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PERCEPTION OF TEACHERS AND PRINCIPALS ON ICT INTEGRATION IN THE PRIMARY SCHOOL CURRICULUM IN KITUI COUNTY, KENYA

Nzwili K. Mwendwa[i]
PhD student, Moi University,
School of Education, Kenya

Abstract:
The role of Information Communication and Technology (ICT) in education cannot be over stressed. There is a paradigm shift in many developing countries by taking drastic measures in investing heavily on ICT integration in education. Kenya is one of these countries**.** This paper is a report of a study that was undertaken in the year 2016 on the perception of teachers and principals on ICT integration in the public primary school curriculum in Kitui County in Kenya. This study was guided by the Technology Acceptance Model (TAM). It was informed by the pragmatic philosophy and the Mixed Method (MM) research approach. Data was collected from principals and teachers in 388 public primary schools in Kitui County selected through stratified and simple random sampling methods. A total of 388 principals and 776 teachers participated in the study giving a total of 1114 respondents. The research instruments used were questionnaires for teachers and interview schedules for principals. The data collected was analysed qualitatively and quantitatively. The results showed that ICT was perceived as an important tool in improving performance, collaboration, learning experiences and learning outcomes. The perception held by the principals and the teachers who took part in the study on ICT integration in the primary school curriculum was positive. This can be attributed to the fact that the Kenyan government has been creating awareness about introduction of laptops as a learning resource in primary schools and generally on the integration of ICT in education. The principals and teachers have been taken through the awareness programmes. The study recommended that the government should continue with its efforts on ICT integration in education given the positive perception of the teachers on the benefits of ICT in the

[i] Correspondence: email k.nzwili@gmail.com

instructional process. Teachers' perceptions towards ICT integration in education is a significant factor in the implementation of technology related innovations. It is hoped that this study will be useful in education policy making on ICT integration in education in Kenya and other parts of the world.

Keywords: information, communications and technology (ICT), perceptions, ICT integration, curriculum

1. Introduction

The role of Information Communication and Technology (ICT) in education cannot be over stressed. There is a paradigm shift in many developing countries by taking drastic measures in investing heavily on ICT integration in education. Kenya is one of these countries**.** This paper is a report of a study that was undertaken in the year 2016 on the perception of teachers and principals on ICT integration in the public primary school curriculum in Kitui County in Kenya. Research shows that investments in ICT for enhancing formal and non-formal education systems are essential for schools improvement (Tong & Trinidad, 2010). Syomwene (2017a) identifies the perceptions of the stakeholders as a key indicator in the successful implementation of innovations and changes in the school curriculum. Teachers are the key curriculum implementers in the schools. On the other hand, the principals have the responsibility to supervise and oversee the implementation of innovations and changes in the school (Syomwene, 2017a). School principals are chief accounting officers in their schools and therefore are concerned in allocating budgets to various school activities including implementation of ICT. They are responsible on resource provision and maintenance. This study thus investigated on the perception of teachers and principals on ICT integration in the public primary school curriculum in Kitui County in Kenya.

1.1 Background of the study

Curriculum implementers and supervisors play a major role in the implementation of the school programmes. One of the major hindrances on ICT integration in teaching and learning can be the perception of teachers and head teachers. Simply having a positive perception of computers, their use and significance in a classroom increases the likely hood of adoption of the innovation by teachers. Schools should find a way of helping teachers develop that positive attitude.

Perceptions can be determined by many factors such as the awareness of the innovation or change, the availability of the required resources and facilities as well as the competences required in the implementation process. Rogers (2003) opines that communication about an innovation or change can create awareness amongst the stakeholders and consequently create positive perceptions in them. Similarly, Syomwene (2007a) identifies communication an effective action in the implementation of curriculum innovations and changes. According to Betz (2011), implementation of ICT in schools would be successful when schools fully support and provide up to-date infrastructure, adequate professional development and support staff during its implementation. It is crucial that teachers be competent in the integration of ICT and have a broad understanding of the curricular, technological, financial, social and administrative dimension of ICT use in education. The government of Kenya is making frantic efforts to ensure that it provides basic facilities to implement ICT integration in the Kenyan primary schools. These government efforts cannot be realized in case teachers have negative perceptions on ICT integration in education.

On technical support and infrastructure, general competencies that are required would be in the installation, operation and maintenance of technical equipment (including software), network administration and network security. Without on-site technical support much time and money may be lost due to technical breakdowns. The other area of competency is in content development. This is a critical area, there is need to develop original educational content, radio programmes and interactive multimedia learning materials. A study by Mohammed & Abdulghani (2017) indicates that technology helps students become independent, develop research and problem solving skills and enjoy learning in general. Afshari et al (2012) showed that in this age of ICT development, principals and all cadres of teachers in both primary and secondary schools should become competent in using ICT; they should use computers effectively to perform their daily responsibilities. Literature indicates that some teachers in Kenya are lacking proficiency in database, spread sheet, presentation/multimedia software, the internet and information seeking as compared with other technology competencies. With limited access to electricity and phone lines, few people in Kenya have a computer at home. Radio and television access is much better. On the other hand, mobile phones are commonplace and the number of internet users is increasing rapidly due to the number of internet cafés, shops, and access centres that are available, particularly in urban areas.

The ministry's policy framework indicates that there are a number of challenges concerning access to and use of ICT in Kenya, including high levels of poverty, limited rural electrification, and frequent power disruptions. Most of primary schools do not

have computer equipment; however, a few of these schools have computers. This could consist of one computer in the office of the school head. Very few secondary schools have sufficient ICT tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1. Most of the schools with ICT infrastructure have acquired it through initiatives supported by parents, the government, NGOs, or other development agencies and the private sector, including the NEPAD e-Schools programme. According to NEPAD (2005-2006), attempts to set up basic ICT infrastructure in primary schools are almost negligible.

Developing foundational knowledge should be essentially about creating awareness on ICT and its nature. According to Pernia (2008) key competencies that can be expected of individuals who have completed a foundational knowledge course on ICT are as follows: Familiarity with hardware such as mobile phones, computers, internet and other ICTs, ability to identify ICTs, appreciation of actual and potential functions of these technologies in everyday life, understanding basic features and uses of ICT (for instance, mobile phones; voice calls and SMS; computers: word processing, spread sheets, database, information storage; internet: web browsing, e-mail and instant messaging). There is little doubt that society's main ambition for children's use of digital technologies centres on their potential benefits for education.

The government of Kenya introduced Free Primary Education (FPE) in January 2003, which resulted in an increased enrolment of children from 5.9 million in 2002 to 7.2 million in formal public schools, thus creating overstretched facilities (GoK, 2003). ICT integration will enable cheap and synchronous access to the most advanced learning resources from remote locations, changing the traditional way of classroom place of learning and thus bringing learning at home, at place of work and curbing down the old challenges of infrastructure. FPE has also resulted in overcrowding in primary schools especially those in urban slums causing high teacher-pupil ratio in densely populated areas. ICT integration will enable the teachers to utilize white boards and e-conferencing at the same time use educative software, education boards to curb the problem of overcrowding to improve class room activities, learning motivation and general acquisition in class room instruction. ICT integration in primary curriculum will enable teachers to access high connectivity to the internet for accessing data base materials and notes and this will alleviate high cost of special equipment for children with special needs. It is against this background that this study set out to investigate the perception of teachers and principals on ICT integration in the public primary school curriculum in Kitui County in Kenya.

1.2 Statement of the problem

In the improvement of quality education, schools should integrate technology in the curriculum (Syomwene, 2017b). As the key curriculum implementers, teachers in public primary schools in Kitui County in Kenya have been attempting to improve pupils academic performance in the Kenya Certificate Primary Education (KCPE) examination but their efforts has not shown any significant improvement. An analysis on the trends in KCPE performance in public primary schools in Kitui County indicated the following mean scores for a spell of five years: Year 2009 (265, 20%); Year 2010 (271.60%); Year 2011 (265.10%); Year 2012 (279.75%); and Year 2013 (270.65%) [KNEC Report, 2014]. Since ICT integration in the school curriculum has far reaching consequences in students' achievement, it is hoped that a solution can be found in the poor performance in KCPE examination in this area through ICT integration in education. According to Syomwene (2017b), technology can facilitate learning especially the understanding of complex concepts. Students can learn considerably better from a combination of both words and images (which technology enables) than merely words alone (Mohammed & Abdulghani, 2017).

On the other hand, stakeholders' perceptions can inhibit the implementation of curriculum innovations in schools (Rogers, 2003; Syomwene, 2017a). It was therefore paramount that teachers and principals' perceptions on the integration of ICT integration in education be sought so as to establish any challenges. As mentioned earlier, teachers are the key curriculum implementers of school programmes while principals supervise and oversee the implementation process and thus their perceptions can determine the success of ICT integration in education.

1.3 Research Question

The research question addressed in this study was: What are the perceptions of teachers and principals on ICT integration in the public primary school curriculum in Kitui County in Kenya?

1.4 Justification of the study

The study focused on perception of teachers and head teachers on ICT integration in the public primary school curriculum in Kitui County, Kenya. Utilising ICT resources improves the quality of education. The performance of learners in the Kenya Certificate of Primary Education (KCPE) examination is a main bridge for young pupils to proceed to secondary school education in Kenya. Poor performance in the past decade in KCPE examinations especially in Arid and Semi-Arid Lands (ASALs) in Kenya has been observed. Kitui county falls in ASALs in Kenya and the trends noted in performance in

KCPE examinations in this region have been persistently poor. This is worrying in that academic performance in KCPE examination accounts for progression of pupils to the next grades/levels. Primary school education forms the foundation for subsequent levels and thus the instructional process in this level of education demands attention. Improved perception of teachers and principals in ICT integration can definitely enhance academic performance in the primary school level as well as in higher levels. Little research on perception of teachers on ICT integration has been carried out in Kitui County. This research therefore is an eye opener and will shed light on the unique challenges on ICT integration specifically on the perception of teachers and principals.

1.5 Theoretical Framework

This study was based on Technology Acceptance Model (TAM) by Davis (1989) as cited in Venkatesh, Morris, Davis, & Davis (2000). This model provides an explanation about user acceptance of a technology (in this case, ICT integration in the school curriculum). TAM suggests that specific behaviour, beliefs, perceived ease of use and perceived usefulness determines on individuals' attitudes (or perceptions in this case) towards using any new technology. Perceived usefulness is the degree to which a person believes that using a technology increase his/her performance, while perceived ease of use is the degree to which a person believes that using a technology will be free of efforts and perceived usefulness is influenced by perceived ease of use. As postulated in the TAM, usage of technology positively influences the perception towards using as well as perceived usefulness and computer self-efficacy has a significant effort on perceived ease of use. This theory was used to investigate the perception of teachers and principals on ICT integration in the public school curriculum in Kitui County in Kenya.

2. Literature Review

This section presents the literature review on perception of teachers on ICT integration in education. ICT encapsulates technologies that are used to communicate and to "*capture, transmit and display data information electronically*" (Reynolds, 2001, p.127). On the other hand, perception is an evaluative reaction to some referent or attitude object, inferred on the basic of the individuals' beliefs or opinions about the referent (Farren et al, 2015).

Research by Waite (2004) indicates that although teachers in schools show great interest and motivation to learn about the potential of ICT, in practice, use of ICT is relatively low and it is focused on a narrow range of applications, with word processing

being the predominant use and video/network conferencing, e-mailing and the internet being rarely used. International research suggests that ICT as a tool for promoting learning is not generally well embedded in teachers practices (Cubukcuoglu, 2015; Deaney, 2003; Pedretti et al, 1999, Zhao and Cziko, 2001) and that information technology in the classroom is used in an ineffective way and it has proven difficult to integrate within the traditional curriculum setting (Jules Van Belle & Suetaert, 2001)

In the Scottish context, the evident suggests a similar picture (Williams et al, 2009) many teachers recognize a range of benefits for pupils and themselves in using ICT. However, more often than not, teachers fail to integrate it in their teaching, continuing to "teaching ICT rather than teach with ICT". In primary school, Williams et al (2009) study revealed that teachers tend to use ICT to support classroom practice, while secondary school teachers use it more for professional development and personal use rather than for teaching. The same study showed that teachers who use a computer at home tend to use it more in classroom and that differences exist between subject area in the practice and perceptions towards ICT with teachers of business management using it more and mathematics and science teachers using it the best.

As noted above, people's perceptions towards a new technology are a key element in its diffusion (Rogers, 2003; Syomwene, 2017b). Rogers premise corroborates the general and widely accepted belief that attitudes affect behaviour directly or indirectly (Zimbardo et al, cited by Asiri et al, 2012). Albirini (2006) found that teachers have positive attitudes towards ICT in education. For instance, the majority of the participants regarded computers as a strong educational tool that can bring about significant improvements to schools and classrooms. The findings suggested that teachers were in the decision-making process and that they had already gone through the knowledge and persuasion stages. The study also revealed a very strong relationship between teachers' attitudes towards ICT in education and their perception of computer attributes. The present study concurs with study done by Albirini (2006) on teachers' perception towards ICT integration but fills a gap on perception of teachers and principals on ICT integration in Kitui County as there's no specific research done on ICT adoption in primary schools in Kitui County in Kenya.

The present study investigated on ICT integration in ASAL areas specifically in Kitui County. Ultimately, ICT can enhance teaching opportunities and outcomes for learners with intellectual disabilities (Anderson, 2009). Learners who integrate ICT in learning may easily understand complex topics and concepts. They are more likely to recall information and use it to solve problems in the classroom (Mohammed & Abdulghani, 2017).

2.1 Factors associated with teachers perceptions in ICT

In a study to determine the degree the teachers and principals used information Technology to support the goals of education and to identify the factors affecting the level of IT usage, Gilakjani et al (2015) citing (Roszell, 1995) pointed out that most frequently recurring factors affecting the implementation of computers were: pedagogical issues, personal familiarity with computers, teacher training, time factor, availability of hardware and software issues.

2.2.1 The pedagogical benefits

The pedagogical benefits of integration of computers in classrooms level can influence perceptions and may depend on individual teachers. Teachers should be aware of the educational potential of computers (Joseph, 2014 citing Krysa, 1998). They should develop their pedagogical capacity to implement the computer in a variety of educationally effective ways. Components of the plan should include such issues as educationally effective ways components of the plan should include such issues as educationally appropriate use of computer technology requirements for training and support. Rabaani, (2008) emphasized the role of individual teachers in the implementation of computers and how teachers could influence the educational appropriateness of the technology. It would be left up to the teachers to decide how, when, where, why and by whom computer were used.

The outcomes of computers use at classroom level are shaped by the beliefs of individual teachers, the range of their pedagogical repertoire, and their sensitivity and responsiveness to the structure, potential and limitations of particular software programs. The current study which was done in Kitui County focused on perception of teachers and principals on ICT integration and the findings revealed that most teachers and principals had a positive perception on ICT integration though most schools had no ICT resources.

The versatility in the ways computers can be employed for instructional purposes is varied, sometimes within the context of the software itself. 'Effective teachers' states Galligan (1997) are teachers who make effective choices "about why they are facilitating any particular computer-based learning experience" (p, 3). Galligan (1997) provided a number of variables that complicate the pedagogy of implementing the computer in instruction.

> ……*although computer availability is important, the most important factors determining whether teachers use computer effectively are planning time and teachers attitudes, style and background* (p.3)

Andoh (2012) states that changes surrounding pedagogy are necessary if teachers are to be successful in implementing technology to support learning. He states that the "*lack of sound pedagogical basis for integration of technology within the school has led to a narrow and unimaginative usage*" (p.3). He argues that teachers and schools focus the use of computers on classes such as "*computer studies*" (p.3) rather than in other subject areas and thus *"most studies is of the technology rather than with the technology*" (p.4). He contends that this practice has the "*effect of marginalizing*" (p.1) computers in education. Drury predicts a change in pedagogy and teacher role.

The emphasis in our classrooms shifted increasingly from the product of learning to the process of learning and good teachers were regarded as those who instil in students the skills required to navigate successfully through an information rich world (p.1). Becker (2000, p.4 expressed a simple view about teacher role and the pedagogy of computer technology:

> "*The outcomes of computer use at the classroom level are shaped by the theoretical framework and beliefs of individual teachers: the range of their pedagogical repertoire, and their sensitivity and responsiveness to the structure, potential and limitations of particular software programs."*

The Technology Acceptance Model posits that because new technologies such as personal computers are complex and an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them, people form perceptions and intentions towards trying to learn to use the new technology prior to initiating efforts directed at using these technologies (John, 2015). This means that teachers using new technology would have to consider the perceived usefulness in the use of the new technology to accept it. They would need to believe the new technology to accept it. They would need to belief that using the new technology would enhance their job performance. Furthermore; the teachers would have to consider the perceived ease of use of the new technology. That is, they would have to know the degree to which they believe that using a particular system would be free from efforts. Thus new technology is accepted for use if the teachers perceive that there are personal gains to be obtained.

Teachers' perceptions towards computer technology may be a significant factor in the implementation of computers in education. Computer literate teachers may view the integration of computer into school's curriculum more positively than their counterparts who may lack knowledge of computers. The reluctance of teachers to embrace computer technology can be attributed to a number of factors that include

factors anxiety from dealing with equipment, a sense of loss of control over the teaching situation, hard ware and software availability, lack of technical support, time and efforts for training, and remaining up to date in the fields and appropriates technology in the classroom.

Sonia (2012) expressed a concern that computer literate individuals will reap greater benefits than their counterparts who lack that knowledge. Their concern is that the development of computer literate individuals is dependent on computer literate teachers who have in general demonstrated a resistance to learning about computers. Kinuthia (2009) attributes the reluctance of teachers to embrace computer technology to a number of factors that include, anxiety from dealing with equipment, a sense of loss of control over the teaching situation, hardware and software available, lack of technical support, time and effort for training, remaining current in the field and appropriately implementing the technology in the classroom. Kinuthia's (2009) study revealed that while teachers did not feel that their own jobs were threatened by computers they still saw them as dehumanizing, isolating, prone to error and possible as a violation of the right to privacy. Similar results were reported by Albugami (2014) citing (Tetenbaum & Mulkeen 1984). A more recent study by Newhouse (1995) found that some teachers do not belief that computers have a useful educational objective.

Tylor and Group (2006) completed a review of literature on teacher attitudes towards computers. They are able to identify twenty aspects related to teachers perceptions of computers the impact of computer use and the impact of personal and learning environment characteristics affecting a teachers intention to use computer as teaching learning strategies. Andoh (2012) in his reference to a study of the Canadian Ministry of Education and its attempt to implement IT in schools in Ontario finds that:

> *"Canadian ministry officials estimated that only 20 percent of the teaching cohorts are at least moderately committed computer users and even this 20 percent may not be in favour of a dilution of the traditional curriculum model."*

Andoh's (2012) research indicated that the main factor leading to a high level of IT-usage was a school-wide consensus on the importance of IT use for students and the amount of teacher-teacher collaboration. Khan et al (2012) in their examination of the barriers to the implementation of computers, observe a critical factor that all staff needed to recognize and understand that integrating computers into classroom practice is a complex innovation which requires change to the whole schools' practices and culture, to the curriculum and in teachers' attitudes and classroom practice. Such change is achieved incrementally over a long period of time. In this study on the

perception of teachers and principals on ICT integration in education, the perception factors that were investigated were: pedagogical issues of teachers, teachers perception towards use is ICT hardware and software appliances and personal familiarity with computer.

2.2.2 Personal familiarity with computers

A study by Morton (1996) cited by Danner (2014) drew same important conclusions surrounding teachers' personal familiarity with technology such as:

1. The acquisition of computer expertise and skills is generally left to teachers' initiative.
2. Teachers wanting to use computers and have few role models.
3. Teachers are critical of lack of computer resources to implement change.

The success of any classroom ICT project depends on the teacher ultimately. While ICTs themselves can be used to improve the quality of teacher training, if teachers are not comfortable with the technology, they will not use it. Training and orientation of teachers must therefore be a priority. Training of teachers must focus not merely on developing proficiency in the use of various technologies, but in particular, in the application of modern pedagogical methods. Various competencies must be developed throughout the educational system for ICT integration to be successful. According to Robertson (2002), teacher professional development should have five foci: (i) skills with particular applications; (ii) Integration into existing curricula; (iii) curricular changes related to the use of IT (including changes in instructional design); (iv) changes in teacher role; and (v) underpinning educational theories. Ideally, these should be addressed in pre-service teacher training and built on and enhanced in-service.

The current study concurs with study done by Danner (2014) on aspects of teachers' behaviour in computer implementation in instructional process. A little number of head teachers concurred that lack of computers in their schools may result to creating anxiety when teachers are forced to integrate the resources without prior use in instructional process. The study also found that teachers' exposure to computer use frequently will lead to changes in pedagogy. Research on the use of ICTs in different educational settings over the years invariably identify as a barrier to success the inability of teachers to understand why they should use ICTs and how exactly they can use ICTs to help them teach better. Unfortunately, most teacher professional development in ICTs is heavy on teaching the tools and light on using the tools to teach (Draft Education policy, 2001). The present study concurred with study done by Draft educational policy on computer integration, that majority of teachers from Kenya are

using the ICT resources as teaching tools but not as teacher aid in instruction. There should not be lessons set aside to teach computers but the resource should be used to assist the teacher in the instructional process.

According to Consortium for schools network in Jamaica (2008), there is the concern among some educators that with the introduction of computers in the classroom, students from households that can afford computers are likely to advance faster in the curriculum than those who do not have a computer at home or have never used one before. It is believed that those who have computers at home and are more comfortable with the technology are likely to dominate in the classroom. Further, it is possible for them to continue their schoolwork at home and to access invaluable information from the internet. The present study findings are morosely the same with study done by consortium for schools only that it investigated on teachers utility of computers either at home or at school. The present study findings indicated that a few teachers have their personal computers at home and school but they never use them in the instructional process. This scenario depicts that efforts must be made towards establishing computer facilities that are accessible to students who do not have computers at home (Laudon, 2003). The present study done concur with study done by Laudon, (2003) that when computers are utilised adequately in classroom situation the teaching methods used is opted to be friendly to learners thus improving performance.

2.2.3 Teacher training

Syomwene (2017b) highlights lack of teacher competences in ICT as a factor influencing integration of ICT in the curriculum. Olasina's study (2012) asserted that teachers expressed a need for teacher training on basic computer skills. This study found that teachers training should not be limited to teachers who teach computing. It should be spread to the whole school community. Teachers need to know the use of computers first before they can integrate them. Teacher knowledge and skills influences the successful implementation of curriculum innovations and changes (Rogers, 2003; Syomwene, 2017a).

In addition to the pre-service training, teachers should take part in in-service programs through conferences and workshops that focus on integrating computer into the curriculum. Such conferences and workshops would inculcate skills to produce materials to use in the classroom and use the computer to manage student's marks. This way, teachers would have a clear understanding of what computers can and cannot do in the classroom (Antifaiff, 2001).

Appropriate role models are required for in frequent users to implement and manage computers. In this case, the principals require prior training in order to act as the role models.

Newhouse (1995) identified teacher's lack of computers literacy as being an obstacle to their using computers in classrooms. Newhouse draws a conclusion about the number of years of experience with computers teachers have and the impact it makes on the implementation process:

> *"…most teachers needed two or three additional years of experience using computers to become significant users of computer in classroom...teachers need up to five years solid experience in using computer to become proficient at integrating them (computers) in the curriculum"* (p.5).

Newhouse's findings are shared by Gilakjani et al (2015) the most commonly identified factor in the literature affecting IT by teachers was their level of knowledge and skills in using computers. The current study done in Kitui County supported the findings of the study by Newhouse (2002) that teachers required more time to adopt the integration of ICT in primary schools in Kenya. Experience is one of the major determining factors in success of ICT integration in the instructional process.

Computer competence is defined as being able to handle a wide range of varying computer applications for various purposes (Van Braak et al, 2004). According to Bordbar (2010), teachers' computer competence and training is a major predictor of integrating ICT in teaching. Evidence suggests that majority of teachers who reported negative or neutral attitude towards the integration of ICT into teaching and learning processes lacked knowledge and skills that would allow them to make informed decisions (Bordbar, 2010). The current study which investigated on perception of both teachers and principals on ICT integration indicated that both cadres of teachers had positive perception to integrate ICT in the instructional process. The findings indicated that perception of teachers was positive in integration of ICT integration in the primary school curriculum in Kitui County, Kenya.

In a qualitative multiple case-study on primary school competence and confidence level regarding the use of ICT in teaching practice conducted in five European countries, Peralta & Costa (2007) found that technical competence influenced Italian teacher's use of ICT in teaching. Similarly, in Kenya a study conducted by Laaria (2013) on challenges of ICT implementation in secondary schools similar findings as this study were observed. Further, the present study fills the gap on study of ICT integration in primary school curriculum. The findings indicate that head teachers'

involvement in ICT integration is a key factor for success of the whole process. However, in this study, the teachers cited pedagogical and didactic competences and training as significant factors if effective and efficient educational interventions are likely to be implemented. In Portugal, teachers reported different views regarding the most important competences for teaching with ICT. The experienced and new teachers stressed the need for technical skills and attitude, the innovative teacher's emphasized curricula and didactic competences and the student-teachers cited technical competence and pedagogical efficiency as significant to integrate ICT in teaching and learning processes. Similarly, the present study rhymes with the findings of the study of Peralta & Costa (2007) that teacher's required adequate time to acquaint themselves with computers for integration in the instructional process.

According to Peralta & Costa (2007), teachers with more experience with computers have greater confidence in their ability to use them effectively. To conclude, Jones (2004) reported that teachers competence relate directly to confidence. Teachers' confidence also relate to their perceptions on their ability to use computers in the classroom, particularly in relation to their children's perceived competence. The present study concurs with study done by Costa (2007) on experience and confidence of ICT teachers in instruction. The findings indicated that teachers required more experience in handling ICT materials. Similarly, the findings of this study indicated that teachers who had phobia of using ICT resource materials and needed more experience to perfect their skills.

2.2.4 The time factor

Instructional preparation for ICT integration in the instructional process takes some significant time. Syomwene (2017b) opines that technology integration in the curriculum places additional demands on teachers' planning and preparation time. Clement et al (2012) stated that teachers were reluctant to embrace technology because of its potential to shorten learning time for students. Clement et al (2012) contended that teachers faced a number of potential interruptions during class time and that, consequently, the actual time spent teaching and learning was shortened significantly. Gilakjani et al (2015) found that one of the most frequently occurring and significant conditions affecting teachers willingness to embrace computer technology in instruction was the lack of available preparation time for teachers to develop lessons that used computers. The present study indicated that teachers required time to use ICT resources in preparation of lesson notes and lesson plans. Similarly, the findings of the present study indicated that teachers' perception was positive towards adoption but they had no experience of using ICT resources in instruction.

To overcome time barrier, Hew and Brush, (2007) identified three strategies from their view of empirical studies. First, schools could change their time-tabling schedule to increase class time to double period's sessions. Secondly, class loads for teachers could be reduced in order to free up some school time for teachers to familiarize themselves with technology and develop appropriate technology-integrated curricula activities. Thirdly, teachers should be encouraged to collaborate to create technology-integrated lesson plans and materials together to shorten the time needed to produce technology-integrated lessons as compared to producing the lesson alone.

2.2.5 Hardware and software issues

According to Syomwene (2017b), some challenges affecting technology integration in the instructional process include lack of electricity, internet connection and poor or missing technology materials. Primary schools may not have funds to buy computers and other hardware's that may make integration possible. Ginsberg and McCormack (1998) conducted a survey of 1163 teachers to discern what barriers teachers encountered in using computers. The responses to their survey indicated that issues surrounding computer hardware were the most serious barriers affecting its implementation. Middleton, Flores and Knaupp (1997) viewed the hardware factors as an accessibility barrier. It involved limitations of computer laboratories and issues of scheduling computer time. Middleton et al (1997) argued that computers should be situated in classroom where they can be easily accessed by students and used in a meaningful and pragmatic way.

Suitable software for use in primary and secondary schools has been found to be an important factor in integration of computers in all schools (Ginsberg & McCormack, 1998). Ginsberg and McCormack stated that teachers' issues and potential barriers to implementation of computers are software resources related. These are matching courseware to curriculum, evaluation, and quality control, acquisition, setting priorities, security, placement and appropriate use. There may be a lack of appropriate software that is appropriate for specific applications. Hepburn (2010) enumerates hindrances' of using proprietary software as high cost, restrictions on flexibility of use due to licensing constraints, and ethical and social issues including equity and the moral of exposing students to and training them on particular companies' software while the students pay the proprietary companies to do so.

According to Hepburn (2010), Mathieson (2009), Kroah (2009) and Mungai (2013) a possible way out for schools and other institutions of learning to the software issue is the use of open source software, software distributed with a license granting access to source code, distribution, modification and free use. Compared to proprietary software,

open source software is less costly, offers greater flexibility of use, and is in a position to address the social issues of equity and corporate involvement (Hepburn 2010). The foregoing discussion indicates that lack of computer hardware and software hindered ICT integration in the curriculum in many cases. The present study revealed that most schools under study had not received ICT hardware and software, but the teachers were fully ready to integrate ICT resources in the teaching and learning process.

3. Research Design and methodology

The Mixed Methods research approach was used in this study. According to Creswell (2004), the paradigm of mixed method design (MM) accurately measures specific construct, has capacity to conduct group comparisons and capacity to examine strength of association between variables of interest and the capacity for model specification and the testing of research hypothesis. A sample of 388 principals and 776 teachers was used in this study. This sample was drawn from 388 public primary schools in the County that were selected through stratified and simple random sampling methods. Purposive sampling method was used to select the principals while the teachers were selected through simple random sampling method. Data was collected using for the teachers and interview guides for the principals.

4. The Results

This section presents and discusses the findings for the study. A Likert scale was used to measure teachers' perception on ICT integration in the primary school curriculum. Some statements were provided and the teachers were asked to indicate their level of agreement. The findings are presented in Table 1.

Table 1: Teachers' perception on ICT integration

Statements	SD		D		U		A		SA	
	F	%	F	%	F	%	F	%	F	%
I own a personal computer/laptop that I use in teaching/learning process.	348	44.9	273	35.2	28	3.6	25	3.2	101	13.1
I prepare my schemes of work using a computer.	373	48.1	299	38.6	0	0	53	6.9	50	6.4
I prepare my lesson plans using a computer.	374	48.2	327	42.2	0	0	53	6.8	22	2.8
I feel uncomfortable when using a computer in teaching	318	41.0	356	45.9	0	0	53	6.9	49	6.3
I prepare my lesson notes using a computer	374	48.2	327	42.2	0	0	53	6.8	22	2.8
Most of my lesson notes are on soft copy	317	40.9	409	52.7	0	0	28	3.6	22	2.8
Some of my teaching resources are available online	346	44.6	187	24.1	0	0	192	24.8	50	6.4
Computers save time and efforts	74	9.5	28	3.6	27	3.4	275	35.4	373	48.0
Computers motivate pupils to do more work	129	16.6	27	3.4	83	10.7	189	24.3	349	45.0
I prefer to do things by hands than with computers	262	33.8	303	39.0	27	3.4	53	6.9	131	16.9
If I had money, I would buy a computer	74	9.5	0	0	0	0	242	31.2	460	59.3
Computer technology skills can improve the quality of teaching/learning in schools.	96	12.4	0	0	27	3.5	109	14.0	544	70.1

Key: SD = Strongly Disagree, D = Disagree, U= Undecided, A= Agree and SA= Strongly Agree

The results in the table above indicated that most teachers had positive perception towards the use of ICT hardware and software tools in their instructional process. Through interview schedules, the principals revealed that the utility of ICT in the instructional process can greatly improve time management. Majority of the principals understood the importance of ICT in time management in schools. This could be a pointer to positive attitude towards integration of ICT in teaching/learning in schools.These findings reveal that teachers and principals had a positive perception on ICT integration in the curriculum if only the required resources and facilities for ICT

integration in the curriculum are present in their schools. These finding concur with Fakeye's (2010) argument that lack of ICT infrastructure is a fundamental problem for developing countries to deal with and it might take a long time and huge funding to improve. The finding also support Kawade's (2012) study findings that ICT may be used for effective teaching and learning processes to achieve quality education and overall development of students and for administrative purposes by teachers, staff and management team.

5. Conclusions and Recommendations

This study investigated the perception of teachers on CT integration in the primary school curriculum in Kitui County in Kenya. From the findings obtained, this study concluded that the teachers and principals had positive perceptions on ICT integration in the curriculum. This can be attributed to the fact that the Kenyan government has been creating awareness about introduction of laptops as ICT resources among the teachers. The principals and teachers have been taken through the programmes.

From the research findings and the conclusions, the study recommended that the government should continue with its efforts on ICT integration in education given the positive perception of the teachers on the benefits of ICT in the instructional process. Teachers' perceptions towards ICT integration in education is a significant factor in the implementation of technology related innovations.

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