PRIMARY SCHOOLS' PREPAREDNESS FOR EFFECTIVE INTEGRATION OF INFORMATION, COMMUNICATION AND TECHNOLOGY IN CURRICULUM INSTRUCTION: A CASE OF KITUI COUNTY, KENYA

BY

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DECLARATION

Declaration by the Candidate

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DEDICATION

I dedicate this thesis to my wife Irene Esther, to my son, Benjamin Mumo and my daughter Victoria Mukai who never rationed their care and love for me during the struggle of study and the writing of the dissertation. May God reward them greatly and bless them too.

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ABSTRACT

Information and Communication Technology (ICT) has become un-resistible entity in all aspects of life. Within the past twenty years, the use of ICT has tremendously changed the practices and procedures of almost all forms of endeavour within education and governance. The purpose of this study was to investigate school preparedness for effective instruction through ICT integration in primary school curriculum in Kitui County, Kenya. The objectives of this study were: to find out the availability of resource materials for ICT integration, to establish teachers' perceptions on ICT integration, to determine the level of knowledge and skills of teachers on ICT integration, to find out the support by government on ICT integration and to determine the perception of head teachers on ICT integration. This study was guided by the Technology Acceptance Model, a theory developed by Davis and advanced by Vankatesh. The study was a mixed method research and adopted the pragmatic paradigm. The data was collected from 388 public primary schools in Kitui County and 1164 teachers were targeted in the study. The study used stratified, simple random and purposive sampling methods to select the sample. The research instruments used in this study included questionnaires, interview schedule and observation checklist. The questionnaires were administered to the teachers, interview schedule for the head teachers and observation checklist was used to check for availability of resource materials in primary schools. The data collected were analyzed qualitatively by use of themes and quantitatively through descriptive statistics such as frequency distribution tables among others. Quantitative variables were analyzed using SPSS computer software. The study findings indicated that: some primary schools were yet to be connected with electricity, there were inadequate ICT resource materials in primary schools, teachers had positive perception on ICT integration, majority of teachers were skilled in ICT use, there was support by government and head teachers had positive perception on ICT integration. The study recommended that government should uniformly provide ICT resource facilities to all public schools in Kenya, all teacher training colleges should facilitate training on ICT and the government to motivate teachers who are ICT literate so that they can further their skills and make tremendous improvements on ICT integration in primary school education in Kenya. The results of this study are useful in the implementation of curriculum innovations in Kenya and other parts of the world.

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ABBREVIATIONS AND ACRONYMS

ASALs	Arid and Semi-arid lands
BECTA	British Education Communication and Technology Agency
CDE	County Director of Education
CDMA	Conceived Determination Model Application
CS	Computer Studies
CC	County Commissioner
DLP	Digital learning program
EFA	Education for All
EMIS	Education Management Information System
EOU	Ease of Use
FGD	Focused Group Discussion
FPE	Free Primary Education
GII	Global Information Infrastructure
GOK	Government of Kenya
GSM	Global Systems for Mobile Communications
GIS	Geographical information system
HIV	Human Immune Viruses
AIDS	Acquired Immune Deficiency Syndrome
ICT	Information Communication Technology
IT	Information Technology
ITU	Information Technology Users
KCPE	Kenya Certificate of Primary Education
KESSP	Kenya Education Sector Support Programme
KICD	Kenya Institute of Curriculum Development
LAN	Local Area Network
MDGs	Millennium Development Goals
MTP	Medium Term Plan
MOE	Ministry of Education
NEPAD	New Partnership for Development
NGOs	Non Governmental Organizations
NICE	Network Initiative for Computer Education
NICI	National Information and Communication Infrastructure
OER	Open Education Resources
OHPs	Overhead Projectors
OLPC	One Laptop per Child
PC	Personal Computers
PDA	Personal Digital Assisted
PEU	Perceived Ease of Use
RINAF	Regional Information Network for Africa
SAS	Support Application System
TAM	Technology Acceptance Model.
TV	Television.
USA	United States of America.
ToTs	Trainer of Trainers
OTA	Office of Technology Assessment

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Introduction

Throughout the world, the information and communications technology (ICT) is changing the face of education. It has been argued that the transformation of education may be the most important of the many practical revolutions sparked by computer technology. No facet of civilization will be altered more radically. Just as computers are about to (some would argue have already) replace books as our main repository of information, computers will come to occupy the central position in education once occupied by books.

This study investigated on school preparedness in ICT integration in the primary school curriculum for effective instruction, a case of Kitui County, Kenya.The chapter forms the general introduction to the research study, specifically it discusses background of the problem, statement of the study, purpose of the study, objectives of the study, research questions, major research question, subsidiary questions, assumptions of the study, scope and limitation of the study, justification of the study, significance of the study, theoretical framework and definition of operational terms.

1.2 Background of the study

The factors associated with students' academic performance may have been addressed but the impact of school preparedness for effective instruction through ICT integration in primary curriculum involvement continues to be a significant issue. Some schools in Kenya post poor results amid claims that there are adequate resource facilities. These schools fall in ASAL areas characterized by severe prolonged droughts, poor

staffing of teachers, rough connecting roads which have hindered monitoring and supervision by Quality assurance officers to attend to their duties.

Despite fifty three years after independence, KCPE performance in Kenya has been raising eye blows especially so in Kitui County (KNEC, 2010). This is due to lack of resource facilities in ICT, perception of teachers and Head teachers in ICT integration, Teachers level of knowledge in ICT integration and government support on ICT integration. Unless this deterioration performance of pupils in Kitui County is checked, pupils will not achieve vision 2030.

Schooling is an instrument of individual and social change, increasing the probability of general well-being. According to Oxford Advanced Dictionary, a School is an institution designed to provide learning spaces and learning environment for the teaching of pupils under the guidance of a teacher. Decade after adoption of the Education for All (EFA) goals in 2000, many children are still out of school ([UNESCO, 2010). For millions of children, hunger is one of the obstacles to school participation. Primary education is a critical stage in the development of the consciousness and personality of the children. At this stage children are extremely inquisitive and elementary education must encourage this tendency among children. Nutrition is an endogenous factor that affects the learning ability and skills of children at school.

Pupils' performance has been an issue of great concern since the beginning of modern education. Majority of the countries have realized that in the heart of educational process are the pupils. Further it has been noted that all the innovations being seen in education without good Performances are destined for failure (Glewwe2002). Globally, the main objective of education in any democratic society is to provide

learners with quality education that enlightens them to be productive members of the society (Kundu & Tutoo 2000).

More than a quarter of children below fifteen years of age in Sub-Saharan Africa are underweight due to malnutrition. Nutritional deficiencies in children increase the risk of infection and affect their mental development (UNESCO, 2011). Although Kenya has already achieved a remarkable progress in reducing under-five mortality in the last decades, under nutrition among children is still a common health problem (FAO, WFP, IFD, 2012).

Educational disadvantage starts in the womb – free maternal and child health care are an education imperative (Education for All, Global Monitoring Report, 2010). The Kenyan government introduced free primary education in 2003 in order to fulfill the commitments of the World education forum of 2000 as well as to make education accessible to all school age children irrespective of their social class. This initiative led to an upsurge in primary school enrolments with the resultant effects of numerous strains on human and material resources, high dropout rates and poor performance in national examinations. As a result of this, the government has been undertaking many reforms aimed at addressing the challenges resulting from education service expansion. The overall purpose of these reforms has been to improve efficiency in education provision by addressing factors that influence learning.

Following the implementation of free primary education, there was a dramatic increase in pupil enrolment with primary schools in Kenyan registering an increment Of 3% to 22%, (World Bank, 2004). This brought numerous strains to the existing physical Facilities and learning resources in schools. The government thus developed a programme of providing schools with learning resources which were initially

provided by parents through the initiative of cost sharing introduced in 1998. However this initiative by the government cannot match the overwhelming numbers of pupils in primary schools and this necessitates the need for efficient utilization of the available resources to address the issue of quality in education provision which is perceived to be falling as indicated by poor performance at national examinations.

Eshiwani (1996) asserts that education resources can be defined from distant to proximal levels. From distant levels, they may only represent the availability and presence of textbooks in class but from proximal levels, they may include all that which comes into play to facilitate smooth learning. With this in mind we can perceive resources as the amount of time that we have, the space for activities and strategies, the people who can help, the places we might visit and the money available to facilitate the smooth learning of school programmes. All the above inputs should be utilized fully if education is to serve its objectives at both individual and national levels and be efficient.

The extent to which a school system is described as efficient depends almost entirely on the uninhibited flow of students from the initial grade to the final grade (Gravenir, 2004). Wastage in primary schools is manifested in the form of repetition, dropout and low completion and graduation rates. Inefficient flow of students is accompanied by inefficient use of the scarce resources and students space. However school efficiency cannot only be measured by the smooth students flow from one grade to another especially in countries where there is government regulation on repetition thus students may progress to higher grades without gaining meaningful experiences. Once enrolled, students drop out of school for a number of reasons including, the low

quality of schooling, discouragement from poor performance, poor school environments and direct and indirect costs of schooling (World Bank 2003).

Thus, apart from reducing wastage to improve on efficiency of Learning in primary schools, it is also necessary to improve on the curriculum, teaching and learning materials, teachers' qualification, adequate facility, sufficient teaching and learning time, school environment and appropriate class size. With the introduction of FPE in 2003, the GER increased from 92 percent in 2002 to 104 percent in 2003. This made the numbers in enrolment rise from 6131000 to7208100 in 2003.This was followed by high dropout rates. A study carried out by the ministry of education showed that there was a high rate of school dropouts in Kenya. One of the best ways to improve the performance of learners in our primary schools is through introduction of modern information technology ICT in our primary school education.

Information Communication and Technology (ICTs) are transforming world economies with an increasing number of countries, especially in the developing world, identifying ICT industry as key sector for achieving rapid economic growth and educational advancement (Balanskat, Blamer & Kefala,.2006).

Since the 1980s integration of ICTs in education has been compulsory in the developed nations. This is not so in developing nations such as Kenya, where ICT integration in education is considerably more recent, small-scale and experimental. It is however, recognized that adoption of computer in education has progressed, in nearly identical pattern (Balanskats et al., 2006) from acquisition of basic computer skills, computer aided teaching, communications and research, to usage in every

subject. This has been accelerated by convergence of the computer and telecommunication technologies, particularly e-mail and internet. Whereas the impact of ICTs on the education goals is still inconclusive, reported observations include rapid expansion of knowledge, improved examination outcomes, enhanced communication and technical efficiency, as well as greater decentralization in the delivery of education services. It is not in doubt, however, that ICT has the potential to play a more powerful role in increasing resources and improving the environment for learning. ICTs can also play a role in preparing students to acquire skills, competencies and socio skills that are fundamental for competing in the emerging global knowledge economy (Cuban, 2001).

Educational systems around the world, in both developed and developing countries are under increasing pressure to use ICT in order to teach students the knowledge and skills needed for the future knowledge society. Since the 1990s a large number of educational initiatives and research have been directed towards ICT integration in schools. Various approaches have been tried. Prominent among them have been, firstly, the development of technology infrastructure in schools and, secondly, the production and infusion in schools of sophisticated ICT-based tools for instruction and learning (Cuban, 2001; Ofsted, 2004).

Therefore, integration of ICT in primary school curriculum covers thematic context as ICT provision in learning environments at school and home can improve the quality of teaching, learning and management in primary and secondary schools and help raise standards (ICT in secondary schools website, Department for Children, Schools and Families, 2010). It is teachers' ambition to create a more exciting, rewarding and

successful experience for learners of all ages and abilities enabling them to achieve their potentials (British Education Communication and Technology), BECTA, (2008).

There is little doubt that society's main ambition for children's use of digital technologies centers on their potential benefits for education. ICT bring together traditionally separated educational technologies-books, telephone, television, photographs, databases, games and more. In consequence, they bridge forms of knowledge and literacy, and they intersect places of learning-home, school, work and community. But these changes pose both opportunities and challenges to schools, to embed ICT in the educational infrastructure, teacher training, curriculum structures and materials, classroom practices and modes of assessment must be redesigned at all levels. In recent years ICT has been steadily embedded of digital and networked technologies in the classroom, with widespread use of interactive whiteboards, virtual learning environments, educational computer games, and increasing reliance on internet applications including email and e-learning for both classroom and independent study (Sheard & Shmed, 2007).

As a Nation, Kenya hoped to achieve Sustainable Development Goals [SDG] by the year 2030.This is an uphill task given that various challenges in the education sector still prevails. The ICT integration in primary schools curriculum offered in Kenya is very significant in the achievement of provision of education for all through universal school education. The ICT integration that this study investigates was first introduced into Kenyan curriculum in primary schools in 2005 when the government initiated the e-school project. The aim was to impart ICT skills on learners from both primary and secondary schools in Africa (Evoh, 2007, NEPAD, 2005). The e-schools were equipped with computers that were interconnected through local area networks

(LANs). New Partnership for African Development (NEPADs) e-school initiative was designed to tap into benefits of connectivity through satellites to connect schools in Africa regardless of their location within different national boundaries (NEPAD, 2005).

The quality of the installed e-school infrastructure determines the level of success of the e-schools. The computers were installed in computer laboratories in all schools. This arrangements restricted access to computer laboratories a few times in a week and only during scheduled lessons, thus restricted access to e-school resources makes it difficult to integrate ICT in teaching and learning (Sanchez, Salinas & Harris,2011). ICT adoption in primary school curriculum in ideal situation, teachers should use ICT as a teaching platform in everyday classroom teaching but the above was not fulfilled thus creating limitations to access the ICT infrastructure (Sifa, Lwanga & Sanga, 2007). The ICT skills intends to expose the children to a high quality and relevant curriculum, which enhances the advantages below of ICT to students as asserted by Jonassen and Webb (2005, p.112)

i. Equips students with knowledge and skills needed for future knowledge society,
ii. Increases students' motivation and deepen understanding,
iii. Promotes active, collaborative and lifelong learning,
iv. Offers shared working resources and better access to information,
v. Helps students to think and communicate creatively,
vi. Students become enthusiastic by using digital technologies for exploration, creativity and fun, online gaming and social networking to foster constructive learning practice when at school and at home,

vii. ICT liberates teachers and students from the rigid hierarchies which have locked them to their desks, curricula and assessment of traditional style.

In Kitui County, there are still a significant number of vulnerable children who face challenges in accessing quality education due to natural and manmade disasters more so in Kitui County. This is especially so in marginalized districts and nomadic areas of arid and Semi-Arid lands (ASALs) and Counties prone to drought, floods and conflicts (inter clan as well as cattle rustling). Disasters result in closure of schools, which disrupt normal learning programmes, thereby negatively affecting learning outcomes. Integration of ICT in school curriculum will curb these hindrances in the County. Further owing to political instability among the pastoralists communities at the Horn of Africa (Somali, Ethiopia, South Sudan), Kenya continues to suffer the effects of influx of refugees that has strained educational resources (EFA a global monitoring Report, 2012).

Programmes on expanding educational opportunities in ASALs targets alternative, flexible, community-based learning approaches that suit the nomadic nature of communities in ASALs. The rationale for EFA programme is that in spite of the success of the Free Primary Education (FPE) Programmes, some areas continue to show poor enrolment rates, particularly in primary schools (Republic of Kenya, 2007). The overall aims of this programme was to increase access to education for children living in ASALs especially girls and children with Special Needs, through identification and application of alternative approaches to provision of education. The Kenyan government has taken affirmative action to ensure the minority and marginalized are provided Special opportunities in educational and economic fields.

The government has introduced 87 mobile schools and training of 286 mobile schools teachers at the same time training 57 mobile schools teachers on multi-grade pedagogy and monitoring and evaluation for the year 2009-2010. ICT integration in primary schools in Kitui County will curb the school drop out of learners due to challenges of prolonged drought, inter-clan conflicts, floods which result in closure of schools and poor staffing situation by allowing the learners to accessing quality education through the internet.

Educational status of ASAL Counties is distinguishing evidence by the Counties bottom seven positions on performance merit list, Kitui County been among them.. Literacy and numeracy levels among children are lowest in comparison to the national average. The region tops on out of school children at a rate of 20.6% with girls more affected. The region is marred with myriad of challenges ranging from high teachers and children absenteeism rates, lack of decent basic infrastructure including classroom teacher shortage, high student book ratio as well as little access to ICT facilities. Notably the harsh learning environment in ASAL Counties, insufficient and dilapidated infrastructure like class rooms, inadequate provision of desks, books, computers and basic facilities like toilets, clean drinking water and sanitation towels have contributed to low teachers and children efficacy to school attendance.

The government through the Ministry of Education (MOE) has put in initiatives to improve learning in ASAL like Free Primary purposely to increase education access in poverty stricken, disadvantaged, marginalized and challenging environments like ASALs. It is also piloting targeted cash transfer programmes, bursary schemes, among other initiatives to change the terrain of education in these regions (Marris et

al., 2011). Kitui which falls under the ASALs has been experiencing the hindrances in education thus reflecting the poor performance of KCPE results.

ICT integration in school curriculum alleviates the challenges of poor staffing, lack of infrastructure, lack of teaching resources like text books, blackboards, by providing teaching content through the internet. Kitui County which is categorized as ASAL zone will benefit tremendously due ICT integration in school curriculum.

According to Yusuf (2005) ICT integration in school curriculum includes broadcasting technologies which have been used to reach geographically dispersed populations common hindrances of education in ASAL zones. ICTs have potential to accelerate, enrich and deepen skills, to motivate and engage learners, to help relate school experience to work practices. The improvement of performance of learners in examination will be improved because contemporary ICTs are able to provide strong support and there are many outstanding world class settings for competence and performance-based curricula that make sound use of the affordances of ICT (Oliver, 2009).

In Kenya, between the years 2009 to 2013 the county of Kitui has witnessed dismal performance in KCPE as shown in Table 1.1

Table 1.1 National 5 Years (2009-2013) Performance in KCPE

Year	**2009**	**2010**	**2011**	**2012**	**2013**
Performance in KCPE % Mean Score	269.20	271.60	265.10	279.75	270.65

Source: KNEC, 2014

The percentage performance in KCPE in the whole county was poorer when compared to the ASAL neighboring county of the Machakos and the national performance as well as shown in Table 1.2.

Table 1.2 comparative National/Kitui/Machakos counties % score in KCPE

Year	National (%)mean score	Kitui county (%)mean score	Machakos county (%)mean score
2009	269.20	232.90	265.60
2010	271.60	232.60	273.00
2011	265.10	232.10	274.70
2012	279.75	236.00	273.00
2013	270.65	233.95	274.00

Source: Field survey Data (2014) From CDEs office for Kitui/Machakos Counties.

As shown in Table 1.2, the performance in KCPE has been persistently poor in the whole country and also in Kitui County, the selected study area which justified the choice of the County for this study. This study aimed at investigating the school preparedness in ICT integration in public primary school curriculum for effective instructional process in Kitui County, Kenya. The results of this study were used to improve on the national performance in KCPE by expanding ICT integration opportunities in ASALs. There are still a significant number of vulnerable children who face challenges in accessing quality education due to natural and manmade disasters. This is especially so in marginalized districts and nomadic areas of Arid and Semi-arid lands (ASALs) and counties prone to drought, floods and conflicts (inter clan as well as cattle rustling) Disasters result in closure of schools, which disrupt normal learning programmes, thereby negatively affecting learning outcomes (Republic of Kenya, 2007).

The use of ICT in educational system will curb the above difficulties by improving the traditional way of curriculum delivery of face to face of instructors in classroom situation and use of text books, which are rare, motivates learners by advocating

hands on work thus improving learners' interaction with learning environment. ICT promotes collaborative learning at the same time changes the old system of curriculum delivery from teacher centered to learner centered. The connectivity to the internet for accessing data base materials and notes will drastically improve the performance of learners. If unchecked, the increasing ignorance of ICT utility will jeopardize Kenya's bid to attain SDGs and Kenya vision 2030 goals of quality of education besides entrapping the country in poverty.

Kenya Vision 2030 places great emphasis on three key pillars, Economic, Social, and Political. ICT integration in primary schools will alleviate the problems in quality of education by enabling teachers' access internet and extract learning materials for any subject taught in primary school curriculum. The current government policy is that a primary school teacher should be able to teach seven subjects in the primary school curriculum. The very two years of teacher training college is not adequate for teacher trainees to acquire mastery in subject content and skills of pedagogy in all seven subjects. This compromise the quality of teaching offered after training.

The government of Kenya introduced FPE on 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. 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 equipments for children with special needs, diminished community support following their misconstrued role vis-à-vis that of the government in the implementation of the FPE initiatives, gender and rational disparities, increased number of orphans in and out of school as a result of HIV/AIDS.

The result of this study will be used to improve on the national performance in KCPE. The second Medium Term Plan (MTP) of vision 2030 identifies key policy actions, programmes and projects that the government will implement in 2013-2017 period in line with its priorities, the Kenya 2010 constitution and long term objectives of vision 2030.According to the second MTP of vision 2030, the government will continue strengthening access to universal primary education and provide wider access to secondary school education for all primary school leavers. It will also introduce universal access to computers starting with standard one in May, 2016,promote wider use of ICT as instrument of instruction and training in schools, lower the student/teacher ratio by more recruitment of teachers and provide more text books and teaching equipment to school education in ASAL Counties will be enhanced through special programs. Ministry of Education MOE downloaded on 17th April 2007, policy in ICT advocates for the following to be done in education to enhance ICT integration. According to MOE (2007), the government has initiated the following,

- Basic computer knowledge to be provided in Teacher Training Colleges (TTC),
- Government to seek and facilitate universal access and equitable distribution of ICT infrastructure,
- Government to impose ICT to be inbuilt in all curriculum subjects,
- Government to provide weekly professional training in ICT for all concerned teachers.

According to Daily Nation News paper of Dec 1, 2015 the government has implemented the Digital Learning Program (DLP) also known as Digischool was initiated by the government of Kenya in 2013.The programme is branded simply as Dig school to identify with target audience. The programme is targeted at learners in all public primary schools and is aimed at integrating the use of digital technologies in defines our world and there is need to prepare our young people for today's realities.

The ministry of Information, Communications and Technology (ICT) is the main drivers of the programme will be executed through a multi-stakeholder approach with cost of first phase of the project estimated at 17 billion shillings. The government will deliver 1.2 million devices in the next two years to cover all public primary schools. The pilot phase of 150 schools is planned for September, 2015.

The project aims at:

- Entrenching ICT in teaching and learning process and management of education in primary schools,
- Equipping public primary schools with appropriate ICT infrastructure to support teaching and learning process,

- Developing capacity of education managers, primary school teachers and stakeholders to enable them use the wide range of ICT tools in teaching-learning process and management of schools,
- Facilitating the development and accreditation of appropriate digital content that will enhance acquisition of 21st century skills,
- Promoting universal access and equitable distribution to ICT infrastructure in primary schools,
- Integrating suitable and affordable digital programme in Kenyan education system.

Another Daily Nation of 15th December, 2015 the government of Kenya has laid a strategic procedure of disseminating the key components of the ICT infrastructure programme devices:

- Integrating suitable and affordable digital programme in Kenya education system,
- Provision of digital devices for both learners and teachers,
- Capacity development for teacher and implementers,
- Broadband connectivity devices,
- Establishment of local assembly for digital learning,
- Establishment of local assembly for digital devices and related accessories.

The government of Kenya is relentlessly making efforts to implement the ICT integration in school curriculum. Tuesday, 15th December 2015, Nairobi, the digital content was launched by the education cabinet Secretary, Dr Matiang'i at Kenya

Institute of curriculum Development (KICD) in a bid to realize the dream of a smart school and ultimately a smart society.

The content was developed by KICD and included interactive animations, cartoons, videos and audios, puppets, quizzes and exercises aimed at helping pupils learn better. The stakeholders involved by the government were, Ministry of Education, Ministry of ICT, ICT Authority, KICD, Kenya publishers Association, among others. The importance of digital content for various levels of education is articulated in the education reform framework, which is on education quality delivery, governance and imparting soft skills on learners.

1.3 Statement of the problem

Despite fifty three years of independence and advancement portrayed in training of teachers in colleges for effective instructional process in Kenya, there has not been quality education in all primary schools. Although in the last 50 years Kenya has had notable initiatives and reforms seeking to access teacher education and improve the quality of teacher educators' knowledge, (O'sullivin, 2009) yet, research indicate that teachers educators knowledge base is still lacking. This is portrayed in Persistent low performance in most of the schools under investigation in Kenya Certificate of Primary Education (KCPE, 2009). Due to consistent lack of teaching/learning resources, poor staffing, Poor training of teachers on ICT, and lack of government support in instructional process, more than 1,200 public primary schools in Kitui County have been categorized in the cadre of low performers' especially so, standard eight candidates in KCPE (KNEC, 2013). Unless this trend is dramatically checked of poor performance in KCPE and lack of ICT skills in our Kenyan teachers, an estimated 129,000 learners in Kitui County will not achieve the sustainable

development goals (SDGs) by 2020 besides entrapping in illiteracy in computer (KNEC, 2013, Abrami, 2010).

Studies conducted in Kenya, further indicate that there are no set criteria enumerating the skills and knowledge teachers should possess to qualify to handle ICT resources (Livingstone, 2009). Researches done by Earle, (2002); Misra & Koehler, (2006); Neiss, (2005);Salmon and White, (2004) indicate that preparation and development of school teachers in ICT utility can lead to school effectiveness and improvement in performance out-put.

Apparently, many countries especially in developing world have come up with institutions and programmes for preparation and training of school teachers. Adversely, not much has been done of school teachers' preparation and training in the third world countries have been brought to the fore, though this should not be mistaken for complete lack of ICT skills in teachers' preparation and training in these countries. Most studies carried out on teachers in Africa Amara, (2006); Pernia, (2008); Hughes,(2005); Duderstadt (2001); Nesseh,(2000) Focus mainly on skills required for ICT integration in various subjects. In these studies, preparation and training of these skills is recommended as one of the ways of solving those problems, of fully integrating ICT in teaching and learning process.

A growing body of studies has shown that technological revolution is inherently associated with paradigm shift of learning process as a result of ICT integration in instruction. Research has shown that the traditional instructional approaches is been eradicated whereby teachers are ultimate sources of knowledge while learners passively receive and record this knowledge in memory are not effective (Bransford et al;2000; Moon,2004; Kozma & Buckley, 2002); Marrison & Oblinger,(2002); Collis

and Van der Wende, (2002) found significant correlations between technological revolution and paradigm shift in ICT integration and several factors of transformational process of ICT integration process.

Similarly, researches done on perception of teachers especially head teachers towards ICT integration indicate that the skills acquired in ICT integration can improve profoundly the KCPE results by far (BECTa, 2002). Further research support the idea that school head teachers' behavior and perception determines success or failure of schools to implement ICT in its instructional process (Schiller, 2011; Hennessey, 2010; Aguyo, 2010; Chang, Chin & Hsu, 2012). Alternatively, Bishop, (2012) found that school heads were not competent in knowledge level of ICT skills, though Gurr (2010) asserted that the present school leaders should demonstrate some basic understanding of ICT in order to perform their duties effectively and inspire the school communication to implement it. Research and subsequent perception of teachers is lacking in the Kenyan situation.

The purpose of this study was therefore to advance research on effective instructional process in primary schools and postulate that integration of ICT in primary schools will tremendously improve the performance of KCPE in schools. The outcome of the study will advance the contributions and efforts made by the government, other stake holders and all the players in education sector to integrate ICT and improve instructional process in Primary School curriculum.

Policy makers will spearhead the policies of ICT integration by supporting and co-coordinating approaches of ICT use and adoption in education. The learners will gain tremendous and meaningful learning that translates into improved student performance. The learners will gain from ICT support which exposes learners in various types of improved learning environment by allowing learner to interact with

the content, learner to interact with other learners, learner to the teacher and learner to interface. ICT increases learner motivation, holds learners attention, allows learners to learn by doing, learners receive immediate feedback, allows learners to use all senses, able to use new tools to master the key concepts and skills and lastly, ICT allows different learning styles to addressed. The 21st century skills will be acquired which improves creativity and innovation skills, critical thinking and problem solving at the same time communication and collaboration skills will be improved.

The class room teachers and Head teachers will benefit from ICT integration by accessing content that would otherwise be unavailable in the traditional classroom, classroom activities run smoothly and disruptive behavior is managed, that is, classroom control, motivation, discipline, respect, communication and cooperative learning. The teachers will benefit from multimedia elements in their teaching since they are motivating to the learners and they communicate to each other using e-mailing.

1.4 Purpose of the study

The main purpose of this descriptive survey study was to understand and investigate school preparedness for effective instruction through ICT integration in the primary school curriculum, a case of Kitui County, Kenya. At this state in the research, the integration of ICT in upper primary has been defined as the seamless integration of ICTs in teaching, learning and management across all levels of education that enhances learning that translates into improved student performance.

1.5 Objectives of the study

This study addressed the following objectives,

i. To find out the availability of resource materials and facilities for ICT integration in public primary schools curriculum for effective instruction.

ii. To assess the perceptions of teachers on ICT integration in public primary schools curriculum for effective instruction.

iii. To find out the level of knowledge and skills of teachers on ICT integration for effective instruction.

iv. To identify government support on ICT integration in public primary schools curriculum for effective instruction.

v. To determine the perception of Head teachers on ICT integration in public primary schools curriculum for effective instruction.

1.6 Research Questions

i. What resource materials and facilities are available for integration of ICT in public Primary Schools for effective instruction in Kitui County?

ii. What are the perceptions of teachers towards ICT integration in public Primary Schools curriculum for effective instruction in Kitui County in Kenya?

iii. What is the level of training of teachers on ICT integration for effective instruction in public Primary Schools in Kitui County?

iv. What is the level and kind of government support on ICT integration for effective instruction in public Primary Schools in Kitui County?

v. What are the perceptions of Head teachers on ICT integration for effective instruction in public Primary Schools in Kitui County?

1.7 Assumptions of the study

The study was undertaken under the assumption that:

i. Teachers were aware of expected performance in all primary schools in Kitui County in Kenya.
ii. The respondents were to be cooperative in answering the questions.
iii. Gender does not affect the integration of ICT in public primary schools in Kitui County.
iv. That ICT integration in the school curriculum in Kenya was underway.

1.8 Scope and limitations of the study

1.8.1 Scope of the study

The study targeted public primary schools in Kitui County, Kenya and that ICT integration in primary school curriculum in Kenya was underway. Teachers and Head teachers of primary schools were targeted in the study. As regards the content, the study restricted itself to school preparedness for effective instruction through ICT integration in primary schools curriculum in Kitui County, Kenya, which may directly or indirectly, improve the performance in KCPE. The study was done in the month of March and August in the year 2016.

The conceptual scope of this study targeted utilization of available resource facilities and materials for ICT integration, perception of teachers on ICT integration, the level of knowledge and skills of teachers on ICT integration, support by the government on

ICT integration and the perception of Head teachers on ICT integration for effective instruction, thus improvement in KCPE performance.

The methodological scope of this study used was Mixed Method research design. Mixed methods stands in between qualitative and quantitative as it provided a more significant results and easy ways of interpreting data and analyzing using the most convenient method. It incorporates all the elements of both qualitative and quantitative. Some of the deficiencies exposed by qualitative and quantitative are significant addressed by MM methods because it uses the deficiencies to provide solutions. The design has three concurrent mixed methods designs as identified by Creswell et al, (2003). They are concurrent triangulation, concurrent nested and concurrent transformative.

The instrumental scope of this study used questionnaires for the teachers. The researcher administered the questionnaires to the teachers to fill. The questionnaires have the following advantages, the information can be collected from a large sample and diverse regions, and there is confidentiality, which is upheld. The study also used interview schedule for the researcher to fill on face to face encounter with the Head teachers. Interview schedules were administered to Head teachers by the researcher who filled the interview schedules directly and they have the following merits, more information and that too greater depth can be obtained, interviewer by his own skill can overcome the resistance, if any, of the respondents, the interview method can be made to yield an almost perfect sample of the general population, there is greater flexibility under this method as the opportunity to restrict questions is always there, especially in case of unstructured interviews, Observation method can as well be

applied to recording verbal answers to various questions, personal information can be well obtained easily under this method, samples can be controlled more effectively as there arises no difficulty of the missing returns, on-response generally remains very low.

Another instrumental scope of this study used was observation checklist which was filled by the researcher himself to ascertain the available resources facilities and resources utilized for improvement of instructional process. Observation checklist is a research tool used to collect data by observing and recording data about variables under study to determine their behaviour in different situations in natural setting. It comprises of a list of questions that an observer will be looking to answer when they are doing a specific observation of a classroom, in either ascertaining the presence of resource materials used in teaching/learning instruction, ensuring that the teacher is using proper teaching methods and that the learners are learning in the best environment possible.

1.8.2 The limitation of the study

The study experienced the number of Limitations namely:

i. The availability of primary school teachers who were to teach ICT skills in different periods/sessions in the block timetable. The above was overcome by setting aside a whole day and station at the targeted schools.

ii. Honest of the teachers during collection of data. The above problem or challenge can be overcome by assuring teachers confidentiality during data collection.

iii. Due to vastness of the area and unreliability of means of transport, costs and time constrained the study. This was overcome by providing for additional resources and time in budgeting.

1.9 Justification of the study

This study aimed at identifying school preparedness for effective instruction through ICT integration in the primary schools curriculum: a case of Kitui County, Kenya. The teachers of primary schools were to make best utility of ICT learning aids and to improve the performance. The teachers were to note areas where they were well acquainted in ICT programmes and software's and makes best utility in instructional process thus improve their perception towards ICT integration.

The performance of KCPE as one of major bridge for young pupils to proceed to form one has been on decline in the past decade in ASALs in Kenya yet the examination accounts for improvement of pupils in proceeding in the next grade/class. If the teachers of public primary schools are made to produce their best, the ICT integration in public primary schools will improve higher the KCPE performance in the whole

county. Since there is a paradigm shift to a world of 21st century, learning is rooted in the following sets of goals for all learners:-acquire a range of skills needed to succeed in a modern, globalized world, receive tailored instruction that enables them to reach their full potential, connect to their communities in person and digitally, and interact with people from different cultures and continue learning throughout their lives.

Little research on availability of resource materials, perception of teachers, level of knowledge and skills of teachers on ICT integration, support by government and perception of Head teachers in ICT integration has been carried out in Kitui County yet the county is predominantly performing poorly. This research therefore is an eye opener and should help understand the unique demands of pupils in the county at the same time, better performance and provision of the above needs.

1.10 Significance of the study

It is hoped that this study was useful to educational policy makers. These are educational officers who make plan of actions of educational policies to be implemented.

The policy makers who are also administrators take serious attention on the usage of teaching/learning resources. The policy makers provide in -service education to teachers on recent changes in the field of teaching methods and materials to be used to improve KCPE performance.

It is also hoped that teachers will be in a position to benefit from the research by acquiring best skills in instructional process by integrating ICT in their teaching to

improve KCPE performance in arid and semi-arid lands (ASAL). Teacher's perception towards ICT integration in school will be improved, at the same time, benefit from in-service courses to improve their skills in ICT utility. It is also hoped that teachers will benefit from the research through better practical utility of ICT resource materials and facilities, best application software's used to improve their performance in KCPE. The head teachers will also learn best communication skills at the same time skills to access the knowledgeable materials from the internet. The teachers also will have an opportunity of seeking job opportunities and any relevant knowledge from the internet.

1.11 Theoretical Framework

This study was based on Technology Acceptance Model (TAM) which was put forward by Sternad et al (2013) citing Davis (1989). The importance of technology acceptance as the precursor to the use of technology has attracted much attention from researchers and practitioners (Venkatesh, Morris, Davis, and Davis, 2003). The Technology Acceptance Model (TAM) has been widely studied and accepted as a valid model in predicting individual acceptance behavior across various information technologies and their users (Sternad, 2013).

TAM explains the relationship between internal psychological variables – such as beliefs, attitudes, and behavioral intention – and actual system usage (Davis, 1986; 1989). According to Sternad (2013), perceived usefulness and perceived ease of use are major beliefs that influence attitude toward system use and eventually lead to actual system use. TAM has been highly regarded both because of its parsimony and

because of its high predictive power in explaining IT acceptance behavior across various contexts (Mathieson, 1991; Venkatesh, 2000).

In TAM, two factors are primary determinants of system use: perceived ease of use and perceived usefulness (Davis et al., 1989). Perceived usefulness is defined as the user's subjective probability that using a specific technology will increase his or her job performance within an organizational setting. Perceived ease of use is the user's assessment that the system will be easy to use and require little effort. Davis's model specifically postulates that technology usage is determined by behavioral intention to use the technology. Behavioral intention is in turn determined by attitude towards using the technology and by perceived usefulness. Attitude toward system use is postulated to partially mediate the effect of perceived ease of use and Perceived usefulness on behavioral intention.

TAM utilizes perceived ease of use in the ICT integration in primary school curriculum by enabling teachers to utilize the available ICT resources for improvement in their class performance in KCPE. Ease of use can be considered a pre-requisite for useful systems. With a significant body of literature lending support to TAM, the model has emerged as a powerful one with which practitioners can predict IT acceptance and usage behavior. When IT professionals foster users' beliefs in ease of use and usefulness of the focal IT, adoption and usage are likely to occur, thus improving KCPE performance. Perceived usefulness in ICT integration in Kitui County will enable teachers to embed ICT in their instructional process by utilizing multiple resource materials from the internet thus improving their degree of output in KCPE performance.

The advantage of focusing on TAM is that it is simple and parsimonious model which has encouraged researchers to apply it widely because it integrates contextual focus into TAM. This model provides an explanation about user acceptance of a technology. TAM suggests that specific behavior beliefs, perceived ease of use (EOU) and perceived usefulness (U) determine on individuals attitude 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 influenced the perception towards using as well as perceived usefulness and computer self-efficacy has a significant effort on perceived ease of use. In this theory five attributes that were to facilitate technology by facilitating integration of contextual factors are,

i. To find out the availability of resource materials and facilities for ICT integration in public primary schools curriculum. TAM will enable teachers to make best utility of available ICT resource materials to improve in instructional process and better the KCPE results.

ii. To establish perception of teachers in ICT integration in teaching/learning in classroom. TAM will enable upper primary school teachers to improve the positive perception of the ICT resource facilities and materials by using the resources with ease without any cost and improve their instructional process, thus improving KCPE performance.

iii. To determine the level of knowledge and skills of teachers on ICT integration in Kitui county.TAM will enable teachers to utilize the already skills they attained in training to better their instructional process, thus improving output in KCPE performance in future.

iv. To identify government support on ICT integration in public primary schools curriculum and to determine the perception of Head teachers in ICT integration in public primary schools curriculum. TAM will enable teachers to improve in instructional process thus improving output in KCPE performance by increasing the already deteriorating mean grade to a better one.

This study utilized these five factors in establishing good performance in KCPE by integrating ICT integration in primary schools curriculum in Kenya.

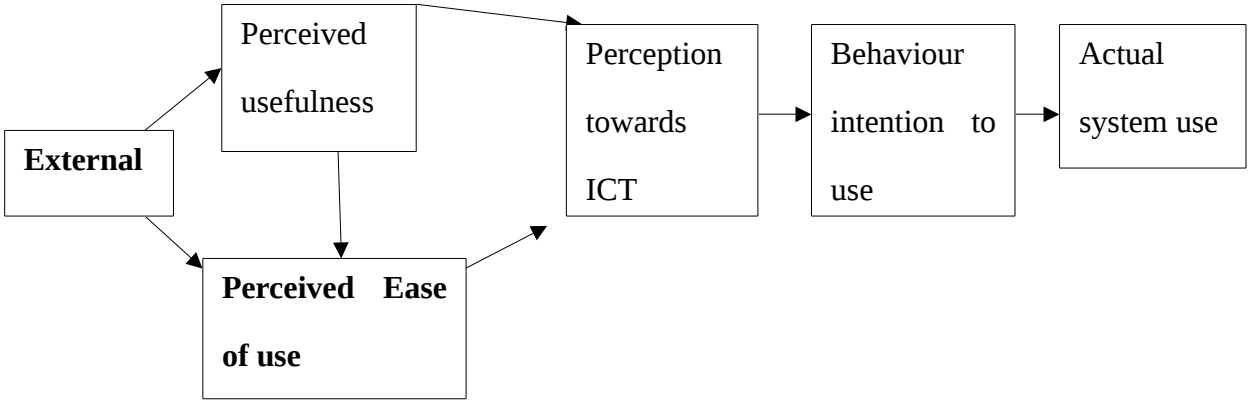


Figure 1.1 Flow chart on five attributes on ICT integration.

The TAM model of informed system success relies on Saade et al (2003) citing (Fieshbein and Ajzens, 1980) that usage is predictable beliefs and attitudes of the users' behavioural intention to use a technological innovation. Theory of reasoned action asserts that two factors are primary determinants of system use.

The study employed TAM as the underlying theoretical grounding for the research framework as it provides a valid basis for explaining and predicting teachers'

intentions towards ICT integration in teaching and learning. The knowledge this study generates will contribute in two ways: in terms of theory, this provides an empirical understanding on the technology acceptance of Kitui county teachers towards ICT integration, and in terms of practice, this study presents strategic implications and directions for the development of ICT utility in teaching and learning.

Perceived usefulness (PU). PU is defined as the users subjective probability that using a specific technology will increase his/her job performance within an organizational setting Sternad and Bobek (2013) , and Perceived ease of use **(**PEOU), is the users assessment that the system will be easy to use and require little efforts. Straub (2009) suggest that perceived usefulness of computer has a positive effort on the adoption of IT (Information Technology).

Sternad and Bobek (2013) citing (Davis,1989) asserted that perceived usefulness affects both attitudes and actual computer use while Legris et al.,(2003) , suggests that perceived usefulness is a significant determinant of attitudes and intention. This provides a theoretical basis for the study. Expense-value theory has emerged as a model for understanding and predicting behaviour in the process of adopting innovations. Models of expectance-value have been largely applied to industrial and occupational setting. Caulfield (2007) citing (Vroom, 1964), Admin (2013) citing (Michael, 1977), have found the model to be an accurate predictor of productivity.

1.12 Conceptual Framework

Conceptual framework is a graphical/narrative relationship of the study variables' network which represents an argument about the study. In the conceptual framework of this study, the Independent Variables were shown in their network with the intervening variables to give the output variable. The output variable is also called the Dependent Variable of the study. When teachers of upper primary utilize the available

resource materials for ICT integration, the performance in KCPE examinations of class eight will improve tremendously. When their perception towards ICT integration is positive, the performance of KCPE will improve. When teachers have basic knowledge of ICT integration, when the government provides support for ICT integration and when the perception of Head teachers is positive, the performance of primary school examinations will be improved.

The conceptual framework of this study, which gave the study's variable graphical relationship's network, is as shown in Figure 1.2

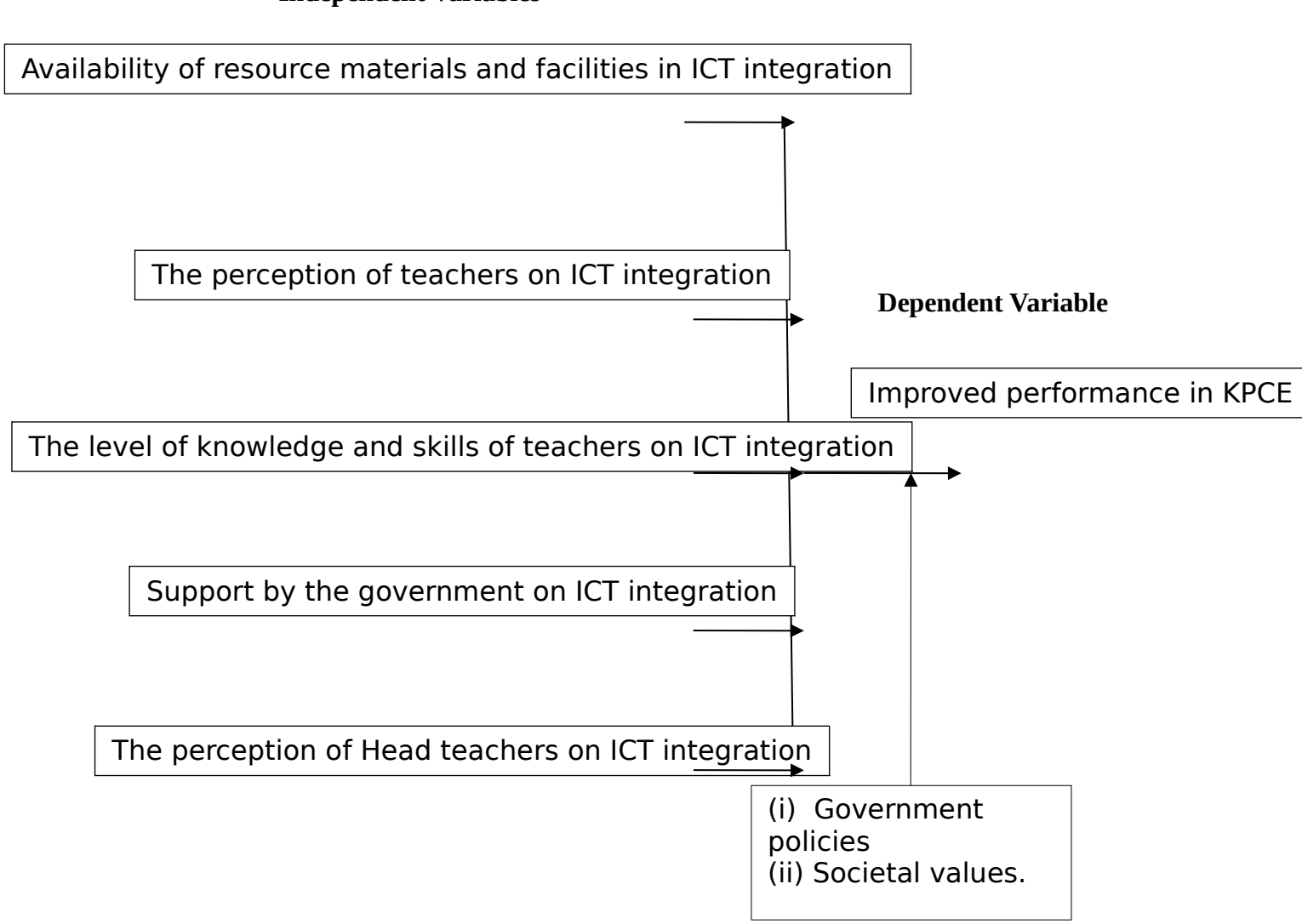


Figure 1.2: Conceptual Framework

The relationship between the independent and dependent variables is that – The utilization of available resource materials and facilities in ICT enabled effective integration of ICT in teaching and learning thus better improvement in instructional process and KCPE grades. The perceptions of teachers when favorably positive influenced the integration of ICT in teaching and learning thus improvement in instructional process and quality of school grades in KCPE examination. The

knowledge level of teachers in ICT skills also enabled effective integration of ICT in teaching and learning in class thus drastic improvements in KCPE national examination performance. Support by government on ICT integration enabled teachers to acquire required skills required to handle ICT resource facilities, thus improvement in instructional process and improvement in KCPE examination outcome.

1.13 Operational definition of terms

Educational Support activities - In this study**,** educational support activities are those activities that focus in enhancing quality of education as regards teaching, learning and management of schools. For instance, use of computers as tutors, tutorials, simulations, virtual laboratories and use of Education Management Information System (EMIS) (GeSCI 2009**).**

Government support - In this study, government support implies the support provided by the central government in Kenya towards integration of ICT in primary school curriculum, which includes provision of computers/laptops, supply of Electricity, provision of funds for construction of computer laboratories, training of teachers etc.

Information Communication Technology (ICT)

This is a collection of technologies and applications which enable electronic means of capturing, processing, storing, transfer and dissemination of information to a variety of users or clients. A technology involves computing, communication and internet (Duncombes et al 2002).

Integration: In this study, integration refers to a method of teaching where two related Subjects are merged to enhance each other. For instance, the two important elements of teaching and learning which are content and pedagogy must be joined when technology is used in lesson. In other way, if students are offered series of websites or ICT tools (e.g. CD ROMs, multimedia, etc) then the teacher is not integrating ICT into teaching since he/she is not tackling the pedagogical issues.ICT integration refers the process of involving some ICT facilities to enhance instructional process by delivering teaching and learning by using both content and pedagogy. It is used to engage learners in meaningful learning that translates into improved student performance. Effective ICT integration should focus on pedagogy design which takes into account the fact that teachers need to 'learn about technology … in the context of their subject matter and pedagogy' (Hughes 2004, p. 347). Additionally, ICT can support various types of interactions in the learning environment.

ICT integration-ICT integration refers to use of ICT to enhance the teaching and learning process. In broader term, it is the use of engaging learners in a meaningful learning using ICT facilities that translates into improved student performance. For instance, the two important elements of teaching and learning which are content and pedagogy must be joined when technology is used in lesson. In other way, if students are offered series of websites or ICT tools (e.g. CD ROMs, multimedia, etc) then the teacher is not integrating ICT into teaching since he/she is not tackling the pedagogical issues.

Knowledge: In this study, knowledge implies that information and facts required by the teachers in order to handle ICT infrastructure in classroom situation.

Preparedness: This is the state of being ready for something to happen, especially so for goodness (Advanced learners Dictionary, 2004). In this study, preparedness means the prior skills and knowledge in ICT required by primary school teachers' in order to adopt the integration of ICT in instruction.

Perceptions: According to Zhao et al (2001) perceptions are predictions or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. In this study, perception means predisposition or a tendency to respond positively or negatively towards integration of ICT in classroom learning situation.

Resources: In this study, resources means software and hardware ICT materials e.g. computer, keyboard, whiteboard, projectors, books, teaching aids, resource people who/which provide learning content to the learners of ICT.

Skill: In this study, skill means the practical knowledge required by teachers in order to adopt ICT in instruction.

Training: In this study, training means the process of acquiring professional development of a teacher in order for a teacher to handle ICT hardware.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature related to this study. The review focused on the literature that had strong affinity to the topic of the research, namely “the school preparedness for effective instruction through [ICT] integration in the primary school curriculum: A case of Kitui County, Kenya”. The review focused on Information Communication Technology [ICT] and its application and use in teaching, learning for effective instruction, research and its implication in primary schools in particular. The ICT encapsulates technologies that are used to communicate and to “capture, transmit and display data information electronically” Reynolds, (2001, p.127).

According to this study, ICT involved collection of technologies and applications which enabled electronic means of capturing, processing, storing, transfer and dissemination of information to a variety of users or clients. A technology involves computing, communication and internet (Duncombes et al 2002). Some of the facilities involved in ICT were, television (TV), Radio, Overhead Projectors (OHPs), Computers, Laptops, Interactive white boards, PC tablets, PDAs and Networks all fall under ICT. The chapter delves into the literature and studies done on the adoption of ICT in general and in primary schools in particular. The chapter explored the perceived resources, perceptions of both teachers and Head Teachers towards integration of ICT, support provision by government, and lastly teachers’ knowledge in ICT integration. The section also covered areas of ICT in theoretical foundations in the study as listed here, ICT in developing countries, Impact of ICT adoption in

education in developing counties, Impact of ICT on what is learned, Critical review of past studies of ICT in Africa, Demands and challenges of ICT in Africa, ICT adoption in Kenya, Teachers perceptions in ICT, Theories on Adoption of ICT in schools, Technology Acceptance Model [TAM].

Factors associated with teachers perception in ICT included Pedagogical issues, Teacher attitude, Personal familiarization with computer, Teacher training, Time factor, Availability of Hardware, Software issues, Perception of head teachers. Other factors included, computer attributes, sex, age, level of education, teaching experience, computer training, technical support needed, availability of resources materials, Perception of students in ICT integration, Government support in ICT adoption, Teachers knowledge and skills in ICT integration.

2.2 Theory on adoption of ICT in schools

Theory is defined as “A set of interrelated constructs (variables) definitions and propositions that presents a systematic view of phenomena by specifying relations among variables with the purpose of explaining natural phenomena, Buchere et al (2009) citing (Kerlinger, 1997).So, in this study, the theory of ICT adoption used was Technology Acceptance Model (TAM) in primary school curriculum in Kitui County.

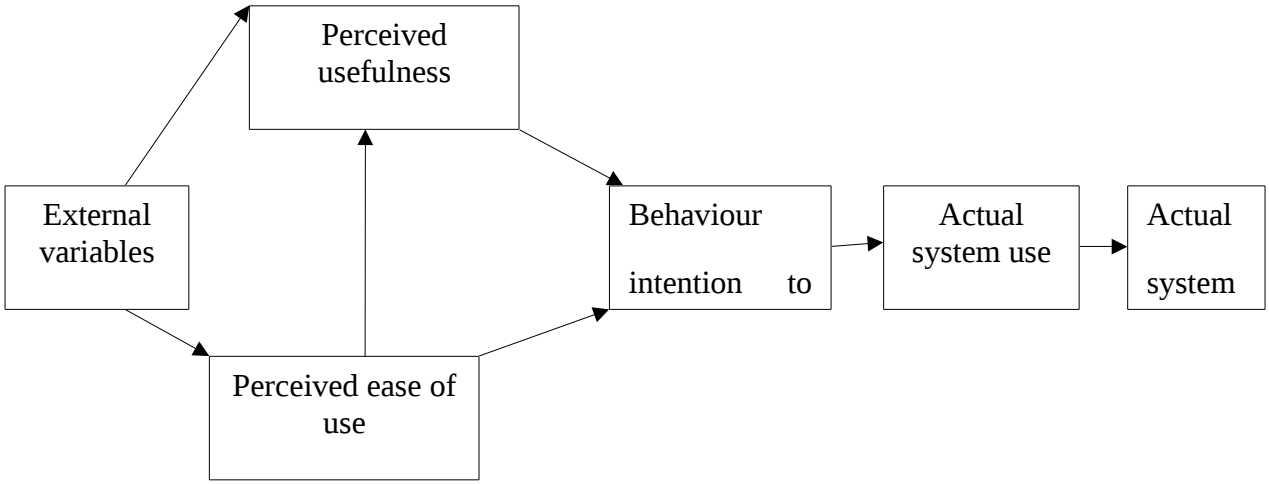
2.3 Technology Acceptance Model [TAM]

Technology Acceptance Model (TAM) was developed by Davis (2009). The theory is linked to the theory of reasoned action (Fishbein, 1975). TAM represents one of the explanatory models to have influenced the theories of human behavior (Venkatesh et al 2003). TAM was developed with primary aim of identifying the determinants

involved in computer acceptance in general and to examine a variety of information technology usage behaviors. Tylor (2000) citing (Davis, Bagozzi and Warshaw 1989) assert that TAM explains why a user accepts or rejects information technology.TAM provides a basis with which one traces how external variables influence beliefs, attitudes/perceptions, to use technology. The theory is also linked to the Perceived usefulness which is the degree to which a person believes that using particular information system would enhance his/her job performance or help in resolving a certain task. Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free of efforts (Sternad & Bobek, 2013).

Two cognitive beliefs are posited by the TAM, Perceived usefulness (degree to which the technology will improve achievement) and Perceived ease of use (degree of easiness to use technology). According to TAM, the actual use of a technology is influenced directly or indirectly by the user's behavioral intentions, attitude, perceived usefulness and perceived ease of the technology. In addition, the TAM proposes that external factors (self-efficacy, anxiety, motivation, external control, etc) affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use). TAM adapts the belief attitude-intention behavior relationship to a users ICT acceptance. TAM predicts user acceptance based on two specific behavior beliefs: perceived ease of use (PEU) and perceived usefulness (PU), which determine an individual's behavior intention (BI) to use ICTs (Sternad & Bobek 2013). Figure 2.1 depicts the original technology acceptance theory.

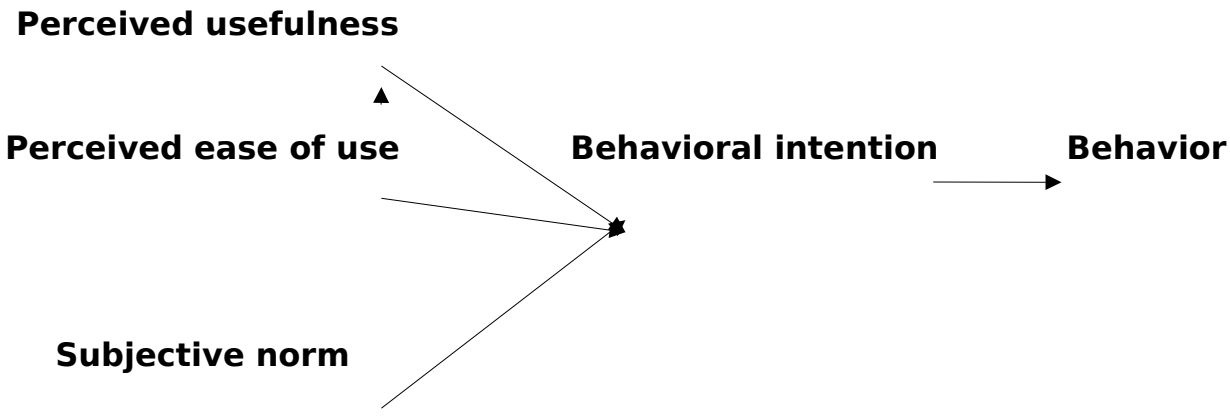
Figure 2.1 Technology Acceptance Model (TAM)



Source: Adapted from Vankatesh& Davies, (2009)

The outlines of the technology acceptance model one described in figure 2.6. In the model behavioral intention is seen as the dependant variable. The behaviors intentions influence the behavior to use the technology in a positive or negative way perceived usefulness. Perceived ease of use and subjective norm are independent variables.

Fig. 2.2 TAM with the extension of subjective norm



Source: Adapted from Venkatesh & Davies, (2000)

Research indicates that perceived usefulness and subjective norms influences the behavioral intentions to use an information system in a positive way. The more people importance to user, e.g. teachers believes that it is appropriate to use the information system, the more likely-the user is to accept and use the system. Perceived ease of use has been shown to have an effect on intentions in two ways: a direct effect on behavioral intentions and an indirect effect on perceived usefulness (Venkatesh and Morris, 2000).

2.4 Global perspective of ICT integration in schools

In an age when education standards have been on the decline globally, scholars have argued the integration of ICT can help in revitalizing both students and teachers, Bates (2009). Technologies such as interactive whiteboards, e-conferences, educative software and education portals among others, have been proved as an essential boost to classroom activity, learning motivation and general inquisitiveness Gulbahar & Guven (2008).

According to The World Bank Development Report, ICT-enabled teaching and learning by "greatly facilitating the acquisition and absorption of knowledge … reducing the sense of isolation, and opening access to knowledge in ways unimaginable not long ago" World Bank (2006). Other researchers have proposed that technology aided teaching provides curricular support to students and teachers alike, in subject areas that would otherwise be viewed as difficult (Gulbahar & Guven, 2008).

It has previously been concluded that "one of the most commonly cited reasons for using ICT in the classroom has been to prepare the current generation of students for

a workplace where ICT, particularly computers, the Internet and related technologies, are becoming more and more ubiquitous" (Tinio ,2003).

This means that technological literacy amongst both students and teachers as well as the ability to employ ICT skills efficiently and effectively to solve life problems and needs is perceived as representing the competitive edge that the modern society in the increasingly globalizing atmosphere (Jones, 2004). Another very significant advantage of ICT enabled education is how ICT makes education accessible from any place and at anytime. According to Tinio, "the prominent defining feature of ICT is its ability to transcend time and space" thus enabling what she refers to as "asynchronous learning" or real-time transfer of knowledge across different regions, without the necessity of having learners and instructors in a single location and which is accessible at any time of the day, Sonia (2012) citing (Winnas, 1992).

In teleconferencing for instance, ICT enables learning in a way that can be simultaneously received by multiple, unrestricted and geographically-dispersed participants. Modern ICT capabilities enable teachers to engage in collaborative projects with their peers, to build partnerships within a particular discipline and to develop effective intervention change strategies for their Student (Sife, 2007).

Researchers have also argued that ICT integration in education is a prerequisite to the academic Preparation of contemporary students, in a world where technology has "created a new global economy "powered by technology, fueled by information and driven by knowledge" Gulbahar & Guven (2008). Without a background in ICT use,

graduates from modern schools would not fit into the society since ICT applications have become common place in every field of ordinary life (Bates, 2009).

Significantly also, ICT enables cheap and synchronous access to the most advanced learning resources from remote locations. As Tinio (2003) argues, “teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries and available in limited quantities for their educational needs with the Internet and the World Wide Web, a wealth of learning materials in almost all the areas of study.

2.5 ICT in Developing Countries

Before independence, informal indigenous Education was very popular and important in the organization and transmission of knowledge and culture in all African communities. When formal education was introduced in Kenya during the British colonial Era, no African values were included in the curriculum that was being used. Ideological conflicts were inevitable and they arose. The education being given to the Africans was a British brand of education divorced from all things Africans practiced. Along the line and over a period of administering the British education system many African leaders in many parts of Africa saw the inadequate and the irrelevancy of the colonial education, hence the rise of native independent African schools.

When Kenya attained its independence in 1963, many Education commissions were set up to recommend changes in the formal Education system. The forces of the commissions were to build a national identity, bring value and relevancy in the curriculum and to unify the different ethnical groups in the country using the schools.

Between 1964 and 1985, the 7-4-2-3 Education system which was modeled after British Education system was used. The country was in dire need for skilled workers to hold positions previously held by the British. This made the government to quickly expand educational opportunities by introducing and adopting 8-4-4 in 1985.

Kenya has always placed education at the centre of its development strategies and plans and at all levels promoting it as a key indicator and means for social and economic development, Gikungu et al., (2014) citing (Bogonko, 1992). The ministry of Education is responsible for providing education for Kenyan citizens (MOE, 2008) Education in Kenya is directly influenced and determined by government decisions and policies and it therefore changes according to socio-economic and political trends. In the above light many policies have been spearheaded by the ministry of Education for example, the ICT policies. This policy was meant to support and co-ordinate approaches to ICT use and adoptions in Education. The adoption of a National ICT policy by the Kenya and specifically the ministry of education was aimed at ensuring that a national ICT policy that grantees a consisted framework is utilized by ICT users in Education activities, the development of ICT in Education was given to a steering committee to develop and revise quality assurance guidelines for the ICT programmes.

In 1995 the Ministry of Education of Kenya initiated the Information Communication Technology ICT project that sought to integrate management and programmes throughout the country, under the project; ICT was being integrated into all Education and training programmes to improve access to teaching, learning and administration.

In the following year, 2006, in the month of January, the government of Kenya promulgated an ICT National policy, the aim being "…..to improve the livelihood of Kenyans by ensuring the availability of accessible, efficient, reliable ICT services. The policy as pertains to education states in passing that the use and adoption of ICT in schools, colleges and universities and other educational institutions in the Republic of Kenya i.e. needed so as to improve the quality of teaching/learning and research with e-learning by Central government (Kandiris & Ferrel, 2008). Apparently and unfortunately Kenyan Universities were not fully Incorporated neither were they involved in this project.

An ICT unit was established in the Ministry of Education in Kenya in 1997 to ensure that systematic efforts were made towards strengthening, adoption and use of ICT in the education sector. The use of ICT in education sector is in the line with development priorities as outlined in the economic recovery strategy for wealth and employment creation. This is found in the Sessional paper No.1 of 2005 of GOK, on policy framework in education training and research and the Sustainable Development Goals [SDG] (GoK, 2012).

The Kenyan Education sector support programme (KESSP) which was developed by the Ministry of Education in collaboration with partners, placed a lot of emphasis on ICTs its use and adoption at all levels of education transition. The implementation of ICT in the education sector fits within the broad government policy which aims at mainstreaming ICT in all government operation and service delivery. It also has a specialized component, education management systems which aim at providing education managers and administrators with accurate and timely data to enable them make better and informed decisions.

Another component of ICT is e-learning which aims at using ICT as a tool for teaching and learning. The government has developed a national strategy to enhance development of ICT and integrate it in educational instructions. This has been made possible through the new partnership for development (NEPAD). The partnership facilitates greater dissemination of ICT services. The other initiative is the role of ICT trust fund where public and private corporate organizations come together to provide funds and resources to equip schools and colleges with computers and internet facilities and many other facilities yet to come.

Several NGOs and private sector players have also established a consortium called Network Initiatives for Computers in Education (NICE) which promote use of computers in education and this is well articulated in the ministry of education of the Republic of Kenya strategic plan 2006-2011. The resources obtained have been used to equip schools with ICT equipment especially computers. Secondly, the digitalization of the curriculum is on-going under KESSP at Kenya Institute of Curriculum Education [KICD]; thirdly, the ministry with support from NEPAD is implementing connectivity in twenty (20) schools to serve as demonstration for future roll-out to other schools GOK (2008).

The above development is not withstanding and given the fact that the ministry of Education (MOE) recognizes the need for more efforts in addressing the existing challenges in ICT adoption and use. There is an urgent need to create awareness on the need for ICT use and adoption in education at all levels. The sub sector also faces challenges with regard to the cost of ICT infrastructure and suitable manpower. In view of the prevailing high poverty levels most parents are not able to provide the requisite facilities to support ICT. Integration of ICT in all learning institution was

faced with limited technical expertise in the area of curriculum digitalization and the ability to transform the national curriculum into digital form to aid faster integration is and remains a big challenge both to parents and the government. For example over 90% of the primary schools required functional telephone lines so as to access internet services a report of (MOE) strategic plan 2006-2011.

Developing education managers who are ICT compliant are critical for the management of ICTs in education. There are issues addressed in the ongoing efforts to establish the education management information systems (EMIS) in the ministry. This is imperative for Kenyan to attain Education for all (EFA) and achieve the Sustainable Development Goals (SDGs). Establishment of an education channel at KICD, where basic facilities already exist is essential. This has been articulated in the session paper No.1 of 2005 and in the KESSP document GOK (2008).

The main objectives of the ministry of education in its strategic plan of 2006-2011 are to integrate ICT in education. The ministry has the following strategies in order to achieve this objective (GoK, 2008, p.165-167),

1. To create awareness on the importance of ICT not only in education, but across the board.
2. To equip education institution with ICT equipments both for short-term and long term purposes.
3. To enhance the development of ICT curricula for all categories of learners.
4. To increase collaboration with other relevant Government ministry to expand network and connectivity infrastructure.
5. To reduce the cost of ICT in education.
6. To develop the capacity of education policy makers and managers.

7. To enhance working partnership with ICT.

The foregoing information and position on ICT policy established by the ministry of education was a source and a cause of motivation on the researchers mind. It has far reaching ramification on the part of lecturers teaching in universities in Kenya. What it entails and expects of primary school teachers cannot be underrated especially when the high grades of standard eight students come to join form ones to be taught by many teachers who have never had a chance to use ICT when they were in school.

The Kenyan government Sessional paper No.1 of 2005 points out clearly the ICT policy framework of the ministry of education. It does not only focus on students being empowered with ICT knowledge base and skills but it stresses the need for others and all people working in education to equip themselves with ICTs knowledgeable and skills. It includes training research and the Sustainable Development Goals [SDG].

The foregoing discussion is pertinent when one ventures in discovering the position and status of ICT use and adoption by teachers of primary schools. In practical terms the situation begs many questions and implies many demands and expectations on the part of the teachers. How can and will teachers operate when children joining primary schools report and find these studies in school? Given that MOE, ICT policy is succeeding the situation begs many questions including, how well prepared are primary schools teachers to handle and help the learners in primary schools to learn well effectively.

The adoption and use of information and Communication Technology ICT has taken over and rules people's lives. New innovations as a result of ICT are continuing to emerge. Some statistics are in order, globally, in the year 2000,539 million computers were being used with 450 million in USA, European Union and Asia, leaving 129 million in the developing countries. The number of computers usage was projected to grow to one million by the year 2005. Similarly, the internet users were 315 million in 2000, and the number was estimated to grow to 716 million users by 2005 and the majority of these users were in developed countries (Ngplains 2002). The internet usage rate in the developed world was 8 times that of the developing countries, and there were 22 million internet users in Africa by 2004 (ITU 2004), ICT in that respect Information Communication Technology are technologies that can process different types of information including voice, video, text, data and facilitate different forms of communication amongst the learners and even among communication systems. ICT is a force that has changed many aspects of the way we live. If one was to compare such fields as medicine, tourism, travel business, law, banking, engineering and architecture, the impact of ICT across the past two or three decades has been enormous.

The way these fields operate today is vastly different from the ways the operated in the past. There are a number of factors impeding the whole sale uptake of ICT in education. These have included such factors as: lack of funding to support the purchase of the technology, lack of training among established teaching practitioners, lack of motivation and need among teachers to adopt ICT as teaching tools (Starr, 2001). But in recent times, factors have emerged which have strengthened and encouraged moves to adopt ICTs into classrooms and learning settings. These have

included a growing need to explore efficiencies in terms of program delivery, the opportunities for flexible delivery provides support for customized programs to meet the needs of individual learners, Chiou et al., (2012) citing (Kennedy and McNaught, 1997), and the growing use of the internet and websites as a source and tools for information access, research and communication, Marris et al (2011) citing (Oliver and Towers, 1999).

Legislative assembly parliament of Western Australia [LAPWA], (2012) citing (Maddux et al, 1997) asserted that Computer Technologies had attained wide recognition in technologically developed countries by the time they entered developing countries. The wide spread use of ICT has caused fundamental changes in the chapter of technologically developed societies. The new changes were often characterized by speed, convenience and efficiency. With these attributes, computerization has risen to ideological prominence, an expression of grand hopes and ideas (Winner, 2003, p. 595). On the international level, Information Technologies facilitated the worlds shift to a more open and global society, which created new challenges, related to changing patterns of labor, business and world communications Chemwei et al., (2014) citing (Berg & Vogelaar, 1998).

With the change in the organization of society and the central role of Technology in it, new competencies are required Kiridis et al., (2008) citing (Van Weert, 1995). Taylor (2000) citing (Warschauer & Healey 1998) noted, the ability to read, write, and communicate effectively over networks were essential for success in almost every sphere of life. Because International business and economy is controlled by the same countries and forces that nurtured the computer culture, the adoption of computer

technology became not only an option but a must dictated by international standards in business, communication, and global labor.

Further, given the global demands for technologically skilled labour force, together with the challenges of an increasingly competitive global market, developing countries have suddenly found themselves under economic, social, vocational and pedagogical pressures to use technology in education, Gulati (2008) citing ((Kiangi, 1998). Information Technologies are deemed necessary for economic survival, social change and international business competition, international governments' adoption of these tools reflects an awareness of those unavoidable facts, Byungura et al., (2016) citing (Ojo & Awuah, 1998). Technology implementation is also essential to prepare students for the future. ICT has the potential to empower individuals as well as their nations.

Similarly, the need for implementing technology drove many ministries of education in developing countries to introduce technology into schools as ad hoc instruments (Gumbo, 2015). Many researchers have pointed out the lack of national policies to place some structures on the introduction of these alien tools to the indigenous educational systems Merrill,(2016) citing (Fodge,1999), warns that computerization cannot be allowed to become a new form of cultural imposition-neo-colonialism is not acceptable even in an automated package similarly, De Castell *et al.,(*2002) asserts "It is irresponsible for educational administrators in ministries of education, school districts and schools to utilize resources provided for integrating technologies into the curriculum to support what is now a burgeoning comporting involvement in educational software design and development. Better by far to reallocate time and resources to teachers and learners for harnessing, themselves, new forms of

intelligence and new functional capabilities to participate directly in the world of digital technologies as purposeful and capable producers of artifacts, and not merely as consumers of the products of others (De castle 2002p.14).

Developing countries need to find a formula to put these tools in service of their own needs purposes and circumstances. Even if developing countries are not technically capable of producing local technologies, they should at least be culturally and educationally prepared to indigenize these tools. Albirin,(2008),citing Fodge (1999) contents:

> What the world needs today is not talent in producing new technologies but talents in producing new technologies but talents in understanding the impact of technology on the society and individuals…..Educational programs in the third world hereto fore Have designed around the western ideas. These needs to be re-worked to reflect the Indigenous cultures and promote human values while at the same times producing the talent for "controlled" technological advancement. Only then would we be able to talk of developments. (p.122).

In particular, teachers need to be in the forefront of change, else "commercial and other organizations will take the lead in using technology for education purposes" Lyamu and Aduwa (2005) citing (Harper, 1987:60). The discrepancy in developing countries lies in that, while lacking in financial and human resources to invest in computer technologies, they still need to face the greater demands of keeping place with the technologically developed countries (Modum, 1998).

According to Lyamu and Aduwa (2005) citing Harvey (1983, p,206), "there is a rapid extension of information and data processes in the industrialized nations that threatens to push third world countries even further behind their more developed sister states….."Predictably, the hastily and often improved implementation process has been fraught with problems. Studies on the use of educational technology in developing countries have revealed common problems. Among the problems

described by Sarfo et al., (2014) citing (Sagahyroom ,1995) were the death of sufficiently qualified teachers, spread of computer illiteracy, deteriorating infrastructures base, lack of computer resources, inadequate funding, and the absence of accepted standards to guide educational planners.

Further, in a multi-national study, Pelgrum (2001) examined what educational practitioners in 26 countries perceived as major impediments to technology implementations in their relative schools. Pelgrum (2001) found that the main obstacles were shortage of computers and lack of computers knowledge among teachers. In her study of technology implementation in Malaysian schools, Andoh (2012) citing (Abas, 1995) reported that the main hindrance to successful technology implementation was the scarcity of resources. Research in developing countries has frequently underscored the lack of equipment and infrastructure to be a major obstacle to educational computing initiatives. Factors such as the general population, poverty, fragile economies, and high computational cost have often stood behind restricting the expenditure and subsequently the benefits of educational computerization efforts. It seems that balancing resource allocation among the competing areas of need in education is a critical issue (Ojo & Awuah, 1998).

Another major problem associated with integration of Technology into Educational systems of developing countries has been the lack of trained teachers and trainers, Gumbo (2015). Generally, the skills and technical background necessary for effectively utilizing the new technology are absent or in short supply. As Hansson et al (2016) citing (Ruohoners & Adelakun 1998) note, insufficient and inadequate human resource development for IT implementation works against the effective IT adoption and integration in most developing countries.

Abas (1995) pointed to the shortage of well trained teachers as a main barrier to effective technology integration into Malaysian schools. She concluded that effective in-service training is a key for technological integration. She further suggested that teacher training is not enough. What is needed is “effective “teacher training. This present study confirms the findings of Abas (1995) as cited by Isman (2016) that some of the major hindrances experienced in ICT integration in primary school curriculum is lack of trained teachers, lack of ICT resources required for smooth implementation process to take place.

Based on his study in South Korea, Koech et al (2014) citing (Na 1993) recommended teachers participation in computer training programs to increase their skills and knowledge about computer use. He suggested that teachers should be trained, not simply to use computer but also to use it in the classroom. According to the report of Koech et al, (2014) citing Na (1993), the present study confirms the findings of the teachers requiring proper training in fully integrating ICT in primary school curriculum in Kitui County, Kenya.

Khan (2012) citing (Hogenbirk, 1995) recommended creating teachers networks where teachers could meet and work together on regular basis to exchange experiences and activities. According to Hogenbirk, (1995), this strategy could be useful for creating “a critical mass of experts”, who gather on common interests and expectations (1995:55). The study by Hogenbirk (1995) is reporting on networking of teachers in order to improve their skills in ICT but the present study however

confirms teachers' perception in ICT integration to be motivated by the government for ICT integration to be a success in our primary school curriculum.

Some researchers pointed to the process of change itself as a main barrier to technology implementation Grainger and Tolhurst, (2005) citing (Vee, 1995). Based on four case studies, Grainger and Tolhurst citing Vee (2005:179) concluded that "educational change is a slow process and teachers need time to gain experience with computers, change whether related to humans or organizations, is a fitful process". Hansson and Byungura, (2016) citing (Marchal & Ruohonen, 1998:1). The present study confirms the findings of Vee (1995) as cited by Kounenou et al., (2015) that time factor and experience of teachers is required to adopt ICT in primary school curriculum is of fundamental especially so in areas where the laptops have reached the school for the first time.

Rather than been a process that starts from a zero point and accumulates with time, it is characterized by many obstacles, regressions and sometimes advances. For those who have been engaged in developing the role of technology in education, the task has been very hard, Bhalla (2013) citing (Benzie, 1995). It seems that change can only be achieved if those involved in it gain a better understanding of the procedures and concepts related to change (Robinson, 1995) as cited by Mbugua et al (2015). Gaining a better understanding of the process of change makes potential Technology using teachers and students aware of the nature of the tasks waiting a head for them and helps them plan for professional development. Indispensable to such type of knowledge are theories and Models describing changes driven by the diffusion of innovations.

2.6 Impact of ICT Adoption in Developing Countries

The society today puts a lot of importance on students' academic performance. Outcome in national examinations is used as criteria for admission in university and middle level colleges in most countries all over the world. For this reason, (ICT) is increasingly becoming more and more powerful tool for education and economic development world over. According to survey done by RIA (2012-12) ICT platforms are being harnessed by the state to improve service delivery, including the Kenya National Examination Council [KNEC]. The Kenya government has come up with various initiatives aimed at serving the citizens better through the use of ICT. Since 2010, national examination results have been released online for access via mobile phone and internet. The results are accessible through the Kenya National Examination Council (KNEC) website or via mobile phone after the user sends a prescribed SMS to the number 7070. This online service is operational as soon as the exams results are made public.

Prior to this online service, students had to go through a long process to access results. The tradition had been, provincial Directors of Education had to attend a news conference in Nairobi, where the national Education Minister would release the exam results, then they were to be handed over to Directors then transport them physically to respective districts. School Head teachers had to deliver them after duration of two days or more according to where the schools were from Nairobi.

Further, (Boege et al,2009;Booth , 2011; Meagler, 2012; Gagliardone, 2015) surveyed on state building in the field of ICT which referred to ability of a

government to provide services such as healthcare or education, which normative models of governance typically ascribe to the government. This is ICT transformation which is bringing bureaucratic and lessening distance between government and its citizens thus reducing corruption. Similarly, ICT is- use for capacity development and citizen empowerment. Similarly, in Kenya, Mwaka (2003) reported the same findings of ICT curbing corruption in terms of text books and any other teaching materials mysteriously disappearing from school library.

The present study investigated on ICT integration in ASAL areas especially so in Kitui County and how lack and inadequate teaching materials were tremendously reduced by accessing internet anywhere any time. 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 (Apple complex, 2002). The present study is concurring with Anderson (2009) and Apple Complex (2002) that some of the benefits of ICT integration in Primary Schools was the rate of learning which learners were learning especially so, to slow learners who's pace was slow and likelihood of recalling what they learned.

Integration of ICT in teaching enhances learners' knowledge, investigation and inquiry skills and creates curiosity and interest as information is available at multiple levels (CEO forum on Education and Technology, 2001). Integration has a sense of completeness or wholeness by which all essential elements of a system are seamlessly combined together to make a whole (Earle,2003), In teaching, simply handing out to

learners a collection of websites or CD-ROM program is certainly not integration of ICT. In a properly crafted ICT integration teaching lesson, ICT and other crucial curriculum contents such as content and pedagogy are moulded into one entity. As a result, the quality of the lesson would somehow be diminished if the ICT ingredient were taken away from the ICT-integrated lesson (Williams, 2003). The present study is concurring with study done by Earle (2003) in Malaysia, which investigated on ICT integration in Primary Schools in Kitui County; the best utility of available ICT resource materials which is opted to improve learning and performance in Schools in Kitui County.

Teaching is imparting knowledge, attitudes and values Mbugua et al., (2015) citing (Lefrancise, 1991). Hough and Duncan (2001) described teaching as a unique professional, rational and human activity in which one creatively and imaginatively uses himself and his knowledge to promote the learning and welfare of the learner. Buchere et al., (2009) citing (Shiundu & Omulando 1992) summarised teaching as interactions between teacher and learner under the teachers responsibility in order to bring about expected changes in the learners behaviour.

Teachers must understand the context within which students' performance improvement takes place (Wong, 2009). Porter in Kaplan and Norton (2008) noted that operational effectiveness and strategy are both essential to superior performance and that strategy execution is crucial for quality and better students' academic result. ICT can be a catalyst by providing tools which teachers use to improve teaching and by giving learners access to electronic media that make concepts clearer and more accessible. Further, Wong (2009) in his study done in Singapore concurred with present study done in Kitui County, Kenya on ICT integration and how the

performance of learners is expected to improve in their examinations, since the learners are opted to interact with resource materials even when the teachers are inadequate resulting to improved performance outcome.

ICT has the potential to improve academic results as well as the whole school functioning, Becta, (2004). This is mainly due to ICT increasing the schools ability to prepare learners for the technology and knowledge-based society, increasing access to education, supporting new pedagogy practices, and improving schools and classroom administration. ICTs help; prepare learners by developing cognitive skills, life-long learning habits, ability to think critically, communicate and collaborate, access, evaluate and synthesize information etc. Castro, (2003), and Cawthera, (2006). ICT also make learning materials more authentic through simulations and analysis tools, Reynolds, (2001). ICTs provide effective tools to administer schools, Cawthera (2006) and classroom information by providing a means for central data storage and easy data transfer and sharing. Using ICTs educators are able to track and analyze learner performance on an ongoing basis, Jones, (2004), while reducing the time spent on class administration.

The study done by Cawthera, (2006) is concurring with present study done in Kitui County which investigated on availability of ICT resource materials and benefits of ICT resources in instructional process. Learners' language skills are opted to improve since there is freedom of communication through the internet. Conversation and exchange of ideas and content amongst the learners are opted to drastically improve their performance.

2.7 The impact of ICT on what is learned

Conventional teaching has emphasized content. For many year courses have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary setting are now favoring curricula that promote competency and performance curricula which emphasize capabilities and concerned more with how the information will be used than with what the information is:-The moves to competency and performance-based curricula are well supported and encouraged by emerging instructional technologies (Stephenson,2001). Such curricula tend to require:-

1. Access to a variety of information sources.
2. Access to a variety of information forms and types.
3. Student-centered learning settings based on an information access and inquiry.
4. Learning environments centered on problem centered and inquiry-based activities.

5. Authentic settings and examples, and teachers as coaches and mentors rather than content experts.

Batainer et al (2006) citing (Cuban 1998) says that each new development in information and communication technology in society brought with it a desire to deploy such revolutionary technology into schools. This could bring the schools and specifically classrooms from the dark ages into the modern world. Technology was also adopted out of desire for modernization and standardizations. Schools like factories should produce uniform learners in what they have been taught and acquired

skills. This is only possible if they are exposed to these technologies early and given an opportunity to interact with them continuously.

The use of educational technology strategic for instruction is an issue of importance to educational administrators around the world. Technology is revolutionizing the way both teaching and learning process is conducted today. Technology provides a new and pleasurable experience for teachers and pupils. The use of educational technologies in enriching teaching and learning depends largely on the unique attributes which technology affords. These unique attributes in each technology makes a difference by arousing learners interest, stimulates their imagination, raise questions for discussion and a desire to find out more or solve problems.

Technology also ensures greater enthusiasm for learning among the learners. The main purpose of using ICT in schools is to improve learning outcome of learners because of the ease with which information is accessed. Technology helps to relate academics to the practice of today's workforce. The use of computers and internet provides exposure to various types of equipment, how to operate them and helps the learners to get the technical know-how which is necessary for today's workforce. This increases the viability of tomorrow's workers.

ICT can be a solution to teacher shortage in school system since it gives room for diverse teaching methods. With the introduction of subsidized secondary school education and free primary school education, the enrolment in schools has doubled. The classrooms are overcrowded with teachers having more work load than they can handle. In some areas the teacher pupil ratio is 1:100 which is far beyond the

recommended ratio of 1:40 (Laaria, 2013). Teachers find it hard to give individual attention to learners especially the slow ones. If teachers have ICT skills and competencies they can use this strategy to ensure quality learning for all learning (Aguyo, 2010). However, are teachers competent enough in ICT use? Ballad (2006) is of the view that technology can reshape today school systems by giving learners and teachers innovative ways of instruction. The present study investigated on the level of knowledge of ICT teachers and the study findings indicate that teachers have more knowledge in ICT. The resources were not available in most schools thus hindering ICT teachers to utilize ICT resources to curb the poor staffing which was noted in almost all the schools in Kitui County.

For administrators, they can learn new ways of organizing educational systems. This calls for staff training initiatives to equip them with competencies in design and implementation of ICT in education (Wantson, 2011). Several studies on use of ICT as an innovation show that its use in the classroom is essential for providing opportunities for students to learn to operate in an information intensive age. Grimus (2000) points out that by teaching ICT skills in primary schools, pupil are prepared to face future development in proper understanding. What is known provides important guidelines for use of technology for teachers and learners to develop competencies needed for the 21st century, (Bransford, 2013) and (Volma, 2015).

2.8 Demands and Challenges on ICT in Africa

In a global context, ICT is increasingly accessible and influential. Therefore, most countries see ICT as a gateway for the raising of educational standards (Noor-Ul-Amin, 2013). Today, both developed and developing countries recognize the value of

ICT tools for their economic development. Developed countries, The US, for instance, spends more than $10 billion annually in educational technology in public schools (Brunk, 2008), while Australia spends approximately AUD$8 billion (Lane, 2012).

There are a number of strategies and frameworks, which have been applied in developed countries to allow the effective use of ICT in education. For instance, the research published by The Ministry of Education in New Zealand (2006), *'ICT Strategic Framework for Education'*, offered ICT tools to direct and manage ICT input with the goal of enhancing educational objectives for the government. The study commenced with the question: 'why an ICT strategic structure for learning?' The cooperation of educational centres and government institutions was assumed to be essential in the efficient application of ICT in the learning sector.

The framework takes into consideration the issues of those working and studying in educational environments. On top of this, it is in line with the country's E-government and National Digital Strategies offering the basis for dynamic E-education to be integrated into New Zealand learning practice. Therefore, there is a need to establish and maintain partnership between all parties engaged in the educational process in order to handle all ICT issues effectively (Bingimlas, 2009).

Similarly, the current study is investigating the two groups of teachers who are expected to handle ICT resources in order to integrate them in teaching/learning process and what are their perceptions in ICT integration. Further, the study is confirming how well the teams are ready to adopt the ICT materials in instructional process. The current study in Kitui County investigated on availability of ICT

resources and perceptions of both head teachers and the assistant teachers. The findings indicated that both calibres of teachers had positive perception and they were willing to adopt the change in instructional process.

Lim and Khine, (2006) examined the strategies employed by four Singapore schools, two primary and two junior colleges in order to manage barriers in and out of the classroom to ICT implementation. They found six operating strategic elements, based on the observations of ICT lessons and face-to-face interviews with teachers, directors of ICT and school headmasters. These included: technical support staff; training of student ICT helpers; time for teachers to prepare for ICT; collaboration among teachers; support provided by headmasters in addressing teachers' ICT concerns; and training for teachers on how to use ICT in the classroom.

This framework is central to the questions and gaps in knowledge addressed by the current study. The current study addressed the evaluation of these factors in terms of ICT application by teachers. The study also assessed the availability of ICT resources, perception of teachers in ICT adoption, the level of knowledge acquired by the teachers in ICT and perception of the headmaster in addressing teachers' ICT concerns in Kitui County. For the effectiveness of ICT, the challenges are not only limited to knowledge level issues.

Critical examination of the social, economic, technical and policy issues relating to the ICT industry in Nigeria by Alabi (2010) discusses Nigeria's information telecommunications sector, the status of science and technology, the constrains to telecommunications development and the infrastructure in development, including capacity building. Describes the framework developed for national communication

policy and ongoing initiatives in telecommunications development. There is a detailed discussion of initiatives to increase human resources in the IT fields for example, the Regional information's Network for Africa (RINAF). The author recommends that, in the case of ICT, the government must establish a clear set of national objectives such as universal services technological leadership, and broadband capability into all population centre's, through a comprehensive and up-to-date National policy for Telecommunications and information Technology, Alabi, (2010).

ICT policy is clearly defined as "An integrated set of decisions guidelines, laws, regulations and other mechanisms geared to directing and shaping the production acquisition and use of ICT packages, components and knowledge base". Alemna (2006) described the usual opportunities and challenges, such as wider access to research opportunities, distance learning, appropriate content and access to hardware. The main barrier identified is the absence of national information communication Technology policies. He recommends the formulation of these policies and suggests that external support should be sought to develop information network infrastructure. Alemna (2006) decried the lack of information policies for information development in African countries. The importance of oral traditions in Africa as a source of information is discussed, the main argument being that there is a great deal of information with, Africa that could be useful for development if it were appropriately accessed. If is recommended that governments should allocate financial resources towards documenting such information. The current study concurs with this of Alemna (2006) on access to ICT hardware and software resources. The Kenyan government is still underway in disbursing ICT resource materials to various primary schools nationwide. It is opted that once the resource materials shall be available in

almost all primary schools; integration of ICT in schools will be fully adopted since most teachers' perception is positive.

AL-Harbi (2014) and Ghamrawi (2013) concurred that the headmaster has a key role to play in implementation of ICT in schools. For example, if the headmaster does not provide adequate support and encouragement to teachers, a good working environment cannot be created to motivate teachers to experiment with ICT in their classrooms.

In addition, Levin and Wadmany (2005) confirm if Headmasters and Teachers perceptions and beliefs are not constructive with regard to ICT implementation, it is likely that ICT will not be accepted or applied in schools. This present study confirms the report by AL-Harbi (2014) that Head teachers' perception plays a tremendous role in ICT integration in public primary schools. When Head teachers fail to support the adoption as administrators, a good working environment fails to be created and thus motivation of teachers to effectively handle ICT resources collapses leading to failure of the whole process.

Bingimlas (2009) highlighted in his research several obstructions that may limit ICT incorporation in learning institutions. For example, the growing number of students in classrooms, insufficient amounts of ICT recourses along with technical support and maintenance, and the absence of incentives for the teachers regarding the employment of ICT in their classrooms. The current study critically highlighted on ICT resources available in our primary schools in Kitui County, Kenya. Most schools hardly had any ICT resources available in their schools. The effect of FPE in our schools resulted to

high classes' enrolment thus teacher- pupil ratio increasing to 1:100.This is opted that the government of Kenya to issue a big number of hardware and software ICT resources to our primary schools.

Another study done by Ageel (2011), and Almadhour (2010) on availability of resource materials in Saudi Arabia, the findings revealed that there were no enough available ICT resource materials in most of schools under the study. Further findings asserted that there was proper strategy of disbursement of ICT resource materials to schools. The present study concurs with the study done by Ageel (2011) and Almadhour (2010) that there were no available ICT materials in most schools in Kitui County. Furthermore; the Kenyan government is underway in issuing of ICT resource materials in all the government school but there is no strategic plan in provision of those ICT resources.

2.9 ICT Adoption in Kenya

The Government of Kenya has of late, been on a critical footing to put in place ICT initiatives and projects aimed at realizing the potential within its recognition of ICT as a foundation for a knowledge economy as per vision 2030 (IST Consortium 2013,GoK 2013,Vision 2030). The velocity has raised several eye blows higher with the immediate intention and initiative of making available laptops to pupils and students in primary schools in the years to come (Kinyamu, Jubilee Manifesto, Whats new, & Katlic, 2013).

Realistic cognizance of possible challenges to this initiative (and hence possible ways of surmounting the challenges) is pertinent, for as Anne (2013, p1) has noted, "ever

since the new government announced in their manifesto that they will be deploying laptops to standard 1 children in schools across Kenya, the big question on everyone's mind is how will this program work? Can the country afford it? What would it take to make the idea work?"

Some of the challenges include cost of hardware, cost of software, connectivity, infrastructure, pupil competencies, teacher competencies, school policies, administrative structures and cultures, hardware and software support systems, success metrics, security considerations, educational content, acceptance by teachers and society, danger of misappropriations, sustainability and business and commercial interests (Kinyamu; Wokabi , Anne & Mungai 2013; Hepburn 2005). This current study paper focuses on the critical issue of availing what will be in the laptops and other computers meant for educational use – educational software and content in Kitui County, in Kenya.

Cautions to be considered in attempts to avail educational software to schools include not seeing the issue in terms of availing hardware alone, what software will be availed, the educational content of the software, scarcity of digitized content relevant to approved curriculum, and development of software that can extract content from school textbooks (Anne 2013; Wokabi, 2013).Further, Hepburn (2005, p1) stated that

> An unavoidable part of making ICT available in schools is obtaining and maintaining the software that is necessary to allow school computers to function. Most software that schools use is produced by proprietary software companies that normally charge considerable sums of money for their products. The cost and usage restrictions that characterize proprietary software place an enormous stress on cash strapped schools. As a result of this situation, many schools end up becoming unsafe for such gadgets to be entrusted to these institutions.

Khasiani (2000) conducted a project study on women ICT and governance, the project focused on the role of ICT.The study was conducted in Kakamega and Makueni counties in Western and Eastern Kenya respectively. She argues from the basis that the new development paradigm emphasizes partnerships between the state, the market and the civil society. This results in existing gaps especially in civil knowledge and in skills needed to use ICTs and these gaps set a new agenda for development work especially so to government and any other stakeholders who are supposed to support the ICT integration in Kenyan primary schools. The author assumes that women's lack of access to information is a reflection of the disparity in women's and men's access to development resources. The current study concurs with this study done by Khasian (2000) that ICT integration in primary schools especially so in upper classes will enable both gender to interact with 21st resource facilities which will tremendously improve their performance in their examinations. The old traditional system of resource accessing would not allow learners to interact with modern resource facilities thus limiting their ability to perform to their best in their examinations.

Information for the project was obtained from both primary and secondary sources including consultative meetings. The study provides evidence on how community-based resource centre's, equipped with ICTs, can play a key role in information development.

Khan et al., (2012) citing (Kibati, 1999) in his research describes a cost model that contrasts Global Systems for Mobile Communications (GSM) and Conceived Determination Model Application (CDMA) networks. It is based on research to access

communication services for the low income, mostly rural population in Kenya, in which our current study is embarked on mostly primary schools which are situated in rural areas in Kenya. There posits a gap in the research done by Khan et al., (2012) which researched only on available communication tools available in rural places for the low income, but the present research was on available ICT resources available for adoption of ICT in public primary schools in Kitui County .

Khan et al., (2012) further investigated on present ICTs as well as the projected evolution towards more advanced technologies that are capable of handling broadband data communication. The model conceived determined that CDMA developments instill flexibility and better evolutionary properties to the network without the burden of extra costs for the operator. He recommends that the Kenyan government do link wireless local loop regulation from the regulation of wire based local access and allows the immediate private provision of fixed wireless local loop service. The current study concurs with study done by Kibati, (1999) on connectivity of ICT resources and it investigated on ICT resources and how the schools can utilize W-FI, LAN or MODEMs to access the internet. The study findings indicated that the ICT resources were not available and no connectivity was available since the ICT resources were not available.

The republic of Kenya (2004) policy framework for education, training and research published mid 2004 is a sketchy document. The document is more of a policy drafts than anything else. If the content of this paper were actualized, it would have helped Kenyans to advance in ICT adoption and use. Wims and Lawler (2007) citing (Makau 1990) in his “computers in Kenyan secondary schools, Mwaka (2007) in her implementation and use of computer assisted learning in higher education,” a case

study in selected Kenyan University provides inside into use of Information Communication and technology in training teachers in both universities and teacher training colleges.

Winn's and Lawler (2007) in a journal of education development focused generally on ICT use in educational institutes which included schools, colleges, and to a less extend universities. Similarly, the present study is seeking to investigate the knowledge level of teachers in adoption of ICT in primary schools, which is a gap from the research done by Mwaka, (2007) and Makau, (1990).

According to a research done by Laaria, (2013) on leadership challenges in the implementation of ICT in public secondary schools in Kenya, asserted that school heads interest, their commitment and championing implementation of ICT in schools positively influences the whole process. She further asserted that ICT curriculum and management skills should be incorporated to training of schools in Kenya. Implementation of ICT is becoming more and more essential to primary schools and secondary schools and the success of such implementation is often due to presence of effective school leadership. The current study concurs with the study done by Laaria (2013) on positive perception of Head teachers on ICT integration in secondary schools but there exists a gap on ICT adoption by Head teachers in primary schools in Kitui County. Similarly, the study seeks to investigate Head teacher's perception on ICT integration in primary schools. The research findings indicate that Head teachers had positive perception on ICT integration.

2.10 Teachers perceptions towards ICT in Education

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) citing (Gardner, 1985),

- The affective component consists of a person's evaluation of, linking of, or Emotional resources to some objective or person.
- The cognitive component has been conceptualized as "a person's beliefs about or factual knowledge of, the objective or person".
- The behavior component involves the persons overt behavior directed toward the three folds definition is significant in that it provides us with ideas about how to measure them. The affective component could be measured by physiological responses or verbal statements of like and dislike, while the cognitive component might be measured by self-ratings of beliefs or by the amount of knowledge which a person has about same topic.
- The behavior component could be measured by observation of how the person behaves in specific stimulus situations. Following the above definitions, in the present study, teachers' perception towards ICT consists of teachers' feelings towards ICT (affective), teachers' belief and factual knowledge of ICT (cognitive) and teachers' behavioral intentions and actions with respect to ICT (behavioral). The operational definition of perceptions towards ICT in this study is teachers' knowledge, belief, liking and intent for future use of ICT.

Recent research by Waite, (2004) indicates that although teachers in schools shows 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 is a tool to promote learning is not generally well embedded in teachers practices, Cubukcuoglu (2015); Deaney, (2003) citing (Cox et al., 1999; 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 difficulty to integrate within the traditional curriculum setting (Jules Van Belle & Suetaert, 2001:32)

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, but more often than not fail to integrate it in their teaching, continuing to “teaching ICT rather than teach with ICT”. In primary school, 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). Rogers premise corroborates the general and widely accepted belief that attitudes affect behavior directly or indirectly Asiri et al., (2012) citing (Zimbardo *et al.*, 1997). Several perceptions theories and models have confirmed the symbiotic relationship between perceptions and behavior.

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 on teachers' perception towards ICT integration but fills a gap on perception of teachers on ICT integration in Kitui County. No specific research done on ICT adoption in primary schools, especially so in Kitui County.

A study conducted by Oyaid (2009, p154) showed that 39.8% of teachers saw a lack of explanation of ICT in Saudi educational policy. In addition, studies conducted by (Almadhour, 2010; Almalki & Williams, 2012; Al-harbi, 2014), highlighted the need to develop an effective strategy for ICT in education and to put it into practice in Saudi schools. Furthermore, Almadhour (2010) concluded in his study:

''Unfortunately although the Saudi Arabian government has lots of funding, there is no clear strategic framework towards equipping ICT in schools'' (p, 62).

The present study which was done in Kitui County investigated on availability of ICT resource materials in schools and the findings indicated that most schools had no ICT resource materials. Further, the Kenyan government is in process of disbursing ICT resources which is underway, but there is no strategy of issuing ICT resources (Daily Nation of 13th Dec. 2015).

AL-Harbi (2014) and Ghamrawi (2013) found that the headmaster plays a major role in ICT implementation. For example, if the headmaster does not provide adequate

support and encouragement to teachers, a good working environment cannot be created to motivate teachers to experiment with ICT in their classrooms. In addition, Levin and Wadmany (2005) confirm if headmasters and teachers attitudes and beliefs are not constructive with regard to ICT implementation, it is likely that ICT will not be accepted or applied in schools. In relation to the role of the teacher, several researches were carried out to examine the relation between ICT and teacher roles (Erdemir et al., 2009; Oyaid, 2009; Alhawiti, 2013).

The outcomes of these researches showed that teachers play a vital role in making the ICT implementation more successful. It is apparent that the integration of ICT in education is a highly comprehensive process requiring changes at all system levels. Teachers as the providers of information and knowledge should adjust to new strategies to make their contribution to the learning process relevant. If this is not the case, teacher resistance to change can be another barrier to their utilization of technological advances in education. Individual teacher beliefs and attitudes towards ICT can have a significant influence on their performance in the classroom (Bingimlas, 2009). However, teacher reluctance or resistance to change are other barriers to using ICT and can be due to a number of factors such as teacher competence, school digital infrastructure, technophobia, and access to ICT tools. Hence, such teacher reluctance can mean they are unenthusiastic about using computers in their teaching practices and integrating supplementary learning, thus hindering full-scale ICT integration in education (Bingimlas, 2009).The present study investigated on Head teachers' perception towards ICT integration in primary school curriculum in Kitui County. The findings indicated that Head teachers' perception was positive towards ICT integration in primary school curriculum.

2.11 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 are, Pedagogical issues, Teacher perceptions, Personal familiarity with computers, Teacher training, Time factor, Availability of Hardware, Software issues, Perceptions of Head teachers.

(a) Pedagogical Factors

The pedagogical benefits of integration of computers in classrooms level 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) citing (Galligan, 1997) 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 in ICT integration and the findings concur with above study that implementation of ICT resources in instruction depended on knowledge level of teachers. Most teachers had positive perception in ICT integration though most schools had no ICT resources.

The emphasis on the use of computer in the classroom would shift from the product of learning to the process of learning. The teachers will be regarded as those who instilled in students the skills required to navigate successfully through an information rich world.

The versatility in the ways computers can be employed for instructional purposes is varied, sometimes within the context of the software itself. Galligan (1997:2), on "Effective teachers" states that teachers who make effective choices "about why they are facilitating any particular computer-based learning experience" .

Becker (2000) cited (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) citing (Drury, 1995) 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 are 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. Similarly, the current study which was done in Kitui County focused on ICT integration in instruction and findings indicated that most teachers had not integrated ICT in instruction due to lack of resources. Again,the study indicated that teachers perception was positive only that most schools lacked ICT resource materials.

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 instill in students the skills required to navigate successfully through an information rich world (p.1). Becter, (2000) cited (Galligan, 1997 p.45) 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 (Drury .p, 4).

(b) Teachers perceptions

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) cited (Bagozzi et

al., 1992). 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 that 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 such as anxiety from dealing with equipments, 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 Implementing the technology in the classroom.

Sonia (2012) cited (Griswold 1984), Haggins (2016) cited (Stevens, 1984) and Stevenson and Delandsheere (2001) cited (Madden, 1989) expressed a concern that computer literate individuals will "reap greater benefits than their counterparts who lack that knowledge" (p.16). 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) cited (Lidtke, 1989) 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.

Results indicated 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 and Mulkeen, 1984). A more recent study by Newhouse (1995) found that some teachers do not belief that computers have" a useful educational objective" (p.4)

Tylor and Group (2006) citing (Dupagne and Krendal 1996) 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" (Tylor 2006:5).

Andoh (2012) citing (Drury, 1995:2), 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 favor of a dilution of the traditional curriculum model software integrates the curriculum.

It can work against a subject approach however 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) citing (Kazlauskas & Koop 1995), 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.

(c) Personal familiarization with Computer

A study by Morton, (1996) cite by (Danner, 2014) drew same important conclusions surrounding teachers' personal familiarity with:

i. The acquisition of computer expertise and skills is generally left to teachers' initiative.
ii. Teachers wanting to use computers and have few role models to follow experience a high level of anxiety in using them.
iii. Teachers view the use of computers as promoting learning in students.
iv. Teachers are aware that increasing the frequency of computer use will lead to changes in pedagogy.
v. Teachers are critical of lack of computer resources to implement change.

Head teachers have created a major barrier to implementation because they are focused on learning about the computer instead of using the computer for learning and teaching.

The success of any ICT classroom 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. Teacher professional development should have five foci:

1) Skills with particular applications;

2) Integration into existing curricula;

3) Curricula changes related to the use of IT (including changes in instructional design);

4) Changes in teacher role; and

5) Underpinning educational theories. Ideally, these should be addressed in pre-service Teacher training and built on and enhanced in-service. (Robertson, 2002).

The current study concurs with study done by Danner (2014) on aspects of teachers' behaviour in computer implementation in instructional process. A low 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.

In some countries, like Singapore, Malaysia, and the United Kingdom, teaching accreditation requirements include training in ICT use. ICTs are swiftly evolving technologies, however, and so even the most ICT fluent teachers need to continuously upgrade their skills and keep abreast of the latest developments and best practices. While the first focus—skills with particular applications—is self-evident, the four other foci are of equal, if not ultimately greater, importance. 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 a lesson set aside to teach computers but the ICT resource facilities should be used to assist the teacher in instructional process.

According to Consortium for schools network in Jamaica of 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 instructional process. Due to positive perception in teachers towards ICT integration, if these resources are availed in different schools, teachers can capitalise in utilising ICT resources in instruction.

The Ministry, in its efforts to minimize the effects of the access gap between the 'haves and the have-nots', with respect to information and communications technologies, must put in place appropriate measures such as ensuring that new teaching methods are "friendly" to all students, irrespective of prior or present access to computer resources outside the classroom. Simultaneously, efforts must also be made towards establishing computer facilities that are accessible to students who do not have computers at home (Laudon, 2003). The present study done at Kitui County 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.

(d) Teacher training

Olasina (2012) citing (Seidman 1996) asserted that those teachers' respondents 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. The present study investigated on the level of knowledge of teachers on ICT integration in primary schools. The study found that teachers were trained twice the previous year and skills required in ICT integration were adequate for integration in primary schools.

In addition to teachers training, administrators ought to also ensure that a professional development found is in place to encourage teachers to take advantage of 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 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. Morton (1996) presented a complicating, factor to the role model situation,

> ...the situation is that those role models exists are generally based on computing studies teachers using computers in laboratory situation...and the more subtle obstacle of computing being the domain of computer studies (teachers) inhibits the spread of computers across the curriculum (p.5).

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 Roszell (1995) cited 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 (1995) 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 instruction.

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 Berner (2003), Na (1993) and summers (1990) as cited in 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 decision" (Al-Oteawi, 2002, p.253), as cited in Bordbar, (2010). The current study which investigated on perception of both teachers and head teachers in ICT integration indicated that both cadres of teachers had positive perception to integrate ICT in instruction. The findings indicated that perception of teachers was positive in integration of ICT integration in primary schools in Kitui County, Kenya.

In a qualitative multiple case-study research 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 school head teachers had similar findings of head teachers perception towards ICT integration in school curriculum. 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, 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 findings of the study of Peralta & Costa (2007) that teacher's required adequate time to acquaint themselves with computers in 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 of 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 years in experience in handling ICT materials. Similarly, the findings of study done in Kitui County indicated that teachers who had phobia of using ICT resource materials needed more experience of perfectly using ICT materials.

(e) The time factor

Preparation for incorporating computers into a class takes a long time. Stellard (1998) as cited by (Clement et al (2012) stated that teachers were reluctant to embrace technology because of its potential to shorten learning time for students. He 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) citing Roszell (1995) 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 concurs with the study done in Saskatchewan by Roszell on factors affecting adoption of ICT in schools, the findings 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.

2.12 Availability of Resources

According to Jebeile and Abeysekera (2010), resources are substances that give help, support or comfort when needed. On availability of resource materials, Education in Kenya requires rethinking as the country prepares to face the demands of transformations of 21st century. The first general component of ICT in teaching/learning is lack of digital equipments. According to Chigona (2010), the range of ICT digital resources required range from Electric board, Audio cassette, Radio for interactive Radio instruction (IRI), Video/TV-learning, Computer, integrated ICT infrastructure and support Application system (SAS). The major challenge in respect to this component is the limited digital equipment at virtually all levels of education. While the average access rate is one computer to 15 students in developed countries in secondary schools, while in Kenya, its one computer to 150 students in secondary schools.

In primary school section, the ratio is barely minimal, with most schools having no digital infrastructure in their schools in Kitui County. There exist a number of challenges concerning access to ICT in Kenya. This includes high levels of poverty that hinder access to ICT facilities, limited rural electrification and frequent power disruptions. Where there is availability of electricity to use for few primary schools, hindrances to application of ICT includes, high cost of internet provision, costs associated with digital equipments, inadequate infrastructure and support.

One of the major components of ICT integration in teaching and learning is perception of teachers. Simply having a positive perception of computer and positive perception about their use in a classroom increases the likely hood of adoption by teachers. Schools should find a way of helping teachers develop that positive attitude. This step goes outside the western approach of partitioning work and home actions. Teachers are rarely able to access computer outside a school and desire to use them in many of the same ways people in developed nations use personal computers. Teachers should be given access to computer either a specific computer in the lab or a computer in staffroom, for personal use.

Having a computer set aside for teachers means they do not have to compete for time with pupils and given them a sense of privacy. Storing information like tests, classroom materials and grades will also be more secure on a staff computer as many teachers do not have personal flash drives or other storage devices. In conclusion, ICT integration in teaching/learning will depend upon whether teachers see ICT as a changing the nature of their subject and the way it is understood, or whether ICT is seen as a tool for teaching another artifact in the classroom.

The level of knowledge and skills of ICT teachers is another major component in ICT integration. The access of any classroom ICT learning depends on the teacher ultimately. While ICTs themselves can be used to improve the quality of teacher training, if teachers are not comfortable with 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 particularly, in the application of modern pedagogical methods. Various competencies

must develop throughout the education system for ICT integration to be successful. Teacher professional development should have, skills with particular application, integration into existing curricular, curricular changes, related to the use of IT, changes in teacher role, underpinning educational theories, Research on the use ICT, in different educational settings over the years invariably identify as a barrier to success the ability of teachers to understand why they should use ICTs and how exactly they can use ICTs to help them teach better. In conclusion, unfortunately, most teachers professional develop in ICTs is heavily on teaching the tools and lightly on using the tools to teach.

The government of Kenya has put in place the National ICT policy and E-government strategy that provides guidelines for transformation of the Kenyan into a digital society. In both documents the government recognizes that an ICT literate workforce is the foundation on which the nation will become a knowledge-based economy. Again this background the government will make education a platform for equipping the nation with ICT skills in order to create dynamic and sustainable economic growth. Other supporters who are supporting the provision of ICT infrastructure in secondary schools are NEPAD, E-school programmes (NEPAD, 2005).

Therefore; this study investigated the school preparedness for effective instruction through ICT integration in Primary Schools Curriculum, a case Study of Kitui County, Kenya.

(a) Hardware issues

Over the last five years, the Kenyan government has initiated some capital investment towards set up and installation of ICT infrastructure. Funding for these investments is

achieved through partnerships between the government and development partners. The foreign funding component constitutes the largest percentage of this investment in terms of technology. The government contribution is usually in the form of technical and support staff and facilities including buildings.

So far, the Government Information Technology Investment and Management Framework is connecting all ministries to the Internet under the Executive Network (Limo 2003). The government is also connecting the ministries to run integrated information systems for example the Integrated Financial Management Information System (IFMIS) and the Integrated Personnel and Pensions Database (IPPD).

While developing countries may have similar characteristics, the Kenyan context presents various challenges that affect the successful implementation of ICT projects. Characteristics that define Kenyan ICT environment:

- Most ICT projects are initially donor funded.
- Some donations are made without prior consultation or carrying out needs analysis by the recipient organization
- Operational/running costs are met by the government. Funding (capital and human resource requirements) ends with the project phase.
- The budgets for ICT are inadequate but rising.
- A lack of ICT policies and master plans to guide investment to the extent that with a number of donors funding ICT, there have been multiple investments for the same product due to lack of coordination.

- A focus on ICT applications that support traditional administrative and functional transactions rather than on effective information processing and distribution within and without government departments;
- Unstable ICT resources.

Primary schools may not have funds to buy computers and other hardware's that may make integration possible. Ginsberg and McCormack (1998) as cited by (Livingstone et al 2015) 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) as cited by (Sabouri et al 2015) 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.

The present study conducted at Kitui County indicated that most schools under study had not received ICT hardware, but the teachers were fully ready to integrate ICT resources in classroom teaching.

(b) Software issues

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 and McCormack, 1998) cited by (Gilakjani et al. 2015). 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. Similarly, the present study investigated on availability of both hardware and software resources in schools under study in Kitui County and found that most schools had no software and hardware resources'.

The Kenyan government should take Caution and consider attempts to avail educational software to schools include not seeing the issue in terms of availing hardware alone, what software will be availed, the educational content of the software, scarcity of digitized content relevant to approved curriculum, and development of software that can extract content from school textbooks (Wokabi 2013, Anne 2013). Further, Hepburn (2010, p1) stated that...

> An unavoidable part of making ICT available in schools is obtaining and maintaining the software that is necessary to allow school computers to function. Most software that schools use is produced by proprietary software companies that normally charge considerable sums of money for their products. The cost and usage restrictions that characterize proprietary software place an enormous stress on cash strapped schools. As a result of this situation, schools are left with a serious problem: they clearly need to integrate ICT into teaching and learning but doing so requires large, ongoing expenditures to purchase and maintain ICT resources.

The present study conducted at Kitui County in Kenya concurred with findings of Wokabi (2013) that most of the schools under study had neither software nor hardware resources and the teachers under study portrayed positive perception to integrate ICT in instructional process.

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) confirmed that 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).

This approach has shown fruit in the case of a number of open source software initiatives including the Linux operating system, Open Office and LibreOffice, and chatbot ALICE (Djx 2012, Kroah 2009, Wallace 2009, Astleitner et al 2008).
If a similar approach is made possible for educational software content development, the pool of developers, development, and continuity potentially is unlimited since this approach opens up the software to a large community to become involved in the development effort, allowing rapid bug fixes and enhancements to occur. The potential developers of interest here are students, teachers, lecturers, educational resource persons and other interested developers. The suggested specific content to be developed by this pool of developers is the educational chatbot's knowledge base. This open source approach coupled with the Participatory Action Research model, illustrated in Figure 1, has a possible chance of bearing fruit.

In Participatory Action Research, there is an explicit intention to educate and co-produce change with the collaboration of those affected by the issue being studied (Green at el 2003). The PAR process involves participants in 'planning action (on the basis of reflection); in implementing these plans in their own action; in observing systematically this process; and in evaluating their actions in the light of evidence as a basis for further planning and action, and so on through a self-reflective spiral' (Milligan 2013, p317). The steps in practice may overlap and can begin at any point.

2.13 Perception of Head teachers

Individual teachers' initiative accounts for much of the implementation of computers Technology in schools. Lack of support by administrators is identified as a significant barrier towards implementation of computers in classroom (Morton 1997, Brand, 1998) as cited by Danner (2014) .Successful implementation of computers can only occur if administrators offer teachers support and leadership. Administrators have to put in place proper facilities and help solve all the problems that may occur during its implementation. Similarly; study done at Kitui County found the same findings of Morton (1997) that if head teachers are not fully involved in ICT integration, they may become barriers to ICT integration, more so, they fully supported the implementation process.

Serhan (2007) investigated the willingness of school principals to advocate and support the use of Technology in their schools. Results of this study revealed that principals of primary schools had positive perception towards the use of technology in teaching. Results also showed that not only were the principals willing to support the use of Technology in their schools but that they were also willing to improve their knowledge, abilities and skills for facilitation of the integration of the Technology

into curriculum. The results indicated that school principals viewed Technology as an enhancement to the classroom that would motivate students to learn in an interesting environment. The current study conducted at Kitui County concurred with study done by Serhan (2007) that all primary school teachers were willing to integrate ICT in instructional process at same time willing to further their knowledge in ICT skills.

To successfully initiate and implement educational technology in school's program depends strongly on the teachers' support and attitudes. It is believed that if teachers perceived technology programs as neither fulfilling their needs nor their students' needs, it is likely that they will not integrate the technology into their teaching and learning. Among the factors that influence successful integration of ICT into teaching are teachers' attitudes and beliefs towards technology, Hew and Brush (2007); Keengwe and Onchwari, (2008).

If teachers' attitudes are positive toward the use of educational technology then they can easily provide useful insight about the adoption and integration of ICT into teaching and learning processes. Demici (2009) conducted a study on teachers' attitudes towards the use of Geographic Information systems (GIS) in Turkey. The study used questionnaire to collect data from 79 geography teachers teaching in 55 different high schools. The study revealed that though barriers such as lack of hardware and software existed, teachers positive attitudes towards GIS was an important determinant to the successful integration of GIS into geography lessons. The current study done at Kitui County concurred with the study done by Demici (2009) in Turkish teachers that hardware and software resources are a major hindrance in ICT integration in most schools in Kitui County.

In a similar study, Teo (2008) conducted a survey on pre-service teachers' attitudes towards computer use in Singapore. A sample of 139 pre-service teachers was assessed for their computer attitudes using questionnaire with four factors: affect (liking), perceived usefulness, perceived control, and behavioural intention to use the computer. He found that teachers were more positive about their attitude towards computers and intention to use computer than their perceptions of the usefulness of the computer and their control of the computer. Also, Drent & Meelissen (2008) conducted a study about factors which influence the innovative use of ICT by teacher educators in the Netherlands. A sample of 210 teachers was used for the study. Their study revealed that student–oriented pedagogical approach, positive attitude towards computers, computer experience, and personal entrepreneurship of the teacher educator have a direct positive influence on the innovative use of ICT by the teacher. The present study which was conducted at Kitui County concurred with the study done by Drent & Meelissen (2008) in Netherlands teachers that the teachers under study had a positive perception in ICT integration.

Research has shown that teachers' attitudes towards technology influence their acceptance of the usefulness of technology and its integration into teaching, Huang & Liaw (2005). In European Schoolnet (2010) survey on teachers' use of Acer net books involving six European Union countries, a large number of participants believed that the use of net book had had positive impact on their learning, promoted individualized learning and helped to lengthen study beyond school day. However, evidence suggests that small number of teachers believe that the benefits of ICT are not clearly seen. The Empirical survey revealed that a fifth of European teachers believed that the use of ICT in teaching did not benefit their students' learning, Korte

& Hüsing (2007). A survey of UK teachers also revealed that teachers' positivity about the possible contributions of ICT was moderated as they became 'rather more ambivalent and sometimes doubtful' about 'specific, current advantages', Becta (2008, p.45).

Teachers' computer experience relates positively to their computer attitudes. The more experience teachers have with computers, the more likely that they will show positive attitudes towards computers (Rozell & Gardner, 2010). Positive computer attitudes are expected to foster computer integration in the classroom (van Braak, Tondeur & Valcke, 2004). According to Woodrow, (1992) as cited by (Andoh, 2012) for successful transformation in educational practice, user needs to develop Positive attitudes toward the innovation. The study done at Kitui County concurred with study done by Andoh (2012) on UK teachers on successful transformational educational practice that all teachers in the County under study had positive perception in ICT integration.

There are a significant number of factors affecting teachers use and perception of ICT and subsequent integration of technology into their teaching and learning practices. Once survey found several key issues of ICT investment effectiveness that determines how ICT is used in academic institution (Manson, 2000). The below are some of these factors ,Computer attributes, Cultural relevance and impact of ICT, Sex, Age, Level of education, Teaching experience, Computer training and teaching support needed.

(a) Personal Characteristics

Personal characteristics such as educational level, age, gender, educational experience, experience with the computer for educational purpose and attitude

towards computers can influence the adoption of a technology, Schiller (2003). Teachers are implored to adopt and integrate ICT into teaching and learning activities, but teachers' preparedness to integrate ICT into teaching determines the effectiveness of the technology and not by its sheer existence in the classroom (Jones, 2001). The attitudes of teachers towards technology greatly influence their adoption and integration of computers into their teaching. According to (Russell & Bradley, 1997) cited by Jones, (2001).anxiety, lack of confidence and competence and fear often implies ICT takes a back seat to conventional learning mechanisms. Therefore, an understanding of personal characteristics that influence teachers' adoption and integration of ICT into teaching is relevant.

To identify possible influencing factors on computer perceptions in principals, the literature review could not be confined to the Rwandan studies due to the lack of scientific studies available on the topic. Studies from other countries have also been used. Rogers (2003) asserts that one of the major factors affecting individual's perceptions towards innovation is the attribute of the Technology.

In order to address the "innovation "differently, he identified, five perceived attributes of innovation as, relative advantage, compatibility, complexity, friability and observability. Therefore, a new Technology will be increasingly diffused if the adopters perceived that the innovation has an advantage over previous innovations is in agreement with existing practices not complex to understanding and adopt, shows observable results and can be experimented with on a limited basis before adoption. In a study of EFL teachers perceptions towards ICT, Albirini (2006) noted that participants perceptions of ICT attributes was the largest factor in predicting their perceptions towards ICT. Zhang ,(2007) found in her study that EFL teacher

perceptions of ICT attributes i.e. relative advantage, compatibility, simplicity and observability explained the major difference in teachers perception towards ICT and ICT use. The present study done in Kitui County concurred with study done by Zhang (2007) that teachers under study asserted that ICT resources will enable learners to gain a lot in their instructional process, the resources will suit the teachers utility in their teaching.

(b) Sex

Sex differences concerning computer perceptions have been a topic of much investigation. Despite the persistent debate about the under-representation of women in computing Technology (Shashaani & chillily, 2001) studies have reported conflicting ideas about the role of sex in formulating perceptions towards ICT. Several researchers found no significant relationship between sex and teachers perceptions (e.g. Roza, 1994, Kim, 1986, Na, 1993) as cited by (Andoh, 2012). Rosa (1994) cited by (Pynoo et al., 2011) found that no difference in perceptions towards computers between male and female principals, even when male teachers had greater computer literacy scores and experience with computers than female teachers. Similarly, Andoh (2012) citing (Kim 1996) found that the sex of school teachers had no significant effect on their perceptions towards computers or their computer literacy level.

A few researchers have found a significant relationship between sex and perceptions towards computers, Moses et al (2012) citing (Jones, 1998, Francis, 1994), for instance, Francis (1994) found that males are more enthusiastic and more confident in using computers than females. The current study investigated on teachers' perception

without considering their sex and the findings indicated that all both cadres of teachers indicated positive perception in Kitui County.

(c) Age

Different experiences of different groups may entail disparity in perceptions towards computers. Young principals may have been exposed to computers as part of their high school or college studies. In fact many head teachers are now expected to take obligatory computer courses during their high school or college study. On the other hand old principals may have had limited exposure to computers. Therefore, learning to use a computer in the classroom is a new skill and may result in different perceptions towards ICT. Several studies reported a relationship between teachers Age and their perceptions towards computers; Bulent et al (2009) citing (Blankenship 1998) found that age was the most important demographic variable affecting computers use and perceptions.

Na (1993), as cited by (Njagi et al 2014) found that a significant, negative relationship between age and teachers perceptions towards computers in education. Young principals had more positive perceptions towards computers than their older colleagues'. The same finding was reported by Davis (1998), Varner, (2003) and others as cited by (Sternad 2013). However; many studies reported no relationship between teachers' age and their perceptions towards computers. For example, Cuban (2002) found that the older teachers had lower technological knowledge yet; principals' motivation, their perceptions towards ICT and their technological knowledge were not significantly related to age. He concluded that "no matter how old a principal is or at which level she/he has technological knowledge, she/he still has high motivation and maintains a positive perception towards IT "(p.113). Similar

conclusions have been reported by several other researchers (e.g. Jones, 1998, Roza, 1994, Kim, 1989, Spiegel, 2001). The current study done in Kitui County concurred with study done by Sternad (2013) that young teachers had more interest in ICT resources than older teachers who believe in old traditional way of teaching.

(d) Level of Education

Jebeile and Abeysekera (2010) citing (Rogers 1995) suggests that an individual's educational level affects his/her adoption of an innovation. It seems reasonable that the higher the education level, the more familiarity an individual may have with the new technologies. This may entail more positive perceptions towards ICT. The hypothesis has been supported in different education contents. Several studies have reported a significant relationship between education level and perceptions towards computers (Na, 1993, Francis, 1988). However, such relationship did not exist in different educational context. A-mutairi (2011) citing (Al-Tamimi 1998) found no relationship between education and teachers perceptions towards technology in United Arab Emirates. The present study found no difference between education level and perception of teachers in ICT integration in Kitui County.

(e)Teaching Experience

Several researchers have reported a significant relationship between teaching experience and perceptions towards computer. For example, Davis (1998) investigated the perceptional differences among early childhood teachers towards the instructional use of computers in their classroom. He also examined the relationship between teachers' perceptions and teachers' demographic variables such as age, sex, educational level, grade level taught, years of experience and prior computer use.

Davis (1998) found a significant correlation between teachers' perceptions and age, years of teaching experience, amount of computer training and amount of computer experience. Huang (2003) found that senior teachers had less positive perceptions towards computers and were less willing to use them in their classes than did less fresh teachers. However, several researchers found no significant relationship between teaching experience and teachers' perceptions (Kim, 1986, Na, 1993) as cited by (Brooks et al 2014). The present study concurred with study done by Kim (1986) that there was no significant relationship between teaching experience and teachers' perception in Kitui County.

(f) Computer training

Large scale innovations require large scale teachers training (Pelgrum, 2001). In the case of ICT in education, computer training has been hardly available because of the expenses that it entails. The US office of Technology Assessment (1995) reported lack of training and lack of knowledge as main barriers to the integration of technology in classroom practices. The same errors are in danger of being reported (Pelgrum, p.35). In his study of Saudi teachers and administrators, Al-Oteawi (2002) found that 98.3% of participants asserted the need for training and development in order to improve their knowledge and skills.

A large number of studies showed that computer training significantly increased computer confidence and computer linking Andoh (2012), Melpomeni and Konstantinos (2004), citing (Gressard and Loyd, 1985, Woodrow, 1992, Knezek et al 1997). Melpomeni and Konstantin's (2004) citing (Gressard and Loyd 1985) surveyed 15 principals before and after training program that was designed to enhance their

experience with microcomputers. Teachers reported lower anxiety and more computers confidence after the training program. The relationship between teachers' perceptions towards ICT and their computer training is well documented in the literature (e.g. Davis, 1998, Na, 1993). The findings of present study done at Kitui County concurred with findings of the study done by Na (1993) those teachers who underwent training had stronger perception towards ICT integration in instructional process.

(g)Technical support needed

Technical support is deemed essentials in many aspects of ICT use, including the use of particular software packages and then in the use of learning management systems for ICT-enhanced lessons (Veens et al 1992) as cited by (Roussos et al 2015). As most regular computer users know, troubleshooting skills are important if ICT is to be used as a reliable tool. One study suggested that teachers need to be educated in basic troubleshooting to improve confidence with using ICT Maddin, (1997) as cited by Grainger and Tolhurst (2005).

In one recent Australian study, teachers often commented that reliable, on-site technology support is essential for their day-to-day use of ICT."I need quick, easy access to someone with technical support skills-not having to rely on teachers who cannot possibly support all colleagues when there are hardware problems….. (Schiller, 2003). The study also highlighted the link between technical support and professional development, as on-site technical support can assist teachers who wish to "learn as they go". And quickly develop new ICT skills when required (Schiller,

2003). The study done at Kitui County found that technical support was required to maintain the Computers opted to be issued in all primary schools.

2.14 Support by government in ICT integration

Kenya has made profound remarkable progress putting in place an ICT policy framework and implementation strategy, complete with measurable outcomes and time frames. The process has had the benefit of sound advice from officials and stakeholders and, perhaps more importantly, strong leadership from the office of the permanent secretary of ministry of education, however, universal implementation is challenging given the lack of resources, National ICT infrastructure, and even electricity supply-particularly in the rural areas.

After several years of effort, Kenya promulgated a national ICT policy in January 2006 that aims to “improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services. The national policy has several sections, including information technology, broadcasting, telecommunications, and postal services”. The relevant objective in this section states that government will encourage “……..the use of ICT in schools, colleges, Universities and other educational institutions in the country so as to improve the quality of teaching and learning “The related strategies, under the heading E-learning”, are to

- Promote the development of e-learning resources.
- Facilitate public-private partnership to mobilize resources in order to support e-learning initiatives.
- Promote the development of an integrated e-learning curriculum to support ICT in education.

- Promote distance education and virtual institutions, particularly in higher education and training.
- Promote the establishment of a national ICT centre of excellence.
- Promote affordable infrastructure to facilitate dissemination of knowledge and skill through e-learning platforms.
- Create awareness of the opportunities offered by ICT as an educational tool to the education sector.
- Facilitate sharing e-learning resources between institutions.
- Exploit e-learning opportunities to offer Kenyan education programmes for export.
- Integrate e-learning resources with other existing resources.

The Ministry of Education was given the mandate to lead the monitoring and evaluation of the strategy's implementation, guided by overall government policies on education and ICT, specific educational strategic documents for implementing its mandate and global goals such as Education for All (EFA) and Sustainable Development Goals (SDGs). Through the ICT ministerial committee which meets monthly and reports quarterly, on progress, the committee is chaired by permanent secretary and supported by ministry's ICT unit. It has representation from stakeholders involved in implementing the strategy and mobilizing resources such as donors and private sector partners.

The implementing agencies include:-

- The semi-Autonomous Government Agencies (SAGAs) of the ministry.
- The network initiative for computers in education (NICE) a consortium of NGOs involved in ICT in the education sector.

- Individual NGOs that meet specified criteria.
- Civil society organizations involved in ICT in education activities.
- Academia and/or individuals with experience in ICT in education projects.

Kenya ICT trust fund was formed in 2004 with aims of spearheading ICT initiatives in education. Membership is open to all public sector companies' donor partners, civic society, as well as academic and other educational institutions. The aims was to facilitate public-private partnerships (PPPs) that with mobile and provide ICT resources to Kenyan public schools and community resources and learning centre's. It hopes to achieve the below objectives,

- Resource mobilization for delivery of ICT infrastructure to schools.
- E-readiness assessment for secondary schools, tertiary institutions, and primary schools.
- Development of a portal for ICT information sharing's.
- Establishment of national computer assembly centre's.

- 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. The schools which have computers ,the computer ratio is 150:1.The very schools which have acquired the computer have done so through initiatives supported by parents ,the government, NGOs or other development agencies and private sector, including the (NEPAD) e-schools programmes.

The bellow is some of the components/bodies which organize for ICT integration in schools,

- NICE
- KENET
- ICT trust fund.
- Projects like learning centers' at KTTC funded by UNESCO which provides computers in schools.
- Mukurus promotion centre in Nairobi funded by British Airways.
- Development of learning centre funded by KICD.
- Sponsored schools funded by the Aga khan Education services.

NEPAD e-schools initiative funded by e-Africa commission ministry of Education. The present study investigated on support provision by government and the findings indicated that the government of Kenya fully supported the provision of ICT resources. The National exercise commenced by issuing laptops to a few selected schools for piloting and up-to date, over a quarter of primary schools in Kenya has already received the first bunch of laptops/tablets.

The government is emphasizing on need to modernize the education sector so it can be accessed anytime on digital platforms as we seek to support innovation and enhance access to information. The content is accessible to everyone, anytime and on any devices. Digital learning program targeted at learners in all public primary schools and it aimed at integrating the use of digital technologies in learning. The programme is tested with delivering the following, power to Schools [Electricity] digital content, devices and training of teachers.

At the same event, the Cabinet Secretary unveiled the training annual on digital integration for teachers which will guide their ICT training as from February the following year. So far, 66,000 teachers have been trained on ICT and are expected to get refresher courses early next year. Of those, 150 teachers have been trained as master Trainers and 2,555 trained as Trainer of Trainers [ToTs].

2.15 Studies Conducted in other parts of the World

The world is going through an information technology revolution that has drastically changed many facets of human life, from education, industry, economy, and politics to entertainment. In addition, unpreced capabilities of the information technology to process, store, refine and disseminate data, information and knowledge in a variety of ways across geographical boundaries, has drastically changed the ways in which governments, the public and private sectors operated all over the world, Ajayi (2001). The emergence and convergence of (ICT) has therefore remained at the centre of global social-economic transformations. As a result of convergence of information, telecommunications, broadcasting and computers, the ICT sector now embraces a large range of industries and services; hence, the National information and communications Infrastructure (NICI) must be developed for integration into global information infrastructure (GII).

This study however investigated the use of ICT integration and change in Education, Industry, economy and politics in dissemination of data which was done in Europe has necessitated a study to be done in Kenya to ascertain the state of school preparedness in ICT integration in primary schools. The state of the art of instructional materials in

integrating ICT in education and establish the degree to which the lack of quality and availability of ICT resource materials in the area of education in primary schools may hinder the good performance. The current study is examining the availability and adequacy of ICT resources in teaching and learning of primary school curriculum in primary schools in Kenya and how these ICT resource materials have been integrated in instructional process.

In another study done by Drew and Foster (1994) Information Technology (IT) in selected countries in Tokyo, Ireland, Nigeria and Tanzania (United Nations University Press,1994) which primarily focused on transfer of technological know-how, as opposed to technological products. The study was to investigate lessons that could be learned about the process of innovation from recent Irish experiences. Whereas Drewand (1994) as cited by (UL- Amin 2013) did a research in four countries outside Kenya, the study focused on transfer of technological know-how and lessons that could be taught using ICT resource materials. The current study is more the same as it was focusing on ICT integration in primary schools in Kitui County in Kenya and the findings indicated that due to lack of ICT resource materials, teachers did not integrate ICT in instructional process.

In another study done by Hasan and Dista (1999) as cited by (Katoua et al 2015) on the impact of culture on the adoption of IT. An interpretive study journal of Global information management compared the relationship between culture and adoption of IT in Middle East. They asserted that despite the importance and success of IT projects, culture was the most difficult to isolate, define and measure. The present study further revealed that teachers' perception was positive towards ICT adoption.

ICT holds promise in providing not only anywhere and anytime access to knowledge, but also equal opportunities for networking and communications that allow knowledge sharing, participation and lifelong learning. In realization of the huge potentials of ICT in education governments have heavily invested on developing their perspective ICT in education plans and on bringing various ICT equipment and resources into schools. Alongside these investments, the role and capacity of teachers have become more critical than ever-the challenge is how to enable teachers not only to overcome the technology barriers but also to empower them to integrate appropriate technology into the teaching and learning process.

Study done by Murphy & Greenwood (2016) citing (Aina 1993) investigated the skills required by teachers in order to handle ICT resources, and it asserted that there were inadequate skilled personnel in Africa, a barrier to effective utilization of ICT. The findings also revealed that two obstacles identified as likely to militate against IT education and training in many African countries are, firstly, the perception/attitudes of information managers towards IT, and secondly, the prevalent brain drain of Africa's best professionals, including lectures.

Similarly, the present study concurs with the findings of Murphy & Greenwood (2016) in (Aina 1993) that perception of teachers in handling ICT resources matters a lot in integration process. Teacher's perception should be upheld in Kitui County make it a success in integration of ICT in instructional process.

Isaacs (2007) asserted that all education sector in Botswana all junior and senior secondary schools have fully equipped computer laboratories. However many schools are struggling with their effective use and government-led initiatives seem to mainly

emphasize capacity building for teachers-both in initial and in-service teacher education pertaining to ICT use. There is a clear gap in the primary schools sector in terms of both provision of ICT resources and teachers development. This study focused on availability of these ICT resource materials in all primary schools in Kitui County, Kenya. The findings revealed that most schools had Electricity but ICT resources were not available.

Another study done by Mangesi (2007) investigated on the benefits of connectivity of secondary and primary schools ICT with World Wide Web and concluded that projects of providing computer equipments in schools without paying heed to infrastructure and other constrains operating against its use. Mangesi (2007) further listed further challenges in terms of inconsistent connectivity, high costs and low connectivity speed are Africa-wide problems, and further argues that where ICTs and internet access do exist in schools, a number of teachers use the internet for research, so the benefits for classroom teaching and learning are increased. The present study examined the availability of World Wide Web or Wi-Fi and Modems and if these ICT resources will improve the performance in classroom.

According to Nicholas (2005) the most well-known portable computing initiatives for developing countries globally is the one laptop Per Child (OLPC). This scheme was initiated by Nicholas Negroponte at the MIT Media lab in 2005, whose mission statement was:

> .....To create educational opportunities for the world's poorest children by providing each child with a rugged, low-cost connected laptop with content and software designed for collaborative, joyful, self-empowered learning (p.112).

The scheme has to be adopted wholesale by a country's government and so for Rwanda, Nigeria, Ethiopia, and Ghana have done so (although with varied long term commitment).The in FoDev-supported ICT survey indicated that Nigeria initially embraced the OLPC project for its 24 million public primary schools children.

The OLPC programme has, however, been embraced by Rwanda, to the extent that the country is seen as among the three countries to have made substantial commitment to the project. After an initial trial in October/November 2007 in which 106 laptops were developed in one primary class, a pilot project involving 5000 laptops was commissioned a year later, Nugroho & Lonsdale, (2009). The OLPC News (2009) clearly identified that Rwanda has deployed 110,000 laptops (Worth more than US $18 million) for primary schools far surprising orders by other African countries including Ethiopia (5000 laptops), south Africa (100 laptops),Ghana (100 laptops).

More than 2000 teachers have completed training in use of the laptops and the Rwanda government is trying to convince parents to buy the laptops for their children, claiming they are vital tools for education. The present study of ICT integration in primary schools curriculum investigated on perception of teachers in ICT adoption in primary schools and figure out if best utility of ICT in teaching and learning had to improve the performance of learners in their classroom exams.

Study done by Agyema (2007) investigated the schoolNet Africa which involved several government ministries and among other functions aimed at mobilizing human and financial resources for the purpose of using ICT in education. The study created learning communities of educators and learners to use ICT by:

- Coordinating, implementing and supporting ICT development projects in education.
- Providing and supporting lower cost, scalatable technology solutions and internet for schools.
- Providing support mechanisms for schools for technical infrastructure and connectivity.

The study which was contacted in Nigeria involved activities mainly concentrated in secondary schools. The present study is investigating on the utility of ICT in education and how teachers can best utilize ICT in terms of scheming and lesson planning in their daily teaching/learning strategies in Kitui County in Kenya.

In a parallel consortium of North-South partners including AfriConnect and ischool, centre for commonwealth Education at University of Cambridge (UK),University of Zambia participatory culture foundation (UZ) and ministry of Education, Zambia is currently conducting a small-scale pilot project assessing the feasibility of introducing open educational resources (OER) into Zambia primary schools.OER are leading and teaching materials (including lesson plans) that are not just free to download, but are available under a creative common license that allows adaptation and re-use.OER allows pupils and teachers to contribute innovation and educational materials at low cost and with a low bar to contribute.

Teachers in Uganda have little ICT training, either in general computer skills or knowledge of how to use computers pedagogically. Programs for teachers to learn these skills have been unsuccessful for a variety of reasons. Key factors hindering

teachers from attending computer workshops or practicing skills learned include being overworked and overcommitted at their schools (Bubeng-Andoh, 2012). A challenge for those organizing workshops is teachers disrespecting their level of computer literacy. Some teachers selected to attend workshops to slow down the covering of content and divert the content to basic or remedial information to facilitate the under strained.

This limits the amount of new information proficient teachers can gain (Burniske,2003:McKagan,2010) while fear of failure and uncertainty about the material they would present are the most significant hurdles for teachers, teachers positive attitude and perception play a larger role in teachers adoption than do computers competency or perceived usefulness (Buabeng,Andoh,2012). The current study findings indicated that teachers' perception was tremendously contributing in adoption of ICT in primary school in Kitui County. The head teachers been the administrators of the schools in which adoption of ICT resources were to be implemented had a positive perception.

A more discriminating view would include the observation that a lower level of professionalism and motivation among Ugandan teachers lead to less participation in professional development (Wallace, 2003). A recent survey in central Uganda found that when computers were first given to schools they were used primarily by schools administrators (Head Teachers, Directors of studies, Bursar) for the management related tasks. Next, computers would be set up in the staff lounge for teachers to use. Finally; computers would be designated for students use. There was no consistent threshold at which computers would become available for schools.

Some schools had 5 computers, with 2 for students while another had 11 computers with 3 for students use. In many schools, no computers were available to students (Newby, Hite, Hite, & Mugimu, 2012). The survey also found the number of working computers was almost equal to the number of broken machines present, highlighting the challenges schools face in getting quality ICT resources. Most schools relied on donated computers while only a couple bought a number of their computers and one received computers from the government (Newby *et al.*, 2012), the present study concurs with the study done by Mugimu (2012) on availability of ICT resource materials in public schools in Ugandan schools. The present study done in Kitui County indicated that there were very few ICT resource materials available and they were locked in cupboards. Learners had no access to them.

A common complaint from teachers is lack of resources and funding for any non-lecture based activity (Johnson-Pynn & Johnson, 2005). This decision by the administrations affects using computers in lessons, but could also indicate a lack of comfort with current resources and the connections between resources content and the curriculum. The introduction of computer simulations like PhET by the University of Colorado (McKagan, 2010) and PowerPoint presentations by companies like barefoot education show that curriculum relevant software is available in country and is either freeware or easily accessible through a network of users. Typically, an ICT workshop would provide attendees with some computers-based materials that could be used at their schools. The simplest range from pictures CDs of plants and animals to review of experiments and simulations like the PhET software.

2.16 Studies done in Kenya

Primary Education in Kenya is the first phase of the formal educational system. The starting age is 6 years and primary school takes 8 years. According to MOEST (2002, p.30) Computer Studies is offered as an optical subject in secondary schools. The subject is aimed at enabling learners to "…appreciate the computer system and the development of computers, safely use computers, understands the role of computers, interact with global society, and acquire basic knowledge, skills and attitudes to help them live in a fast changing technological world"

A study conducted by Ratemo (2009) outlined a report in promotion and development of specific e-learning resources that would address the educational needs in primary, secondary and tertiary institutions. A significant step in this direction is the digitization of the curriculum which is going on in Kenya institute of curriculum development. Under the subtle e-learning, the ICT policy goes on to outline the strategies outlined in the national information and communications technology, strategy for Education and Training. According to Kandiri (2008) the following e-learning policies outline in NICT, are:

i. Promote the development of e-learning resources.
ii. Facilitate public-private partnerships to mobilize resources in order to support e-learning initiatives.
iii. Promote the development of an integrated e-learning curriculum to support ICT in Education.
iv. Promote distance education and virtual institutions particularly in higher education and training.
v. Promote the establishment of a national ICT centre of excellent.

vi. Provide affordable infrastructure to facilitate dissemination of knowledge and skills through e-learning platforms.

vii. Promote the development of content to address the educational needs of primary, secondary and tertiary institutions.

viii. Create awareness of the opportunities offered by ICT as an educational tool to the education sector.

ix. Facilitate sharing of e-learning resources between institutions.

x. Exploit e-learning opportunities to offer Kenyan Education programmes for export.

xi. Integrate e-learning resources with other existing resources.

The above strategies will need e-learning resources to support full implementation then there should be awareness, skilled personnel, facilities and public-private partnerships to support the e-learning initiatives.

The current study is investigating the integration of ICT in primary school curriculum which makes teachers aware of the importance of communication skills developed in using e-learning. English writing skills will be developed in making best utility of e-learning.

The ICT survey reported by Farrel (2007) revealed that Kenya recognizes the importance of ICT in education which is manifested through the promulgation of the national ICT strategy in education and training. Farrel (2007) further pointed out that the ministry of education supports the implementation of the strategy either directly or through various institutions involved. Among a series of ICT initiatives identified in the survey for Kenya were as follows:

Establishment of the learning resource centre that offers training in educational management and students at the Kenya Technical Teachers College, MOE project "ICT equipment for schools purchased computers for 142 schools in support of the ICT in educational strategy", Development of learning content focusing on digitization of curriculum content for schools at Kenya Institute of Curriculum Development (KICD), Central and regional support centre provided immediate solutions on ICT issues to schools via telephones or on-line inquiries

Kenya Network Trust (KENET), currently funded by the Kenya Ministry of Education and the ICT Trust, established permanent high-speed internet infrastructure, School Broadcasting-following a successful one year pilot, there was a plan to revive Kenya's national wide school broadcast service, using world space technology educational content to 11 million students in 18000 primary and 3000 secondary schools by the end of 2006. Free software license providing free access to Microsoft corporations operating software for schools and higher education institutions in order to reduce the cost of buying and using computers. The company was to work with the organizations involved in supplying computers to the institutions to install the software on the machines (Farrel, 2007).

The perceptions and attitudes of a political system conscious of the pay offs of ICT for enhancement of the educational profile of a country will form appropriate policies for adoption and dissemination of ICT throughout the country (Kaimenyi, 2012). In Kenya just like in other countries, Education is directly influenced by government policies and is therefore constantly changing according to political trends.

Local politics affect school programmes including ICT adoptions. It is a well known fact that members of parliament manipulate allocation of constituent development funds [C.D.F] monies. Where the principal or the board of management is not perceived as supportive of the local M.P, proposals for ICTs are turned down. Due to “bad “politics, efforts are more often in completion with each other. Besides, there are many unsustainable ICT programmes that have been politically initiated in schools with ICT tools that do not work or are poorly maintained as resources are often redirected or misused (Ford 2007, Kaemba, 2006).

Attempts to enhance and reform education through ICTs require clear and specific objectives, guidelines and time bound tangents, the mobilization of the necessary resources and the political commitment at all levels to see the initiatives through (Tinio 2003). Research on influence of local politics on ICT adoption in teaching and learning has not been done in our country but its influence is crystal clear going by then laptop project for public primary schools in Kitui County, Kenya. Issues of policy and leadership dictate political sustainability of any significant innovation. As such political leaders need to have a keen understanding of the innovation process, identity the basic requirements for successful adoption and harmonize plan and actions accordingly.

In another study conducted by Momanyi, Norby and Strand (2006) a survey analysis to determine the technology goals and needs in schools in Kenya. Findings in their study indicated that the respondents considered equipping secondary schools with computer technology as being important, but that it was less important to equip primary schools with computers. Ford, (2007) reports that Kenya has approximately 19890 primary schools many of which are in rural areas. Of those, only 15% have

electricity and only 500 schools have computers albeit with limited internet access. The present study done in Kitui County, Kenya investigated on availability of ICT resource in schools under study. The findings indicated that most schools had no computers/laptops but the electricity connections were complete. The Kenyan government is underway disbursing lap-tops to various schools and it is opted that when this exercise is complete, integration will roll out effectively.

2.17 Research gap

The government of Kenya has invested heavily in introduction of ICT (Hardware, software, networking and staff development) in most of schools. This is deemed a worthwhile course considering the benefits of ICT adoption in teaching and learning. Literature review reveals that ICT integration in teaching and learning increases pupils' motivation and successfully develops a learner centred environment. This environment facilitates deep learning which takes place when learning is social, active, contextual, engaging and learner owned (Tinio, 2002).

Apart from these obvious benefits, ICT adoption continues to be of small scale in Kenyan schools (Laaria, 2013). A research conducted by Khasiani (2000) a project focused on the role of ICT on women and governance. The study was conducted in Kakamega and Makueni Counties in western and Eastern Kenya respectively. Her findings indicated that women lack access to ICT resource facilities and this is a reflection of disparity in women. The information for the project was obtained from both primary and secondary schools sources.

All in all, literature reveals that school preparedness in ICT integration in the primary schools for effective instructional process is more or less the same in most schools, especially in rural schools in Kenya. Makueni County shares the same ASAL conditions as Kitui County and a comparative study has however not been done in our county which has diverse regional differences characterized by a wide digital divide. This regional disparity determined development factors enabling or constraining the adoption of ICT in teaching and learning. Most of the earlier researchers have focused on effects of various factors on ICT adoption and implementation. This research thus sought to bridge this gap by focusing on availability of ICT resources, perception of teachers on ICT integration and government assistance in adoption of ICT in primary schools curriculum in Kitui County, Kenya.

2.18 Chapter summary

There are numerous conditions to be met before ICT innovations can be introduced, adopted and integrated through an institution. By integrating a range of theories designed to describe and understand perceptions towards the uptake of ICT integration, a number of key factors in a framework for early adoption will be identified. These key considerations are associated with early adopter characteristics, communication channels features associated with innovations, scales and sources of initiations and the time scale. The study will synthesize the following factors as most likely to affect the implementation of computers. These were pedagogical issues, teachers' perceptions, and teachers training access to hardware and software perceptions of parents and administrators and policy issues. Other issues are opted to be the dynamics of change. Education reforms can bring about change only if the communities buy in the idea and adopt the changes as their own. The extent to which

the computers are integrated in school systems would depend on the teachers and administrators perceptions of the benefits to be gained from it.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter describes study area, research design, the target population of the study, the sampling design and sample size, data collection procedures/ethical considerations, the research instruments, questionnaire, interview schedules, reliability and validity of research instruments, presentation and analysis of data and summary.

3.2 Study area

This study was done in Kitui County of Kenya. According to the information obtained from County Director of Education in Kitui County 2016, the performance of Kenya Certificate of Primary education (KCPE) has been declining in the County compared to other ASAL areas for the five four years that is 2009-2013. Therefore the researcher's curiosity was aroused as to why the KCPE examination results were low. Kitui county is among other six counties in Eastern province and estimated population of 1,195,330 served by six institutes of higher learning, three public universities, one teacher training college and three private computer colleges in Kitui County. It borders Makueni County to the south, Garissa County to the north, Machakos County to the west and to the East, it borders Tana River County. The inhabitants of the study area are peasant farmers and beekeepers. According to information from Kitui County Development Profile (2013) in ministry of devolution and planning (p.5), Kitui County falls in the category of arid areas with a lot of hindrances and hardships in the education sector. Kitui County experiences severe

shortage of teachers, poor infrastructure, prolonged droughts resulting to pupils dropping out of school due to lack of food.

Most primary schools were connected to electricity and majority of them experienced shortage of teaching/learning resources. ICT integration in public primary schools will curb the above because computers enable teachers to engage in collaborative learning with learners, thus building partnership amongst students. ICT makes learning content to be accessible from any place, at the same time curbing the problem of teacher shortage. Integration of ICT in class room will boost teachers and learners' utilization of resource materials in the internet, websites, audio and video education software by creating learning environment to be more conducive for learners thus improving classroom activities by far. This has helped curb the problem of teaching/learning resources. Below find KCPE performance, tabulations for Kitui County for the year 2009-2013.

Table 3.1: erformance in KCPE in Kitui County

YEAR	KITUI COUNTY MEAN SCORE	KCPE MEAN SCORE NATIONAL LEVEL
2009	232.90	269.20
2010	232.58	271.60
2011	232.12	265.10
2012	235.09	279.75
2013	233.93	270.65

Source: Field Survey Data: 2015

3.3 Research Paradigm

Research paradigm means a set of philosophical assumptions about the phenomena to be studied, about how they can be understood, and even about the proper purpose and product of research (Hammersley, 2012).

Research Paradigms are fundamental models or frames of reference that we use to organize our observations and reasoning. They may be implicit. Paradigms lie behind theories. They are ways of looking that may be more or less useful. Examples include Marxism or Structural-functionalism (Hammersley, 2012).The essence of a paradigm is the influence a researcher inclines towards appropriate research approach (Mackenzie & Knipe 2006).

Further, Bryman (2004) identified a paradigm as a cluster of researchers and dictates which scientific in a particular discipline influence what is to be studied, how research is done and how results should be interpreted. Paradigms are opposing world views or belief systems that are a reflection of and guide the decisions that are made. This study adopts a pragmatic world view as its philosophy in order to investigate school preparedness in ICT integration in the primary school curriculum for effective instruction: a case of Kitui County, Kenya. This pragmatic option allows for a mixed methods approach to the design of the study engaging qualitative and quantitative methods.

3.4 Research Methodology

This section reviewed different approaches, designs, procedures and methods for investigating the topic under study. Specific tools were described and evaluated to achieve the research objectives under the sub-headings below.

3.5.1 Mixed Method Research

The philosophy that underpins this design is that of Pragmatism. According to Creswell (1994) the paradigm of mixed method design (MM) accurately operationalize and measure specific construct, it has capacity to conduct group comparisons, the capacity to examine the strength of association between variables of interest and the capacity for model specification and the testing of research hypothesis. It has also capacity for generating rich detailed accounts of human experiences, narrative accounts that are examined within the original context in which observation occur. On the issue of sample size the design determine an appropriate sample size requiring broader integrative perspective that balances qualitative considerations favoring small manageable samples for conducting in-depth qualitative analyze. Again the quantitative approach considers favoring large sample size.

Mixed methods stands between qualitative research design and quantitative research design as it provides a more significant results and easy ways of interpreting data and analyzing using the most convenient method. It incorporates all the elements of both qualitative and quantitative. Some of the deficiencies exposed by qualitative and quantitative are significant addressed by MM methods because it uses the deficiencies to provide solutions. Concurrent triangulation design is classified on the basis of purpose of the study, Here, both Quantitative and qualitative approaches are used to confirm or cross validate finding, within a study using the variables (Creswell et al, 2003). On the other hand concurrent nested design is classified on the basis of dominance of the study. In this case the design collects both qualitative and quantitative data at the same time although any of them can be given priority or more weight than the other. This is used to confirm finding within a study. Concurrent

transformative design entails mixing of qualitative and quantitative approaches at all stages with data transformed and analyzed both qualitatively or quantitatively. It is theoretically driven in order to initiate change and provide support for various perspectives.

According to Tashakori and Teddlie (2003) mixed method research paradigm has the following advantages; the method affords a rigorous and interactive analysis of qualitative textual evidence and quantitative numeric data, it offers the descriptive richness of text narratives and the precisions in measurement and hypothesis testing afforded by this method, Can be used to conduct analysis of events, by developing interview protocol that consists of a temporarily ordered series of open-ended focus questions that examines the natural sequence of unfolding events that has occurred before.

3.6 The Research Design

According to De Vaus (2001) research design is the overall strategy that a researcher chooses to integrate the different components of the study in a coherent and logical way, thereby, ensuring that the research problem is effectively addressed. It constitutes the blueprint for the collection, measurement, and analysis of data. The type of design to be used is determined by the research problem of the study. Research design ensures that the evidence obtained enables us to answer the initial question as unambiguously as possible (Yin, 2014).

The selection of a research design for any study forms the cornerstone of the whole research exercise. A research design is the systematic arrangement of conditions for

collecting, interpreting and analyzing collected data in a manner that aims to combine relevance, for research purpose, with economy in procedure, (Claire, 2004). A research design by nature is a master plan of the whole process involved in the proposed research work. Fundamentally it forms a blue print or a road map for the whole exercise of data collection, evaluates, measures and analyses. In this study, descriptive survey design was used and it directly combined the procedures and events in the study. The survey research method was selected because it provides the components and characteristics that are viable in this study. Creswell, (2004) states that survey research design provides a media and a platform for the researcher to collect data from members of a population in order to determine the current status of the population with respect to the dependent variable(s), and in this study, it was “School preparedness for effective instruction through ICT integration in the primary schools curriculum: a case of Kitui County, Kenya".

3.6 Target population

Best and Khan (1993:13) defines a population as “any group of individuals that have one or more characteristics in common that are of interest to the researcher” Gay and Airasian (2000:122) define a target population as “the population that the researcher would ideally like to generalize to”. The target population in this study was:- classroom teachers who trained in ICT workshops organized by the Government of Kenya at the same time, those who teach subjects in standard seven. The study also targeted head teachers in primary schools making a total of one thousand, one hundred and sixty four (1164) teachers. According to Gelo, Braakman and Benetka (2008), sample population should be taken within 10-30% of the entire population. Teachers were purposely sampled whereby. Every school, two ICT teachers and one

head teacher were included in the study. Gelo *et al.,* (2008) asserts that sampling procedure is only applicable in the selected type of variables and in this case, the schools within Kitui County were targeted.

3.7 Sampling design and sample size

The total number of teachers in upper and lower primary schools in Kitui County was 388. Purposive sampling technique was used to categorize female teachers and male teachers who had trained in ICT in every primary school.

Wiersman (2000: p 269) defines sample as "A subset of the population to which the researcher intends to generalize the results". Orodho and Kombo, (2002) suggest that purposive sampling as "the best way where the research purposely targets a group of people believed to be reliable for the study to obtain a representative sample.

According to Amin (2003) Purposive sampling method is a technique used to select a sample cases that have the required information with the respect to the objectives of his/her study. Its purpose is to select subjects which are handpicked because they are informative/poses the required characteristics. While stratified sampling method is a technique used to identify sub-group in the population and their proportions and select from each sub-group to form a sample. The purpose of using Stratified sampling method in selection of targeted schools is to group the schools into subsets/clusters that share similar characteristics and also to ensure representation of the population in the sample. The researcher used stratified sampling method and grouped the schools into zones.

Kitui County has 12 zones, simple random sampling was used to pick schools using the lottery system. According to Gay (2002), Simple random sampling has the following merits, the system yields research data that can be generalized to a large population, the system allows the researcher to apply inferential statistics to the data and provides equal opportunity of selection for each element of the population, each element in the population have the equal and independent chance of being selected. Simple random sampling has the following disadvantages, the method is not statistically efficient method of sampling because the researcher may not get good representation of subgroup in a population, the method is bias in selection, some samples may be over or under represented, on response error is high and some of the members selected may have moved to other areas.

Orodho (2005) asserts that purposive sampling method is a technique used by the researcher to decide who to include in the sample. It is used to collect focused information in a research study. Head teachers were selected using purposive sampling process. According to Gay (2002), Purposive sampling method has the following advantage, the method can be used both qualitative and quantitative studies, the method is convenient to a researcher and he/she uses less time, the method is used to provide in-depth information . The method has the following disadvantage, sample may not be representation of the whole sample, and the results may easily be dismissed for being extreme although they may be representative of an extreme group, however small. Teachers were selected using purposive sampling process whereby, 2 ICT trained teachers were included from every school.

Table 3.2: Summary of Sampling Frame

Unity Respondents	Population	Sample Size	Sampling Method
Head teachers	1294	388	Purposive Sampling method 1-Headteacher in each school
Teachers	8541	776	Purposive sampling method 2-teachers in every School
Totals	9835	1164	

Source: Field survey data: 2015

The above method ensures that each individual in the entire population has equal chances of being selected. Besides, it is controlled for only one specific school bias.

3.8 Data collection procedures

The researcher sought research permit from the ministry of education, which issued a research permit to be presented to County Director of Education (CDE), Assistant County Director of Education (ACDE) and head teachers of selected primary schools to make me access the teachers and pupils. Another letter from School of Education, Moi University, which warranted me to access the research area to collect data from the respondents. Data was collected through techniques such as self-administration of questionnaires.

3.9 Research instruments

3.9.1 Questionnaires for the teachers

Kisilu & Kombo (2009) asserts that a questionnaire is a research instrument that gathers data over a large sample. The researcher administered the questionnaires to the teachers to fill to collect data for objective 2; about perception of teachers on ICT integration on public primary school curriculum. Kothari (2003) states that

questionnaires have the following advantages, the information can be collected from a large sample and diverse regions, and there is confidentiality, which is upheld.

However, the Questionnaire had the Bio data section and other sections according to the objectives of the research. According to Taylor & Francis (2004) Questionnaires have the following merits, low cost even when the geographical area is widely spread; it is free from bias of the interviewer. The demerits of Questionnaires are, it can be used only when respondents are educated and cooperating, the control over questionnaire may be lost once it is sent, it is difficult to know whether willing respondents are truly representative and this method is likely to be the slowest of all (Mugenda & Mugenda, 2003).

The key issues captured in the Questionnaire were, the Biodata of the respondents, availability of ICT resource materials, perception of teachers on ICT integration, teachers level of knowledge and skills in ICT integration, support provided by government in ICT integration and observation checklist to confirm the availability of resource materials in ICT integration in various schools. A copy of this questionnaire for teachers is found in appendix 6 of this thesis.

3.9.2 Observation Checklist

According to Kay Burke (1994) cited by (Daniel and Hochachka, 2012) describes an observation checklist as ‘‘a strategy to monitor specific skills, behaviours, or dispositions of individual students or all the students in the class.’’ She suggests that teachers use observation checklists for ‘‘formative assessments by focusing on specific behaviours, thinking, social skills, and writing. She further states that Observation Checklist is a method of collecting data by observing and recording

systematically the results of what has been observed. It is conscious and planned, systematic recording data by using an observation checklist, then the data is analysed using both qualitative and quantitative data analysis methods.

Kothari (2004) consents that Observation checklist is a research tool used to collect data by observing and recording data about variables under study to determine their behaviour in different situations in natural setting. It comprises of a list of questions that an observer will be looking to answer when they are doing a specific observation of a classroom, in either ascertaining the presence of resource materials used in teaching/learning instruction, ensuring that the teacher is using proper teaching methods and that the learners are learning in the best environment possible.

Observation can be used where it is not possible to collect data using interviews or questionnaires, Observation of behavior may affect the behavior the researcher wants to observe, many events are not open to observation, ethical issues may arise. According to Kothari (2004), Observation checklist has the following merits, the method eliminates subjective bias, the information recorded is related to what is currently happening, and the method provides information for non-talking participants. Observation Checklist has the following demerits, it is an expensive method to be used by researcher, the information provided by this method is very limited, sometimes unforeseen factors may interfere with the observational task and sometimes some people are rarely accessible to direct observation creates obstacle for this method to collect data effectively Kothari,(2004,p.96). The key issue captured in observation checklist was, availability of ICT resource materials, in which the

researcher himself filled the checklist, the section of this observation checklist for the researcher is found in appendix Six.

3.9.3 Interview Schedule for the Head teachers

According to Mugenda & Mugenda (2003) Interviews are questions asked orally by researcher to get the information from respondents. Interviewer who is the researcher asked a set of questions to the interviewees who were the Head teachers and the researcher filled in the data on the spot in a face to face interaction with the Head teachers. Interview schedules have the following merits, more information can be gathered, interviewer by his own skill can overcome the resistance, if any, of the respondents, the interview method can be made to yield an almost perfect sample of the general population, there is greater flexibility under this method as the opportunity to restrict questions is always there, especially in case of unstructured interviews. Observation method can as well be applied to recording verbal answers to various questions; personal information can as well be obtained easily under this method. Samples can be controlled more effectively as there arises no difficulty of the missing returns; on-response generally remains very low.

According to Punch (2005) the interviewer can usually control which person(s) will answer questions, the interviewer may catch the informant off-guard and thus may secure the most spontaneous reactions than would be the case if mailed questionnaire is used, the language of the interview can be adopted to the ability or educational level of the person interviewed and as such misinterpretations concerning questions can be avoided. Also they are flexible because there are no pre-defined questions, and since it is a free response in a relaxed atmosphere situation the answers given are more reliable. Interviews provide in-depth data, on the side of disadvantage; interviews are

time consuming since a respondent can dwell on one issue. Again, they are not systematic as a respondent can comment on issues in haphazard way.

Interview schedule has the following demerits, it is very expensive method, especially when large and widely spread geographical sample is taken, there remains the possibility of the bias of interviewer as well as that of the respondent, the presence of the interviewer on the spot may over-stimulate the respondent, sometimes even to the extent that he may give imaginary information just to make the interviewer interesting and effective interviewer presupposes proper rapport with respondents that would facilitate free and frank responses. This is often a very difficult requirement (Mugenda & Mugenda, 2003).

The key issues captured in the interview schedule were, the availability of resource materials on ICT integration, the perceptions of Head teachers on ICT integration, Head teachers level of knowledge and skills in ICT integration, support provided by the government in ICT integration. Interview schedule were administered to head teachers by the researcher, which lasted for one hour for the researcher to fill the forms.

3.10 Ethical considerations

According to Resnik (2015) ethics are the methods, procedures or perspectives for deciding how to act and for analyzing complex problems and issues. Grady (2013) also defines ethics as norms for conduct that distinguishes between acceptable and unacceptable behaviors. This is a way of minimizing harms and risks and minimizes benefits, respect human dignity, privacy, and autonomy, take special precautions with

vulnerable populations, and strive to distribute the benefits and burdens of research fairly. The following are the ethical considerations which were used by the researcher during the research study;

Maintaining confidentiality. The researcher maintained confidentiality by avoiding sharing the information about the respondents with others for the purposes other than for the research only.

Seeking consent. The researcher informed the subjects adequately about the type of the information needed from them, why the information is being sought, what purpose it will be put to, how they are expected to participate in the study and how it will directly or indirectly affect them. The consent should be voluntary and without pressure of any kind.

Anonymity. The researcher maintained anonymity by informing the respondents that their names were not required to be written in the questionnaires. This will make the respondents to be confident in writing their information in the questionnaires.

Avoiding bias. The researcher should maintain trust worthy to be objective by all means.

Avoiding incentives. The researcher avoided provision of incentives during the research study and diligently explained to the respondents about the importance of the study.

Avoiding sensitive information. The researcher avoided certain information which may cause embarrassment like drug abuse, income, age, marital status, sexuality. Such unethical intrusive questions cause respondents to lose confidence.

Avoiding incorrect reporting. The researcher avoided reporting of the findings in a way that changed to serve his own or other interests.

Avoiding plagiarism. The researcher maintained honesty during the research study. Plagiarism involves cutting and pasting ideas of other diligent researchers without acknowledging any source of information.

3.11 Piloting

Piloting according to Lancaster et al (2004), is feasibility study, is a small experiment designed to test logistics and gather information prior to a larger study, in order to improve the latter's quality and efficiency. It can reveal deficiencies in the design of a proposed experiment or procedure and these can then be addressed before time and resources are expended on large scale studies. A good research strategy requires careful planning and a pilot study will often be a part of this strategy. The researcher used the pilot study in one neighboring school to Kitui County, DEB Makutano which is in Machakos County that has similar characteristics to the schools under study which was not included in the final study. Two teachers who had ICT skills from that school were selected for piloting. Teachers Questionnaires were distributed by the researcher to the respective respondents and collected after being filled. Two weeks later, the researcher gave out identical questionnaires to the pilot respondents who were teachers to fill. He then went through the responses to check out any ambiguities inherent as well as find out the level of understanding and relevance exhibited by the responses.

3.12 Validity and Reliability of research instruments

3.12.1 Validity of research instruments

Validity refers to "the degree to which a test appears to measure what it claims to measure" (Gay and Airasian, 2000). On the other hand content validity is the degree

to which a test measures an intended content area (Gay and Airasian, 2000). Content validity for the instrument was also established by the designated supervisors by requesting them to check the accuracy of the findings. The team of supervisors consisted of experts from Moi University. The researcher did piloting in the neighboring County, which is Machakos County to ascertain the feasibility of research tools. Machakos County was appropriate for piloting because they are in ASALs.This feasibility study was administered to teachers of Makutano DEB to develop and test adequacy of research instruments and ascertain whether the degree to which an assessment tool measured what it appeared to measure (Razmjoo and Tabrizi, 2010).

3.12.2 Reliability of Questionnaires

Reliability is the degree to which a test tool consistently measures whatever it is measuring (Gay and Airasian, 2000:169). Reliability of this study was gauged using the Kuder–Richardson Formula 20 (KR-20). It is a test used to measure internal consistency of research Questionnaires with dichotomous choices. It is equivalent to performing the split half methodology on all combinations of questions and is applicable when each question is either right or wrong. A correct question scores 1 and an incorrect question scores 0. The test statistic checks the internal consistency of measurements with dichotomous choices. The researcher administered the Questionnaires to two ICT class teachers in the chosen primary school under study and retested the Questionnaires once again to confirm the reliability of the instrument after an interval of 2 weeks at A.I.C Makutano primary school in Machakos County. The use of K-R 20 in assessing internal consistency of an instrument is based on the split – halves of the instrument. A high coefficient implies that items correlate highly among themselves; i.e., there is consistency among the items in measuring the

concept of interest. Values can range from 0.00 to 1.00 with high values indicating that the examination is likely to correlate with alternate forms (a desirable characteristic). A reliability coefficient of 0.830 was established and hence the adoption of the questionnaire for the study.

3.13 Data analysis procedures

To analyze data, descriptive and inferential statistical techniques were used. Questionnaires that were received were subjected first to coding to facilitate analyses of the data obtained from the Questionnaire. The data collected from the Questionnaires were tabulated in frequencies and percentages to help in interpretation by the researcher. The data collected was analyzed using the statistical package for the social sciences (SPSS). Descriptive statistical techniques involved tabulations and frequency tables. Then the researcher used SPSS computer programmes was employed for data analysis purposes. Qualitative data was analyzed thematically and presented through descriptions.

RESEARCH METHODOLOGY

OBJECTIVES	**DATA TOOLS**	**DATA ANALYSIS TOOLS**
Availability of resource materials & facilities in ICT integration	Questionnaire, Observation checklist	Tables, Charts
The perception of teachers on ICT integration	Questionnaires	Tables, Charts
Level of knowledge and skills of teachers on ICT integration	Questionnaire	Tables
Support by the government on ICT integration	Questionnaires	Tables
Perception of Head teachers on ICT integration	Interview Schedule	Descriptive

3.14 Chapter Summary

This chapter has outlined the research area, research paradigm, sampling procedures, research tools and procedures used in data collection. The data analysis and presentation is presented in the next chapter.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter reports the analyses of data pertaining school preparedness for effective instruction through [ICT] integration in the primary school curriculum, a case of Kitui County, Kenya. The reporting of the results follows a consistent format; a restatement of the research objectives after which the pertinent descriptive statistics are presented. The conclusions are drawn from the results obtained. The chapter opens with the demographic description of the participants involved in the study followed by responding to the research questions.

4.2 Demographic Description of the respondents

The sample of the study comprised of 388 head teachers and 776 assistant teachers. The participants were randomly selected from 16 Sub-counties in Kitui County. The sample was selected using purposive sampling method for both teachers and simple random sampling technique for the selection of targeted schools. The demographic description of the teachers is presented in Table 4.1

Table 4.1: Gender and Category of Teachers Cross tabulation

GENDER	Category of teachers			
	Head teachers		Teachers	
	F	%	F	%
Male	222	57.2	388	50
Female	166	42.3	388	50
Total	388	100	776	100

The results in the Table 4.1 indicate that 222 teachers (57.2%) of the head teachers were males while 166 teachers (42.3%) of them were females. This is an indication that male to female head teachers ration in primary schools in the county surpasses the

one third gender threshold required in the 2010 Kenyan constitution. On the other hand, the results also indicate that the sampled teachers were equally represented in the study with 50 percent of them being males while 50 percent were females.

The sample was also described in terms of experience of the teachers in Kitui County. Table 4.2 gives the descriptive of the sample.

Table 4.2: Teaching experience

Number of years	Frequency	Percent
1 - 5 Years	185	15.9
6 - 10 Years	274	23.5
11 - 15 Years	179	15.4
16 - 20 Years	36	3.1
Above 20 years	490	42.1
Total	1164	100.0

The results from Table 4.2 indicate that majority 490 teachers (42.1%) have had a teaching experience of more than 20 years. Another 274 teachers (23.5%) have a teaching experience of between six and ten years. The lowest teaching experience category is between 16 to 20 years which is represented by only 36 teachers which is (3.1%) of total sample population.

The study also described teachers' educational qualifications. The results are summarized in Table 4.3.

Table 4.3: Teacher qualification

Qualification	Frequency	Percent
Secondary School	286	24.6
Certificate	398	34.2
Bachelors	99	8.5
Diploma	329	28.3
Masters	52	4.5
Total	1164	100.0

The results indicate that 398 teachers (34.2%) have certificate in teacher education. This is followed by 329 teachers (28.26%) with diploma in teacher education. However it is also revealed that 286 teachers (24.6%) of the teaching force in primary schools has no qualifications as teacher because they are form four leavers who have not trained as teachers. This may be attributed to the shortage of teachers in schools.

The study data analysis and discussion was based on the objectives as shown in the following subheadings

4.3 Availability of Resource Materials and Facilities for ICT integration

The first objective of this study was to find out the availability of resource materials and facilities for ICT integration in the primary schools curriculum in Kitui County. To achieve this objective the following research question was posed; what materials and facilities are available for integration of ICT in public primary schools in Kitui County for effective instruction? To answer this question, questionnaires were administered to 1164 participants. The participants were required to indicate the level of availability of ICT facilities in their schools. The study first sought to establish whether schools had electricity because it is an important facet of running ICT infrastructure.

The results indicated that 928 teachers (79.7%) reported that their schools had electricity. This was also supported by results from interview schedule by most of the principals who indicated they had electricity in their schools. This implies that most primary schools in the county have electricity that can be used to run ICT infrastructure. According to Gulati (2008) access to the ICT is highly limited in remote areas, and relatively poor infrastructure in developing nations such as supply of electricity makes this worse. Given that most primary schools in the county have access to electricity, it is possible to install ICT infrastructure in the school. The study having established that most schools had electricity, sought to establish extent to which various ICT infrastructure were available. The results are presented in Table 4.4.

Table 4.4: Availability and Adequacy of ICT Infrastructure

Facilities	Adequate		Inadequate		Not available		Total
	F	%	F	%	F	%	
Laptops	0	0	30	3.9	746	96.1	776(100%)
Computers	0	0	0	0	776	100	776(100%)
Whiteboards	0	0	0	0	776	100	776(100%)
Printers	0	0	0	0	776	100	776(100%)
Wi-Fi	0	0	0	0	776	100	776(100%)
Scanners	0	0	0	0	776	100	776(100%)
Digital cameras	0	0	54	6.9	722	93.1	776(100%)
Projectors	0	0	0	0	776	100	776(100%)

The results in the table indicated that 746 teachers (96.1%) reported that their schools had no laptops while only 30 teachers (3.9%) indicated that their schools had laptops. Through interview schedule the participants revealed that the available laptops in the schools were used for various purposes. For instance, one head teacher reported that:

> '*I use a laptop to prepare schemes of work, to down load educational materials, to make time tables and to save school minutes. I also use it to register students for national examinations and as examination bank"*

This is an indication that ICT is vital for enhancing teaching and also management of the school. This finding supports Kiptalam and Rodrigues (2012) who reported that teachers frequently used ICT for teaching and instructional support. The results also support Condie, Munro, Muir and Collins (2005) argument that many schools are developing computer-supported systems for record-keeping. 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 and McCormack, 1998) as cited by Kiptalam and Rodrigue, (2012). Simply having a positive attitude of computers and positive perception about their use in a classroom increases the likelihood of adoption by teachers. Schools should find a way to help teachers boost more urge towards laptops and develop that positive attitude. This step goes outside the Western approach of partitioning work and home actions. Teachers are rarely able to access computers outside a school and desire to use them in many of the same ways people in developed nations use personal computers. They want to be able to play music, watch videos, play games, and do personal work, including email or Face book, if Internet is available. Limiting these actions is difficult and creates a negative perception with those who do have access to those options outside of the workplace. Ultimately the more familiar teachers are with actions they learn through personal use of computers; the more likely they are to use a computer in the classroom.

Kiptalam and Rodrigue, (2012) 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. Therefore, lack of the computer hardware in school does not allow effective use of ICT in teaching. Teachers should be given access to computers, either a specific computer in the lab or a computer in the staff room, for personal use. Having a computer set aside for teachers' means they don't have to compete for time with students and gives them a sense of privacy. Storing information like tests, classroom materials and grades will also be more secure on a staff computer, as many teachers don't have personal flash drives or other storage devises. Managing this computer and assisting in teacher issues will be an additional responsibility for the ICT instructor.

All 776 teachers (100%) reported that their schools had no computers, whiteboards, printers, Wi-Fi, scanners. This is a clear indication that primary schools in Kitui County do not have ICT facilities that can be used to integrate ICT in teaching. This finding supports Oyejola (2007) who reported that ICT infrastructure is beyond the reach of most schools.

The study however established that 54 teachers (6.9%) reported that their schools had digital cameras used for the purpose of registration of candidates. This is a clear indicator that majority of primary schools do not have the required ICT facilities which can facilitate integration of ICT in teaching at primary school level. The study further established that only 36 teachers (4.6%) indicated that their schools have floppy disks. Since floppy disks are storage devices, it is possible that the schools with these devices utilize them to store vital school related records. For instance, through interview schedule one of the head teachers reported:

> *"I use my laptop to keep minutes and to save school records such as schemes of work templates"*.

The same Head teacher went further and stated that,

"*Technology allows us to go towards the Modification and the Redefinition where we do things we couldn't do before. Some are starting to bud out. Some teachers can do it all the way through ICT facilities. But little hindrances here and there. We are still waiting for this higher level of integration to pick up.*"

The study however indicated that 776 teachers (100%) reported that their schools had no printers, and projectors. This clear indication that most of schools in Kitui County are lacking one of the key essential ICT facilities for integration in instructional process. In spite of inadequacies' in their preparedness to integrate ICT in teaching, it was however encouraging noting that contemporary teachers in Kenya appear generally supportive and willing to use ICT in their classrooms. The review of the literature provided evidence that both in- and pre-service teachers are prepared for the integration and infusion of ICT into and across the curriculum. More importantly, they show a lot of enthusiasm to be part of any professional development programme related to integrating ICT in teaching and learning (Agyei & Voogt, 2011a, 2011b).

Using ICT in the classroom, teachers have the opportunity to develop their lesson plans, make it more inquiry-based, project-based or collaborative-based. There are a plethora of opportunities for students to benefit from technology in the classrooms. They range from simple browsing of the World Wide Web, to using word processors, presentation tools and professional graphic software. Participants mentioned the benefit of integrating technologies in lesson plans, Agyeman, (2007).

Interview schedule also indicated that although most schools have ICT rooms, they remain unfurnished with prerequisite ICT infrastructure. Most of these Computer rooms were constructed through funds provided by the national governments. This finding was in an agreement with a study done by Kiptalam and Rodrigue, (2012).

A checklist on the availability and adequacy of various resources materials indicated that most schools lacked resources such as laptops/computers, white boards, printers, Wi-Fi, scanners, modems, digital cameras, and sprojectors. However, some few schools had some of these resources although they were inadequate.

4.4 Perceptions of Teachers on ICT Integration in Public Primary Schools Curriculum

The second objective of this study was to establish the perceptions of teachers on ICT integration in the primary schools curriculum in Kitui County. The following research question was derived from this objective; what are the perceptions of teachers on ICT integration in public primary schools curriculum in Kenya? To answer this question, participants were requested to indicate their level of agreement with various statements related to their perception on ICT integration in school. The results are presented in Table 4.5.

Table 4.5: 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	274	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	370	47.7	323	41.6	0	0	58	7.5	25	3.2
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	51	6.5
Computers save time and efforts	73	9.4	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	348	44.8
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 and printer	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 show that majority 348 teachers (44.9%) strongly disagreed with the statement that they own a personal computer/laptop that they use in teaching/learning process. This implies that either most of the teachers lacked a personal

computer/laptop or those who had a personal computer/laptop did not use it in teaching/learning process. These results were supported by some head teachers who indicated that they lacked personal laptops/computers. The study also indicated that 273 teachers (35.2%) disagreed that they own a personal computer/laptop, while 101 teachers (13.1%) strongly agreed that they own a personal computer/laptop in their offices or at home. Just minute number 25 teachers (3.2%) agreed that they possess the laptop/computer at their schools. This is a clear indication that these teachers when provided with funds from the government or loans, they can embrace ICT integration in their teaching/learning process by purchasing more ICT facilities for ICT integration. This is supported by Groff & Mouza (2008) who stressed that when teachers integrate ICT into teaching, they operate as innovators and embrace the innovation without any failure. The study also indicated that 28 teachers (3.6%) were undecided on whether to adopt ICT integration in their teaching/learning process. This is a clear indication that these teachers lack skills in technology, for successful adoption and integration of ICT into teaching, teachers must perceive the technology as better than previous practice; consistent with their existing values, past experiences and needs; ease to use, can be experimented with on a limited basis before making a decision to adopt and finally the results of the innovation are visible to others.

Many teachers are hesitant to change an existing program to something they only know through discussion and reading and not through observation. These three characteristics or attributes of teachers' adoption and integration of ICT into teaching provide information of factors supporting their use of technology as well as barriers to ICT integration. The key factor in the studies is teachers' perception toward

technology or intentions to use technology in their classrooms. If teachers have negative attitudes toward technology, providing them with excellent ICT facilities.

The head teachers also indicated that very few of them had personal computers/laptops. This is an indicator of lack of ICT infrastructure in schools and/or lack of knowledge to utilize these devices for teaching/learning process. Only a minute number of teachers' respondents strongly agreed and a few of them agreed that they own a personal computer/laptop that they use in teaching/learning process. This further augments the argument that very few primary school teachers have access to computers that can be utilized in the teaching process. This finding supports Fakeye (2010) argument that low ICT infrastructure is the fundamental problem for developing countries to deal with and it might take a long time and huge funding to improve.

The information in Table 4.5 also shows that majority 373 teachers (48.1%) of the teachers strongly disagreed while 300 teachers (38.6%) disagreed that they prepare schemes of work using a computer. This is a pointer to lack of knowledge on the utilization of computers. However, given that majority of the teachers indicated that they do not own a personal computer; it is possible that it is lack of such infrastructure that prevent them from utilizing them in preparation of schemes of work. The study further indicated that 50 teachers (6.4%) strongly agreed that they prepare their schemes of work using their computers/laptops. Further, the study indicates that 53 teachers (6.9%) agreed that they make best utility of their computer/laptops in preparing their schemes of work using their computers/laptops. This is a clear indication that Kitui County teachers have a positive perception in integrating ICT in instructional process. This is supported by study done by 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 thus improving their instructional process through improved KCPE performance in Kitui County.

The results further showed that 374 teachers (48.2%) of the respondents strongly agreed and 327 teachers (42.2%) disagreed that they use computers to prepare lesson plans. It is interesting to note that although 102 teachers (13.1%) of the respondents had strongly agreed that they own a personal computer/laptop which they use for teaching, only 50 teachers (6.4%) strongly agreed that they use them to prepare schemes of work and 22 teachers (2.8%) strongly agreed that they utilize computers to prepare lesson plans. The study further indicated that 327 teachers (42.2%) disagreed that they use their computers in preparing their lesson plans while 22 teachers (2.8%) strongly agreed that they use their computers in preparing their lesson plans using their computers. Another 53 teachers agreed that they use their computers in preparing their lesson notes using their computers. This is supported by a study done by Sonia (2012) who expressed a concern that computer literate individuals will “reap greater benefits than their counterparts who lack that knowledge” (Sonia 2012, p.16). 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. This means that teachers using new technology would be at advantage of improving their output in their instructional process thus considering the perceived usefulness in the use of the new technology to accept it.

The study further indicated that 318 teachers (41.0%) strongly disagreed that they feel uncomfortable when using computers in instructional process. Another 356 teachers (45.9%) disagreed that they feel uncomfortable when using their computers in their instructional process. Further 49 teachers (6.3%) strongly agreed that they feel uncomfortable when using computers in their instructional process. Another 53 teachers (6.9%) agreed that they feel uncomfortable in their computers in their instructional process. This a clear indication that the positive perception of teachers in Kitui County if upheld, can bring full integration of ICT in the entire County. This is supported by the study done by Serhan (2007) which investigated the willingness of school principals to advocate and support the use of Technology in their schools. Results of this study revealed that principals of primary schools had positive perception towards the use of technology in teaching. Results also showed that not only were the principals willing to support the use of Technology in their schools but that they were also willing to improve their knowledge, abilities and skills for facilitate the integration of the Technology into curriculum.

The results further indicated that 370 teachers (47.7%) strongly disagreed and 323 teachers (41.6%) disagreed that they use computers to prepare their notes. Moreover, majority of the respondents which is 356 teachers (45.9%) disagreed and 318 teachers (41%) strongly disagreed that they feel uncomfortable when using a computer in teaching. This could be due to the fact that most of them did not use the computers in teaching. Moreover, it was established that 409 teachers (52.7%) disagreed and 317 teachers (40.9%) strongly disagreed that most of their lesson notes were on soft copy. The study further indicated that 25 teachers (3.2%) strongly agreed that they prepare their lesson notes using a computer. Further, 58 teachers (7.5%) agreed that they use

their laptops/computers in making their lesson notes. A clear indication shows that primary school teachers are willing to adopt ICT in their instructional process when provided with necessary ICT facilities by the government. This is supported by the study done by Keengwe and Onchwari, (2008) which asserted that a smooth successfully initiate and implementation of educational technology in school's program depends strongly on the teachers' support and attitudes. It is believed that if teachers perceived technology programs as neither fulfilling their needs nor their students' needs, it is likely that they will not integrate the technology into their teaching and learning. Among the factors that influence successful integration of ICT into teaching are teachers' attitudes and beliefs towards technology.

Since ICT infrastructure can not only be accessed from schools but also in other places like cyber café, it would be expected that a significant percent of teachers would use computers to prepare their notes and have their notes in soft copy. However, the finding that most of them do not use computers to prepare notes and do not have soft copy of their notes is an indication that most teachers are not prepared for ICT integration in teaching. This implies that head teachers in primary schools may not be able to use ICT to prepare school announcements, reports, letters for meeting with parents, student registration, and teachers and staff employment as proposed by (Mwalongo, 2011).

Another 317 teachers (40.9%) strongly agreed that their lesson notes are on soft copy, majority 309 teachers (52.7%) disagreed that their lesson notes are on soft copy, 22 teachers strongly agreed that their lesson notes are on soft copy. Only 28 teachers (3.6%) also agreed that their lesson notes are on soft copy. This study concurred with

study done by Clement et al (2012) that when teachers are allowed to utilize their skills in using ICT resource materials, in their instructional process, time factor will be utilized effectively thus by accessing resource materials from a wide range of varieties rather than old traditional method of teaching.

Majority 346 teachers (44.6) strongly disagreed and 187 teachers (24.1%) disagreed that some of their teaching resources are available online. This is true indication that most of the teachers are unaware of the vast materials available online. This implies that as per the results obtained herein, most teachers are not knowledgeable about internet use and the resources available online. Thus, it can be asserted that teachers in Kitui County have a poor perception of resources available online and hence are not well prepared for integration of ICT in teaching and learning. Study further indicated that 50 teachers (6.4%) strongly agreed that some of the resource materials and facilities are online, while 192 teachers (24.8%) agreed that most of ICT resource facilities and materials are online. This is indication that due to exposure of a few teachers using tablets and computers, these teachers can access ICT resource materials online. This is supported by the study done by Stephenson, (2001) who asserted that online resource facilities makes teachers to move to competency and performance-based curricula which are well supported and encouraged by emerging instructional technologies which are extensively online.

Despite this, majority 373 teachers (48%) strongly agreed and 275 teachers (35.4%) of them agreed that computers save time and efforts. Another 74 teachers (9.5%) strongly disagreed that computers save time and efforts in instructional process. Only 28 teachers (3.6%) disagreed while 27 teachers (3.4%) were undecided on whether

ICT resource facilities and materials save their time and energy in instructional process. This implies that teachers perceive use of ICT as a way of simplifying work.

It was also established that majority 349 teachers (45%) and 189 teachers (24.3%) strongly agreed that computers motivate to do more work. Another 129 teachers (16.6%) and 27 teachers (3.4%) strongly agreed that computers motivate learners in instructional process.

The results also indicated that majority 303 teachers (39%) disagreed and 262 teachers (33.8%) of them strongly disagreed that they prefer to do things by hand than with computers. This implies that teachers would rather use computers if available than do things by hand. This finding supports the results above that most teachers agreed that computers save time and efforts. It was also established that majority 460 teachers (59.3%) strongly agreed that if they had money they would buy a computer. This implies that provision of the necessary ICT infrastructure could allow teachers to adopt its use in teaching and learning. This is supported by the finding that majority 544 teachers (70.2%) strongly agreed that computer technology skills can improve the quality of teaching/learning in schools. Another 109 teachers agreed that computer technology skills can improve the quality of teaching/learning in schools. Study also indicates that 96 teachers (12.4%) strongly disagreed that computer technology skills can improve the quality of teaching/learning in schools. This finding supports Kawade (2012) study findings that ICT may be used for effective teaching – learning processes to achieve quality education and overall development of students and for administrative purposes by teachers, staff and management team.

Interview schedule with head teachers indicated that few teachers had computers and that those who have them used the computers for saving notes, schemes of work and monitoring classes. According to some head teachers computers are also used to make personal notes on different topics, downloading teaching/learning materials, grading pupils and saving personal documents used in instructions. The head teachers also indicated that they encouraged their teachers to utilize ICT in preparation of notes, lesson plans and schemes of work. The head teachers indicated that utilization of ICT in teaching and learning can greatly improve time management. For instance one head teacher said:

> "*Integration of ICT in teaching/learning can help in time management because the teacher will not be spending a lot of time preparing learning/teaching materials manually"*

This implies that ICT Head teachers understand 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.Finally, teachers' perception towards ICT integration in primary school curriculum is positive.

4.5 Level of Knowledge and Skills in ICT Integration

The third objective of this study was to establish the level of knowledge and skills in ICT integration in public primary schools curriculum in Kitui County. To achieve this objective the following research question was posed; what is the level of knowledge and skills of teachers on ICT integration in public primary schools in Kitui County? The level of teachers who responded to this question was teachers who had attended training concerning ICT skills. To answer this question, questionnaires were administered to the 1164 teachers. The participants were required to rate the 10 items on a Likert scale. The results are summarized in Table 4.6

Table 4.6: Leveles of knowledge and Skills in ICT Integration

Statements	NC		SWC		C		VC	
	F	%	F	%	F	%	F	%
Installing of new software on a computer.	313	40.4	152	19.6	204	26.3	107	13.7
Using a printer.	190	24.5	183	23.6	259	33.3	144	18.6
Using a computer keyboard.	0	0	153	19.8	379	48.8	244	31.4
Operating a word processing program (word processing).	38	4.9	221	28.5	281	36.2	236	30.4
Operating a spreadsheet program (e.g. Excel)	77	9.8	154	19.8	347	44.7	198	25.5
Operating a data base program (e.g. Access).	76	9.8	312	40.2	250	32.2	138	17.8
Using the internet for communication (e.g. E-mail).	144	18.6	191	24.6	259	33.3	182	23.5
Using the World Wide Web to access information.	183	23.5	199	25.7	211	27.2	182	23.5
Using Computers for grade keeping.	122	15.7	222	28.6	258	33.2	174	22.4
Cleaning a computer by use of ant-virus	334	43.1	176	22.7	181	23.3	84	10.9

Key: NC = Not competent, SWC = somewhat competent, C= competent and VC = very competent

The results show that majority of 313 teachers (40.4%) indicated that they were incompetent in terms of installing new software on a computer. This implies that most of the teachers in the primary schools in Kitui County may not be able to install software on computers even if they are availed to them. This finding was supported by most head teachers during interview schedule who indicated that do not often use computers to prepare instruction materials due to lack of computers in schools. Nonetheless, 204 teachers (26.3%) indicated that they were competent and 107

teachers (13.7%) reported that they were very competent as far as software installation is concerned. Given that the percent of those who are competent in software installation is lower than 50 percent, the government may have to invest more in terms of skills development to allow integration of ICT in the primary schools.

This finding was supported by most head teachers during interview schedule who indicated that most of their teachers were ICT literate in spite lack of computers in schools. This assertion is in agreement with a study that was conducted by Seidman (1996). This study was concerned with issues surrounding teacher training and its relationship with the successful implementation of computers. The study found that teachers' expressed a need for teacher training on basic computer skills. Teachers need to know how to use computers first before they can integrate them.

The information in Table 4.6 further show that only 259 teachers (33.3%) are competent and 144 teachers (18.6%) are competent in using a printer. This study finding was supported by a few head teachers who indicated that they were only competent in basic use of ICT resources. This implies that even if a printer is availed to schools, very few schools will be able to utilize it due to lack of skills. Such schools might be forced to hire a technician or rather train their teachers. In addition to teachers training, administrators ought to also ensure that a professional development found is in place to encourage teachers to take advantage of 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 clear understanding of what computers can and cannot do in the classroom (Antifaiff, 2001).

On use of computer keyboard the results indicated that at least each teacher had a basic knowledge on how to use it. For instance, 379 teachers (48.8%) indicated that they were competent and 236 teachers (30.4%) reported that they were very competent in using a computer keyboard. This is an indication that most teachers in primary schools have basic knowledge on the use of computers. On this basis, it can be argued that provision of necessary ICT infrastructure might enhance their competency in ICT integration in learning and teaching. The finding of this study fits The Technology Acceptance Model which 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 (Bagozzi et al, 1992).

Concerning operation of a word processing program, 281 teachers (36.2%) said they were competent while 236 teachers (30.4%) said they were very competent. Only, 38 teachers (4.9%) said they were incompetent in terms of utilization of word processing program while 221 teachers (28.5%) reported that they were somewhat competent. Again, this is an indicator that teachers in public primary schools in Kitui County have basic computer knowledge. This may be vital in the integration of ICT in learning and teaching. However, the findings in this study contradict the findings of a study by Aina (1993) that investigated the skills required by teachers in order to handle ICT resources. The researcher concluded that there were inadequate skilled personnel in Africa, a barrier to effective utilization of ICT. This contradiction can be

attributed to the efforts the Kenyan government has been putting in place to roll out the laptop project.

The results in Table 4.6 also show that majority of 247 teachers (44.7%) indicated that they are competent and 194 teachers (25%) of them reported that they are very competent in operating spreadsheet program such as excel. This implies that most teachers can use computers to keep records such as examination results for students. This further augments the assertion that teachers in primary schools in Kitui County are capable of using computers and hence can utilize them in teaching.

A majority 312 teachers (40.2%) indicated that they are somewhat competent in operating database program such as access. Even though this is an indication that the knowledge of teachers on use of database program is minimal, this can be enhanced when the necessary infrastructure are availed. Nonetheless, this may compromise record keeping in schools. From the results only 258 teachers (33.2%) of the participant reported that they can competently use computers to keep records such as examination records. This could be due to minimal percent which was 250 teachers (32.2%) who reported that they are competent in operating database programs.

The results show that only 258 teachers (33.3%) indicated that they are competent in use of internet for communication while only 211 teachers (27.2%) reported that they are competent in the use of World Wide Web to access information. This is an indicator that most teachers in public primary schools in Kitui County have little knowledge and skills on internet use. This may compromise the integration of ICT in teaching since internet use is vital for searching teaching/ learning materials.

Majority, 334 teachers (43.1%) of study participants reported that they are incompetent in using antivirus to clean computers. This is an indicator that computers might be easily corrupted and data may be lost if computers are provided due to lack of knowledge on how to protect such data using antivirus.

The head teachers were requested to highlight some of the challenges experienced in the integration of ICT in teaching/learning. It emerged that lack of funds to buy ICT resources was the main challenge in most schools. It was also established that lack of trained personnel was also impeding integration of ICT in teaching/learning. The head teachers were also requested to state how the challenges could be overcome. Most of them indicated that the government need provide ICT materials, provide teaching personnel and funds for ICT infrastructure.

4.6 Support from the Government and Other Stakeholders

The last objective of this study was to find out the support by government and other stakeholders on ICT integration in primary schools curriculum in Kitui County. To achieve this objective the following research question was posed; in what ways are primary schools getting support by government and other stakeholders on ICT integration in primary schools in Kitui County? To answer this question, the 776 teachers sampled from primary schools in Kitui county were requested to indicated the extend they agree with the five statement in section five of the questionnaire schools. The responses of the participants were coded and frequencies and percentages computed. The results were presented in the Table 4.7.

Table 4.7: Government support

Key: SD = strongly disagree, D = Disagree, U= Undecided, A= Agree and SA= strongly agree

Statements	SD		D		U		A		SA	
	F	%	F	%	F	%	F	%	F	%
In my school teachers have been attending in-service courses	0	0	36	4.6	17	2.2	448	57.7	275	35.4
Electricity has been installed by the government in school.	17	2.2	129	16.6	0	0	272	35.1	358	46.1
The government has greatly motivated us on ICT integration	137	17.6	217	28.0	59	7.6	178	22.9	185	23.9
The government has done some needs assessment on status on school for ICT	95	12.3	142	18.3	77	9.9	312	40.2	150	19.3
The government has created awareness to all teachers on ICT	178	22.9	225	29.0	47	6.0	117	15.1	209	26.9

The results in the Table 4.7 revealed that 448 teachers (57.7%) agreed that they have been attending in-service courses on ICT. It was followed by 275 teachers (35.4%) who strongly agreed. However, 36 teachers (4.6%) disagreed. The implication of this finding is that the government has tried to ensure that teachers are equipped with skills and knowledge about ICT. This finding is in agreement with the earlier finding that the level of knowledge and skills is the same among head teachers and assistant teachers.

The results in Table 4.7 show that 358 teachers (46.1%) strongly agreed that schools have been connected to the electricity. This is followed by 272 teachers (35.1%) who

agreed. It should be noted that 17 teachers (2.2 %) strongly disagreed that the schools have electricity. This finding reveals that not all schools in Kitui County have electricity. This may impede ICT integration in teaching and learning.

Concerning government motivation of teachers on ICT integration, the results in Table 4.7 shows that 217 teachers (28%) disagree that the government motivate them to integrate ICT in learning/teaching. This is followed by 185 teachers (23.9%) strongly agree and 178 teachers (22.9%) agree. The implication of this was that the government has not been able to reach all teachers for them to appreciate use of ICT in teaching.

Results in Table 4.7 revealed that 312 teachers (40.2%) agreed that the government has done some needs assessment on the status on school for ICT. This is followed by 150 teachers (19.3%) strongly agreed. It is also revealed that 142 teachers (18.3%) disagree that the government has done some need assessment. This varied view on needs assessment places some doubt on the implementation of ICT in teaching. It is an indicator that some schools might not be able to meet their needs for ICT integration.

It is revealed that 225 teachers (29%) disagreed that the government has created awareness to all teachers in ICT. However, 209 teachers (26.9%) strongly agree that the government had created awareness on ICT. These findings are an indication that the government has done little in creating awareness on the utilization of ICT in teaching/learning in public primary schools in Kitui County.

However, universal implementation is challenging given the lack of resources, National ICT infrastructure, and even electricity supply-particularly in the rural areas. Kenya promulgated a national ICT policy in January 2006 that aims to “improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services. This goes a long way in improving the quality of teaching and learning.

Interviews with head teachers indicated that the government provides support in ICT integration through training teachers on ICT integration, installation of electricity in schools and provision of funds for construction ICT infrastructure storage facilities. The head teachers also indicated that the government organized for training on ICT integration at least twice a year. The head teachers stated that some of the topics covered during such trainings included excel, word processing, using key board, operating data base, internet use in communication and grade keeping. Other topics covered included installation of computers and using printers.

4.7 Chapter summary

This chapter has presented the data that was obtained from the various instruments about school preparedness for effective instruction through ICT integration in the primary school curriculum, a case of Kitui County, Kenya. The next chapter presents the summary of findings, conclusions and recommendations of the study.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter revisited the research questions outlined in chapter one and draws conclusions and recommendation based on the findings of the study. The major question of this study was to investigate the school preparedness in ICT integration in the primary school curriculum for effective instruction. The chapter begins by presenting the major findings of the study. This is followed by drawing conclusions from the findings and giving the recommendations.

5.2 Summary Findings of the study

Kitui County has been connected to electricity. However, the analyses indicated that not all schools in the county have electricity. Participants who were teachers indicated that other resources such as laptops, computers and whiteboards, were totally missing in schools. The implication of this was that primary schools do not have adequate facilities for ICT integration thus the urgency of improving KCPE performance cannot be met. The responses to their survey indicated that issues surrounding computer hardware were the most serious barriers affecting its implementation of ICT in schools.

Secondly the analysis of the collected data revealed that category of teachers has no influence on the perception on ICT integration in schools. Both head teachers and assistant teachers perceived the ICT integration in the same way. This can be attributed to the fact that the Kenyan government has been creating awareness about introduction of laptops among the teachers. The head teachers and teachers had been

taken through the programmes. Teachers' perceptions towards ICT integration is a significant factor in the implementation of laptop project in schools. Teachers with good perception of ICT integration may view the integration of computer into school's curriculum more positively than their counterparts who may lack knowledge of computers.

Thirdly, it was revealed that most teachers had basic computer skills such as word processing, data base, spreadsheet and use of computer keyboard. However, use of internet for communication and searching information was still wanting. Moreover, most teachers indicated that although they had basic knowledge in use of some of these programs, they were not very competent.

Lastly analysis of the findings revealed support by government in ICT integration. Kenya has made profound remarkable progress putting in place ICT. For instance 358 teachers (46.1%) strongly agreed that schools have been connected to the electricity. This is followed by 409 teachers (35.1%) who agreed.

5.3 Conclusions

In this study, school preparedness for effective instruction through ICT integration in primary school curriculum was investigated. Availability of resource materials for improved KCPE performance was considered. Teacher characteristics in terms of their perception and level of knowledge and skills were considered in this study. In view of the findings of this study, the following conclusions were drawn.

(i) Most schools were connected to electricity but lacked ICT resources such as laptops, computers and whiteboards. It was revealed that attempts to set up basic ICT

infrastructure in primary schools were almost negligible. One of the main problems was limited penetration of the physical telecommunication infrastructure into rural and low-income areas. For instance, there was lack of connectivity to internet.

(ii) Teachers perceived ICT integration in learning as best way of accessing learning materials, easing management and teaching/learning.

(iii) Most teachers had basic knowledge about utilization of ICT resources but are not competent enough.

(iv) Government to provide support in ICT integration through training teachers on ICT integration, installation of electricity in schools and provision of funds for construction of ICT infrastructure and storage facilities. Although not exhaustive, the government of Kenya had tried to improve the status of the schools in readiness of ICT integration. For instance, most of the schools in the country did not have electricity courtesy of the rural electrification programme by the government. In addition, the ministry of education carried out a needs assessment with a view to ensure that schools had appropriate infrastructure to roll out the ICT in primary schools.

(v) Head teachers perceived that integration of ICT in schools will help in record management, teaching/learning process and inventory management. The Head teachers in primary schools were vehemently willing and ready to roll out the ICT integration. They have the required knowledge and skills in implementing the programme.

5.4 Recommendations

From the research findings and the conclusions the following recommendations were made,

(i) The school community and the government should partner in provision of ICT resources to facilitate integration of ICT in schools. The vision of the Government of Kenya is to facilitate ICT as a universal tool for education in schools. In order to achieve this vision, every school, teacher, learner and the respective community should be equipped with appropriate ICT infrastructure, competences, and policies for usage and progress.

(ii)The government should continue in its efforts of ICT integration programs in schools given the positive perception of the teachers on the benefits of ICT in learning/teaching.

(iii)Teacher training institutions should facilitate effective use of ICT in training teachers to improve access, learning and administration in delivery of ICT integration in schools.

(iv)The government should improve the curriculum on ICT trainings to ensure teachers are competent enough in the utilization of ICT resources once they are availed right from college exit.

(v) Head teachers should also strive to improve their skills and knowledge on ICT utilization.

5.5 Suggestions for Further Study

There are important issues that this study was unable to address due to scope. From the research findings and conclusions drawn, there are certain aspects of ICT integration that the researcher felt needed some further investigations. In view of this, the following are some of the areas that could be considered for further researcher.

1. There is need for similar designed studies in other areas of the Country. This will make it possible to determine whether the findings documented in this study holds for other areas.

2. A study on the impact of ICT integration for effective instruction should be carried out on schools that were used by the government during the piloting exercise.
3. A study should be done to determine the preparedness of ICT integration for special needs children.

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APPENDICES

APPENDIX A: COVER LETTER FOR TEACHERS

P.O. Box 3900-9040,
Eldoret,
Kenya.

Dear Sir/Madam,

My names are Nzwili K. Mwendwa and I am a Doctor of philosophy (Ph. D) student at the school of education at Moi University. I am currently conducting a study on the "School preparedness in ICT Integration in the primary schools curriculum for effective instruction, A case of Kitui County, Kenya". The study seeks to identify teacher's perception as well as Head teachers' perception in ICT integration.

I am convinced that the best information about ICT in education comes from you. The information you will provide will be highly useful in decision making concerning the future of ICT in education in Kenya.

By taking this survey, your job will not be affected in any way since the information you will provide to us is treated confidentially.

Please complete the questionnaire and feel free to make comment whenever you like it.

Thank you for accepting to provide this valuable information. Your time and efforts in completing this questionnaire is greatly appreciated.

Sincerely

NZWILI K. MWENDWA

EDU/D.PHIL.1014/14

APPENDIX B: TEACHERS QUESTIONNAIRES.

Instructions.

The purpose of this Questionnaire was to examine the school preparedness for effective instruction through ICT integration in primary schools curriculum, a case of Kitui County, Kenya. The questionnaire consisted of five sections. As you begin each section, please read the directions carefully and provide your responses candidly in format requested.

Section one: Background information

The purpose of this section is to collect some basic information about your background. ☐ ☐

1. What is your gender? Male Female

2. What is your age bracket? ☐ 20-29 yrs ☐ 30-39yrs ☐ 40-49 yrs

50-59 yrs ☐ 60 yrs ≤ ☐

3. What is your teaching experience?

1-5yrs ☐ 6-10yrs ☐ 11-15yrs ☐ 16-20yrs ☐ above 20yrs ☐

4. What is your highest completed level of education?

Secondary school ☐ Bachelors degree ☐ Masters Degree ☐

Others specify.....

SECTION TWO: Availability of ICT resource materials

1. Please respond to the following statements on availability and adequacy of ICT resources in your school

ITEMS	**Available & Adequate**	**Available & inadequate**	**Not Available**
(i) Electricity			
(ii) laptops			
(iii) Computers			
(iv) Whiteboards			
(v) Printers			
(vi)Wi-Fi			
(vii) Scanners			
(viii) Modems			
(ix)Digital Cameras			
(x)Key boards			
(xi)Projectors.			

SECTION THREE: Perception of Teachers on ICT integration

2. Please respond to the following statements on perception of teachers on ICT integration

No.	Statements	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
(i)	I own a personal computer/laptop that I use in teaching/learning process.					
(ii)	I prepare my schemes of work using a computer.					
(iii)	I prepare my lesson plans using a computer.					
(iv)	I feel uncomfortable when using a computer in teaching					
(v)	I prepare my lesson notes using a computer					
(vi)	Most of my lesson notes are on soft copy					
(vii)	Some of my teaching resources are available online					
(Viii)	Computers save time and efforts					
(ix)	Computers motivate pupils to do more work					
(x)	I prefer to do things manually rather than with computers					
(xi)	If I had money, I would buy a computer					
(xii)	Computer technology skills can improve the quality of teaching/learning in schools.					

SECTION FOUR: Teachers level of knowledge and skills on ICT integration.

3. Please respond to the following items by ticking appropriately; to reflect your competency in the various skills on ICT.

No.	statements	Not competent	Some what competent	Competent	Very competent
(i)	Installing of new software on a computer.				
(ii)	Using a printer.				
(iii)	Using a computer keyboard.				
(iv)	Operating a word processing program (word processing).				
(v)	Operating a spreadsheet program (e.g. Excel)				
(vi)	Operating a data base program (e.g. Access)				
(vii)	Using the internet for communication (e.g. E-mail).				
(viii)	Using the World Wide Web to access information				
(ix)	Using Computers for grade keeping				
(x)	Cleaning a computer by use of anti-virus				

SECTION FIVE: SUPPORT BY GOVERNMENT ON ICT INTEGRATION

4. Please, indicate your reaction to each of the following statements by ticking appropriately, to reflect support provided by the Government towards ICT integration.

No	Statement	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
(i)	In my school teachers have been attending in-service courses sponsored by the government on ICT integration in instruction					
(ii)	Electricity has been installed by the government in this school					
(iii)	The government has greatly motivated us on ICT integration					
(iv)	The government has done some needs assessment on status of ICT integration in schools					
(v)	The government has created awareness to all teachers on ICT integration in this school					

APPENDIX C: COVER LETTER FOR HEADTEACHERS

P.O. Box 3900,
Eldoret,
Kenya.

Dear Sir/Madam,

My names are Nzwili K. Mwendwa and I am a Doctor of philosophy (Ph. D) student at the school of education, Moi University. I am currently conducting a study on the "School preparedness in ICT Integration in primary schools curriculum for effective instruction, a case Kitui County". The study seeks to identify teacher's perception towards ICT integration in education as well as Head teachers' perception in ICT integration.

I am convinced that the best information about ICT in education comes from you. The information you will provide will be highly useful in decision making concerning the future of ICT in education in Kenya.

By taking this survey, your job will not be affected in any way since the information you will provide to us is treated confidentially.

Please complete the questionnaire and feel free to make comment whenever you like it.

Thank you for accepting to provide this valuable information. Your time and effort in completing this questionnaire is greatly appreciated.

Sincerely

NZWILI K. MWENDWA
EDU/D.PHIL.1014/14

APPENDIX D: INTERVIEW SCHEDULE FOR HEAD TEACHERS.

Introduction-Background information.

1. Researcher to indicate the gender of the respondent……..

2. What is your teaching experience……

3. What is your highest professional qualification?

……....

SECTION ONE:

Availability of ICT resource materials

1. Highlight the resource materials that are available in your school for ICT integration

……

……

……

2. Explain if the resource materials which are available in your school are adequate for ICT integration?

.....

.....

.....

3. What challenges are you facing currently on ICT integration in as far as resources materials' and facilities are concerned?

……

……

……

4. How do you feel the challenges can be overcome?

……

……

……

SECTION TWO: PERCEPTION OF HEAD TEACHERS IN ICT INTEGRATION

1. Please respond to the following statements on perceptions of ICT integration by Head teachers.

(i) Do you own a computer/laptop?

……

……

……

(ii) What about your teachers, do you know of some who own personal computers or laptops?

……..

……..

……

(iii) Describe how you use the computer in your instructional process?

……

……

……

(iv) How do you encourage the use of computers to all your staff?

……..

……

……

(v) How often do you sponsor your teachers for ICT integration courses?

……

……

……

(vi) In your own opinion, how can ICT integration in teaching/learning improve on instruction?

……

……

……

SECTION THREE: TEACHERS LEVEL OF KNOWLEDGE AND SKILLS IN ICT INTEGRATION AS WILL BE REPORTED BY HEADTEACHERS

(i)How do you encourage teachers in ICT integration in instruction?

……

……

……

(ii) How do you rate your competency in ICT integration in teaching/learning process?

……

……

(iii)What is the status of knowledge and skills of majority of your teachers for ICT integration in teaching/learning?

……

……

…….

(iv) Describe any in-service training or workshop sessions involving ICT integration that you may have attended or your teachers?

……

……

……

SECTION FOUR: SUPPORT PROVIDED BY GOVERNMENT IN ICT INTEGRATION

(i) How is the government providing support in ICT integration in primary schools?

……

……

……

(ii) How often does the government organize for in-service training for teachers on ICT integration in teaching/learning process?

……

……

……

(iii) How often have you attended the training on ICT integration on teaching/learning process?

……

……

……

(iv) What are some of the topics covered in the training? [For those who have attended the training]

……

……

……

……

……

APPENDIX E: OBSERVATION CHECKLIST

On availability and adequacy of resource materials for ICT isntegration in the school.

materials	**Available &Adequate**	**Available And not Adequate**	**Not available**
(a)laptops/computers			
(b)Whiteboards			
(c)Printers			
(d)Wi-Fi			
(e)Scanners			
(f)Digital Cameras			
(g)Key boards			
(m)Projectors			

APPENDIX F: RESEARCH PERMIT

THIS IS TO CERTIFY THAT:
MR. KITHOME MWENDWA NZWILI
of MOI UNIVERSITY, 892-90200 kitui,has been permitted to conduct research in *Kitui County*

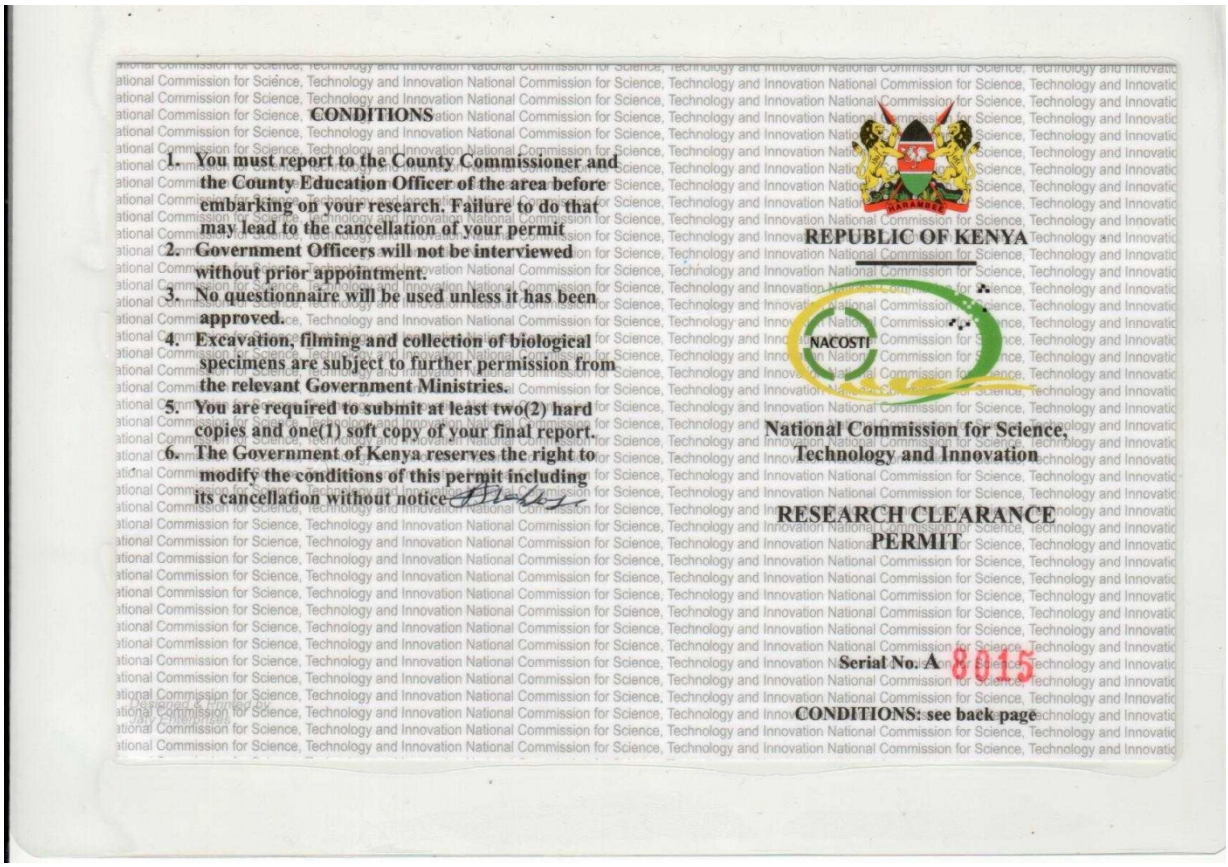
on the topic: *SCHOOL PREPAREDNESS IN ICT INTEGRATION IN PUBLIC PRIMARY SCHOOLS CURRICULUM IN KITUI COUNTY, KENYA*

for the period ending:
26th February,2017

Permit No : NACOSTI/P/16/81836/9861
Date Of Issue : 4th March,2016
Fee Recieved :Ksh 2000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation



CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

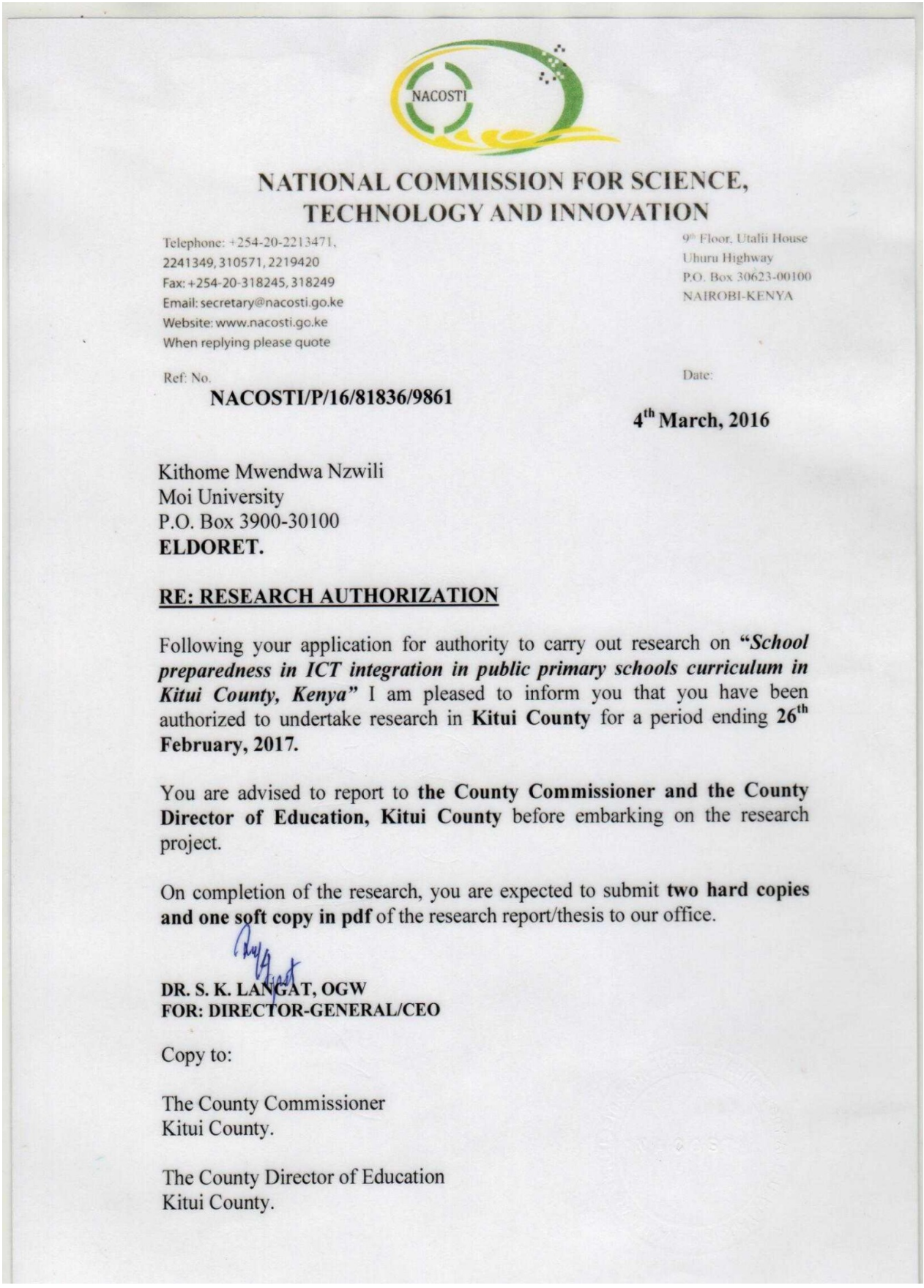
National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 8015

CONDITIONS: see back page

APPENDIX G: RESEARCH PERMIT



NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/16/81836/9861**

Date: **4th March, 2016**

Kithome Mwendwa Nzwili
Moi University
P.O. Box 3900-30100
ELDORET.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"School preparedness in ICT integration in public primary schools curriculum in Kitui County, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Kitui County** for a period ending **26th February, 2017.**

You are advised to report to **the County Commissioner and the County Director of Education, Kitui County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

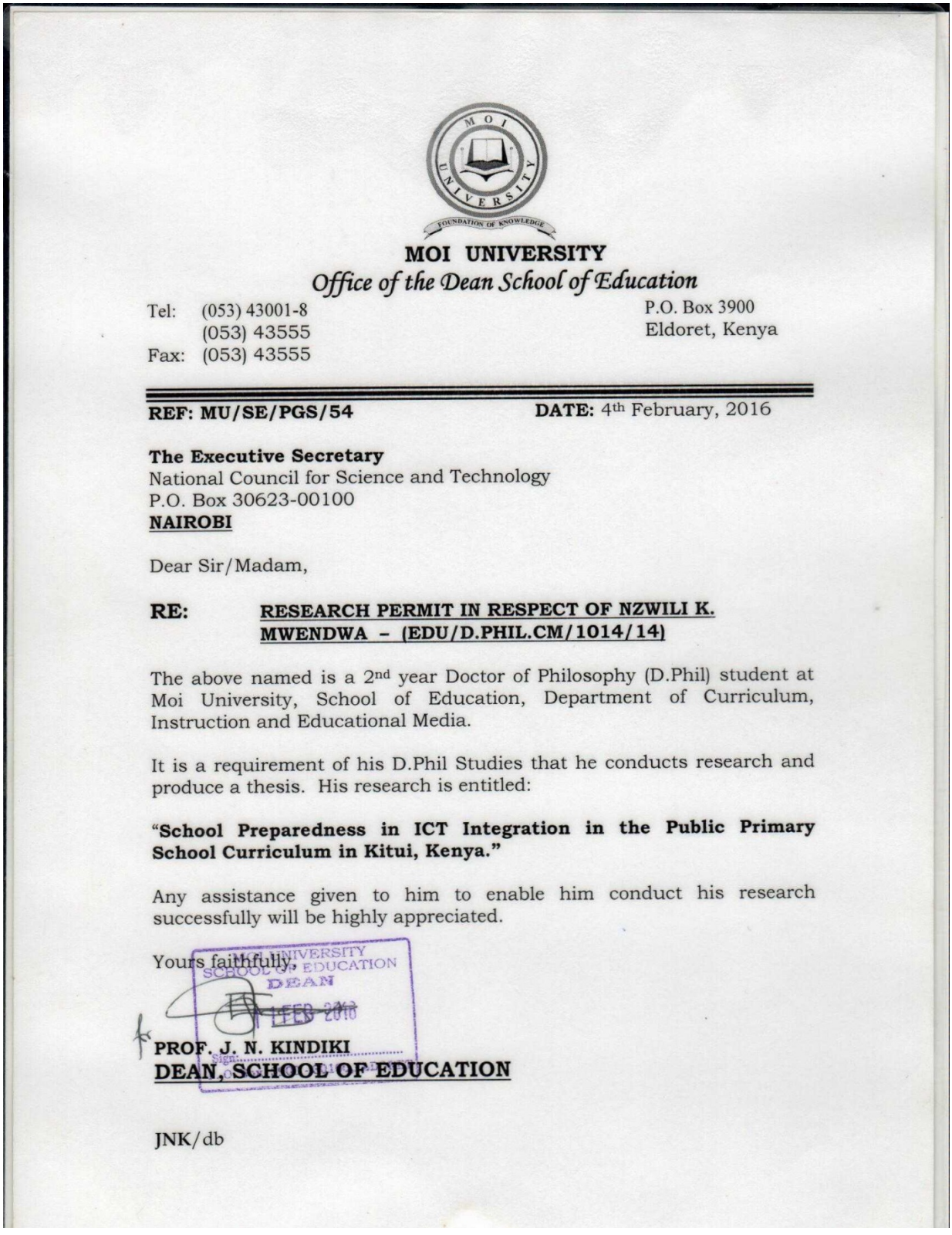
DR. S. K. LANGAT, OGW
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kitui County.

The County Director of Education
Kitui County.

APPENDIX H: RESEARCH PERMIT C



MOI UNIVERSITY
Office of the Dean School of Education

Tel: (053) 43001-8
(053) 43555
Fax: (053) 43555

P.O. Box 3900
Eldoret, Kenya

REF: MU/SE/PGS/54 **DATE:** 4th February, 2016

The Executive Secretary
National Council for Science and Technology
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH PERMIT IN RESPECT OF NZWILI K. MWENDWA – (EDU/D.PHIL.CM/1014/14)

The above named is a 2nd year Doctor of Philosophy (D.Phil) student at Moi University, School of Education, Department of Curriculum, Instruction and Educational Media.

It is a requirement of his D.Phil Studies that he conducts research and produce a thesis. His research is entitled:

"School Preparedness in ICT Integration in the Public Primary School Curriculum in Kitui, Kenya."

Any assistance given to him to enable him conduct his research successfully will be highly appreciated.

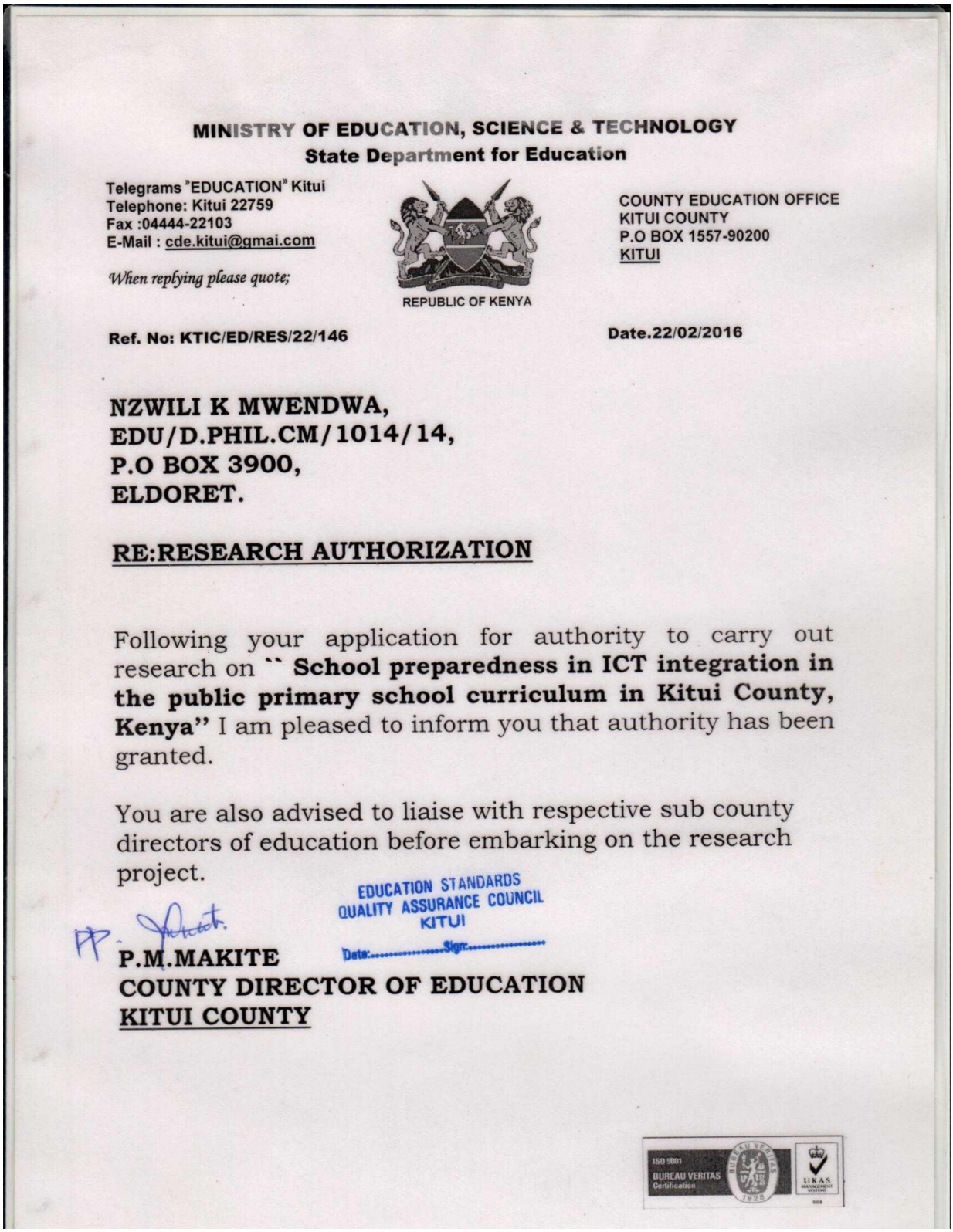
Yours faithfully,

MOI UNIVERSITY SCHOOL OF EDUCATION DEAN FEB 2016

PROF. J. N. KINDIKI
DEAN, SCHOOL OF EDUCATION

JNK/db

APPENDIX I: RESEARCH PERMIT



MINISTRY OF EDUCATION, SCIENCE & TECHNOLOGY
State Department for Education

Telegrams "EDUCATION" Kitui
Telephone: Kitui 22759
Fax :04444-22103
E-Mail : cde.kitui@gmai.com

When replying please quote;

REPUBLIC OF KENYA

COUNTY EDUCATION OFFICE
KITUI COUNTY
P.O BOX 1557-90200
KITUI

Ref. No: KTIC/ED/RES/22/146

Date.22/02/2016

NZWILI K MWENDWA,
EDU/D.PHIL.CM/1014/14,
P.O BOX 3900,
ELDORET.

RE:RESEARCH AUTHORIZATION

Following your application for authority to carry out research on `` **School preparedness in ICT integration in the public primary school curriculum in Kitui County, Kenya''** I am pleased to inform you that authority has been granted.

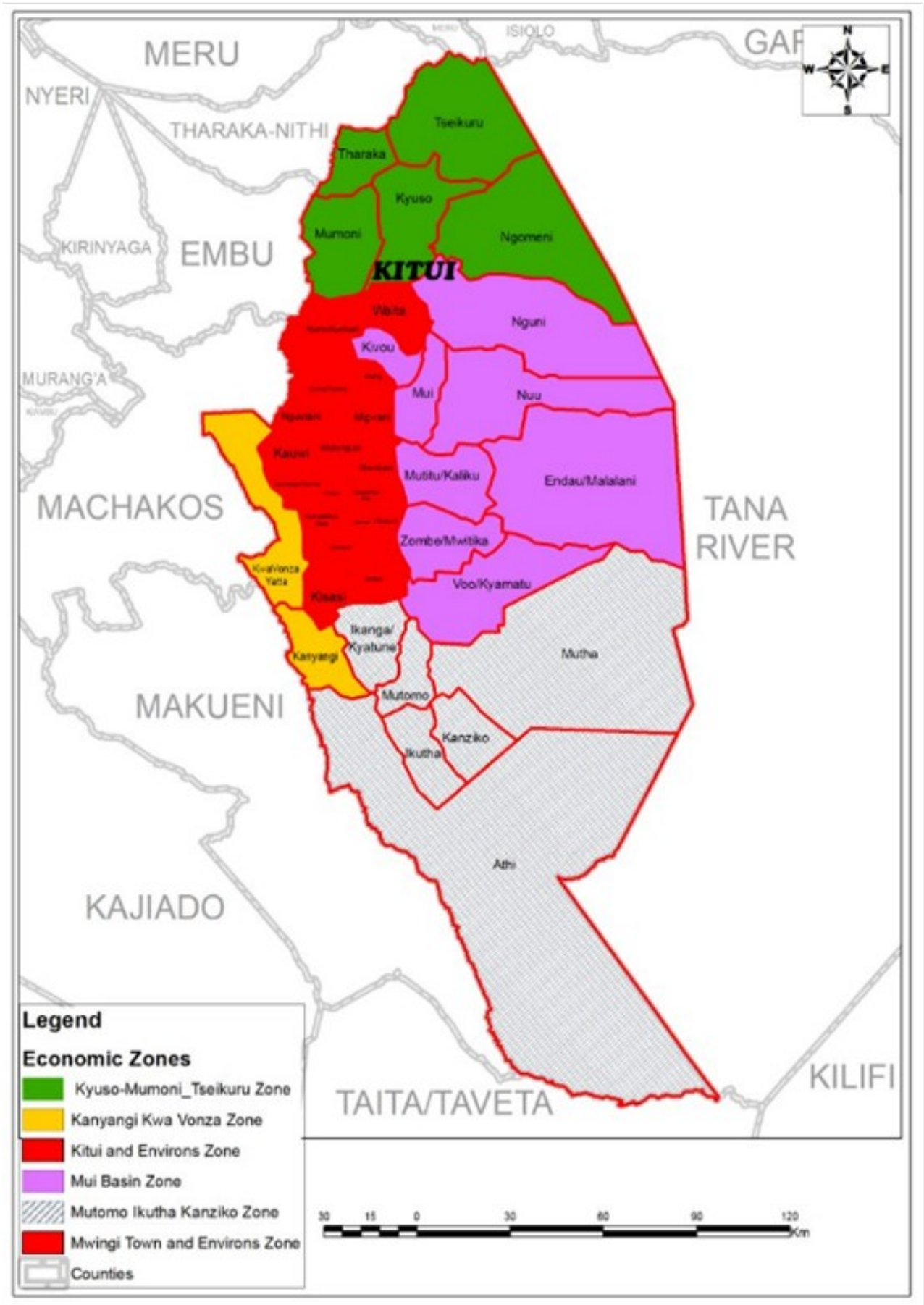
You are also advised to liaise with respective sub county directors of education before embarking on the research project.

EDUCATION STANDARDS
QUALITY ASSURANCE COUNCIL
KITUI
Date:.....Sign:.....

PP.

P.M.MAKITE
COUNTY DIRECTOR OF EDUCATION
KITUI COUNTY

ISO 9001
BUREAU VERITAS
Certification


MERU
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EMBU
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MACHAKOS
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KAJIADO
TANA RIVER
TAITA/TAVETA
KILIFI
Tseikuru
Tharaka
Kyuso
Mumoni
Ngomeni
KITUI
Nguni
Kivou
Mui
Nuu
Mutitu/Kaliku
Endau/Malalani
Zombe/Mwitika
Voo/Kyamatu
Mutha
Ikanga/ Kyatune
Kanyangi
Mutomo
Kanziko
Ikutha
Athi
Legend
Economic Zones
Kyuso-Mumoni_Tseikuru Zone
Kanyangi Kwa Vonza Zone
Kitui and Environs Zone
Mui Basin Zone
Mutomo Ikutha Kanziko Zone
Mwingi Town and Environs Zone
Counties
30 15 0 30 60 90 120
Km