mobile learning for all (UNESCO, 2013).

Efforts to introduce ICTs to support literacy education in Kenya have been met with various impediments including access, funding, inadequate ICT facilities, and high cost of development of interactive e-learning content. In addition, ICT has not yet been embraced as a medium of instruction or as a management tool due to inadequate capacity of teachers. The absence of ICT Curriculum at Early Childhood Development and primary levels does not help cultivate a computing culture early in life. The dynamic nature of ICT technology and inadequate capacity for maintaining ICT equipment makes the frequent acquisition and maintenance of ICTs unaffordable. A key issue affecting ICT provision especially in rural areas is the limited access to electricity and where this exists, frequent power disruptions. Further, high costs of Internet provision and other costs associated with ICT equipment, infrastructure and support costs are obstacles to rolling out a national ICT programme in the medium term (MoE, 2018). However, it is recognized that there are improvements in these areas – wider distribution of internet provision and reducing costs of digital equipment (Ndirangu & Kabira, 2012; Kashorda, & Waema, (2014).

Conclusion

According to UNESCO (2014b) fascinating and exciting new technologies, software and applications are appearing almost on a daily basis. However, exploiting the potential of ICTs can never be an end in itself. Technologies are only tools, if powerful ones. They have the potential to contribute to effective teaching and learning literacy: enhancing

access and outreach, motivating learners to engage or re-engage in learning, improving the quality of teaching and learning, and boosting the possibilities for lifelong learning. However, in order to make effective use of the potential of ICTs, many difficulties have to be overcome and some prerequisites must be met. These cover a wide spectrum including education policies and strategies; physical, hardware, and software infrastructures; human and financial resources; implementation modalities; and teaching and learning contents and methodologies. In the Kenyan context, for any meaningful impact on literacy education to be realized, the ICT investment programmes in education should be refocused and redirected to the Early Childhood Development and primary levels of education as the starting point, and henceforth concentrated on the five variables discussed in this paper that include: enhancement of teaching and learning; raising access to literacy education; training of teachers; localizing content; and creating a literacy-conducive environment.

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