E-LEARNING READINESS AND ICT USAGE AMONG PUBLIC PRIMARY SCHOOLS IN ATHI RIVER SUB-COUNTY

BY

SITIENEI, PHYLLIS J.

D61/61469/2013

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE AWARD OF MASTER OF BUSINESS ADMINISTRATION DEGREE OF THE UNIVERSITY OF NAIROBI

OCTOBER, 2015

DECLARATION

This proposal is my original work and has not been presented for a degree in any other University.

Sitienei Phyllis J.   …………………..   ………………..
Reg: D61/61469/2013   Signature   Date

This project proposal has been submitted for examination with my approval as University Supervisor.

Dr. Kate Litondo   ………………..   ………………………
                                            Signature   Date

DEDICATION

I dedicate this work to my family, my husband Mike and our children Davina, Diana and Jeremy for their constant love, support and encouragement. I cannot forget to mention my mum and my siblings for their prayers and moral support.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This study sought to investigate the status of e-learning readiness in public primary schools in Athi River Sub-County, given the government's plans to provide schools with ICT equipment for use in instruction under the laptop computer project (LCP). However, there is little empirical information on whether the Kenyan primary school teachers have the requisite capacity to implement the LCP in their classrooms. Available empirical literature touched on e-learning readiness in secondary schools and institutions of higher learning but little is said on e-learning readiness in Kenyan primary schools. Consequently this study was designed to fill this knowledge gap by assessing the e-learning readiness of public primary schools in Athi River Sub-County, establishing their level of ICT usage; determining their challenges in adopting e-learning and the relationship between e-learning readiness and ICT usage. The study adopted a census survey design by gathering data from all the 35 public primary schools in Athi River Sub-County. The data was collected for this study from 46 head teachers/teachers using structured questionnaires in a drop and pick later method. The obtained data was analysed using descriptive statistics. The findings showed that schools in Athi River Sub-County are not ready to roll out LCP presently, since their e-learning readiness is low given that teachers are currently inadequately trained and the schools have insufficient basic ICT infrastructure and equipment, such as internet connectivity, computer laboratories and Laptops/Tablets/Computers. Furthermore the schools do not have e-learning content nor an ICT curriculum. The study recommended that The ICT training offered to teachers should be comprehensive enough to enable teachers teach and use ICTs effectively; the government should provide schools with ICT equipment and connect them with internet; computer labs should be built in all schools instead of supplying Laptops/Tablets which will benefit only a few pupils; e-learning content and an ICT curriculum should be developed before the LCP programme roll out.

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Information Communications Technologies (ICTs) is an umbrella term that includes any communication device or application, encompassing radio, television, cellular phones, computer, and network hardware and software as well as satellite systems. It also includes various services and applications associated with ICTs, such as video conferencing and distance learning (Wu, 2012). ICTs utilize both telecommunication and computer technologies to transmit information (Njuguna, 2013). It consists of hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information (voice, data, text, and images). Hand held devices like mobile phones are also part of ICT (Mungo, 2014).

It is possible to use ICT applications to support sustainable development in diverse fields including public administration, commerce, health, banking, communication, education and training. For example the Ministry of Education has adopted ICT broadly in three ways: ICT as an administrative tool referred to as e-government, ICT for teaching and learning also known as e-learning, and ICT for education management also known as Education Management Information System (EMIS)(Kiilu and Muema, 2012). In the field of administration, ICTs have been used to expedite the decision making process as well as to reduce paper work, improve efficiency, transparency and accountability. Thus enabling ICTs to transform various aspects of human life. While ICTs continue to advance in western countries, African countries still experience a lag in its implementation, and that continues to widen the digital and knowledge divides (Kinuthia,

2009). This concern has led many countries in the developing world to take more interest in ICT. Many such countries are conducting surveys, programmes, and formulating policies to help exploit the ICT potential for socio-economic benefits (Ngare, 2007).

In the field of education, integration of ICTs in teaching and learning will help revolutionize an outmoded system of education, thus contributing to an improved learning environment, rapid expansion of knowledge, improved examination outcomes, enhanced communication and technical efficiency (Song, 2010). ICTs enable students to acquire skills and competencies that are fundamental for survival in the emerging competitive and global "knowledge" economy (Chunwijitra, 2013). Adoption of ICT in schools will also accelerate national development efforts by increasing the cost effectiveness of education programmes, facilitating globalization as well as improving the quality of education (Wu, 2012).

1.1.1 Learning Concept

According to Merriam Webster dictionary, learning is the activity or process of gaining knowledge or skill by studying, practicing, being taught, or experiencing something. Moreover, a learning method is any intervention that is deliberately undertaken to assist the process of learning at individual, team or organisational level, according to the Chartered Institute of Personnel and Development (CIPD). Several learning methods have been described in literature and include: traditional learning, distance learning, e-learning, blended learning, mobile learning, and personalized learning (Oketch et al, 2014). Nowadays, learning institutions are adopting modern approaches and pedagogy where the learner controls his or her learning (Oketch et al, 2014).

2

1.1.2 E- Learning

Electronic learning (e-learning) is an example of the use of ICT-supported teaching and learning methods. E-learning is the type of learning conducted via electronic media, typically on the internet (Owino, 2013). Ferdousi (2009) defines e-learning as all forms of electronic-supported learning and teaching, which are procedural in character and aim to effect the construction of knowledge with reference to individual experience, practice and knowledge. ICTs will therefore accord educational and other institutions an opportunity to exploit technology to complement and support the teaching and learning process (Maruti, 2010).

According to Oketch et al (2014) e-learning is supported by electronic hardware and software, either online (synchronous) or offline (asynchronous). It can be delivered as self-paced or instructor-led, either individually or on group basis and can be used as a hybrid to the face-to-face format, or exclusively in open distance learning (Njagi, 2013). It can also be offered through electronic media such as CD-ROMs, DVDs, mobile phones, Television, Video Conferencing (VC), e-mail, interactive TV and satellite among others (Oketch et al, 2014). E-learning signals a paradigm shift in education and encompasses learning at all levels. It uses ICTs for course delivery, interaction, evaluation and/or facilitation. Effective study and success of E-learning, however, usually depends on the self-motivation and discipline of the individuals involved (Kipkirui, 2014).

1.1.3 Challenges of E-Learning

Many challenges face the implementation of e-learning in Africa and other developing countries. These include connectivity (low bandwidth) and accessibility, inadequate telecommunications infrastructure and lack of reliable power supply. The cost of acquiring ICT hardware and software, maintenance and repair of ICTs are other prohibitive factors to ICT use in education (Owino, 2013). However, frequent power outages that hinder e-learning readiness in various schools can be reduced if they invest more on power backup systems and alternative power sources (Njuguna, 2013). Other dynamics affecting e-learning adoption include the learner's computer anxiety, instructor attitude toward e-learning, e-learning course flexibility, e-learning course quality, perceived usefulness, perceived ease of use, and diversity in assessments (Njuguna, 2013)

1.1.4 E- Learning Readiness

The concept of e-readiness emerged in early 2000 and measures the preparedness of institutions and countries to take part in the digital economy (Song, 2010). By so doing, it provides a framework for evaluating the digital divide between various countries. Kingori (2014) and Owino (2013) define e-readiness as a measure of the degree to which a country, nation or economy may be ready, willing or prepared to obtain benefits which arise from ICTs. According to Wu (2012), e-readiness is assessed using four interrelated variables namely: human skills, infrastructure, access and connectivity.

Whereas e-readiness refers to the preparedness to adopt ICT in general, e-learning readiness refers to how ready an organization/institution is to implement e-learning (Ferdousi, 2009). Ojwang (2012) avers that e-learning readiness is the assessment of certain factors that should be considered if organizations are to succeed in implementing an e-learning strategy. Thus, e-learning readiness is a subset of e-readiness. E-learning readiness can therefore be defined as the state of being ready or prepared to implement e-learning. This study defines e-learning readiness as the "mental or physical preparedness of an organization for some e-learning experience or action". The focus of this study will be on e-learning readiness, by assessing the readiness of primary schools in Athi River Sub-County to implement e-learning. According to Ojwang (2012) the factors used in assessing e-learning readiness, and which will be adopted by this study, include: teachers' computer literacy, availability of e-learning infrastructure (technology) and availability of subject content.

1.1.5 E-learning readiness and ICT adoption

ICTs have been touted as potentially powerful enabling tools for educational change and reform and many of the productivity gains in the developed world economies over the past decade to a great extent can be attributed to the impact of ICT (Kiilu and Muema, 2012). For a country to effectively adopt ICTs, it must be "e-ready". E-readiness is achieved by providing the requisite infrastructure and ensuring the populace has access to ICTs. Further the legal and regulatory framework on ICT usage must be in place. E-learning is the delivery of course content through ICTs. However to adopt ICTs for teaching and learning is not just a matter of availing those ICTs-there must be e-learning

readiness. E-learning readiness is achieved through the provision of the necessary ICT facilities and building the infrastructure in terms of the hardware, software, networks and internet connectivity (Ojwang, 2012).

1.1.6 Athi River Sub-County

Athi River is a Sub-County in Machakos County. The County comprises of 8 Sub Counties, namely Yatta, Kangundo, Masinga, Mwala, Athi River, Kathiani, Matungulu and Machakos Town. It borders Nairobi and Kiambu counties to the West, Embu to the North, Kitui to the East, Makueni to the South, Kajiado to the South West, Murang'a and Kirinyaga to the North West. Machakos County stretches from latitudes 0° 45' South to 1° 31' South and longitudes 36° 45' East to 37° 45' East and covers an area of 6,208 KM^{2}. Its total population is 1,098,584 (male: 49.4%, female:50.6%). In terms of settlement, 52% of its population is urban and 48% rural.

Machakos County was purposively chosen, while Athi River Sub-County was randomly picked from the 8 sub-counties as the study area. The Sub-County comprises of 8 locations, namely: Athi River Township, Athi River North, Kinanie/Mathatani, Lukenya, Mlolongo, Katani and Kamulu. The locations are further divided into a total of 18 sub-locations. Athi River Sub-County has a population of 139,502 spread over an area of 843.2 KM^{2}. It has 38 secondary schools: 14 public and 24 private. The primary schools are 171: 35 public and 136 private. Of the 35 public primary schools, 9 are in the urban areas while 26 are in the rural areas.

Machakos County was purposively selected so as to establish whether the local schools have laid the necessary foundation for e-learning readiness among primary school pupils; given their proximity and future potential as employees of the nearby Special Economic Zones (SECs) and the nascent Konza Techno-City. Furthermore, the County is a constituent of the greater Nairobi Metropolis and as such, has a thriving industrial belt, stretching out along Mombasa Road all the way to Konza Techno-City. Hence the need for an ICT-compliant workforce. It is therefore imperative for schools in the study area to start laying the foundation for the requisite knowledge-based workforce.

Presently, Machakos County is perceived as a trend setter in county development and governance (Daily Nation, 29th April, 2015). The study therefore sought to establish whether e-learning readiness in primary schools is part and parcel of its development initiatives, given the thriving industrial activities in this area. The County also performs fairly well in KCPE examinations (Njagi, 2013), hence the need establish whether adoption of ICT plays a role in this performance. Besides, Machakos County has a good blend of rural and urban schools, considering the fact that 52% of its population is urban-based. The County therefore provides an appropriate setting for comparison of e-learning readiness between rural and urban schools.

1.2 Statement of the Problem

It has been noted that while ICTs continue to advance in western countries, African countries still experience a time lag in its implementation, hence the persistence of the digital divide (Kinuthia, 2009). This divide has, therefore prompted countries in the

developing world, Kenya included, to take more interest in ICT. Consequently many Third World countries are in the process of conducting surveys, programmes, projects and formulating policies, all aimed at exploiting the ICT potential for socio-economic benefits and to develop a competitive advantage (Owino, 2013).This study is therefore an addition to the on-going research effort, albeit on a modest level.

A recent research by Ojwang (2012) established that less than 20% of secondary schools in Kisumu were ready to roll out e-learning curriculum, since an overwhelming majority of the schools lacked adequate ICT infrastructure and connectivity. Given the limited financial endowment and diverse geographical diversity of primary schools, their level of e-learning readiness is likely to be even worse. Hence the need to establish the level of readiness of primary schools to roll out the computer project (LCP), a key pillar of the Kenya Government's vision 2030 development programme.

The Jubilee government is set to provide schools with ICT equipment for use in instruction, under LCP. It is necessary for teachers to be prepared for this exercise. However, there is little empirical information on whether the Kenyan primary school teachers have the requisite capacity to implement the LCP in their classrooms, considering the fact that a majority of teachers from resource-poor and far-flung areas of Kenya are yet to see a computer (Kipkirui, 2014). While the available empirical literature touched on e-learning readiness in secondary schools and institutions of higher learning (Ojwang (2012) and Oketch et al (2014)), little is said of e-learning readiness in Kenyan primary schools. There is therefore an urgent need to ascertain the level of e-learning

readiness in public primary schools in the country in view of the planned roll-out of the LCP. Consequently this study was designed to fill this knowledge gap by attempting to assess the e-readiness of the public primary schools. The study, therefore sought to gauge the level of knowledge, understanding and usage of ICTs in public primary schools by assessing the e-learning readiness of public primary schools in Athi River Sub County in particular. The Study aimed to answer the following research questions: a) What ICT devices are used by primary schools in Athi River Sub-County? b) How ready are the schools in Athi River Sub County to embrace ICTs? c) What are the challenges facing primary schools in Athi River Sub-County in adopting e-learning? d) Has e-learning readiness influenced the adoption of ICTs in public primary schools in Athi River Sub-County?

1.3   Research Objectives

The general study objective is to assess the e-learning readiness of public primary schools in Athi River Sub County. The specific objectives are to:

    i)   Find out the level of ICT usage by primary schools in Athi River Sub-County.

    ii) Establish the e-learning readiness among the primary schools in Athi River Sub County.

    iii) Determine the challenges facing primary schools in Athi River Sub-County in adopting e-learning.

    iv) Establish the relationship between e-learning readiness and ICT usage in the primary schools in Athi River Sub County.

1.4   Value of the Study

In line with the government's plans to introduce laptop computers in primary schools in the country, this study was timely since it helped to gauge the readiness of schools to implement the project. As such, therefore, the study was significant since it was likely to yield important empirical data and information on the preparedness of schools and teachers to use computers for teaching and learning. The findings may also generate policy input for educational researchers and planners to design and implement effective ICT policies. Moreover, the findings may assist teachers implement ICT innovations in schools and enable education stakeholders to make informed decisions on the use of laptop computers in schools.

Furthermore, the study was expected to augment existing literature in the field of ICT in general, and to positively impact on the quality of education in particular. By so doing, it contributed to policy formulation and implementation of ICTs in learning institutions. The likely consumers of the study findings are: policy makers in the Ministry of Education who are involved in the planning and integration of ICTs; teachers as users of ICTs; and government officials in charge of ICT policy. All these stakeholders may employ the findings to develop appropriate policies and strategies for effective integration of LCP in schools. It may also empower them to revise and roll out effective e-learning curriculum in schools. As regards matters of scholarship, this study may add to the body of knowledge in ICT adoption and integration particularly in primary schools in Kenya. It may also inspire prospective researchers to explore other areas of e-learning and form the basis for future research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews available literature on the use of ICTs, particularly in the education sector. The sub-themes covered are: Information Communication Technologies, ICTs in Education, types of e-learning, e-learning readiness, e-learning readiness assessment models and the conception framework.

2.2 Information and Communication Technologies (ICTs)

Increasingly, governments, educational organizations and researchers are supporting the view that incorporating ICTs in teaching and learning is an important aspect of keeping the curriculum relevant and preparing students for the future (Njagi, 2013). ICTs also have the potential to transform the nature of education: where and how learning takes place and the roles of students and teachers in the learning process (Mungo, 2014). According to the Song (2010) and (Owino, 2013), ICTs have the potential to revolutionize pedagogical methods, expand access to quality education, and improve the management of education systems. In addition, they can provide an array of powerful tools that may help in transforming the present teacher-centred and text-bound classrooms into rich, student-focused, interactive, knowledge-based environments (Oketch et al, 2014).

Adoption of computers in schools has been recognized as a way of making the education process more efficient, richer and relevant (Maruti, 2010). This is more so with the recent adoption of multimedia, multisensory-based innovative computer-based instruction (CBI). CBI developers employ sophisticated hardware and software tools that allow for the creation and use of high quality 2 and 3-dimension images, drawings and models. Further, CBI has enabled creation of 2 and 3- dimension animations/simulations, audio elements, and video components. These capabilities have facilitated the development of high quality instructional products that engender quality learning. According to Ferdousi (2009), CBI systems are more effective than conventional instruction and the levels of introducing computers in the curriculum vary. For instance, with the wider availability of good software packages, computers are being introduced even in the first year of school.

2.3 ICTs in Education

The first computers to be put to use were the MARK 1 and ENIAC, at the Harvard and the University of Pennsylvania in 1944 and 1946 respectively. In 1959, Donald Battier of the University of Illinois began PLATO, the first, large-scale project for the use of computers in education. This means the era of computers in education is a little more than 50 years old (Kipkirui, 2014). The mainframe computer entered Kenya in 1967 and was used by Kenya National Examination Council to process examination results. Nairobi University and the then Kenya Polytechnic begun to offer Computer Courses in the 1970s. In 1980 Starehe Boys Centre became the first secondary school in Kenya to introduce computer education.

E-learning refers to the use of the electronic media for teaching and learning at a distance (Njuguna, 2013). The electronic media include the internet, computers, DVDs, CD-ROMs, video tape, television, radios, satellite broadcast, intranets, extranets, and cell phones amongst others. Ojwang (2012) argues that e-learning refers to the methods of learning which uses electronic instructional content delivered via the internet. Other terms used to describe e-learning include: online learning, virtual learning, distributed learning, and web-based learning. The term e-learning has also been understood to describe educational technology that electronically supports learning and teaching (Song, 2010). E-learning is dependent on the effective communication process of the knowledge across an electronic medium. The capacity to have a two-way communication between teachers and learners and among learners themselves further enhances the ability to learn since learning does not occur in a vacuum but rather in a social context (Ojwang, 2012).

2.3.1 Types of E-learning

E-learning incorporates all educational activities that are carried out by individuals or groups working online or offline, and synchronously (real-time) or asynchronously (flextime) via networked or standalone computers and other electronic devices (Naidu, 2003) as summarized in the Figure 2.1 below:

Figure 2.1: Types of E-learning

Individualized self-paced e-learning *online*	Individualized self-paced e-learning *offline*
Group-based e-learning *synchronously*	Group-based e-learning *asynchronously*
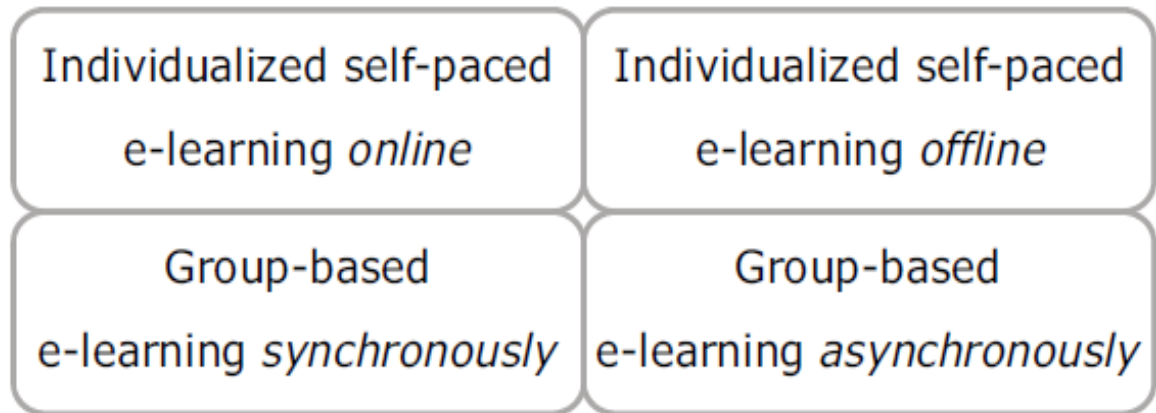
Source: Naidu (2003)

Synchronous e-learning involves learners and instructors having regular, scheduled sessions where either they all meet simultaneously online, or use electronic forums to exchange ideas in their own time (Oketch et al, 2014). The most common synchronous electronic communication is real-time two-way text-based online chat (Kingori, 2014). The synchronous instruction is not only the physical presence of the instructor and the student at the same place but can also include virtual classrooms, which use information and communication technologies to mimic a traditional classroom environment (Njagi, 2013). Thus synchronous instruction may involve video-conferencing or the use of shared electronic whiteboards, that allow learning materials to be created and modified in real time, by the instructor or the learners (Wu, 2012). On the other hand asynchronous instruction allows participants to control their own timetables and fit learning around their other commitments (Maruti, 2010). This works well for learners with busy lives. Many of the technologies used in asynchronous e-learning also permit two way communication between learners and instructors, or multi-directional, collaborative communication among learners themselves (Chunwijitra, 2013).

The extent of the e-learning technology use in course delivery is dependent on the dynamics such as the distance between the teacher and learners (Njuguna, 2013) and time when learning is taking place. When E-learning is described by using the criteria of time and distance, we get other types of E-learning as shown in table 2.1 below:

Table 2.1: E learning Delivery Model

	Near In Place	**Partly Distant**	**Distant in Place**
Distant in Time	A synchronous e learning e.g. taking a self-paced course, exchanging email address with mentor and posting messages about a topic in a discussion group.		
Distant in Time			Trainers and Trainees never meet e.g. course materials are distributed through internet and communication is through emails.
Partly Distant in Time	Face to face training is combined with for example electronic conferencing within one organization	Trainers and Trainees meet for a kick off and for an evaluation. The learning goes on a distance on at a distance in time and place.	Trainers and Trainees use electronic tools to communicate about a problem or course items
Near in Time	Synchronous e learning: Communication occurs at the same time between individuals and information is accessed instantly		
Near in Time			Trainers and trainees do not meet physically but by using for example a video conferencing system

Source: Ferdousi (2009)

The students can be involved in e-learning from distributed locations, as in distance learning, or from the same place, such as using a group support system in a classroom to work on an assignment (Njuguna, 2013). E-learning applications also differ in the levels

of collaboration involved. Some courses are entirely independent and individual, while others incorporate some elements of group learning such as discussion forums or chat rooms (Oketch et al, 2014). The mode of course delivery can be entirely electronic (with or without an instructor) or take a more blended approach integrating electronic and classroom delivery to varying extents (Song, 2010). Many current e-learning offerings follow the latter mode, taking advantage of the benefits of both types of delivery (Kingori, 2014).

2.4 E- Learning Readiness

E-learning readiness can be defined as the state of being prepared or ready to roll out an e-learning program (Kingori, 2014). It can also be defined as the mental or physical preparedness of an organization for some e-learning experience or action (Song, 2010). Several characteristics enhance the e-learning readiness. In this context, Mungo (2014) notes that before embarking on e-learning implementation, it is crucial to decide on the commencement and model of e-learning to create a strong technology plan for teachers. This is because the barriers to the effective use of technology involve teachers' attitudes and resistance to change, training deficiencies and inadequate access (Njagi, 2013). In addition, the need for administrative support, adequate funding, and training has been identified as essential to facilitate change. Several dynamics influence the e-learning readiness among the learning institutions in Kenya (Kipkirui, 2014). These dynamics range from technology, prospective users, local context of use and the associated costs among others (Song, 2010).

2.5 E-learning Readiness Assessment Models

Literature on organizational readiness for e-learning provides managers with questions, guidelines, strategies, models and instruments for assessing their organizations' e-learning readiness (Oketch et al, 2014). E-learning readiness can be assessed/evaluated by looking at an individual's technical experience and competency to use ICTs. Oketch et al (2014) posit that the competency should be supported by the individual's capability to direct his or her own training through appropriate knowledge, skills, attitudes and habits. Literature on e-readiness contains a significant number of models that have been developed to explain the e-learning readiness. Some of them include the Chapnick model in 2000, Borotis and Poulymenakou model in 2004, Aydain and Tasci model in 2005 and Engholm's model in 2002 (Njuguna, 2013; Ojwang, 2012).

The Chapnick model examined eight factors influencing the e-learning readiness. These factors include: psychological, sociological, environmental, human resources (HR), financial readiness, technological skill (aptitude) readiness, equipment readiness, and content readiness (Song, 2010). Since no model is ideal, it is imperative to adopt a model that covers all possible challenges and delivers a complete set of required data (Okinda, 2014).

Table 2.2: Chapnick Model of E-learning Adoption

E-Learning Readiness Factors	Explanation of Factors
Psychological Readiness	The effect of an individual's state of mind on the outcome of the e-learning initiative. Considered a particularly important factor because it can sabotage the implementation process
Sociological Readiness	The interpersonal aspects of the environment within which the e-learning program will be implemented
Environmental Readiness	The major force operating on stakeholders, both inside and outside the organization
Human Resource Readiness	The availability and design of the human support system
Financial Readiness	The budget size and allocation process for the e-learning program
Technological skill (aptitude) readiness	The observable and measurable technical competencies of the organization and individuals involved.
Equipment Readiness	Possession of proper equipment
Content Readiness	The subject matter and goals of the construction

Source: Ferdousi (2009)

Aydain and Tasci in 2005 developed a model with seven categories: human resources, learning management system, learners, content, Information Technology, finance and vendor (Ojwang, 2012). The model was based on the argument that e-learning facilities

are often sourced from external suppliers. It considers the average educational level of an organization's employees and whether it has skilled human resource specialists, an e-learning champion (leader) and whether there are enough e-learning vendors and external e-learning experts (Wu, 2012).

Borotis and Poulymenakou model examined different aspects that indicate the level of e-learning readiness which include business, technology, content, training process, culture, human resources and financial aspects.

Figure 2.2: Borotis and Poulymenakou Model of E-learning readiness

Business	**Technology**	**Content**
• Link e-learning strategy with business strategy • Align with external environment • Organization's support and Change Management	• Degree of access • Technology infrastructure	• Availability of ready content • Standards Compliance

E Learning Readiness

Training Process	**Culture**	**Human Resource**	**Financial**
• Organize • Analyze • Design • Develop • Implement • Evaluate	• Behaviours, beliefs, institutions • Degree of use of e learning • Eagerness for involvement • Training transfer climate • Organization's perception	• Suppliers • Customers	• Budget for e learning • Revenue model

Engholm (2002) developed a model that is simple to understand, with factors considered appropriate in an organization's e-learning readiness assessment. The model is also comprehensive and summarizes a wide range of organizational and individual issues. The issues include the organization's culture, individual learner, technology, content and organizational and industry factors.

Table 2.3: Engholm's Model for E-learning Readiness

E-learning Readiness Factors	Explanation of Factors
Organization's culture	This is a very important factor since in a culture where there is a shared view of the benefits of training and learning, employees would be encouraged to learn, provided with opportunities and time to learn.
Individual learner	E-learning focuses strongly on individual learning due to its availability and flexibility
Technology	E-learning by definition depends on access to a computer and Internet and/or Intranet.
Content	E-learning readiness is determined by the measurement of content readiness. That is, is the content easily available? , Is it well structured? And is it reusable?
Organizational and Industry Factors	E-learning is suited to organisations that need information and knowledge to be quickly created, processed and disseminated or those with many geographically dispersed employees needing to access the same or similar material

Adapted from Engholm (2002)

2.6 Conception Framework

The e-learning readiness of a school influences how it implements e-learning since the school has to demonstrate readiness by availing the necessary ICT facilities. This involves building the infrastructure in terms of the hardware, software, networks and internet connectivity. Further, skilled personnel are needed besides the availability of appropriate content, for the school to embark on the E-learning adoption process. E-

learning readiness will also be influenced by the personal characteristics of teachers such as age, gender, training as well as teaching experience. These characteristics determine how they receive and integrate e-learning in their teaching. School characteristics like the size, location, whether day or boarding will also play a major role in the adoption process. Based on the review of e-learning readiness models, the conceptual framework below was developed to guide the study.

Figure 2.3: Conceptual Framework
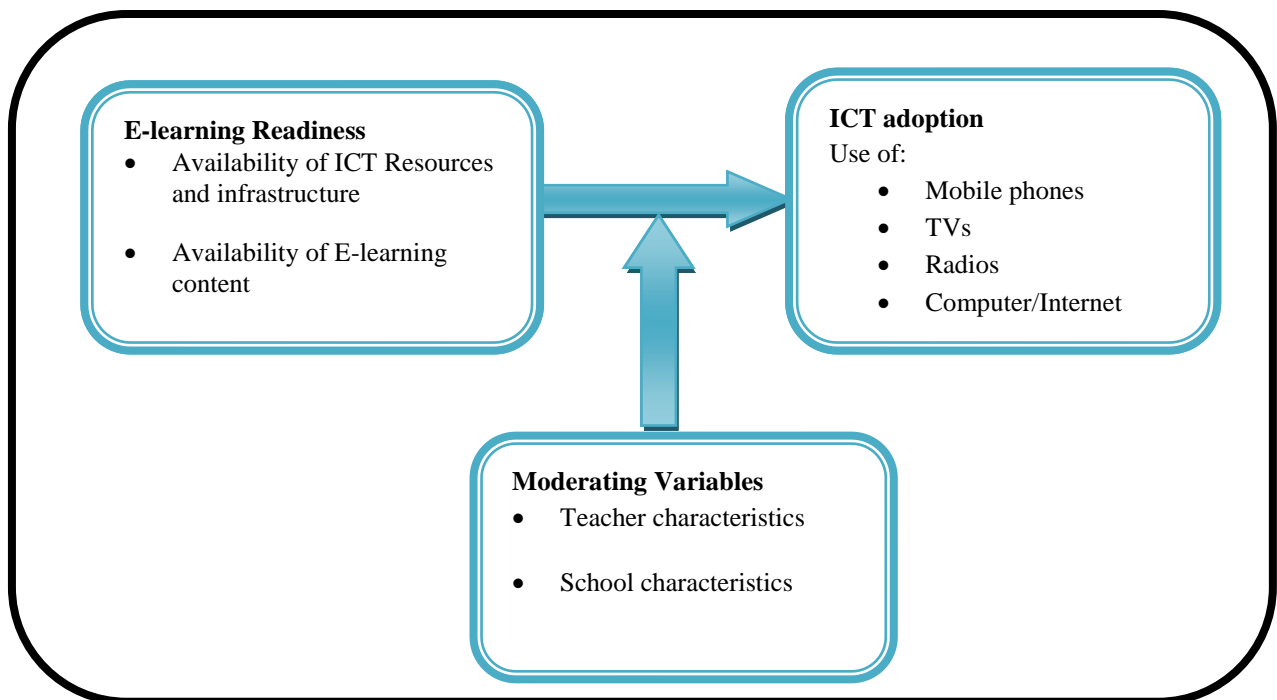
Source: Own Compilation

2.7 Summary of Literature Review

E-learning is the use of electronic media for teaching and learning (Njuguna, 2013). However, according to Owino (2013) implementation of e-learning in the developing countries is slowed by low connectivity (low bandwidth) and accessibility, inadequate telecommunications infrastructure, lack of reliable power supply, among other

challenges. For successful implementation of e-learning, e-learning readiness must first be established. Many models have been developed to explain the e-learning readiness. For example, Chapnick (2000), Borotis and Poulymenakou (2004), Aydain and Tasci (2005) and Engholm's (2002) (Njuguna, 2013; Ojwang, 2012). However, models have to be chosen according to their appropriateness to organizations being assessed. Ojwang (2012) avers that e-learning readiness can be assessed using teachers' computer literacy, availability of e-learning infrastructure (technology) and availability of subject content. This study is similar to the ones done by Ojwang (2012), Kiilu and Muema (2012) and Ouma et al (2013), but differs by the fact that the previous studies explored public secondary schools, while the current study will be looking at public primary schools.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

According to Cooper and Schindler (2003), research design outlines the methods for data collection, measurement and analysis and can be named in terms of time horizons, choice of methods or strategies used to collect data. The study utilized the descriptive research design.This is considered the most appropriate research design as the researcher is interested in determining and reporting the way things are without manipulating variables (Mugenda, 2003).

3.2 Population and Sampling

Population is defined as the entire group of individuals or items under consideration in any field of inquiry and has a common attribute (Mugenda and Mugenda, 1999). Whereas Nzioka (2013) defines population as a well-defined set of people, services, elements and events, group of things or households that are being investigated. The target population of the study will be the 35 public primary schools in Athi River Sub-County.

The two types of surveys used to collect data are: sample and census surveys. In a sample survey, information is obtained from a part of the total population then it is used to make inferences about the whole population. A census survey is a collection of information from all units in the population or a complete enumeration of the population. A census yields more accurate information about the population than a sample survey. Since data was to be collected from all the 35 primary schools, the study was therefore a census. The head teacher and one other teacher (preferably a designated computer teacher) were interviewed to give a total of 70 respondents.

3.3 Data Collection

Primary data was collected for this study using structured questionnaires in a drop and pick later method. In this method, the questionnaires were presented to the respondents and picked at a predetermined later time. The questions were divided into sections to correspond to the study objectives. Section A dealt with general information of the respondents and the school. Section B sought information on the extent of e-learning usage in public primary schools in Athi River Sub-County. Section C sought information on e-learning readiness while section D sought information on the challenges of e-leaning in public primary schools in Athi River Sub-County. Section E sought suggestions for promoting ICT adoption in Athi River Sub-County.

3.4 Data Analysis

The collected data was cleaned and coded to eliminate questionnaires that are incomplete or with identifiers that may introduce any bias. After cleaning, the data was entered into the Statistical Packages for Social Sciences (SPSS) for analysis. Microsoft excel spreadsheet was also used in performing calculations and presenting results in a way that is easy to understand. Data analysis was done by the use of descriptive statistics, regression and correlation; and presented using percentages, means, standard deviations, and frequencies.

Table 3.1: Data Analysis

Objective	Means of data collection	Measurement
Extent of e-learning usage	Questionnaire	Descriptive statistics
E-learning readiness	Questionnaire	Descriptive statistics
Challenges in adopting e-learning	Questionnaire	Descriptive statistics
Relationship between e-learning readiness and ICT usage	Questionnaire	Regression and Correlation

The Regression Model

The following Regression Model was used to test the relationship between e-learning readiness and ICT adoption:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + e$$

Where **Y** is the ICT Adoption

α_0 is the constant

X_1 is the E-learning Readiness

X_2 is the teacher characteristics

X_3 is the school characteristics

4.1:Introduction

This chapter contains data analysis, discussion and study findings. Data was collected from 33 head teachers and 13 teachers of public primary schools in Athi River Sub-County. After which it was summarized and presented in form of frequency, percentage and cumulative percentage tables. Pie and bar charts are also used to present the data. Subsequently, the summarized data was analyzed and interpreted in line with the study objectives. The specific objectives were: to find out the level of ICT usage by primary schools in Athi River Sub-County; their e-learning readiness; establish the challenges they face in adopting e-learning and the relationship between e-learning readiness and ICT usage. Below here is the thematic presentation of the study findings.

4.2: Questionnaire Responses

For this study, the researcher distributed 70 (2 per school) questionnaires to the 35 public primary schools in Athi River Sub-County. However due to the teachers' strike at the time of collecting data, only 46 completed questionnaires from 33 schools were returned. This represented a 65.7% response rate, which was considered sufficient to make tentative generalizations and conclusions about the study.

Table 4.1: Questionnaire Response Rate

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Responses	46	65.7%	65.7%	65.7%
Non Responses	24	35.3%	35.3%	100%
Total	70	100%	100%	

Source: Research Data

Figure 4.1: Response Rate

Response from Schools as a percentage

34.30%

65.70%

■ Responses
■ Non Responses
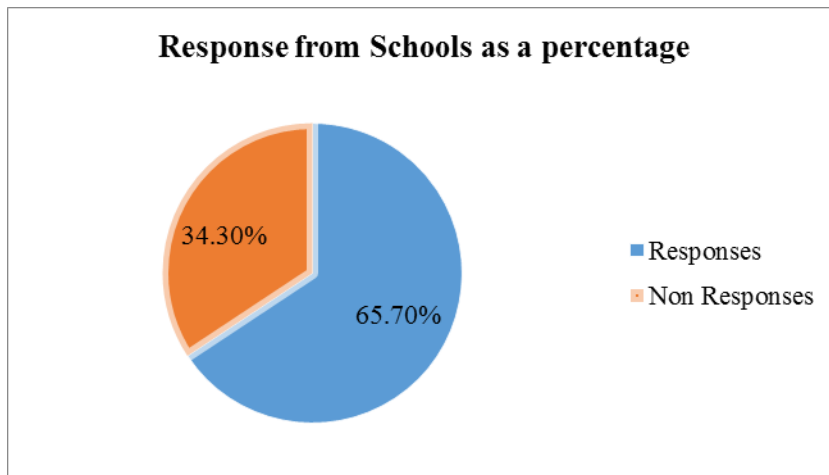
Source: Research Data

4.3 Demographic Characteristics of the Respondents

Demographic information of the respondents in terms of their gender, age distribution and the highest level of education was collected. However information about age was obtained indirectly using the respondents' teaching experience.

4.3.1 Gender of respondents

Out of the 46 interviewed, 65.2% were male and 34.8% were female as shown in table 4.2 below:

Table 4.2: Gender of respondents

Valid		Frequency	Percent	Valid Percent	Cumulative percent
	Male	30	65.2	65.2	65.2
	Female	16	34.8	34.8	100
	TOTAL	46	100	100	

Source: Research Data

Figure 4.2: Gender of respondents

Research Respondents Gender

■ Male
■ Female
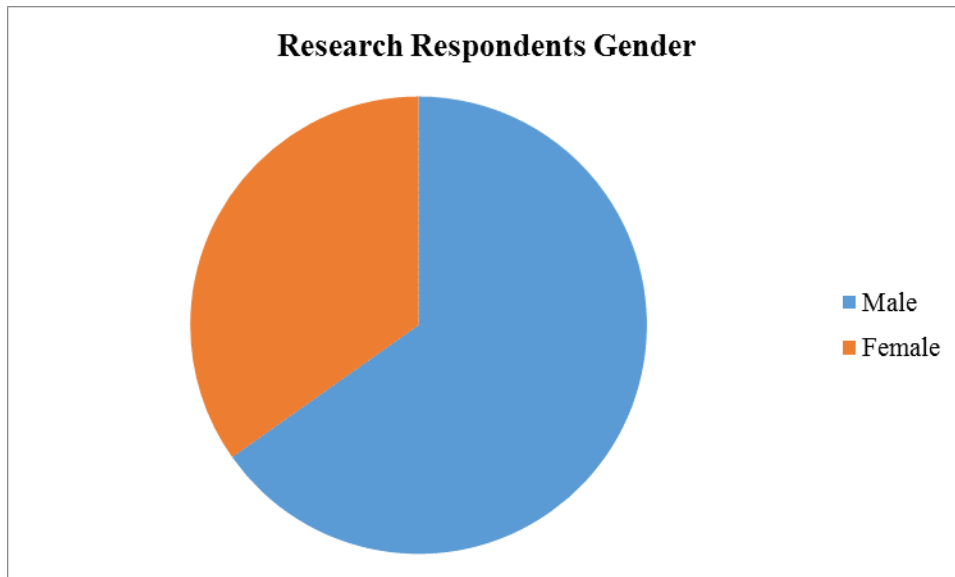
Source: Research Data

4.3.2: Respondents age distribution

Table 4.3 summarizes the age distribution of the respondents. The data suggests that most teachers are in the age range of 30-34 (28%) and 40-60 (30%) years. Thus the average age of a teacher in Athi River Sub-County is 41.7 years implying that the majority of the teachers in the Sub-County are middle aged. Going by Meyer's (2008) findings these teachers may have challenges in adopting ICTs in teaching; since firms with a higher share of younger employees are more likely to adopt new technologies than those with older workforce. Hence, the older the work workforce, including teachers, the less likely the adoption of new technologies, ICTs among them.

Table 4.3: Respondents age distribution

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	20-24 years	3	6.5	6.5	6.5
	25-29 years	8	17.4	17.4	23.9
	30-34 years	13	28.3	28.3	52.2
	35-39 years	8	17.4	17.4	69.6
	40 -60 years	14	30.4	30.4	100
	TOTAL	46	100	100	

Source: Research Data

Figure 4.3: Respondents age distribution
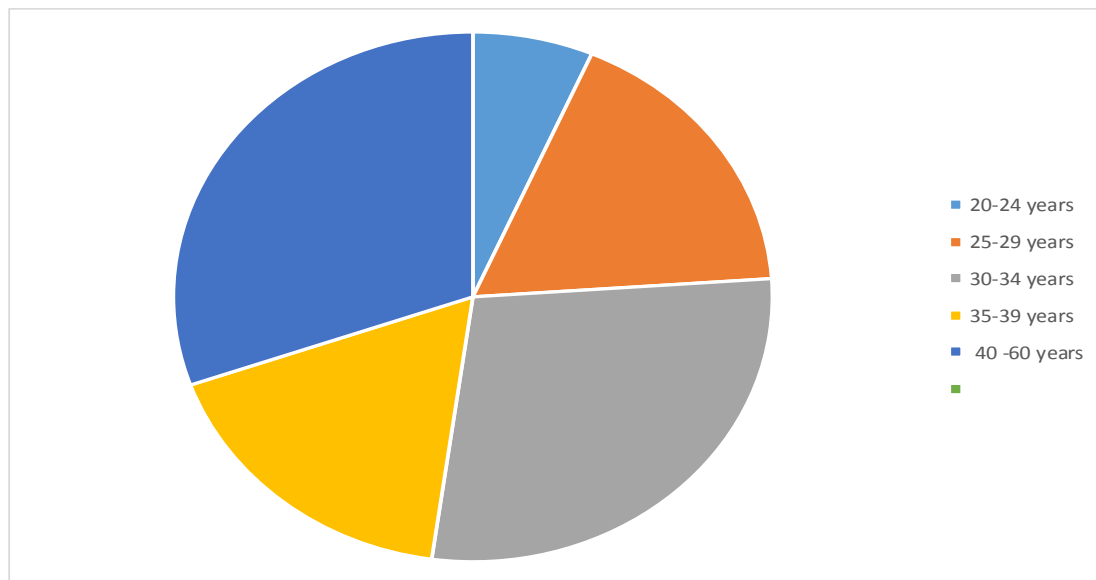
Source: Research Data

4.3.3 Highest level of education attained

From the data, 52% of the respondents are holders of a College Certificate, 30% are holders of a university degree while only 4.3% had secondary education as the highest qualification. This implies that a majority of the respondents are literate and have the necessary capacity for training on ICT skills, given their high academic qualifications.

29

Table 4.4: Highest level of education attained

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Secondary	2	4.3	4.3	4.3
	College	24	52.2	52.2	56.5
	University	14	30.4	30.4	86.9
	Other	6	13.1	13.1	100
	TOTAL	**46**	**100**	**100**	

Source: Research Data

Figure 4.4: Highest level of education attained
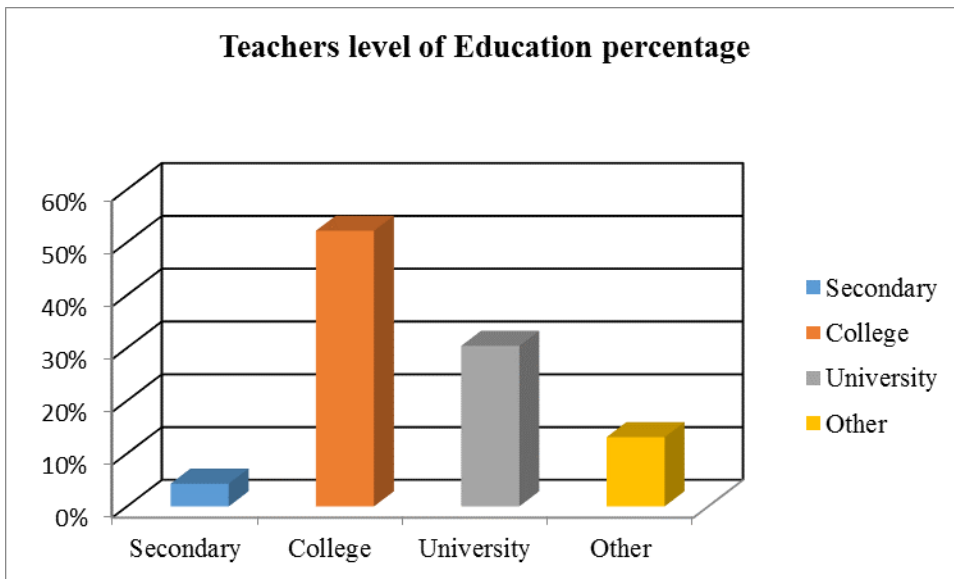
Source: Research Data

4.3.4 ICT Training of Teachers

Generally, ICT training has an impact on e-learning readiness among schools. The study found out that a majority (93.5%) of the teachers had undergone some ICT training while,

only 6.5% had no training at all. This finding is significant in as far as e-learning readiness is concern, since training of teachers on ICT is necessary for effective implementation of e-learning in schools.

Table 4.5: ICT Training of Teachers

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	43	93.5	93.5	93.5
	No	3	6.5	6.5	100
	TOTAL	46	100	100	

Source: Research Data

Figure 4.5: ICT Training of Teachers
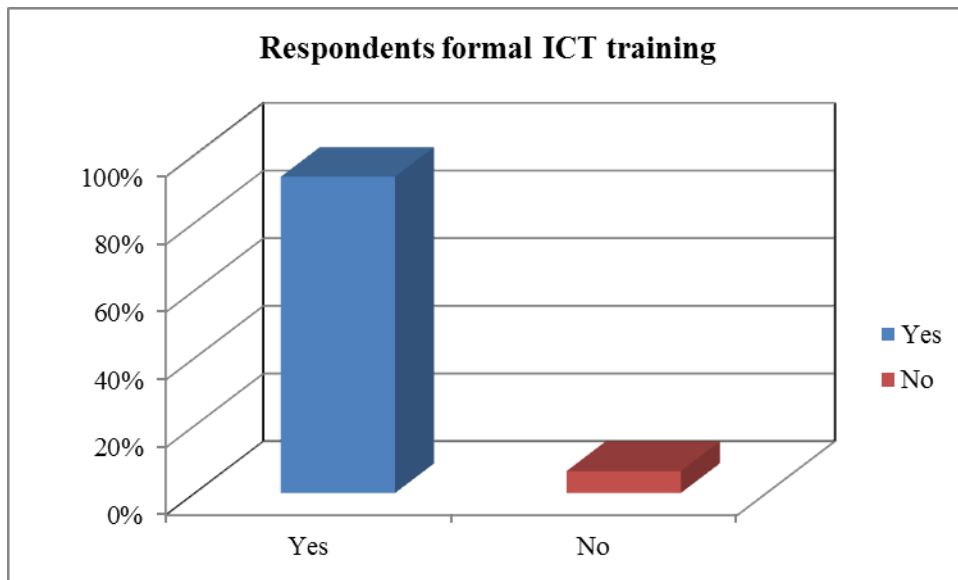
Source: Research Data

4.3.5 The Level of ICT Training

As regards the level of training, it was established that 54.4% of the respondents had some college/university training, while 39.1% had some proficiency training offered by the government as shown in table 4.6. This implies that the majority of teachers in Athi River Sub-County have the necessary training to implement e-learning in their respective schools. It also suggests that the government has to some extent trained teachers to roll out the LCP in primary schools. However, a majority of the teachers observed that the two-week proficiency course by the government was too basic to enable them to use ICT equipment effectively. Furthermore, they were of the view that if the LCP was not implemented soon, they are likely to forget what was taught, thus rendering the training useless.

Table 4.6: The Level of ICT Training

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Proficiency	18	39.1	39.1	39.1
	College	11	23.9	23.9	63
	University	14	30.5	30.5	93.5
	None	3	6.5	6.5	100
	TOTAL	46	100	100	

Source: Research Data

Figure 4.6: The Level of ICT Training
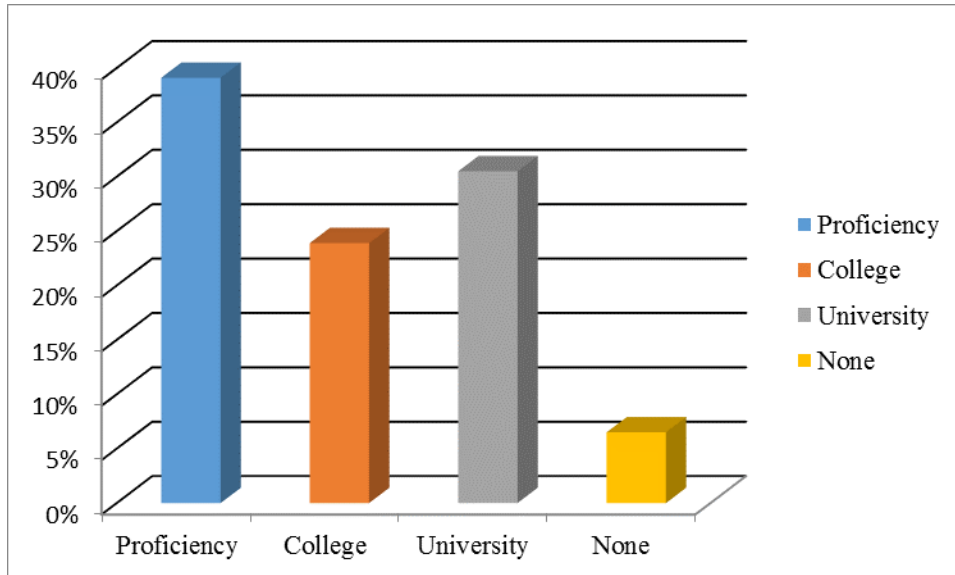
Source: Research Data

4.4 Extent of ICT Usage

The data collected indicates that an overwhelming majority (80%) of the respondents have never used computers and internet, while above 50% use cellphones, radios and CD/DVD players always. This can be explained by the fact that cellphones, radios and CD/DVD players are cheaper than computers and internet soon, thus leading to their widespread adoption. Should the government equip schools with computers and internet soon, teachers in Athi River Sub-County are likely to use them since they have reasonable ICT training, otherwise they may require retraining.

Table 4.8: Extent of ICT usage in schools

	Computers		Internet		Cellphone		Radio		TV		CD/DVD player	
	f	%	f	%	f	%	f	%	f	%	f	%
Always	0	0	2	4.2	31	67.4	26	56.5	17	37	23	50
Frequently	4	8.7	6	6.5	3	6.5	9	19.6	9	19.6	10	21.7
Sometimes	3	6.5	2	4.3	3	6.5	11	23.9	15	32.6	12	26.1
Rarely	2	4.3	1	2.1	8	17.5	0	0	5	10.8	1	2.2
Never	37	80.5	39	84.8	1	2.1	0	0	0	0	0	0
TOTAL	46	100	46	100	46	100	46	100	46	100	0	100

Source: Research Data

Figure 4.7: Extent of ICT usage in schools
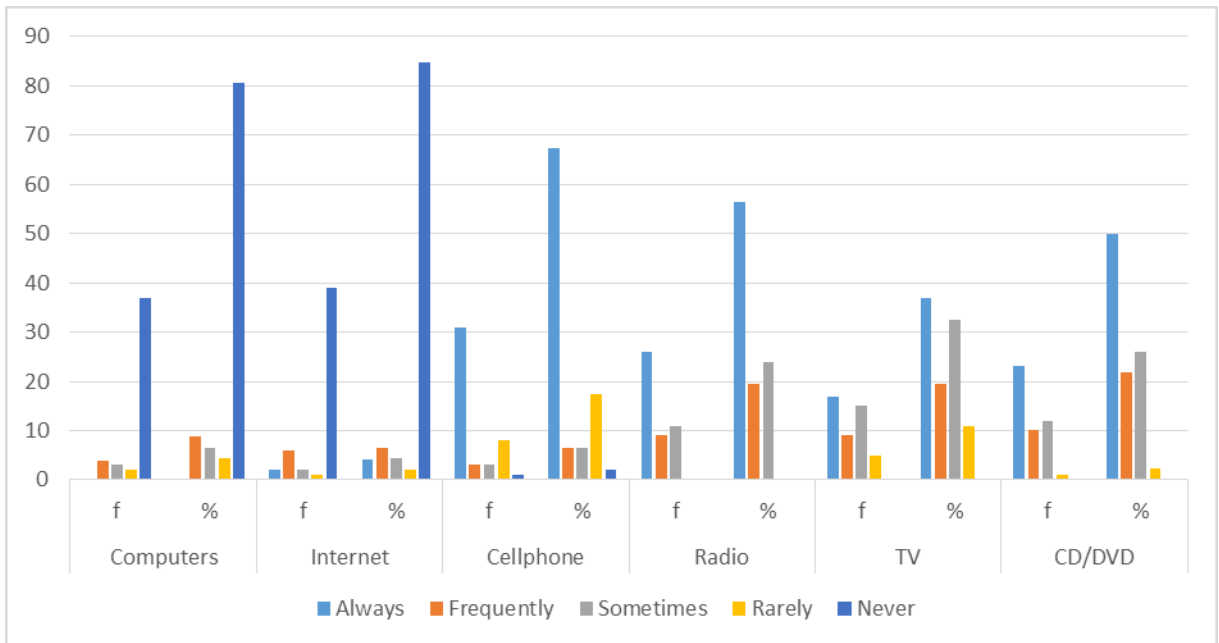
Source: Research Data

4.5. E-learning readiness

4.5.1 Availability of Power supply in schools

The research sought to establish the availability of electricity supply to schools in Athi River Sub-county. The finding was that 75.8% of the schools had readily available power supply from the utility firm-Kenya Power. This result compares well with Ojwang's (2012) findings which indicated that 86.7% of secondary schools in Kisumu County were connected to the power grid. In fact the 8 schools without power in Athi River only required to pay power connection charges since the infrastructure was already in place. This is a significant finding since the success of e-learning and ICT usage largely depends on the availability of power supply. It can therefore be tentatively concluded that the government has achieved a lot in connecting power to schools in Athi River in preparation to rolling out the LCP, a key project in the vision 2030 development blue print.

Table 4.9: Availability of Power supply in schools

Valid	Frequency	Percent	Valid Percent	Cumulative percent
Yes	25	75.8	75.8	75.8
No.	8	24.2	24.2	100
TOTAL	33	100	100	

Source: Research Data

Figure 4.8: Availability of Power supply in schools
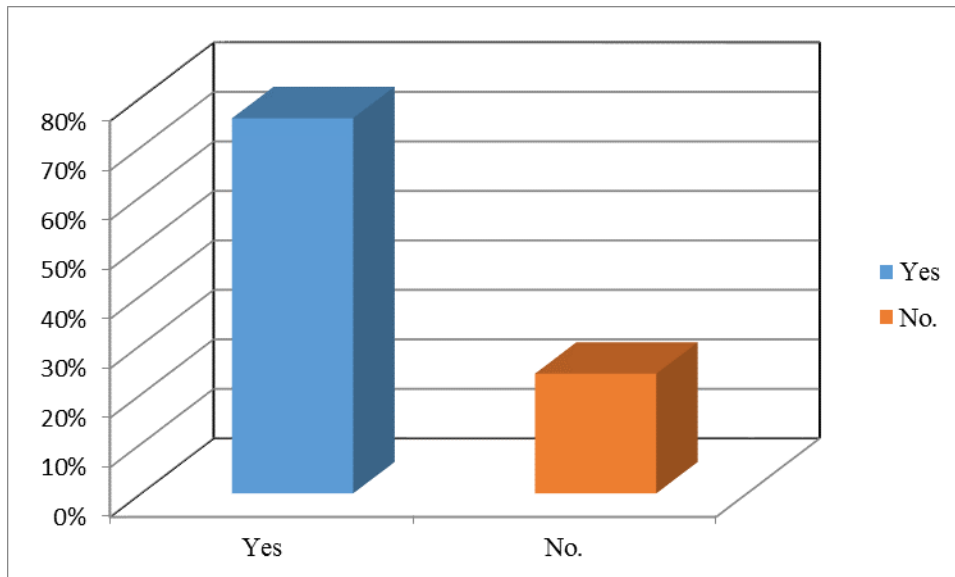
Source: Research Data

4.5.2 Electrical Power Supply Outages

From the 25 schools which had power grid connected, the study sought to establish the frequency of power outages per week in each school. The objective here was to ascertain the reliability of power supply in supporting e-learning and ICT usages in schools. From the results, the power supply reliability is high, since 76% of the respondents reported that their schools do not experience power outage at all or experience power outage only once a week, while 24% reported a power outage of 2 or 3 times a week. A notable observation here is that none of the schools surveyed experience more than 3 outages in a week. Hence, a majority of schools in Athi River Sub-County are unlikely to have major disruptions from power outages should they adopt ICTs. The likely explanation of this finding is that Athi River is a major industrial belt with manufacturing plants that consume huge amounts of power. The government has therefore ensured a stable power supply to the area.

Table 4.10: Frequency of power supply outages per week

Valid	Frequency	Percent	Valid Percent	Cumulative percent
Never	6	24%	24%	24%
Once	13	52%	52%	76%
Twice	5	20%	20%	86%
3 times	1	4%	4%	100
>3 times	0	0	0	100
TOTAL	25	100	100	

Source: Research Data

Figure 4.9: Frequency of power supply outages per week
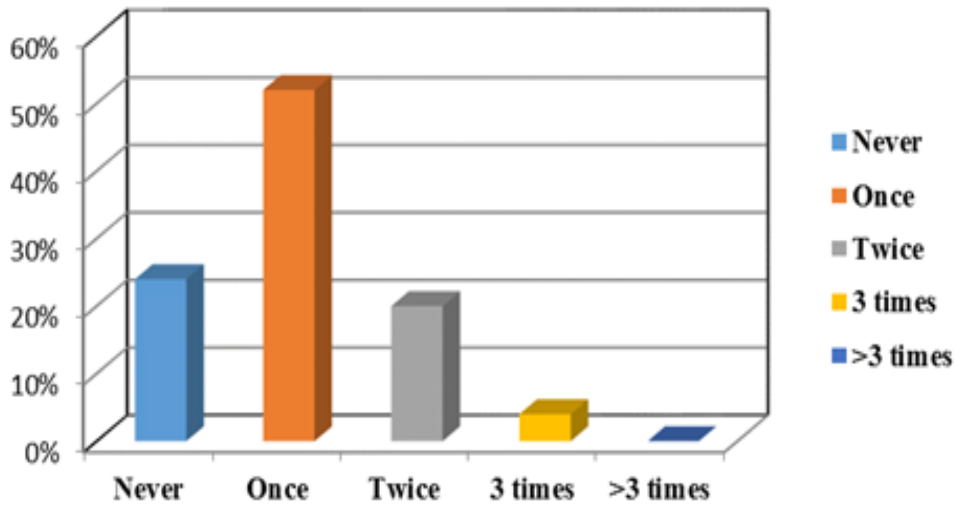
Source: Research Data

4.5.3 Availability of ICT Equipment in schools

The research also sought to determine the availability of various ICT equipment in the surveyed schools. It, however found out that the majority of schools are under-equipped with the necessary tools to support e-learning. As shown in table 4.11, over 76% of the schools do not have computers, internet or TVs. However, radios and cellphones were readily available in 78% of the surveyed schools. Although cellphones were private belongings of the teachers they were also used to transact school business. It was also evident that the schools had not put any effort to acquire ICT equipment on their own but were waiting to be provided for by the government. This finding suggests that the government has to spend lots of money to provide ICT equipment to the schools and to also subsequently maintain them since the schools do not have the capacity to do so.

Table 4.11: Availability of ICT equipment in schools.

		Computers		Internet		Cellphone		Radio		TV		CD/DVD		Others	
Valid		*f*	%	*f*	%	*f*	%	*f*	*%*	*f*	*%*	*f*	*%*	*f*	%
	Yes	6	13	2	4.3	45	97.8	36	78.3	11	23.9	17	37	15	32.6
	No.	40	87	44	95.7	1	2.2	10	21.7	35	76.1	29	63	31	67.4
	TOTAL	46	100	46	100	46	100	46	100	46	100	46	100	46	100

Source: Research Data

Figure 4.10: Availability of ICT equipment in schools.
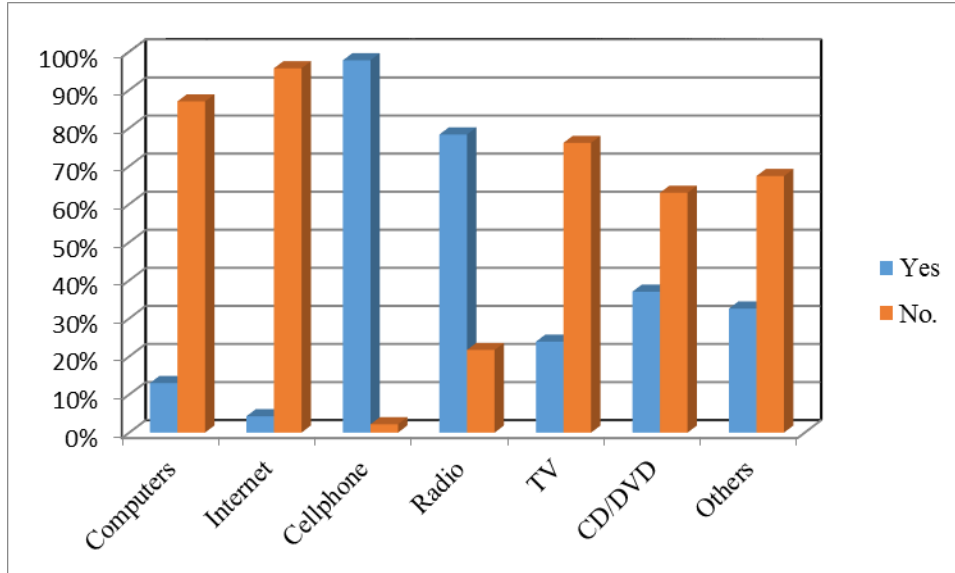
Source: Research Data

4.5.4 Availability of computer laboratories in schools

The study also sought to find out whether the surveyed schools had computer laboratories and the finding was that only 18.2% of the schools had computer laboratories. This is in contrast to the findings of Ojwang (2012) who found out that 56.7 % of secondary schools in Kisumu County had computer laboratories. However, while Ojwang (2012), sampled secondary schools which are arguably better endowed financially, public primary schools have limited resources to afford buying computers or build computer labarotories.

Table 4.12: Availability of computer lab in schools

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	**6**	**18.2%**	18.2	18.2
No.	**27**	**81.8%**	81.8	100
TOTAL	**33**	**100**	100	

Source: Research Data

Figure 4.11: Availability of computer lab in schools
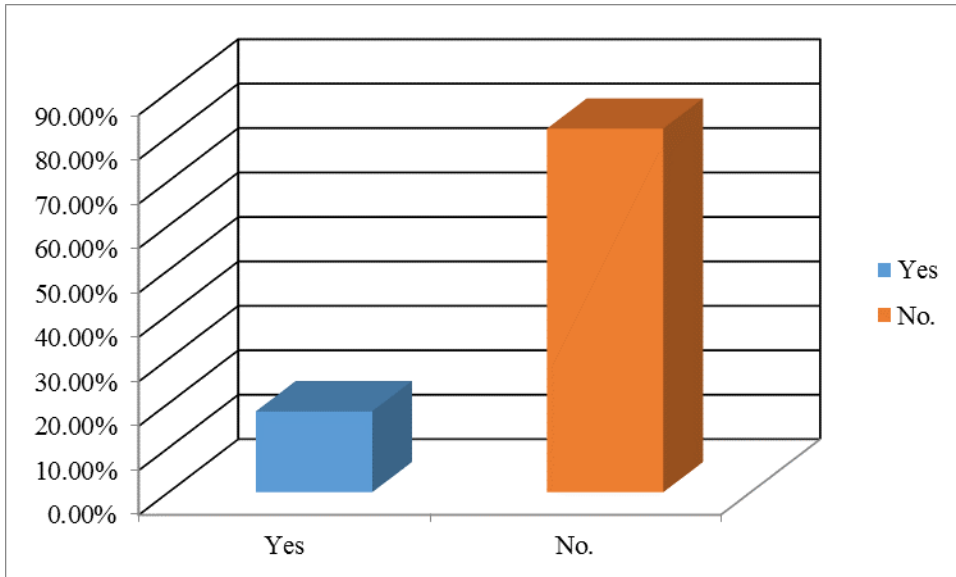
Source: Research Data

4.5.5 Choice between Laptop/Tablets and Computer Laboratories

The research ascertained the preferences of the respondents between Laptops/Tablets on the one hand and computer laboratories on the other. The finding was that the majority (65.2%) of the respondents preferred the building of computer laboratories in their schools, whereas a minority (34.8%) preferred provision of Laptop/Tablets. The finding

suggests that the government's plan to equip schools with Laptops/Tablets does not enjoying popular support among primary school teachers. The government should therefore re-thinks its plan of supplying Laptops/Tablets and build fully equipped computer laboratories in schools, so as to benefit all pupils.

Table 4.13: Choice between Laptop/Tablets and Computer Labs

Valid	Frequency	Percent	Valid percent	Cumulative Percent
Laptop/Tablets	16	34.8	34.8	34.8
Computer Lab	30	65.2	65.2	100
TOTAL	46	100	100	

Source: Research Data

Figure 4.12: Choice between Laptop/Tablets and Computer Labs
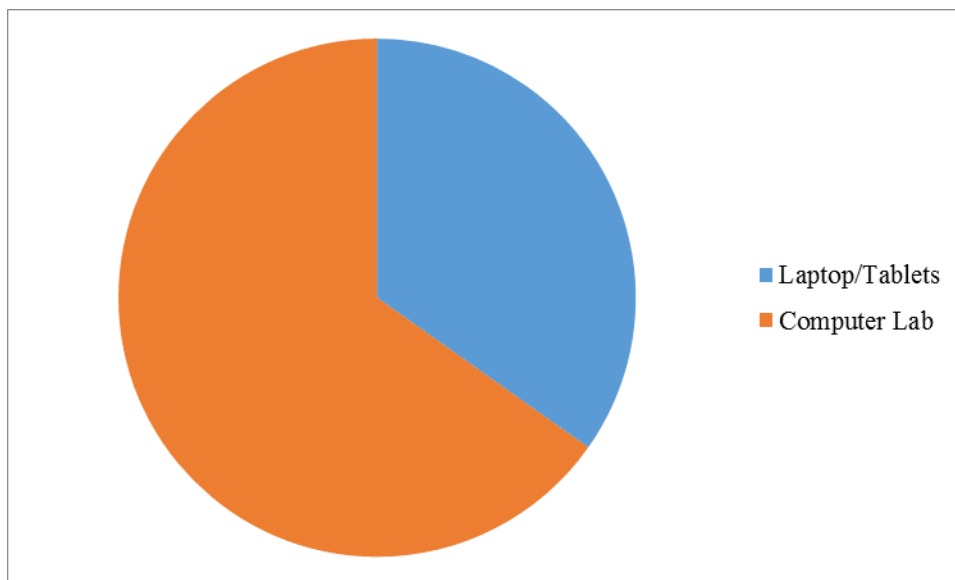
Source: Research Data

4.5.5 Extent of use of ICT Resources in Teaching

The research sought to establish the extent to which the teachers had embraced ICTs in teaching. As expected radio is the main ICT resource that has been adopted widely, with more than 78% of the respondents reporting frequent usage. TV come in second with an adoption rate of 24% of the respondents. Computers were the least used ICT resource with 80% of the respondents indicating that they have never used them. The fact that majority (87%) the schools do not have computers explains why there is low usage of computers for teaching. It is worth mentioning here also that although 97.8% of the respondents use cell phones in school, they use them for other purposes and not for teaching. As shown in table 4.14, only 10.7% of teachers use cell phones for teaching.

Table 4.14: Scope of use of ICT resources in Teaching

	Computers		Internet		Cell phone		Radio		TV		CD/DVD	
	f	%	f	%	f	%	f	%	f	%	f	%
To large extent	0	0	1	2.1	2	4.2	25	54.3	5	11	8	17.4
Frequently	4	8.7	3	6.5	3	6.5	11	24	6	13	9	19.6
To a little extent	3	6.5	2	4.3	3	6.5	10	21.7	3	6.5	20	43.5
Rarely	2	4.3	1	2.1	8	17.5	0	0	29	63	9	19.6
Never	37	80.5	39	84.8	30	65.3	0	0	3	6.5	0	0
TOTAL	46	100	46	100	46	100	46	100	46	100	46	100

Source: Research Data

Figure 4.13: Scope of use of ICT resources in Teaching
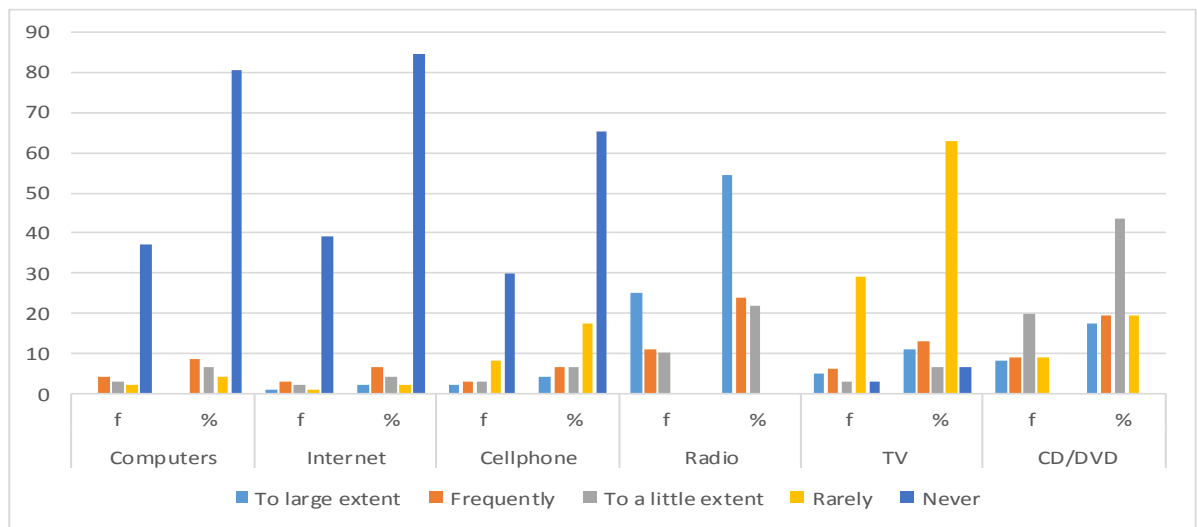
Source: Research Data

4.5.6: Availability of E-learning Content for Teaching in Schools

Respondents were asked to indicate whether e-learning content was available in the schools. To this effect, 15.2% indicated that they have some e-learning content whereas 84.8% did not have. Furthermore, all those responding reported that there was no official ICT curriculum for primary schools. This is a significant observation, given that e-learning cannot take place without the relevant content. The government should therefore invest more in the development of content before rolling out the LCP project.

Table 4.15: Availability of E-learning Content for Teaching in Schools

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	7	15.2	15.2	15.2
	No.	39	84.8	84.8	100
	TOTAL	46	100	100	

Source: Research Data

4.5.7 Readiness to Roll out the E-learning programme

To determine the readiness of schools and teachers to implement e-learning, respondents were asked to rate their own and their schools' preparedness to implement e-learning. The results show that 60.9% of the schools were not ready while 10.9% of the schools were ready to roll out an e-learning program. Notably, 12% of the schools were somewhat ready while 2.1% could not judge their school's readiness in adopting e-learning. Curiously the respondents' reported level of readiness was similar to those of their schools. Although this study and that of Ojwang (2012), focused on different educational levels, their findings are close.

Table 4.16: Readiness to roll out the e-learning programme

Valid	Frequency	Percent	Cumulative percent
Not ready	28	60.9	60.9
Somewhat ready	12	26.1	87
Can't tell	1	2.1	89.1
Ready	5	10.9	100
Very ready	0	0	100
TOTAL	46	100	

Source: Research Data

Figure 4.14: Readiness to roll out the e-learning programme
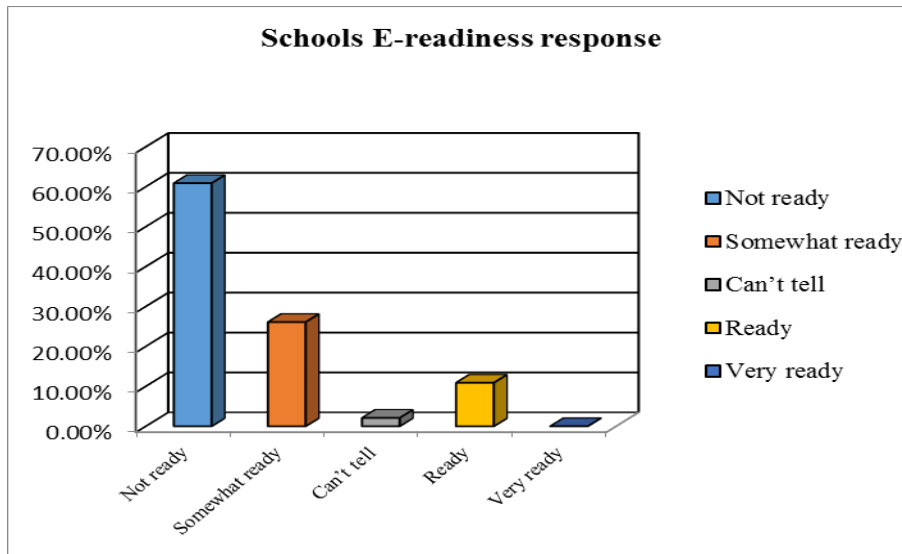
Source: Research Data

4.6 Challenges faced by Primary Schools in adopting E-learning

Available empirical information suggests that the main challenges hindering schools, in the developing countries, from adopting e-learning include lack of internet, lack of power/ unreliable power supply and high cost of acquiring ICT hardware and software (Owino, 2013). However in Athi River Sub-County, the main challenges hindering the adoption of ICT are lack of internet connectivity and the high cost of ICT hardware/software, whereas lack of power/unreliable power supply and lack of skilled manpower are not a major issue in. This finding suggests that should the government supply ICT equipment to schools and connect them to internet, then the schools can successfully implement e-learning.

Table 4.17: Challenges faced by Primary Schools in adopting E-learning

	Lack of internet connectivity		Lack of power		Unreliable power supply		High cost of ICT hardware/software		Lack of skilled manpower	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Yes	28	60.9	7	15.2	5	10.9	36	78.3	0	0
No	18	39.1	39	84.8	41	89.1	10	21.7	46	100
TOTAL	46	100	46	100	46	100	46	100	46	100

Source: Research Data

Figure 4.15: Challenges faced by Primary Schools in adopting E-learning
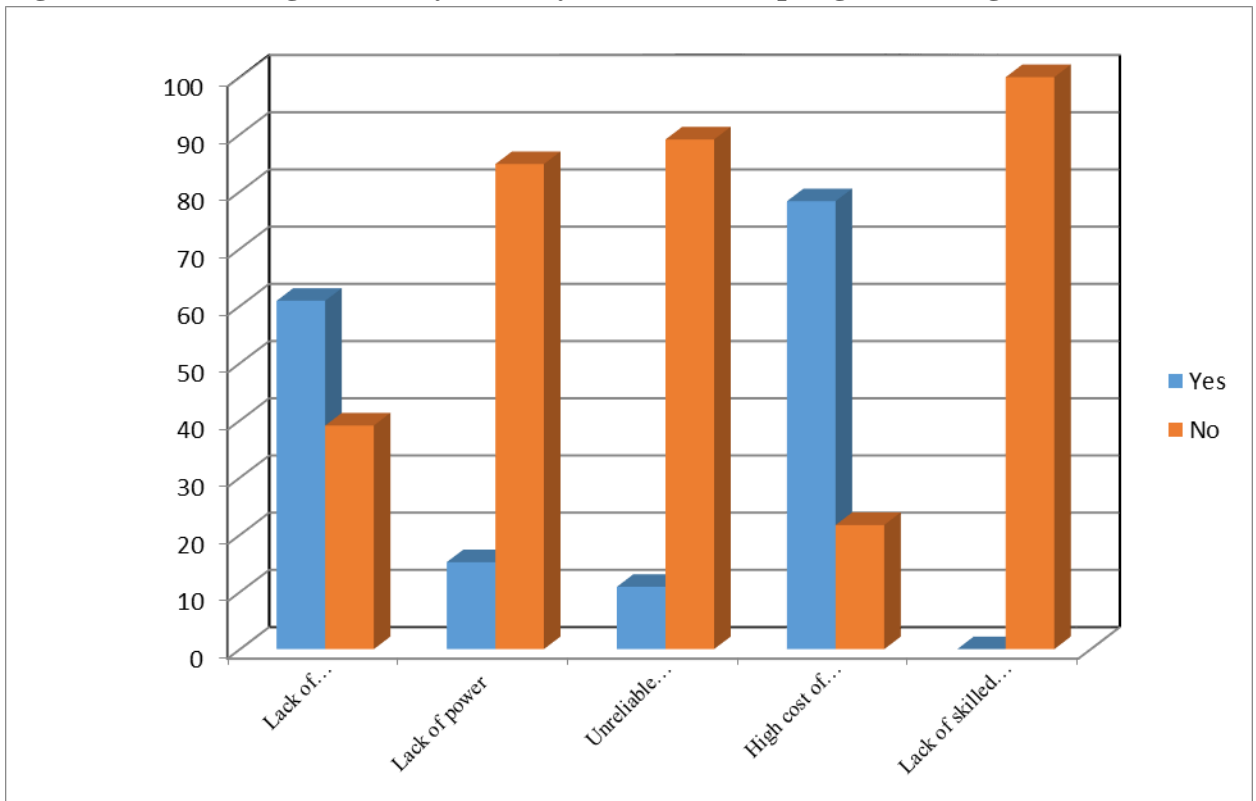
Source: Research Data

4.7 Comparisons between Rural and Urban Schools

Rural and urban schools were compared in terms of the availability of ICT resources, the number of teachers and pupils in the schools as well as the number teachers trained in ICT. Data was collected from 33 schools: 27.3% located in urban setting and 72.7% in rural setting. Of the 14,801 pupils in Athi River Public Primary Schools, 54% are in urban schools while 46% are in rural schools. This compares well with County Population statistics with 52% of the population in urban and 48% rural areas. It was found out also that the urban schools have more pupils and teachers as compared to rural schools. On average a school in the urban setting has 887 pupils compared to 284 in a rural school. The urban schools also, generally have more computers and better internet connectivity as compared to rural schools as shown in table 4.18 below.

Table 4.18: Comparison of rural to urban schools

	No. of schools		No. pupils		No. of teachers		Computers		Internet			ICT trained teachers	
	f	%	f	%	f	%	f	%	f	%	f	%
Urban	9	27.3%	7,987	54%	198	26.6%	5	83.3%	5	100%	35	81.4%
Rural	24	72.7%	6,814	46%	547	73.4%	1	16.7%	0	0	8	18.6%
Total	33	100%	14,801	100	745	100%	6	100%	5	100%	43	100%

Source: Research Data

Figure 4.16: Comparison of rural to urban schools
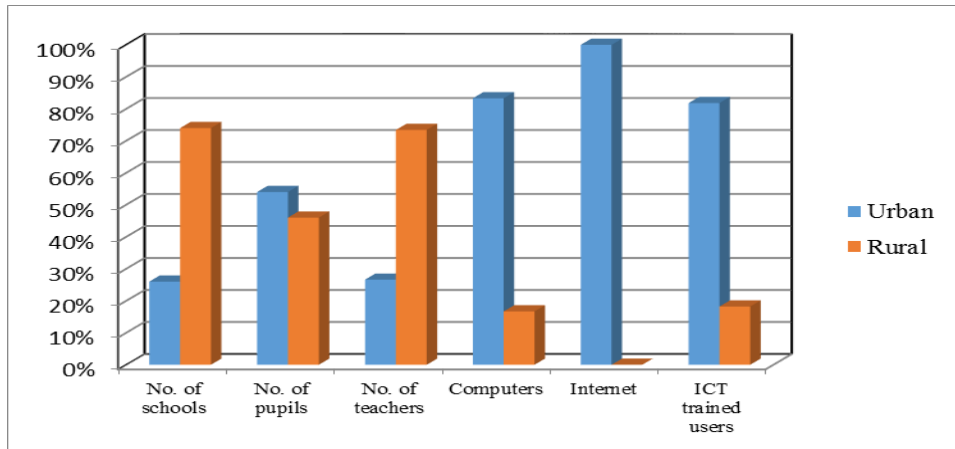
Source: Research Data

The probable explanation as to why urban schools in Athi River Sub-County, are faring better than their rural counterparts, is because urban schools are financially better endowed than rural schools. There are also, generally more ICT trained teachers in urban schools as compared to their rural counter parts. Of the 43 teachers trained in ICT, 81.4% work in urban schools while 18.6% teach in rural. The fact that more teachers in urban schools are ICT trained compared with those in rural schools may be explained by the availability of more training opportunities in urban settings compared to rural areas.

4.8 Regression Analysis

The table 4.19 below presents the regression analysis.

Table 4.19: Regression Analysis

Model	Model	Standardized coefficients	t	Sig
		Beta		
1	(Constant)		-0.208	.79
	Computer equipment	.541	5.983	.046
	Teacher training	.250	6.586	.044
	Teacher readiness	.291	4.420	.040
	E-content	.198	7.336	.024

The beta coefficients give the rate of change of the dependent variable (ICT adoption) that was as a result of change on the independent variables. ICT equipment takes a lead with 0.541 deviation followed by teachers training at 0.250, then at 0.291 is teacher readiness and e-content at 0.198. It can be concluded that ICT equipment, teacher training and teacher's readiness had the major impact on ICT adoption in primary schools.

$$Y = -0.208 + 0.541X_1 + 0.25X_2 + 0.291X_3 + e$$

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This concluding chapter presents the summary of the findings, discussion of results, conclusions, recommendations and suggestions for future research. As a recap, the study sought to assess the e-learning readiness of public primary schools in Athi River Sub-County. Specifically, it set out to establish the level of ICT usage; e-learning readiness; challenges facing the adoption of e-learning and the relationship between e-learning readiness and ICT usage.

5.2 Summary of the Study Findings

This section depicts the summary of the study findings, presented in line with the study objectives.

5.2.1 Extent of ICT usage in schools

The study indicates that an overwhelming majority (80%) of the respondents have never used computers and internet, while more than 50% used cell phones, radios and CD/DVD players regularly.

5.2.2 E-learning readiness

As regards the training of teachers on ICT, the study found out that a majority (93.5%) of the teachers had undergone some ICT training while, only 6.5% had no training at all. Details of their level of training indicate that 54.4% of the respondents had some college/university training, while 39.1% had some proficiency training in ICT.

On the availability of power the study found out that the majority (75.8%) of the schools had readily available and reliable power supply. It also showed that the majority of schools in the area of study do not have the basic infrastructure and equipment to support e-learning. In fact, less than 20% of the schools had Computer laboratories, which is basically a necessary requirement for e-learning. Additionally, 87% of them do not have computers. However, this scenario was slightly different for schools in urban settings, since they had more computers and laboratories than their rural counterparts.

The research also sought to establish the respondents' preference between Laptops/Tablets and computer laboratories. Interestingly the majority (65.2%) of the respondents preferred having computer laboratories in their schools, whereas a minority (34.8%) preferred Laptops/Tablets.

Regarding the extent to which teachers had embraced ICTs in teaching, it was evident that Radio was the main ICT teaching resource, with 78% of the respondents reporting frequent usage. However, Computers were the least used ICT resource with 80% of the respondents indicating that they have never used them. Respondents were also asked to indicate whether e-learning content was available in the schools. To this effect, 15.2% indicated that they have some e-learning content whereas 84.8% did not have.

5.2.3 Challenges faced by Primary Schools in adopting E-learning

The study found out that the main challenges hindering the adoption of ICT in Athi River Sub-County public primary schools, were lack of internet connectivity and the high cost of ICT hardware/software.

5.3 Conclusion

It was concluded in this study that schools in Athi River Sub-County are not ready to roll out LCP presently, since their e-learning readiness is low given that teachers are currently inadequately trained and the schools have insufficient basic ICT infrastructure and equipment, such as internet connectivity, computer laboratories and Laptops /Tablets / Computers. It is therefore implicit that the government ought to do much more in order to make this vision 2030 social development goal a reality. Besides putting in place the necessary ICT infrastructure and equipment, it also needs to enhance teacher capacity to teach ICTs. It should also set aside a sustainable budget for teacher training and maintenance of the schools' ICT infrastructure and equipment.

It emerged strongly that the government's plan to equip schools with Laptops/Tablets does not enjoy popular support among the interviewed school heads and teachers. The government therefore needs to prioritize capacity building of teachers and construction of computer laboratories in all the primary schools in Athi River Sub-County and elsewhere in the county prior to the roll out of LCP.

The average age of a teacher in Athi River Sub-County was 41.7 years, implying that the majority of them are middle-aged. The government should therefore, selectively devote more of its teacher capacity building resources on youthful teachers whose interest and

aptitude to adopt newer knowledge, skills and technologies is comparatively higher than those of their middle-aged counterparts. Besides, this age bracket has a comparatively longer working lives and capacity to contribute to the governments' social development goal.

The fact that only 15.2% of public primary schools in Athi River had some e-learning content clearly shows that they are currently ill-prepared to roll out the LCP programme, given that e-learning cannot take place without the relevant content. Furthermore, the majority of the respondents indicated that there was no official ICT curriculum in their schools. This therefore presents a serious constraint to the government's plan to roll out LCP in the near future. The government should therefore urgently prioritize the development of ICT content prior to rolling out the LCP programme.

5.4 Recommendations.

The ICT training offered to teachers should be comprehensive enough to enable teachers teach and use ICTs effectively. This is because the current training lasts for only two weeks. The Government should therefore increase the period of training and also organize for follow-up refresher training.

Besides providing the ICT equipment, the government should also connect schools with internet and build computer labs in all schools instead of supplying Laptops/Tablets which will benefit only a few pupils. This is because more teachers preferred the building of computer labs to benefit all students in the schools.

Further, given that e-learning cannot take place without the relevant content, the government should ensure that e-learning content an ICT curriculum are first developed before the LCP programme roll out. It is also important to develop an ICT curriculum for primary schools to ensure uniform training in all schools.

5.5 Limitation of the study

This research was done during the teachers strike in the country and this contributed significantly to the low response rate. The researcher also fears that most of the respondents did not give their best because of the same effect of the strike and this could impact to some extent the result of some findings.

The study targeted public primary schools in Athi River Sub-County, a peri-urban location whose features could be significantly different from those of other areas in the country. Generalization of the findings might not therefor reflect the true situation in urban and rural Kenya. The other challenge encountered in the field is the fact that terrain in rural Athi River was so hilly and very dusty. The schools were also far apart.

5.6 Suggestions for Further Research

The research was on e-learning readiness in public primary school in Athi River Sub-County and recommended that a study should be carried to determine the e-learning readiness in public primary schools in other parts of Kenya, especially in the rural areas. This will help guide the planned roll out of LCP in primary schools in all public primary schools in the country.

REFERENCES

Anouk, J,.Bart ,C. and Nyaga, M .(2005*). Integrating ICT in Teacher Training: Reflections on practice and policy implications; case of KTTC*. Retrieved July 12, 2015 from http:www.idrc.ca/en/ev-93060 html.

Barasa, D.S (2005). *Open and Distance Learning and Information and Communication Technologies-Implications on Formal and Non formal Education: Kenyan Case.* Unpublished article. Africa International University.

Chunwijitra, S. (2013). *An Advanced Cloud-Based e-learning Platform for Higher Education for Low Speed Internet*. Doctoral Disseration.The Graduate University for Advanced Studies (SOKENDAI).

Cooper, R. and Schindler, P. (2003). *Business Research Methods* (8th Editio.). New York: McGraw-Hill.

Cullen, R. (2003). The digital divide: A global and national call to action. *The Electronic Library,* 21(3), *pp. 247-257.*

Dada, D. (2006). "E-Readiness for Developing Countries: Moving the Focus from The Environment to the Users*". The Electronic Journal on Information Systems in Developing Countries (EJISDC), 27(6), 1-14*

Engholm, P. (2002). *What determines an organisation's readiness for e-learning? E-business in Australia: Concepts and cases*. Pearson Education Australia

Ferdousi, B. J. (2009). *A study of factors that affect instructors' intention to use e-learning systems in two-year colleges*. PhD dissertation, Nova Southeastern University.

Kiilu, R. and Muema, E.(2012). "An E-Learning Approach to Secondary School Education":E-Readiness Implications in Kenya. *Journal of Education and Practice, 3(16), 142-148.*

Kingori, G. (2014). *An Intelligent Subtopics Suggested for an E Learning System*.Unpublished Masters Thesis, University of Nairobi.

Kipkirui, S. (2014). *Adoption of E learning by Students of University of Nairobi*. Unpublished Masters Thesis, University of Nairobi.

Kothari, C. (2004). *Research Methodoloy; Methods and Technologies,* Secon Edition. New Age International, New Dheli.

Maruti, J. (2010). *E Learning Readiness Among Primary Teacher Trainning Colleges in Kenya*. Unpublished Master's Thesis. Kenyatta University.

Meyer, J. (2008). *The Adoption of New Technologies and the Age Structure of the Workforce*. Retrieved on March 2 2015 from
ftp://ftp.zew.de/pub/zew-docs/dp/dp08045.pdf#page=1&zoom=auto,-274,410

Mugenda, O. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Acts Press, Nairobi.

Mugenda, O., & Mugenda, A. (1999). *Research Methods: Quantitative and Qualitative Approaches*. Acts Press, Nairobi.

Mungo, J. (2004). *E-learning/e-teaching: An Implementation and Evaluation of a Finance Introductory Course*. Masters Thesis, Humboldt-Universitat zu Berlin.

Naidu, C. (2003*). E-learning-A Guidebook of Principles, Procedures and Practices*. Retrieved on May 20 2015 from http://cemca.org.in/ckfinder/userfiles/files/e-learning_guidebook.pdf.

Njagi, M. (2013). *Assessment of the Status of E learning as Course Delivery Method in Public Universities in Kenya*. Unpublished Masters Project. University of Nairobi.

Njuguna, G. (2013). Factors Influencing the Use of E learning in Public Universities in Kenya. *International Education Journal, 2(3), 89–95.*

Nzioka, B. (2013). The Effect of Online Banking on Cost Efficiency in Commercial Banks in Kenya. *International Journal for Management Science and Terchnology, 3(4), 15–17*.

Ojwang, C. (2012). *E Learning Readiness and E Learning Adoption Among Public Secondary Schools in Kisumu County, Kenya*. Masters of Business Administration Project. University of Nairobi.

Oketch H. A., Njihia J. M. and Wausi A. N. (2014). E-learning readiness Assessment Model in Kenya's higher education institutions: A Case Study of University of Nairobi. *International Journal of Scientific Knowledge Computing and Information Technology,* 5 (6), 29-41.

Okinda, R. A. (2014). Assessing E-learning Readiness at the Kenya Technical Teachers College. *Journal of Learning for Development (JL4D), 1(3)*

Ouma, G. O., Awuor, F. M. and Kyambo, B. (2013). E-Learning Readiness in Public Secondary Schools in Kenya. *European Journal of Open, Distance and e-Learning, 16 (2), 97-110*

Owino, O. (2013). *The Impact of E learning on Academic Performance: A Case Study of Group Learning Sets*. Unpublished Masters Project. University of Nairobi.

Song, S. (2010). *E-learning: Investigating students' acceptance of online learning in hospitality programs*. Doctoral dissertation. Iowa state University.

Wu, H. (2012). Designing a reusable and adaptive e-learning system. *Journal of Business and Management, 2(3), 14–20.*

APPENDICES

APPENDIX I: Questionnaire

Introduction

I am Phyllis J. Sitienei, an MBA (MIS) student at the University of Nairobi. I am currently carrying out a research on e-learning readiness and ICT usage among public primary schools in Athi River Sub-County. Please note that you have been identified as a respondent in this study which is aimed at generating information that will assist in assessing the level of e-learning readiness and ICT usage in the Sub-County Schools. The interview will take at most 20 minutes of your time. Kindly read the instructions and respond to each of the questions: some will only require you to tick in the boxes provided; others will require you to state or write down your response(s) or comments in the spaces provided. Kindly note that you response is highly confidential and will not be attributed to you as an individual. In any case, you are not required to indicate your name on the questionnaire.

SECTION A: GENERAL INFORMATION

1.   Name of School:_____

2.   How many students does the school have_____

3.   How many streams are there per class_____

4.   What is the average class size? _____

5.   How many teachers does the school have? _____

6.   How many of the teachers are ICT trained? _____

7.   Respondent's gender?[   ] Male [   ] Female

8.   How many years have you taught?

        Less than 5 years [ ] 5-9 years [ ] 10-14 years [ ] 15-19 years [ ] 20 and above [ ]

9.   What is your designation in the school?

Head Teacher [   ] Deputy Head Teacher [   ] Computer Teacher [   ] Teacher [   ]

10.   What is your highest level of academic qualification?

Secondary [   ] College [   ] University [   ] Other [   ]

If other, specify_____

11. Tick against your highest professional qualification:

P2 [   ] P1 [   ] Diploma [   ] Degree [   ] Other [   ]

If other, specify_____

_____

12. Have you had any training in ICT? Yes [   ] No [   ]

13. If yes, specify the nature of training:

Proficiency [   ] College [   ] University [   ] Other [   ]

If other, specify_____

_____

SECTION B: Extent of ICT usage in Public Primary Schools in Athi River

14. To what extent do you use the following ICT resources in the school?

	Always	**Frequently**	**Sometimes**	**Rarely**	**Never**
Computers					
Internet					
Cell Phones					
Tablets/iPhones					
TV					
Radio					
CD/DVD Player					
Videotape					
Power Point Projectors					
Photocopier					
Digital camera					
Others (specify)					

15. a) Given a choice between laptops/tablets for class one pupils and a computer lab

for use by all pupils, which one would you rather have?

_____

b) Why the preference. Explain your answer_____

SECTION C: E-learning readiness

16. Does your school have Power supply?   Yes [   ] No [   ]

17. If yes, how frequently do you experience electrical supply outages in a week?

[   ] Never   [   ] Once   [   ] twice [   ] 3 times [   ] More than 3 times

18. Does your school have the following ICT resources?

ICTs	YES	NO
Computers		
Internet connection		
Cell Phone		
Tablet/iPhone		
TV		
Radio		
CD/DVD Player		
Videotape		
Power Point Projectors		
Photocopier		
Digital camera		

19. a) Does your school have a computer lab?

Yes [   ] No [   ]

b) If yes, how many computers are in good condition?

20. To what extent have you embraced the following ICT resources in your teaching?

ICT Resources	To a large extent	frequently	To a little extent	rarely	Never
Computers					
Internet					
Cell Phones					
Tablets/iPhones					
TV					
Radio					
CD/DVD Player					
Videotape					
Power Point Projectors					
Photocopier					
Digital camera					
Others (specify)					

21. Does your school have e-learning content for teaching? Yes [   ] No [   ]

22. a) Given the above assessment of ICT resources in your school, how do you rate

its   readiness to roll out the e-learning program?

Not ready [   ] somewhat ready [   ] can't tell [   ]   Ready [   ] Very Ready [   ]

b) Give reasons for your rating of the school's readiness_____

_____

_____

23. a) As a teacher, how ready are you to adopt ICT tools in your teaching?

Not ready [ ] somewhat ready [ ] can't tell [ ]   Ready [ ] Very Ready [ ]

b) Give reasons for your self-rating above_____

_____

_____

SECTION D: Challenges Faced by Primary Schools in adopting E-Learning.

24. a) Specify the challenges faced by your school in implementing e-learning from the list below:

Challenges	Tick
Lack of internet connectivity	
Lack of power supply	
Unreliable power supply	
High cost of ICT hardware/software	
Lack of skilled manpower	
Others (specify)	

b) Prescribe a remedy for each of the above identified challenges.

_____

_____

SECTION E: Suggestion for Promoting ICT Adoption in Athi River Primary Schools

25. In your opinion, how should e-learning be promoted in Athi River primary schools?

_____

_____

_____

Thank you for granting me this interview.

APPENDIX II: LIST OF ALL PUBLIC PRIMARY SCHOOLS IN ATHI RIVER SUB-COUNTY

NO	NAME OF SCHOOL	SETTING
1.	Kyumbi PRIMARY	RURAL
2.	Kalimani PRIMARY	RURAL
3.	Mathatani PRIMARY	RURAL
4.	Katani PRIMARY	RURAL
5.	Wathia PRIMARY	RURAL
6.	Muthwani PRIMARY	RURAL
7.	Nthuluni PRIMARY	RURAL
8.	Kwa Kalusya PRIMARY	RURAL
9.	Nzoiani PRIMARY	RURAL
10	Kavomboni PRIMARY	RURAL
11	Ndovoini PRIMARY	RURAL
12	Ivovoani PRIMARY	RURAL
13	Mitatini PRIMARY	RURAL
14	St. Francis of Assiss PRIMARY	RURAL
15	Ngalalya PRIMARY	RURAL
16	Mt. View PRIMARY	RURAL
17	Ivalini PRIMARY	RURAL
18	Kanaani PRIMARY	URBAN
19	KMC DEB PRIMARY	URBAN
20	St. Pauls PRIMARY	URBAN
21	Athi River PRIMARY	URBAN
22	Mavoko PRIMARY	URBAN
23	Oleshaiki PRIMARY	RURAL
24	Kasuitu PRIMARY	RURAL
25	Mlolongo PRIMARY	URBAN
26	Kaiani PRIMARY	RURAL
27	Ngelani PRIMARY	RURAL
28	Seme PRIMARY	RURAL
29	Githunguri PRIMARY	URBAN
30	Kamulu PRIMARY	RURAL
31	KInanie PRIMARY	RURAL
32	Kwamboo PRIMARY	RURAL
33	Daystar Mulandi PRIMARY	RURAL
34	Kwa Mang'eli PRIMARY	URBAN
35	Ngwata PRIMARY	URBAN