

Intergrating Information Communication Tecnology In The Teaching And Learning Of Early Grade Learners For A Transformative Education In Kenya

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Abstract

Information communication and technology (ICT) is a core aspect of Kenyan society in terms of development, hence it's full utilization will in effects lead to proper achievement of vision 2030 and make Kenya one of the worlds' ICT hub. Kenya is in the process of fully integrating ICT in the new education system or Competence based curriculum (CBC). The author's interaction with pupils, pre-school and primary schools teacher and parent and with the influence of being a teacher trainer prompted the insightful interest in investigating the variables of this study. The purpose of this study was to analysethe integration of ICT in the education system so as to improve the quality of teaching and learning in schools. The main objective of this study was to investigate the integration of Information Communication Technology in the teaching and learning of early grade learners for a transformative education in Kenya. The methodology employed here were interviews for primary data and desktopsearchforsecondary sources. Other secondary sources includedtext books, Articles, Journals, Thesis, Education News, Expert opinion and websites.The study found out that Information Communication Technologyplays a significant role in equalizing opportunities for marginalized groups and communities. This technology has created opportunities where none previously existed, increasing access to educational resources to those in remote areas through mobile phones, and meeting a rising demand for personalized learning.In a negative proportion,Kenya is one of the countries whose teachers just a reported by UNESCO (2015) are lackingcurriculum support in the classroom. Most early grade teacher by the beginning of 2021 still lack basic ICT skills and seem ignorant of the fact that the world is getting transformed faster than their imagination the report found.

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I. Introduction

The last two decades has seen major developments in computer hardware and software and increasing demand to integrate computers into education globally. It is now very vital for every nation to modernize its educational system on the basis of information and communication technologies (ICTs), as globalization and transformation to information society call for new literacy (Unesco, 2002).ICT refers to a collection of computer-based technologies, which are exploited to support teaching and learning, communication and collaboration, self-expression, creation, among others, that is, for the promotion of all developmental domains of children, and learners of any age. The 21st century has already brought historic changes to the world of work. In this age, the transfer of knowledge, skills and information is faster and is competitive globally. The Knowledge Age demands a steady supply of well-trained workers. Information Communication Technology can act as an agent for change by significantly enhancing the transfer of information and educational reform which enables teachers and learners to move away from traditional to a more innovative and effective approaches to teaching and learning (DoE, 2003). A careful deployment of ICT can go a long way in bridging both the access and standard in primary education because ICT could be used to make education accessible to more learners (Evoh, 2007). The challenge for educators is to embrace, and respond to, not just the technology, but extraordinary pace of change.

The integration of ICT into education systems has developed in different ways in different countries at different times sometimes starting at the upper secondary level and spreading downwards through primary to early childhood education. In some countries ICT began at the primary level spreading both upwards and downwards and sometimes through the establishment of computer science or Informatics or ICT as a school subject, which then broadens out to affect other subjects and teachers.Teaching with ICT in primary education requires teachers to act as if they were learners themselves in the computer-enhanced environment (Hardy and

Kirkwood, 1994). Teachers have the best opportunity in the learning process as they are being trained, they practice during lesson preparations and internalize when teaching learners using ICT tools. Teachers' learning is enhanced by frequent questions and answers from learners. Teachers should also expand their opportunities to improve their skills in relation to the use of digital technologies, whether through school programs or through professional networks. Improving learner learning outcomes requires teachers and school administrators to have a deep understanding of the context, content and pedagogy of rapidly increasing range of enabling technologies. The idea that teaching and learning can successfully take place using technology inspires both hope and dismay. There is the hope that more learners can be reached at a more convenient pace than has previously been the case. It is also dismay that the infrastructures necessary for deploying technological resources or constructing an effective ICT platform are lacking in low-income countries Kenya included.

Most East African countries are already integrating ICT into their education system. Tanzania for example has a curriculum for ICT in primary and pre-primary education and is referred to as *Teknolojiaya Habarina Mawasiliano (TEHAMA)*. The subject is only taught in a few schools located at district headquarters, which have ICT facilities. This is because very few primary schools in the country have computers or internet access. Information and Communication Technology (ICT) is therefore taught as a discrete subject. It is viewed in Tanzania as an important tool by society in aiding the acquisition and dissemination of knowledge, skills and attitudes; facilitating teaching and learning, speeding up the process of economic development and increasing efficiency in various sectors (MoEVT, 2005). Olakulehin (2007) emphasizes that the pedagogic application of ICT involves effective learning with the aid of computers and other information technologies as learning aids, which play complementary roles in the classroom, rather than supplementing the teacher.

Many Ministries of Education have made the commitment to bring ICT into schools, but few have developed coherent strategies to integrate the use of computers as pedagogical tools in the classroom. Many governments view computers as a stand-alone subject requiring a curriculum focusing on basic computer literacy skills. While computer literacy is required, the integration of computers and the internet into the broader curriculum is where real learning begins. Primary education in Kenya starts at age 4 at pre-school level and takes 8 years to complete grade 6 in the new curriculum. The objectives of primary education in Kenya are, to promote growth of the whole person through developing the mental, physical and emotive abilities and attitudes, to impart literacy and numeracy, to nurture scientific and social skills and to promote social equity and lay a foundation for further education (GoK, 1998). The primary school curriculum is therefore designed to provide a functional and practical education that caters for both the needs of children who finish their education at the primary school level and to secondary education (State University.com, 2009). The subjects intended to be taught in the new curriculum in primary schools include English, Kiswahili, mathematics, science, music, history, civics, geography, physical education, home science and religious education. This will create a varied of subjects to be selected for areas of specialization as learners progress to higher levels of learning. For Kenyans to fit into the modern technological world, the government introduced the use of ICT in all subjects but the actual use of computers was introduced to grade one where the teacher and the learner are both actively engaged in the learning process using computers. This program has faced several technical hitches and is yet to pick up fully. The introduction of the use of computers in most public primary schools in Kenya failed at the initial stage because of lack of infrastructure, low capacity building of human resource and insufficient financial support as indicated by some school managers.

The emphasis on ICT in education as has been seen in the most developed nations will be to help increase the quality, access and relevance of education and help solve the problems of teacher-student ratio. Teacher pupil ration in Kenya is among the highest in the world now standing at between 50-70 pupils per one teacher as compared to the current requirement of 1:40. The introduction of laptops for learners and teachers will ease this problem as it will be mandatory for each learner to have a laptop which can be used for both writing and reading and the teacher plays much of a supervisory role. This is why the Ministry of Education in Kenya intends to provide pupils with the 21st century skills of acquiring and sharing of information. The introduction of ICT in the curriculum will improve as expected learners' critical thinking, problem solving, collaborative working and peer-to-peer learning. These skills can be facilitated through the use of technology and hence the investments into ICT in education. ICT is a tool which will help improve education through the digitalization of pedagogical material and enabling enhanced teaching. Courses which are interactive and multi-media based will enable learners learn at their own and facilitate the teachers to prepare lessons. With computer-based education, assessments can be prepared and administered online and responses marked electronically, thereby, making it quicker and less costly as opposed to the use of conventional methods which consume a lot of time. This therefore, shows that ICT in education can support other aspects such as the pupil to teacher ratio and improvement of pedagogical materials. The use of ICT also motivate pupils, compensate for language deficiency, encourage active participation, reinforce learning, enhance the applicability of the learning content provided for the learning needs of individual pupils and supplement the spoken word (Kruger, 2010).

Methodology of the study

The study used much of literature review to put together the findings of this study. The study also utilized face to face interviews with teachers, early grade learner, parents, education scholars and personal observation in collecting primary qualitative data. The main areas under investigation in this study were the introduction of ICT into the Classroom, school management and integration of ICT in school curriculum, the role of the teacher in ICT Integration in the Classroom, learner experiences with Information Communication and Technology, the benefits of integrating ICT in classroom instruction and the challenges facing learners and teachers in the integration of ICT in the teaching and learning process in schools in Kenya.

Introduction of ICT into the Classroom in Kenya

According to OECD Report (2004), integration of ICT in education began in the 1980s and has been compulsory in the developed nations. This is not so in developing nations where ICT integration in education is considerably more recent, small-scale and experimental. While most developed countries have reported over 41% of integration of ICT to teaching and learning, the proportion remains substantially low in Africa, Kenya included. Integration aims at using ICT to support teaching and learning in the delivery of the various curricula to achieve improved education outcomes. Kenya is making strides towards achievement of sustainable Development Goals (SDGs). This can be seen through the use of technology in all sectors of the economy. One sector that has made a major milestone toward achieving this is the education sector. Currently, there are several ways in which technology is affecting the direction of education. Education in Kenya has seen different innovations that seek to cover gaps existing in the education system. All of these innovations, like Tusome, Pried, Smase, the laptop project and now the new curriculum (CBC), came out of the desire to bridge a gap in the system. Sustainable Development Goals in Kenyan situation states that by 2030 the government should have all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

After years of promises and delays, the Kenyan government finally fulfilled a promise it had made to transform the education sector through the use of technology in the classroom. Towards the end of the first school term (March 2017), the government sent each public primary school PC tablets and laptops to be used in their digital school programme named "DigiSchool.". Each grade one child got a Windows-based tablet loaded with the officially approved learning materials, and the class teacher got a laptop to control the classroom devices. The school also got a projector that could be used for class and other general purposes. For now, these devices will be used in grades one, two and three and the government will roll out these gadgets gradually in the coming years to expand the Digital Learning Programme to cover the entire primary school years. This Programme is targeted at learners in all public primary schools and is aimed at integrating the use of digital technologies in learning. The decision is borne out of the vision and context that technology now defines our world and the need to prepare young people for today's realities. The devices are pre-loaded with content which includes interactive digital content for grade 1 and 2. This content is from five subjects which are Kiswahili, English, Maths, Science and Social studies. The teachers' laptops, server and wireless router in addition are pre-loaded with the teacher training curricula on ICT integration, Teachers training manual on ICT and a resource kit for teachers. The schools laptop project was rolled out on pilot basis starting and is yet to pick up from the pilot stage.

The ICT programme has been affected by several programmes introduced together with the laptop project which includes Tusome, a program which was highly embraced by lower grade teachers as offering a solution to reading problems. The MoE together with Teachers service commission should have planned for a smooth integration of programmes together with other stakeholders to avoid confusing the implementer. Another programme running parallel with TUSOME and the introduction of ICT is PRIED, which is aimed at improving numeracy for lower grade learners. The program is termed noble as each learner is expected to use one text book which acts as both a course book and an exercise book. This program would see the government provide adequate learning materials to all schools. Text books were mandatory as learners were to be assessed individually using their text books.

The introduction of ICT in lower grade interferes total with earlier programs and this has brought learning in lower primary almost come to a stand still in most rural schools. Smase, which was one of the programs, intended to improve the teaching of science and mathematics is already edged out of the school programs. Looking at all these programs which are supposed to run concurrently, one is almost sure that the introduction of ICT to lower grade learners in Kenya without proper training of teachers on how to merge them is likely to bring confusion both to the teacher who is supposed to implement the programs and the learner who receives learning instructions using the different methods. Another major challenge is the introduction of a new curriculum (CBC); a system which is termed heavily learner centered and requires a lot of attention from all stakeholders. The success of all these programs merged together will be a millstone in the development of

education in Kenya. The role of ICT should be to bring together the various methodologies in the education sector with an aim of placing Kenya in a competitive edge globally. There is therefore a serious need for training all primary school teachers if ICT integration is to succeed and to bring in the intended transformation in the education sector. The government needs to build teachers confidence in the use of ICT for personal development and this will lead to the development of positive attitudes towards the integration of ICT in the teaching and learning processes in the classroom.

School Management and Integration of ICT in School Curriculum

The Government of Kenya recognizes that an ICT literate workforce is the foundation on which Kenya can acquire the status of a knowledge economy by the 2030. Against this background, the government has made education the natural platform for equipping the nation with ICT skills in order to create dynamic and sustainable economic growth. The objective of this priority area is to make teaching and learning more learner-centered and self directed. The integration of ICT into teaching and learning processes in primary schools is necessary. The government is in the process of providing enough required technological tools such computers, projectors, cameras and many other requirements to disseminate knowledge through ICT applications. The government also intends to allocate enough infrastructures so that there are safe places necessary for integrating ICT. Even though teachers have the interest to use ICT tools to facilitate learners through teaching and learning processes, many of them are not at the level of being able to use ICT tools. They lack technological knowledge and other knowledge required to use ICT tools because it is new to them and is now proving difficult to use technology in the teaching and learning processes. The success of full integration of ICT depends whole on the government and school managers.

Strong leadership in schools will be needed to support this new environment to increase teacher capacity and to support the uptake of digital education in schools. Schools must be encouraged to see the importance of supporting the provision of ICT tools to improve teaching and learning in the classrooms. Flanagan (2003) observes that principals who are not prepared for technology leadership struggle to develop the resources required for ICT integration. When computers are introduced in schools, very few, if any, school leaders have in fact used computers in meaningful ways with children and therefore lack the necessary academic vision and experience to lead ICT integration. Investing in digital education is helping to reshape how learners learn and even what they learn through powerful 21st century tools. As key management of change in the teaching-learning processes, school management can facilitate the decision to integrate ICT into teaching, learning and school administration. To achieve this, school managers need to understand, support and practice the idea that ICT integration is not about the ICT but about a change in the teaching and learning processes (Afshari et al., 2008). The demands on schools to integrate ICT into teaching and learning processes should therefore, come with a demand for leadership to lead the development. The introduction of any new strategy should also consider the improvement of the capacity of school leaders to lead the change. Head teachers are crucial in leading the integration of ICT into the school curriculum. If school leaders do not apply ICTs in their management practices, they may not be able to lead the integration of ICT in the classroom (Mentz&Mentz, 2003). Therefore education in the information age requires school leaders to not only update their skills and knowledge, but also work towards the transformation of their roles as educational leaders (TTL SA, 2002, in Mentz&Mentz, 2003). Looking at the introduction of ICT as a tool to improve learning in the classroom in Kenya, it is evident that the issue of training both the head teachers and school boards was given minimum considerations. The government should come out strongly to correct this as unskilled managers may likely not lead in the process effectively. Board of Management should also attend workshops on the integration of ICT into the curriculum as they are the decision makers of their schools.

Effective leadership is needed to take advantage of the potential of ICT in education. This suggests that the success or failure of ICT integration in schools depends on the leadership in the school. This is because ICT integration involves decision making, influencing others, supporting teachers and being a role model in ICT use. Schools have focused on purchasing equipment, setting up labs and wiring their buildings, without considering the substantial organizational and cultural changes that are necessary to support appropriate use of technology to enhance pupils learning. As a result, many schools have expensive computer labs that are being used for typing and games if they are being used at all. In schools where principals are not prepared to handle the complex issues around ICT integration, decision-making is based more on financial and technical considerations than pedagogy. It is also important to recognize that schools are at different stages in their development and therefore require different levels of commitments in the development of digital capacity and hence have different needs to be at same level with those which are considered to have advanced. Leaders in every county in Kenya should be encouraged to monitor the development of ICT in their schools. Some teachers, however, are intimidated by technology and are very comfortable with their own established teaching styles. To change this, any teacher training institution must help teachers see past the technology to the pedagogical and educational gains that use of the technology brings. Teachers need support, examples of good practice, and leadership from their school

leaders and necessary time for professional development, in order to truly transform teaching and learning in the classroom. Eventually, teachers need to be transformed from information consumers, using the internet to access resources and information, into information producers who adapt the information for their particular cultural and educational reality. Currently, World Links has focused its training on helping teachers to use technology as a tool, and to transform their classrooms into interactive learning environments (Kozma et al., 2004).

The Role of the Teacher in ICT Integration in the Classroom

Primary education is the largest sub-sector of any education system and offers the unique opportunity to contribute to the transformation of societies through education of the young. In order for young people to adjust to and compete in the rapidly changing environment of the contemporary world they need to have a set of life skills which includes among others, communication, problem-solving skills for creativity, flexibility, mobility and entrepreneurship. Thus an educational strategy should be oriented on the new lifestyle concept and corresponding skills developed alongside technological innovations. This is where competence based curriculum (CBC) comes in handy for the Kenyan child.

As ICT continues to be an integral element for educational reforms and innovations in schools, the need for enhancement of teachers' skills for pedagogical ICT integration is even higher. Recognizing that schools can be no better than the teachers who work within them, teacher professional development is therefore a key component in almost every improvement plan for education and constitutes a main component of educational reform programs. Building teachers' capacity on how to effectively integrate ICT in classroom practice for the purpose of improving education quality and reforming curricula has been one of the main goals of national, regional and international education reform efforts in various countries (Kozma and Anderson, 2002; Pelgrum and Law, 2003). Looking at the Kenyan situation, the integration of ICT into the classroom learning was an initiative of the government. Teachers were trained but the training was too short to make an impact in classroom lesson presentations. Most trained teachers lacked confidence in the system as they felt ill-equipped to use the new tools. Majumdar (2005) observes that most teachers, who received ICT training as part of their professional development, still lack the confidence needed to integrate ICT in teaching and learning. Computer literacy should be understood that it is not a single day or week training as was done by the ministry of education. It takes time for teachers to understand and this may suggest that teachers be trained fully during their pre-service training in order to be able to make proper lesson presentation in their classrooms using new technology.

When considering ICT-related innovations in education, teachers cannot be seen as isolated actors with no past. Teachers follow routines and implement strategies that they have learnt during pre-service training and in their schools, they are required to implement curricular objectives and contents that quite often are formally established and they work within the constraints of the school organization. Any innovations that require teachers to change many aspects of their daily routines are very demanding. Complex innovations can only be successful if a number of interacting conditions are met. The greatest problem causing dissatisfaction among teachers is lack of planning time. New technologies like ICT require teachers to play more of a facilitator's role rather than a more directive one. This new role conflicts with traditional teaching methods and requires teachers to step back and allow learning to happen without much direction from them.

In the current digital era, teachers are required to integrate ICT in their daily teaching and replace their traditional methods with modern tools and facilities. Teachers need to be confident and competent in using various ICT tools to build their trust in the technology. Success comes in when the implementer of a specific programme develops a supportive attitude. Positive attitudes towards computer use by school teachers are important to ensure the integration of the technology is effectively carried out in the school curriculum and also during teaching and learning (Buabeng- Andoh, 2012). Teachers' attitudes are influenced by their perception of the usefulness of ICT, their behavior, intentions and pedagogical aspects (Ayub et al., 2012). Teachers' attitudes towards the use of ICT in teaching and learning are also influenced by other factors. It is important to view ICT in education as not just the computers and software but also a solution to strengthen and improve access to the whole learning environment. The Master Plan for ICT in education which is currently under development by the ministry of education targets training of teachers in the use of ICT, access to infrastructure, enhanced bandwidth for learners throughout the country and digital content. Teachers are seen as the key players in using ICT in their lesson presentation.

The technology is seen to have the potential in preparing learners for life in the 21st century. Tarus (2015) noted that, teachers have the motivation to use ICT because they can prepare the new content by the means of ICT tools. They also are aware that ICT will help learners to do their self-coaching and that teachers can use technology to illustrate and demonstrate new content. Through learning of ICT skills, pupils will be ready to face the future challenges based on proper understanding as it develops their skills and widens their knowledge and information. With ICT integration in the classroom, learners will be able to engage in interactive tasks with a wider range of information and knowledge during their learning. ICT is capable of providing a

dynamic and proactive teaching and learning environment. The teachers are the custodians of the ICT project, and will actually do the grounds work in terms of equipping learners with the very vital skills necessary to make the program succeed.

Information Communication Technology is to a large extent dependent on teachers' strategies. Hudson's (1997) in his study conducted in a relatively early stage of ICT implementation found that teachers are important for fostering peer interaction among students in multimedia-based activities. He explained that teachers play the cyclical role of observation, reflection, recording, discussion and feedback. Teachers not only monitor the interaction in group learning, but also use direct intervention such as asking questions to stimulate discussion to facilitate learners' thinking, understanding, and then learning on the subject. Information Communication Technology is a major vehicle for teaching and learning from the earliest years. It is at a very young age that learners begin to acquire digital skills which they increasingly use to explore and exploit the world of information and to craft that into knowledge. ICT facilitates the opportunity for more learner centered teaching, more self-learning and more peer teaching. It also provides greater opportunity for teacher-to-teacher, and learner-to-learner communication and collaboration and access to the worldwide web and the learning resources contained thereon. For ICT to succeed in Kenyan schools, teachers, parent, school managements and the national government must put their heads together and develop strategies which will ease the work of the teacher and develop teachers' confidence in the use of the new technology.

Learners Experiences with Information Communication and Technology

Computer aided instruction has been seen to slightly improve pupils' performance on multiple choice, standardized testing in some areas. Computer assisted instruction which refers generally to learner self-study, has been seen to slightly improve pupils test scores on some reading and math skills, and although whether such improvement correlates to real improvement in pupils' learning is debatable (Tarus, 2015). ICT is seen to be less effective or ineffective when the goals for their use are not clear. While such a statement would appear to be self-evident, the specific goals for ICT use in education are in practice.

It has been demonstrated worldwide that when exposed to ICT at very young age, learners begin to acquire digital skills which they increasingly use to explore and exploit the world of information and to craft that into knowledge. ICT use supports early learning; where clear connections can be made between sounds and letters on a page. Learning to read is a long and difficult process, and many pupils struggle to concentrate when using books alone. According to lower grade teachers interviewed during this study, they claimed that ICT improves pupils' listening skills needed in all areas of the curriculum but possess a great challenge to the older generation of teachers who by majority think that teachers must be taken back for training in this specific area so as to be competent enough to use ICT in the classroom otherwise learners will be seen to be controlling what the teacher should teach through their discoveries.

Learners visited during this study expressed great interest in the use of laptops in the learning process. They said that they could not be bored any more as computers had a lot of interesting sites to visit and that they learnt new things all the time. Computers are both hands on and minds on as learner read and write at the same time. "In cases where teachers are engaged elsewhere, learners are able to do assignments through group discussion, individual learning and listening to the computer teacher when clarifying concepts" one of the lower grade teachers explained in her interview with the researcher. Learners using computers for schools are not without challenges. Grade two learners expressed dissatisfaction with frequent loss of power, slow pace of some computers when being started, on and off of certain laptops as teachers lack skills to either repair or maintain them and poor discipline among learners which in most cases lead to loss of information as they can delete them. ICT has promoted learning and made it more meaningful where learners can do assignments and mark them using the same computers as observed by the researcher in few schools visited during this study. Learners are able to get clear diagrams of any kind with their correct colour and the way they appear in real life situation. Fast learners can learn more by helping those with challenges in computer use including some of their teachers. They get time to ask challenging questions and get results instantly. Teachers have adequate learning materials to use as they can download them using the available internet. The integration of ICT into the new curriculum in Kenya created a new method of searching for information away from the traditional method where the teacher and the text book were the only source of new knowledge for learners. If the use of ICT is to be continued in a better organized manner, then the Kenyan education system is headed for a competitive world of work and information.

The Benefits of Integrating ICT in Classroom Instruction

Bringing ICT into the classroom can have a considerable impact on the practice of teachers and in particular when ICT is conceptualized as a tool that supports a real change in the pedagogical approach. Not only do the teachers need to change their roles and class organization, they in particular need to invest energy in themselves and their pupils to get ready to introduce and manage new learning arrangements. Some have to start

with acquiring basic ICT knowledge and skills. They also need to determine which applications have added value for learning in their subject area. While doing this they need to be aware that this is not a one-time activity as the information environment is continuously changing. It is challenging for teachers who engage their pupils in open, flexible, authentic and autonomous learning environments to determine which basic subject, social and management skills learners need in order to function in such environments.

The change brought about by the introduction of ICT can impact on assessment tasks, with new learning environments moving away from summative methods of assessment to formative approaches and open-ended products such as reports and assignments that are created by groups of pupils. These different aspects are time consuming and result in an increased teacher workload. To reduce the workload, teachers can be encouraged to share resources with others and locate good practices on the Web and adapt these to their local circumstances. In a number of cases the high workload is caused by teachers wanting to control all the activities of their pupils, which means answering many questions and running from one pupil to the other all the time. Teachers can take time to discover that computers do not mean extra work but that they can actually make their work easier. The impact on pedagogy can be summarized as being strategies that are more learner-centered, more cooperative and collaborative, more active learning and based on greater access to information and sources of information. These impacts on pedagogy relate directly to the impacts on teachers, in particular the roles they play, their use of information, and their workload. There is no doubt that teachers who use ICT in classrooms have to demonstrate high levels of energy, hard work and perseverance, often in the face of considerable odds (Lankshear & Snyder, 2000). If teachers are early adopters then they are required to be resourceful and can overcome many barriers to make things work. Planning lessons involving computers can take considerable time and demands complex scheduling and resourcing. Therefore, teachers using computers in the classroom should not act in isolation from each other. They need to have access to resources that will supply ideas and material for different classroom applications and including peers who are also developing their own pedagogies and resources (Leach et al., 2004). While computers may be seen to have great potential in education, they also present teachers with some additional obstacles to overcome. Most of the potential benefits are directed towards the student in improved learning and instruction. Very few of the benefits are directed towards the teacher.

Benefits from the utilization of ICT in teaching and learning have also been reported by Newman (2002) and Wheeler (2000) who argue that the benefits include shared learning resources, shared learning spaces, the promotion of collaborative learning and the move towards autonomous learning. In terms of sharing learning resources, according to Newman (2002), ICT has the potential of enabling pupils and teachers to use video systems to transmit television programs and information throughout an entire school and even between schools. In turn, sharing learning resources has the potential of minimizing costs and improving the quality of teaching and learning, especially in under-resourced schools (Newman, 2002). In terms of shared learning spaces, networked computing facilities create a distributed environment where learners can share work spaces, communicate with each other and their teachers in textform, and access a wide variety of resources from internal and external databases via web-based systems through the Internet (Wheeler, 2000). Sharing learning space could go a long way in reducing the problems of lack of teachers which are said to be at an alarming stage, especially in rural schools of some developing countries such as Kenya.

In terms of Promoting collaborative learning, Riel (2000, cited in Wheeler 2000), argues that the use of ICT will make it possible for much of what we now see as individual learning to change and become collaborative in nature. Furthermore, in terms of ICT facilitating the move towards autonomous learning, computers and the power they bring to the pupils to access, manipulate, modify, store and retrieve information will promote greater autonomy in learning (Wheeler, 2000). In turn, such pupils' learning autonomy will enable them to exert more choice over how they approach study, requiring less direction from teachers. This is no way to imply that ICT is going to replace teachers. However, as students become increasingly independent and able to direct their own studies to a greater extent, the teacher's role will become more and more a guide or moderator rather than as a director (Forsyth, 1996).

There appears to be a general consensus that both teachers and pupils feel ICT use greatly contributes to pupils' motivation for learning. Pupils who use a computer at home also use them in school more frequently and with more confidence than pupils who have no home access. Placing computers in classrooms enables much greater use of ICTs for higher order skills than placing computers in separate computer laboratories. Evidence exists that use of ICTs can increase learner autonomy for certain learners. The role of ICT in Kenyan schools will be of great benefits as many Kenyans are far much ahead of technology. Most learners are able to use smart phone at home as is evident among millions of Kenyans currently communicating using both computers and smart phones in their day to day activities. Job application for example is by large through emails. Others includes registration of learners for examinations, accessing various documents through emails and hudumacentres and sending messages through phone which is easier for both the young and the old.

Integration of ICT in early grade classes will enable the whole nation to adopt technology faster than can be imagined. This is because most high school students are already using technology at school and at home.

Teachers who are computer literate will take the advantage of the new technology to develop their learning materials using the acquired skills. It is also encouraging to see teachers who are less experience in the new technology struggle to learn from their learners and children at home. This in turn makes learning exciting and enjoyable for both to the teacher and learners. The introduction of ICT in lower grade classes has seen many parents struggle to purchase smart phones and tablets for home use both by them and their children. Investment in education supports a way of life based on participation, fairness and sustainable growth. To support new ways of learning, learners need access to appropriate resources and assessment that allows them to demonstrate skills such as reasoning and problem solving. ICT introduction has been beneficial to many teachers who would have otherwise failed to cop up with the current technological era. The current generation will fit in the fast growing advancement in technology and place Kenya among the most advanced nations of the world technologically. Teachers require formal training, but also sustained and ongoing support from their colleagues to help them learn how best to integrate technology into their teaching. ICT use can enhance teachers' professional knowledge and capability by permitting new forms of teacher-to-teacher cooperation. Teachers need to learn to transform their classrooms from static environments where a one-way flow of information from teacher to learner occurs, into dynamic, learner-centered environments in which learners interact with peers in teams, both in their own classroom and in as well as with virtual classes.

Challenges in Classroom Instruction and the Integration of ICT in Kenya

Integration of ICT into the classroom teaching is a complicated process that requires changes in various aspects of the learning environment. In a study of ICT integration in Singaporean schools, Lim (2007) analyzed the necessary and sufficient conditions for the effective integration of ICT in the classroom and the supporting context of the school. These conditions include classroom management issues, availability of ICT tools, establishment of disciplinary and educational rules, division of labour among teachers, teacher assistants and students, and revised school policies. Lim found out that policy-makers and school administrators need to apply strategies to address the various barriers to successful integration of ICT in the classroom, and support the creation of necessary and sufficient conditions for that purpose. Tondeur et al. (2008) point out that school-related policy, such as an ICT plan, ICT support and ICT training have a significant effect on classroom use of ICT.

Naturally the use of ICT in teaching, learning and managing educational institutions, just like any other innovation, compels the emergence of a new set of skills, attitudes and pedagogical approaches that requires continuous training programs to build sufficient capacity among teachers, developers, educators and administrators (Rwanda Ministry of Education, 2008). This means that, while most schools especially in developed countries, and relatively in urban areas of developing countries are now equipped with computers, Internet access and occasionally more sophisticated equipment such as interactive whiteboards and effective e-Learning requires far more than the mere introduction of hardware in the classroom (van Rij & Warrington, 2010). For this ICT equipment to mean anything, teachers must be conversant in utilizing them to implement an integrated approach in ICT use and new approaches (Bialobrzeska & Cohen, 2005). According to (Beyers, 2000), in his view of the current scenario which is characterized by lack of capacity, there is a heightened need to fast-track the training of teachers. Teachers need to be lifelong learners to keep themselves updated with the changes in technology and new teaching methods. When teachers are poorly prepared to handle ICT tools, they will lack competency as they have low mastery of skills in ICT. Mastery of skills in ICT integration is an appropriate need as it cannot be put into good use for instructional delivery without the requisite skills.

Integration of ICT in the teaching and learning processes pose great challenges to the teacher. The prevalence of undesirable websites is a genuine and critical concern that could affect learning and teaching because the teacher has to spend much time trying to control pupils from using websites unrelated to the learning content, instead of teaching (Mikre, 2011). These challenges bring into question the issue of security, not in terms of physical security but in terms of access to information security. Another challenge is that, the openness of the web puts pupils into an exploratory mode which often challenges effective learning in time-constrained formal school systems (Devadason, 2010). Without teachers' supervision, it is possible that pupils might misuse the technology for leisure time activities and have less time to learn and study (Mikre, 2011). Yousef and Dahmani as quoted by Mikre, (2011) list online gaming, use of Facebook, chat rooms and other communication channels as some of the other perceived drawbacks of ICT use in education, because pupils easily switch to these sites at the expense of their study. It is also possible that the use of ICT to access website with unsolicited and harmful content may lead some pupils to develop anti-social behavior such as promiscuity, violence, Satanism as some learners tend to imitate whatever they watch on these websites.

There are other major problems associated with the ICT use in education as related to learners' learning. Over-reliance on ICT for example may limit learners' critical thinking and analytical skills as they will rely fully on answers posted to the websites as the absolute truth. Computer-based learning has negative physical side-effects such as vision problems and that there is need for doctors' advice on the amount of light

necessary for learners self study. Pupils may have less opportunity to use oral skills and hand writing as they will depend on typed letters already programmed. The use of ICT may be difficult for weaker pupils because they may have problems with working independently and may need more support from the teacher. Another problem is negative attitude and resistances to change. The resistance in the acceptance of ICT in the classroom is often said to be primarily based on the risk of teachers losing influence over the values and directions of classroom activity (Chan, 2003). However, it is very important to note that resistance to change is not necessarily a barrier in itself but could also be an indication of the presence of a much deeper problem (Bingimlas, 2009). Part of the problems could be teachers' beliefs which may greatly influence what they do in classrooms. The government should facilitate teachers to gain more skills required to integrate ICT into teaching and learning process by providing enough trainings or by creating the special formal program to learn how to use ICT into teaching and learning process. Teachers should be given more advanced laptops so that they can use and advance their profession through ICT' applications. Training in itself requires greater time than was done in the case of Kenya.

Teacherare said to be afraid of entering the classroom with limited knowledge in the areas of ICT were some pupils have a more advance knowledge of computers than them. This problem was supported by Fullan (1993) and Kayisire&Wei (2016) who argued that, teachers cannot provide what they do not have and suggested that teachers must be skilled enough if learners have to possess the same characteristics. Teachers lack the competence to integrate ICT into their lessons has as turn to be one of the major challenges facing the new technology in Kenya. Many teachers lack the knowledge and the skills to use computers and are not enthusiastic about the changes and integration of supplementary learning associated with bringing computers into their teaching practices. Many teachers initially feel threatened by the loss of control in the classroom as pupils with some ICT skills can quickly access information and challenge the teacher's role as the primary source of information.

Teachers who receive appropriate professional development, however, learn how to more effectively manage their classroom and use the technology to create a more stimulating learning environment while realizing that their pedagogic knowledge rather than technical knowledge is what makes them a teacher. Anastasiades and Vitalaki (2011) claims that teachers who are competent and professional in ICT tend to have high sensitivity and are effective in providing pedagogical guidance, promoting internet safety, teaching learners moral behaviors when navigating the Internet for educational, recreational, and interpersonal purposes. In addition, if teachers are concerned about management of websites and possible risks on the Internet, they will be better skilled in engaging learners in meaningful online interaction and be more comfortable to use the Internet as a teaching tool. Therefore, teachers play the role of considering all the information available about the dangers related to Internet use, and what is effective training to protect learners, and thus guide them on the issue of Internet safety. Another challenge is that lower grade learners take time to settle and to pick up instructions. The introduction of laptops as a learning tool in the classroom has been hindered by insufficient time. A lower grade lesson in Kenya takes 30 minutes maximum. Teacher must share this limited time accurately and manage time effectively during lesson presentation. In fact this has been the greatest challenge in the adoption of ICT for early grade learners and teachers in Kenya and hasseen the use of computers in schools come to a near collapse in all primary schools.

II. Conclusion

In this study we can conclusively say, integrating ICT in the new system of education in Kenya has been investigated to find out whether classroom teaching and learning using the new technology shall lead to new innovations and creativity of learners now and in future. ICT is a tool which will help improve education through the digitalization of pedagogical material and enabling enhanced teaching. Courses which are interactive and multi-media based will enable learners learn at their own and facilitate the teachers to prepare lessons. Strong leadership in schools will be needed to support this new environment to increase teacher capacity and to support the uptake of digital education in schools. Schools must be encouraged to see the importance of supporting the provision of ICT tools to improve teaching and learning in the classrooms. School leaders need to understand, support and practice the idea that ICT integration is not about the ICT but about a change in the teaching and learning processes. Teachers need to realize that there is a technological gap between the progress of the society and instructional activities of the teacher in the classroom. Societies have been revolutionized by technology and the teaching and learning activities at school level have remained same hence being too far away from technology. The 21st Century education is student centered where students learn from multiple sources and for this reason the use of ICT & Multimedia is very much essential in educational field. ICT acts as the gateway to the world of information and helps teachers to be updated. It creates awareness of innovative trends in instructional methodologies, evaluation mechanism which leads to teachers' professional development. Computer literacy should be understood that it is not a single day or week training as was done by the ministry of education in Kenya. Teachers who receive appropriate professional development, however, learn

how to more effectively manage their classroom and use the technology to create a more stimulating learning environment while realizing that their pedagogic knowledge rather than technical knowledge is what makes them a teacher. Younger and energetic teachers graduating from teachers training institutions and Universities are most of the time forced to teach upper grade classes as they are assumed to be full of energy to manage more challenging topics and prepare learners for national examinations while the experienced and elderly teachers believe that engaging in new methodologies is beyond them. A large portion of teachers in Kenya enters the teaching profession when inadequately prepared, while those already in the field receive insufficient support in their professional lives. If the introduction of ICT is anticipated to focus on pedagogy and on ICT integrated learning rather than on technology, then there is no doubt that teachers need basic ICT skills to be able to function in an ICT rich environment. The acquisition of ICT skills will be best realized when the skills are used to enhance the learning process. Computer technologies make it easier to create environments in which learners can learn by doing, receiving feedback, and continually refining their understanding and building new knowledge.

Recommendations

1. The government should train teachers regularly on emerging trend in ICT and to boost their confidence and competence in the classroom.
2. School management should come out strongly to support teachers in the care, repair and maintenance of their own laptops and other advanced technological tools.
3. The ministry of education should plan for teachers to be trained fully during their pre-service training in order to be able to make proper lesson presentation in their classrooms.

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