FACTORS INFLUENCING UTILIZATION OF INFORMATION AND COMMUNICATIONS TECHNOLOGY IN SECONDARY SCHOOLS IN KITUI CENTRAL DISTRICT, KITUI COUNTY

By

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DECLARATION

This research project report is my original work and has not been presented for an award in any other university.

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This research project report has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This study is dedicated to my father Kivuli, mum Jacinta, my husband Elias Wanjala and children Blessed Wanjala and Maggie Mukosi Wanjala.

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I am grateful to my supervisor Dr. Angeline Sabina Mulwa for her enlightening suggestions which were of great help in developing this research project report. She offered useful corrections and guidance which was helpful in writing the final research project proposal.

I will appreciate the efforts of the selected respondents from secondary schools in Kitui Central District, first for finding time within their tide schedule to accept my request to participate in this study. I am also grateful to all of them for their unwavering support in timely filling in the questionnaire without failure. Their contribution was of great help in the success of this study.

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ABSTRACT

The purpose of this study is to investigate factors influencing utilization of information and communications technology in secondary schools in Kitui Central District, Kitui County. The objectives of the study were: to establish the influence of initial cost of ICT installation and infrastructure on utilization of the ICT in secondary schools, to establish the influence of teachersô competency in ICT on its utilization in secondary schools and to establish the influence of Principalsô ICT compliance/ICT supportive school management on utilization of ICT in secondary schools. The researcher used a descriptive research design in this study. The targeted population was 394 teachers within the 25 secondary schools in the District. Purposive sampling followed by random sampling was used to select 110 teachers and 10 Principals from the 10 purposively selected schools because mainly the study targeted schools that had used some computers for either administrative or teaching and learning purposes. Therefore, the key participants in the ICT developments were teachers and principals within the selected schools. A structured questionnaire was used to collect data. To establish validity the questionnaire was pretested by means of a pilot study. This was to ensure that there were no double-meanings or ambiguities in the items. The feedback was used by the researcher to correct any anomalies. In data collection process the questionnaire was personally administered by the researcher to the selected teachers and head teachers. Each participant was given sometime around 20-30 minutes to fill in the questionnaire, and then requested to return it to her. Descriptive statistics was used to analyze the data in which percentages and mean values were used. The findings were presented in frequency distribution tables, with narrations of the results as well as implications of the study findings given alongside the tables. The findings were that the initial ICT installation cost had significantly and negatively influenced the ICT utilization in secondary schools in Kitui Central District. The teachersô ICT competency was needed for them to effectively implement the utilization of the ICT in the secondary schools in the District and the principalsô did not adequately comply with ICT neither did they support it, so the school management negatively influenced the ICT utilization in secondary schools in Kitui Central District.

This study recommends that there is need to alleviate the problem of high cost of computers. There is also need for provision of adequate ICT support infrastructure. Teachers need to be competent in utilization of ICT in teaching and learning as well as in the entire school managerial operations and the teachers too need to change their negative attitude towards utilization of ICT.

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ABBREVIATION AND ACRONYMS

CAD	Computer-Aided Designs
CPU	Central Processing Unit
CDE	County Director of Education
EMIS	Education Information Management System
GOK	Government of Kenya
ICT	Information and Communications Technology
Internet	International Network (international information and communication network)
IT	Information Technology
KEMI	Kenya Education Management Institute
KLB	Kenya Literature Bureau
MOE	Ministry of Education
PCs	Personal Computers
TSC	Teachers Service Commission
S-CEO	District Education Officer
SMS	School Management Systems (using information and communications technology)
STV	Satellite Television
WWW	World-Wide Website

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Information Communications Technology(ICT), is often used as an extended synonym for information technology (IT), but it is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), intelligent building management systems and audio-visual systems (Caperna, 2009). It consists of all technical means used to handle information and aid communication, including computer hardware and software and communication middleware (Carnoy, 2005).

The use of ICT has not been extensive in education systems worldwide as found in other fields, such as business and engineering. Reasons for the low adoption or absence of ICT in education systems also vary significantly depending on the prevailing circumstances (Oliver, 2009). Some experts suggest it is the high costs associated with implementing these technologies that prevents schools from using them in the classroom. Other experts argue that the social nature of current education systems, which require a substantial amount of personal contact between teachers and their students, prevents these technologies from being better integrated in the classroom setting (Carnoy, 2005). The use of ICT in education extends beyond equipping classrooms with computers and an Internet connection. There are a wide variety of ICT currently available to schools to enhance studentsô overall learning experiences in numerous ways (Oliver, 2009).

The importance of ICT is quite evidence from the educational perspective. A fundamental priority for institutionsô e-learning and school management systemsô (SMS) aid in managing a school is improved by computers. Computers can be used to enable successful learning and to

provide professional development for multiple staff in an institution, enabling them to be more effective. Computers enables more effective conversations between the ICT community and the teaching-learning community in the schools; integrating ICT tools, techniques and processes needed to ensure successful school management and learning.

Though the chalkboard, textbooks, radio and film have been used for educational purpose over the years, none has impacted on the educational process like the use of ICT (Oliver, 2009). According to Shavinina (1997), domain-specific educational multimedia is directed to knowledge acquisition skills development in the language arts, history, physics, literature, biology and so on. There is no doubt that ICT provides productive teaching and learning in order to increase peopleôs creative and intellectual resources especially in todayôs globalized information society.

Through the simultaneous use of audio, text, multicolor images, graphics, motion, ICT gives ample and exceptional opportunities to the students to develop capacities for high quality learning and to increase their ability to innovate (Caperna, 2009). Kenya cannot afford to lag behind in using multimedia to raise the intellectual and creative resources of her citizens. This is particularly important for children whose adulthood will blossom in a cyber environment entirely different from that of the present (Oliver, 2009). Kenyan children need to be taught through radically new educational programme and variety of educational contents with multimedia playing key role.

Although ICT enhances student learning in many ways, there are some disadvantages associated with implementing these sophisticated technologies within the rural schools in developing countries around the world (Grossman and Helpman, 2005). Some of these disadvantages

include: High costs: Implementing ICTs in the education setting can be quite costly regarding updating existing infrastructures, training teachers and developing quality course materials. To make matters worse, funding for such projects is often scarce (Oliver, 2009).

Despite the cognizance of the role played by Information and Communication Technology in improving the quality and quantity of education, ICT remains a low government financial priority in most educational systems among the African countries. Most African countries lack the local human capacity and finances essential for sustainable teaching and learning of ICT. Another impediment is the cyber teaching of ICT which counteracts at times the studentsô ideas with that of the ICT curriculum and the methods used to teach the ICT content. At the level of the teachers training, there is still lack of well-structured training programme for ICT pedagogy; this is because most the teachers teaching ICT now are untrained. Utilization of ICT in secondary schools since its initiation in Kenya has faced a lot of difficulties.

Insufficient ICT school support infrastructure and low maintenance rate of the ICT equipment available also prevent students from developing the ICT technological and manipulative skills. Teaching of some programmes and manipulation of some application software is difficult because of inadequate computers for practical lessons.

Most rural areas lack electricity and those that have suffer from constant current shortage which hinders the effective use of computers to do practical work. Some students donôt yet know the importance of learning ICT in secondary schools. Although the Government of Kenya (GOK) has to an extent started resolving the case of teacher training by creating a department for computer science in all the teacher training colleges in the country, the problem of teacher shortages still remains unabated.

1.2 Statement of the Problem

Despite the universal recognition of the need to use information and communication technology in secondary school education in tandem with ICT globalization era, many education systems worldwide, are yet to adopt ICT. The reasons behind the absence of use of information and communication technology in secondary school education are varied.

Although secondary school students have limited access to Internet services, these services would enable them to download available and useful knowledge and collaborate with other high school students worldwide. Despite of the importance of teachers and studentsô adopting the ICT systems, Kenya is yet to make significant effort to integrate ICT into secondary school curriculum. In some rural areas of Kitui Central District, there is inadequate power to run the computers.

A great deal of public secondary school curriculum instruction and administrative work in Kenya is carried out manually. To integrate information communication technology into teaching and learning, there is need for proper ICT education policy and adequate financing of secondary school education. This study, therefore, examined the major obstacles militating against the use of ICT in secondary schools in Kitui Central District, Kenya.

1.3 Purpose of the Study

This study aims at investigating the factors influencing utilization of information communication technology in secondary schools in Kitui Central District, Kenya.

1.4 Objectives of the Study

This study seeks to achieve the following objectives:

i. To establish how the ICT installation cost involved influence the utilization of information and communication technology in secondary schools in Kitui Central District

ii. To establish how teachersô competency in computers influence on the utilization of information and communication technology in secondary schools in Kitui Central District.

iii. To establish the influence of school leadersô support on utilization of information communication technology in secondary schools in Kitui Central District.

1.5 Research Questions

The study was guided by the following research questions:

i. To what extent does ICT cost involved influence the utilization of information and communication technology in secondary schools in Kitui Central District?

ii. To what extent does teachersô competency in ICT influence the utilization of information and communication technology in secondary schools in Kitui Central District?

iii. To what extent does school leaderôs ICT compliance influence utilization of information and communication technology in secondary schools in Kitui Central District?

1.6 Significance of the Study

The findings of this study may be beneficial to the head teachers because it might help them in improving their knowledge in ICT and support the ICT teacher training programs. The head teachers may also become aware of the benefits of ICT in teaching and learning which may enhance the quality of secondary education. The study findings may also be a source of information for student-teachers in their colleges and the study recommendations may be useful to curriculum developers at the Kenya Literature Bureau (KLB) if infused into the teacher-training curriculum so that teachers may undergo their initial ICT training courses at their respective colleges before taking up their first appointed teaching jobs after graduation. The Kenya Education Management Institute (KEMI) may use these study findings in identifying

areas which urgently need to be addressed during the in-service courses for head teachers, deputy head teachers, head of departments as well as teachers which may assist in enhancing utilization of ICT in both teaching-learning process and in the entire school management systems (SMS).

1.7 Limitations of the Study

Utilization of ICT in secondary schools in Kitui Central District has not yet been documented. Therefore, finding literature materials for review in the District was a limitation of the study. Kitui Central District might have peculiar characteristics from the other places in Kenya. This was a source of limitation of the study. Therefore, the study findings may only be generalizable and replicated elsewhere worldwide provided that similar characteristics to those in secondary schools in Kitui Central District, Kenya prevails.

1.8 Delimitations of the Study

This study is designed to be carried out in a geographical area where only the secondary schools are located in Kitui Central District. The study results may be useful to similar further studies on utilization of ICT. In the individual sampling procedure care was taken to ensure proportionate school and gender balancing, avoiding gendered data opinions on factors influencing utilization of ICT in schools within the District.

A questionnaire was used for data collection. Therefore, the responses obtained form the participants was based on the reliability and validity of data obtained using this research instrument. On the basis of the reliability and validity of the collected data the study findings, conclusion and recommendations was made. The scope of this study was delimited to the aforementioned personal researcherôs choice of variables as shown in the objectives of the study: The other factors was held constant in this study.

1.9 Assumptions of the Study

The following are the assumptions made in this study:

i. Study sample was a representative sample of all stakeholders involved in enhancing utilization of ICT in secondary schools in Kitui Central District, Kenya.

ii. Research instrument would accurately measure all the attributes influencing the utilization of ICT in secondary schools. Therefore, the data collected was valid and reliable.

iii. Data collection methods will not have any influence on the participantôs responses and this enable the researcher to collect fairly unbiased data.

1.10 Definition of Significant Terms

Policy: A government-issued document which sets out the principles, guidelines and strategies for action in education sector for example policy on use of ICT in education.

E-learning: electronic learning is the use of Internet access services where studentsô exchange information worldwide in a computer-aided student-centered free learning process**,** which enhances creativity and allows students to develop innate critical thinking.

Email: Individualized electronic communicationsô username used by students, teachers plus any other web subscribers to communicate within a worldwide website (www).

Information Communication Technology: A diverse set of information and communication technology tools and resources used to transmit, store, create, share or exchange information and knowledge internationally.

ICT Support Infrastructure: Secure secondary school physical facilities which can support utilization of ICT in teaching and learning and administration like electricity, classrooms, furniture and textbooks.

Internet: used as a shortened form of International Networking using satellite signals obtained in worldwide website for sharing information and communication technologies.

School leaders' support: Head teachersô compliance in administrative ICT support strategies as financial plans for and provision of ICT support incentive structures. These structures can be used in teaching and learning and general school operations.

Teachers' Competency in ICT: Teachers with ICT skills to use in ICT teaching and learning with adequate knowledge about ICT curriculum frameworks, related curriculum resources, pedagogy, and the use of ICT in enhancing school administration.

1.11 Organization of the Study

The study was organized into five chapters. Chapter one consists of: background to the study, statement of the problem, purpose and objectives of the study, research questions, and significance of the study, scope of the study, limitations of the study, assumptions of the study, definition of significant terms and organization of the study.

Chapter two contains literature review under: introduction, influence of cost involved on utilization of ICT in Secondary Schools, cost of ICT Infrastructure and its utilization in Secondary Shools,Government Education ICT policy on its utilization in Secondary Schools, Accessibility to Relevant Software in Secondary Schools, Accessibility to the Internet by Teachers and Students in Secondary Schools, Influence of Teachers ICT Competency on its utilization in Secondary Schools, Utilization of ICT for Teaching and Learning in Classroom at Secondary Schools, Prospects for ICT skilled Teachers and its utilization in Kenyan Secondary Schools, Influence of Principals ICT Compliance on its utilization in Secondary Schools, Utilization of ICT as a tool for Secondary School Management and Administration,Satatus of Secondary School Education at Kitui Central District in Kitui County . A conceptual framework and summary of the literature review with research gaps identified was at the end of the chapter.

Chapter three has: introduction, research design, location of the study, target population, sample size and sampling procedures, research instruments and instrument validity and reliability, data collection procedures and data analysis, ethical considerations and operationalisation of the study variables. Chapter four consists of: data analysis, presentation and interpretation and Chapter five is on summary of the study, discussions of the findings, conclusions, recommendations and suggestions for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the reviewed literature according to the objectives of the study such as: influence of cost of computers; ICT support infrastructure; teachersô competency in ICT; school managementsô ICT support and ICT educational policy for public secondary education. The chapter also presents a conceptual framework with a summary of reviewed literature and the research gaps identified in the process of literature review.

2.2 Influence of Cost Involved on Utilization of ICT in Secondary schools

The information communication technology is used as an extended synonym for information technology (IT), but is a more specific term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

Therefore, the adoption application and implementation of ICT to schooling is an urgent task for developing countries (British Parliamentary Office of Science and Technology 2006). However, there are challenges that the developing world is facing and these make the ôDigital Divideô continue not only between countries but also within countries (Parliamentary Office of Science and Technology 2006). Some scholars (Oliveira 1989) argue that ICT is a formidable tool for developing countries to leap up to the economic level of developed nations. The first issue, which almost all developing countries face, is how to deal with the scarcity of financial resources (Oliveira 1989). Resources in the developing world are always scarce so that they have to be

spent mostly on basic supplies such as food, housing and roads. In a sense, investing in ICT for schooling might be regarded as a long term issue which means adopting ICT in the education system is relatively not an urgent issue considering the serious poverty in many African countries. This results in a vicious circle between scarcity of funds and under-development. The cost of hardware has been decreasing rapidly.

The price of Personal Computers (PCs), laptops and peripherals is reduced to half of the original price every two years. Because of this, the salary of the ICT professionals who can teach the new technology is the biggest burden on education budgets and it is followed by software related costs (Oliveira, 1989).Jervis and Steeg (2000) discussed the use of the Internet in secondary schools, and they concluded that there have been rapid developments in Internet access in British schools during the period 1997-1999.

The technology-supported education system is cost-efficient, which is especially meaningful in countries with poor infrastructure (Oliveira 1989). However, compared with developed countries, the use of ICT in education programs in developing nations is relatively limited, because underdeveloped countries face shortages of financial resources, limited internet access, lack of trained teachers and the lack of proper policies (Gulati, 2008).

Governments can cut the tax imposed on ICT related imports or liberalize the market for PCs, telecommunication and the internet business. These actions will result in a lower price of ICT related products and an increase in affordability. Industries also have a role in closing this division. Normally, industry works for profit, but corporations have a social responsibility to spend their resources on unprofitable but highly required areas and some of them are actively involved in addressing the digital divide (Thierer, 2000).

2.2.1 Cost of ICT Support Infrastructure and its Utilization in Secondary Schools

Despite the existence of research and evidence-based studies, that the adoption and utilization of ICT in enhancing public secondary school education in developing countries as the pathway to educational development the future of utilization of ICT in public secondary school education remains unclear in less developed countries (Caperna, 2009). As such Caperna (2009) concludes that additional research is needed to better understand if a link exists between the use of ICT in education and improved student learning (Caperna, 2009).

Adoption and utilization of ICT in enhancing public secondary school education in developing countries has been and it is still generally perceived as a way to relieve poverty, social division and improve living standards due to the fact that information communications technologies can deliver secondary school educational programs at a relatively lower cost rates than the traditional educational methodologies would do (Parliamentary Office of Science and Technology 2006).

Internet access is limited in remote areas, and relatively poor infrastructure in developing nations such as supply of electricity makes it worse in their quest to adopt ICT in secondary schools (Gulati, 2008). Low quality infrastructure is the fundamental problem for developing countries to deal with and it might take a long time and huge funding to improve such kind of the infrastructure to the acceptable level that guarantees effective utilization of ICT in public schools. Low literacy rates also hinder locals in remote areas from accessing information through the internet and due to the dominance of English on the internet; non-English speaking local people are isolated from the benefits of using internet (Parliamentary Office of Science and Technology 2006). In contrast, in underdeveloped countries, ICT infrastructure is weak and the internet access is limited. Supply of PC in school is much less than needed and trained person

who can resolve computer literacy is also in serious shortage (Gulati 2008). The digital divide is mainly related to such factors as appropriate products, cost, education, literacy, human resources, and government regulations (Kenya: National Council for Science and Technology survey-June, 2010).

In Kenya, there is need for affordable and appropriate education for students who are preparing to join the middle level training institutions. This points out to the fact that appropriate technology is required to provide fast and accurate feedback to students. The best technologies are those that focus on education quality and relevance if schooling is to provide a skilled confident manpower equipped to prosper regardless of background with productive ability responsive to social challenges (National Council for Science and Technology survey-June, 2010 Nairobi: Kenya).

2.2.2 Government Education ICT Policy on its Utilization in Secondary Schools

Policy frameworks and guidelines that create legislation that enables schools to open school-based tele-centres to their communities can empower schools to develop partnerships with local communities and the private sector. The enhanced partnerships in sharing resources, makes them to gain additional resources and carry out vision and plan that are culturally sensitive to respond to the target populationsô needs (Kenya: National Council for Science and Technology survey-June, 2010). Gulati (2008) argues that inappropriate policy and funding decisions may hinder equal educational development in some developing countries. He also asserts that elitism is the most common driver for improper policy. For example, India focuses mostly on the higher education system so the poor do not have enough opportunities to get adequate education even though there is certain technology-enhanced education such as satellite television (STV) learning programs (Gulati, 2008).

Pressure from industry might be another source of improper policy (Oliveira 1989). Industry lobbyists distort the policy of ICT and education for the purpose of their favour. In policy advice, Gulati (2008) especially focuses on investing in infrastructure. These actions will help boost sustainable technology enhanced schooling. The principal is responsible for ICT investment; otherwise, schooling fails to ultimately improve socioeconomic conditions for families, communities, and future generations.

2.2.3 Accessibility to Relevant Software in Secondary Schools

The Government of Kenya (GOK) confirms that prioritizing construction of ICT connectivity fosters effective opportunities for those with difficulty in accessing ICT services and enhances teaching and learning in secondary schools (GOK: National Council for Science and Technology Survey-June, 2010). The survey also reported that the level of ICT awareness among educational leadership was inadequate, mainly at the school management level to ensure that schools develop their own alternative sources of funds for ICT infrastructure plans, connectivity strategies and technical needs and programs (GOK, 2010).

There is no doubt that the ultimate power of technology is the content and the communication. Though, software developers and publishers in the developed countries have been trying for long to develop software and multimedia that have universal application, due to the differences in education standards and requirements, these products do not integrate into curriculum across countries. Software that is appropriate and culturally suitable to the Kenyan education system is in short supply. There is a great discrepancy between relevant software supply and demand in developing countries like Kenya. According to Salomon (1989), there are clear indications from many countries that the supply of relevant and appropriate software is a major bottleneck

obstructing wider application of the computer. Even if Kenya tries to approach this software famine by producing software that would suit its educational philosophies, there are two major problems to be encountered. First, the cost of producing relevant software for the countryôs educational system is enormous. Second, there is dearth of qualified computer software designers in the country. To overcome this, people need to be trained in instructional design.

2.2.4 Accessibility to the Internet by Teachers and Students in Secondary Schools

In Kenya there are few Internet providers that provide Internet gateway services to Kenyans. Such Internet providers are made up of Kenyans who are in partnership with foreign information and communication companies. Many of these companies provide poor services to customers who are often exploited and defrauded. The few reputable companies, which render reliable services, charged high fees thus limiting access to the use of the Internet (GOK, 2012).

The greatest technological challenge in Kenya is how to establish reliable cost effective Internet connectivity. In a country where only about 0.6% of the populace has home personal computers, the few reliable Internet providers who have invested huge sum of money in the business have a very small clientele. They have to charge high fees in order to recoup their investment in reasonable time. Kenya has about 500,000 Internets subscribers (GOK, 2012).

Secondary schools in Kenya are not given adequate funds to provide furniture, requisite books, laboratories and adequate classrooms let alone being given adequate funds for high-tech equipment (computers) and Internet connectivity. Again, due to the lack of adequate electricity supply, especially in rural areas in Kenya, secondary schools located in those areas have no access to the Internet and are perpetually isolated and estranged from the worldôs information superhighway. Kenya in lagging behind other African countries such as Uganda, Senegal and

South Africa who are already helping secondary school students in those countries to become better information users. All Internet service providers in Kenya are based in the urban areas.

For many years, the Kenyan government had a monopolistic control of telecom service, which does not allow for the competitive environments that reduce telephony rates. Paltridge (1996) asserted that the penetration of Internet hosts is five times greater than in monopoly markets and that Internet access in countries with telecommunication competition enjoyed a growth rate five times higher than the monopoly environments. All that may change for Kenya now as the government had invited private participation in the telecom industry and many investors are already in the Kenya markets but it will take many years to know their full impact on Kenya education system.

2.3 Influence of Teachers' ICT Competency on its Utilization in Secondary Schools

Another challenge of developing nations to adopt ICT in education systems is a lack of trained teachers (Gulati 2008). When it comes to practically applying ICT, which is new to traditional teachers, many may not know how to deal with it and sometimes they are reluctant to accept new technologies in their classrooms. Thus, tutors who can train these teachers about new technology and IT professionals who can technically install and maintain the systems are needed (Kozma 1999).

Many teachers at secondary schools who are unfamiliar with the use of ICT in classroom are resistant to incorporating such technologies into their established pedagogies. To succeed, the use of ICT in education needs to be supported by well-trained teachers. Currently, no large-scale studies have been conducted that show whether or not the use of ICTs in an educational setting will result in a measurable increase in individual student achievement, making school

administrators hesitant to invest in these technologies (Grossman and Helpman, 2005). Results of an initial ICT survey in Britain, feed back to the teachers though mentor training sessions, proved to be a very useful tool to help audit the situation in partner schools (Jervis and Steeg, 2000).

The main focus of the teacher student's ICT training remains knowledge and understanding of, and competence, with ICT to enable them to decide when the use of ICT is appropriate and effective to achieve their teaching objectives. This includes the use of generic ICT subject specific software such as Computer-Aided Designs (CAD) and computer controlled equipment (Jervis and Steeg, 2000). However, this does not translate into extensive ICT use and they found that current use was very low.

Issues noted from previous studies included staff training, the need for effective online database technological resources to support teaching and learning and the provision of an adequate bandwidth at affordable prices. Some of the teachers, ICT coordinators in Kenya have undergone some form of staff development with information and communications technology qualifications at diploma, degree to postgraduate levels from pre-service training or commercial college.

Though a number of secondary school teachers have good background on ICT and face no challenge to learn and acquire computer skills as they work with students, the study reported negative attitudes to activities in school ICT activities and programs (Kenya: National Council for Science and Technology survey-June, 2010). According to the teachers the activities of ICT Committee made consistent progress in expanding access with increased demand for ICT literacy in the schools. Teachers was asked to rate their own experience as ICT coordinators by qualification years half of them (50%) reported 6 to 10 years and the next range reported at least

15 years. Only a few teachers qualified in below 5 years and/or 16 years and above held assignments as ICT Coordinators. It suggests that ICT trained teachers on entry need an active involvement to make full use of ICT in teaching (African Union 2004).

Teachers who are generally considered to be more competent are either excellent or good in the use of ICT for student advancement judging by the quality of schools and educators who work with them. Efforts where individual teachers pursue their ICT technical skills enrich themselves with experience, roles, team building and knowledge exchange. This is needed to improve higher level of ICT-related skills in national secondary schools (GOK: National Council for Science and Technology survey-June, 2010).

2.3.1 Utilization of ICT for Teaching and Learning in Classroom at Secondary Schools

The importance of ICT is quite evidence from the educational perspective. Though the chalkboard, textbooks, radio/television and film have been used for educational purpose over the years, none has quite impacted on the educational process like the computer. While television and film impact only on the audiovisual faculties of users, the computer is capable of activating the senses of sight, hearing and touch of the users. ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability.

The main purpose of ICT ñconsists just in the development of human mental resources, which allow people to both successfully apply the existing knowledge and produce new knowledgeò (Shavinina, 2001,P.70). Information and communication technologies are being used in the developed world for instructional functions. Today, computers perform a host of functions in teaching and learning as many nations are adding computer literacy, reading and writing literacy as skills students will need for succeeding in a technologically developed world (Thomas, 1987).

At the instructional level, computers are used by pupils to learn reading, mathematics, social studies, art, music, simulation and health practices.

In educational multimedia application Shavinina (1997) asserted that todayôs learning contents are domain-specific products and that they dominate the world market. According to Shavinina (1997), domain-specific educational multimedia is directed to knowledge acquisition skills development in the language arts, history, physics, literature, biology and so on. There is no doubt that ICT provides productive teaching and learning in order to increase peopleôs creative and intellectual resources especially in todayôs information society. Through the simultaneous use of audio, text, multicolor images, graphics, motion, ICT gives ample and exceptional opportunities to the students to develop capacities for high quality learning and to increase their ability to innovate.

Kenya cannot afford to lag behind in using multimedia to raise the intellectual and creative resources of her citizens. This is particularly important for children whose adulthood will blossom in a cyber environment entirely different from that of the present (Shavinina, 1997). Kenyan children need to be taught through radically new educational programme and variety of educational contents with multimedia playing key role.

2.3.2 Prospects for ICT skilled Teachers and its Utilization in Kenyan Secondary Schools

There are numerous and good prospects for the use of ICT in teaching and learning in secondary schools in Kenya. ICT can enhance educational efficiency. The efficiency in teaching various subjects could be improved. The computer can enhance problem-solving skills of the learners by focusing on thinking skills especially in subjects such as mathematics. ICT can be used for individualized learning in secondary schools in Kenya.

Due to large classes and differences in individual learning style and pace, microcomputers enables the student to progress at his or her own pace and receive continual evaluation feedback and corrections for errors made. In this way, computers allow the development of partner-like interactive and individualized relations with the user. Computers play the role of the tutor and present the leaner with a variety of contents and symbolic modes.

Use of ICT can change current pedagogical practices in secondary schools in Kenya, which depends heavily on the traditional lecture method. It is universally accepted that computers allow more independent exploration, more personally tailored activities, more teamwork, and more significantly, less didactic instruction. The role of the teacher, therefore, changes from information dispenser to that of information manager, from authoritative source of information to a guide of self-propelled exploration (Smith, 1989).

Use of ICT can serve administrative functions to replace the laborious exercise of filing papers in filing cabinets and shelves where records accumulate dust over a long period of time. Another administrative application of ICT is in its use for budget planning, accounting for expenditure, writing correspondences and reports, assigning students to classes, reporting studentsô progress and testing students and scoring tests which help to reduce paper work. Many of these tasks are not effectively and efficiently done in secondary schools in Kenya.

The ICT utilization offers teacher improvement in research techniques. The cumbersome exercise of searching by hand through the libraryôs card catalog or periodical indexes can be made easier by typing few key worlds pertinent to the research topic into a computer and the teacher can receive extensive list of related sources of articles in books and journals in just a matter of minutes.

2.4 Influence of Principals' ICT Compliance on its Utilization in Secondary Schools

The permeation of uses of ICT in-school and out-of-school for educational purposes means that for all those who manage, ICT make information acquisition, and, improve efficiency in productivity and management empowering students and staff become more self-sufficient. This will also mean that there are likely implications on management of performance at school level, curriculum management, classroom management, site management, financial management, or personnel management (Kenya: National Council for Science and Technology survey-June, 2010).

The value proposition predicted in ICT awareness, enablement and integration is indented to drive additional interest in the institution and enabling it to gain competitive advantage over and above other institutions. A School management system is a powerful software with: studentsô registration and enrolment database, automated-scheduling and interactive master schedule builders, studentsô attendance tracking lists, integrated teachersô-studentsô lists, report cards, emergency contact services, school nurse system, assessment reporting, discipline monitoring reports, fees and tuition billing system (Twain, 2010).

The school management can use ICT as a strategy of lowering the cost of leadership by use of School Management System and that of efficiency in teaching-learning process. This has led to high studentsô performance in examinations and low running cost of the institution. Therefore, the integration of SMS may lower the cost of production and efficient delivery of all institutional services (Porter, 2001). The SMS helps one to search a student's record in less time span compared to manual filing system. It also helps one to automatically send emails or short text messages to parents if something happens in school (Olson, 2010). Using ICT the school management has an opportunity to establish a new, energized brand to ensure studentsô academic

success. Placing learning and the learner at the heart of the institutions work on transforming teaching and learning differentiates the ICT compliant school from other schools, strengthens the focus and provides valuable services to the members of the institution. Successful learning requires an understanding of the learner as well as the integration of pedagogy and technology. As a result, the institutions should expand their ICT integration to teaching and learning.

2.4.1 Utilization of ICT as tool for Secondary School Management and Administration

It is not uncommon to find that many establishments in Kenya, including educational institutions, still keep records in files and tucked them away in filling cabinets where they accumulate dust. Many of these files are often eaten up by rodents and cockroaches thus rendering them irretrievable. A great deal of routine administrative work in government establishment is still done manually with the state and the Federal government showing little or no interest in embracing ICT. The official administrative drudgery in government offices and education institutions can be better managed through ICT. Educational administrative functions include a wide variety of activities such as educational governance, supervision, support services, infrastructure, finance, budgeting, accounting, personnel selection and training system monitoring and evaluation, facilities procurement and management, equipment maintenance, research, and so on (Thomas, 1987).

In most Kenyan schools, officials still go through the laborious exercise of manually registering students, maintaining records of pupil, performance, keeping inventory list of supplies, doing cost accounting, paying bills, printing reports and drawing architectural designs. The huge man-hour spend on these exercises can be drastically reduced with ICT to enhance overall management procedure. Thomas (1987), said that ñComputers bring great speed and accuracy to each of these tasks, along with the convenience of storing large quantities of information on

ósmall disks or tapesô (P.5). However, the prevailing condition in school management in Kenya is disheartening and discouraging. The country seems to be living in prehistoric times in the educational management while even developing countries in Africa such as South Africa, Kenya, Uganda and Tanzania are far ahead of Kenya in ICT applications.

2.4.2 Status of Secondary School Education at Kitui Central District in Kitui County

There are 25 secondary schools in Kitui Central District. The adoption of ICT in secondary schools is poor in the District. Only ten (10) out of the twenty five (25) secondary schools were already utilizing ICT in Kitui Central District by the time of data collection for this study. Those schools use computers for either school management or teaching and learning process in the classrooms. The remaining fifteen (15) secondary schools were not using ICT for either school management or teaching and learning [(District Education Officer (S-CEO) Report, Kitui Central District, 2013)].

Secondary school education attendance is also poor in the Kitui County. Whereas 85 per cent of primary school age children were attending school, only 15 per cent of secondary school age children (14-17 years) were attending secondary school education in Kitui County (Vasudevan and Gichohi, 2008). Majority of the children in the secondary school age-group (14-17 years) in Kitui County were either out of school or still attending primary school education.

Gender differentials in secondary school attendance were very apparent and in favour of girls; 53 per cent of the girls are in secondary schools compared with only 24 per cent for boys. The proportion of children attending secondary schools increases with increasing levels of the household wealth index (Vasudevan and Gichohi, 2008).

2.5 Conceptual Framework

This conceptual framework is constructed on factors influencing utilization of information communication technology in secondary schools as shown in Figure 1.

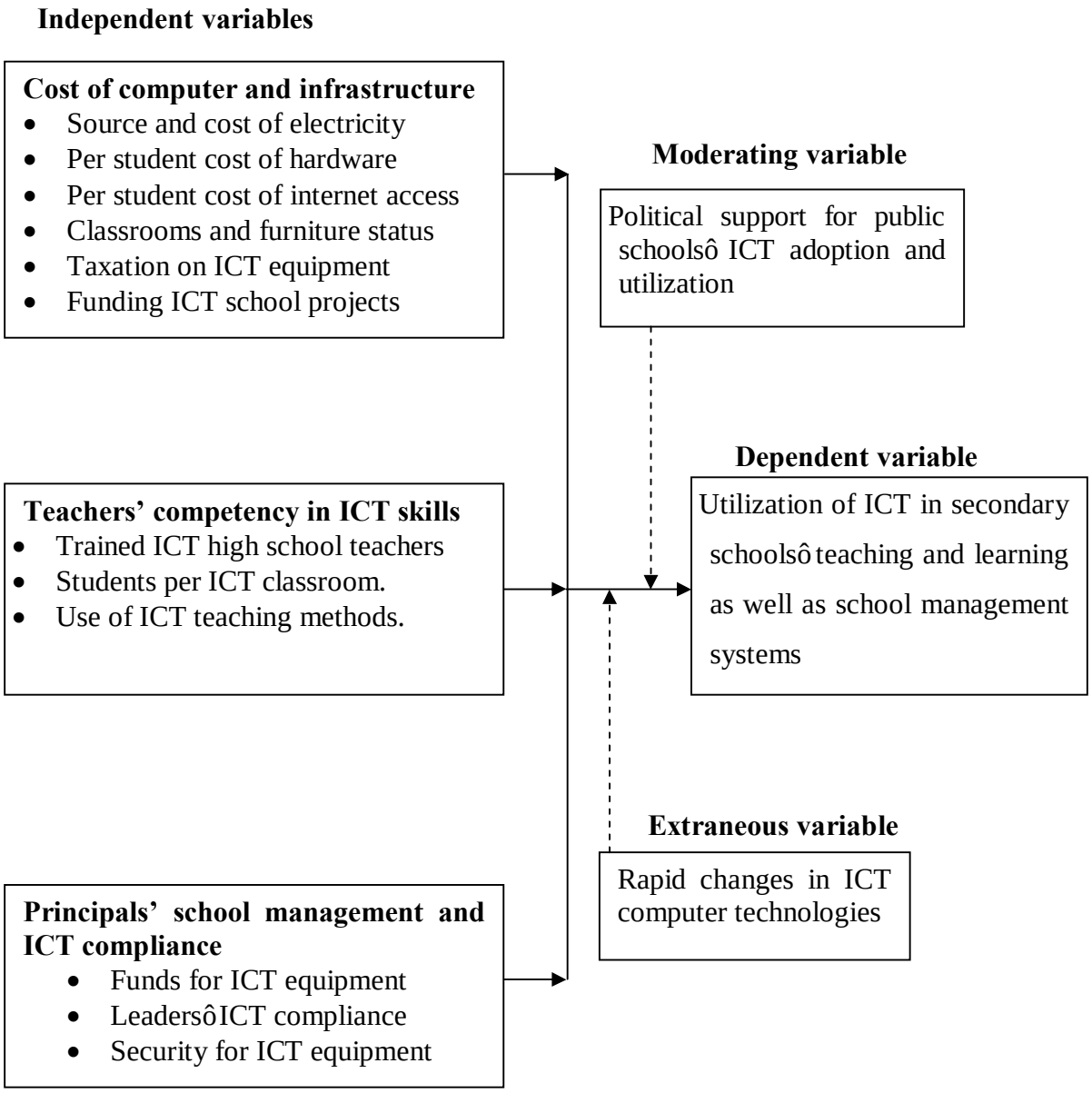

Figure 1 Conceptual Framework

As shown in Figure 1, the independent variables are: influence of cost of computers, teachersô competency in ICT, school management and ICT compliance to achieve the dependent variable the utilization of ICT in secondary schools.

2.6 Summary of Reviewed Literature and Research Gaps

From the literature review, the ICT related capacity framework can be divided into three parts, the first part refers to the ability to provide and maintain infrastructure, such as internet access at an affordable cost. Sectors to which ICT can be applied are those such as education, health, business, governance, society and environment. The capacity related to these sectors is the creation and maintenance of useful content and applications. Use of computer application is linked to the capacity of the users to utilize those applications (Osterwalder, 2009). Although ICTs can enhance student learning and school management, some of the disadvantages associated with implementing these sophisticated ICT in schools.

The challenges include: Costs: Implementing ICT in the education setting can be quite costly regarding updating existing infrastructures, training teachers and developing quality course materials. To make matters worse, funding for such projects is often scarce (Oliver, 2009). Many teachers are unfamiliar with using ICT in the classroom and are resistant to incorporating such technologies into their established pedagogies.

Currently, no large-scale studies have been conducted that show whether or not the use of ICT in an educational setting would result in a measurable increase in individual student achievement, making school administrators hesitant to invest in these technologies (Grossman and Helpman, 2005). Despite existing research and evidence-based studies, the future of ICT in education remains unclear in Kenya and in Kitui Central District in particular.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology in the following subheadings: Research design, target population, sampling procedures and sample size, research instruments, validity and reliability, data collection and analysis, ethical considerations and Operationalization of variables.

3.2 Research Design

The study adopted a descriptive survey and comparative research designs. In descriptive designs structured questionnaires are used to collect data from a representative sample of the study population and the study findings are generalized to the target population (Orodho, 2005). A comparison between ICT compliant and non-ICT-compliant public schools will also be made.

3.3 Location of the Study

The Location of this study was in the secondary schools in Kitui Central District in Kitui County, Kenya. The District had 25 secondary schools. Only teachers employed by the Teachers Service Commission (TSC) were considered for inclusion in the sample.

3.4 Target Population

The study targeted 394 participants among them were the 369 teachers and 25 principals or head teachers in 25 secondary schools in Kitui Central District. The teachers from the schools using ICT were expected to give data of interest for this study from their experience.

3.5 Sampling Procedures and Sample Size

Stratified random sampling was used in this study to select the only eight (10) secondary schools out of the 25 schools in Kitui Central District that utilize ICT. Then simple random sampling

was used to select the ten Principals from these schools. Simple random sampling was used to select 11 teachers in each selected school plus the Principal to get 12 respondents from each of the ten selected schools. Therefore with the sum of 10 Principals and 110 teachers the sample size was 120 respondents as shown in Table 3.2. This was 30 percent of the targeted population of 394 teachers as recommended by Mugenda and Mugenda, (2003), when the target population is small less than one thousand subjects as: [N < 1000], in the case of this study N = 394 as shown in Table 3.2 which shows the ten selected schools with the sample size of 120. This ensured that the respondents from secondary schools that used ICT were purposively sampled from their stratum of schools because they had the data of interest in this study. Principals and Teachers were the best placed respondents because the study was on the factors influencing utilization of ICT in secondary schools. As such students may not give valid data on the same due to their level of education and their status in the society.

Table 3.1 Sampling Frame and Sample size

S/N	Selected Schools for Study	Population of Teachers	Population Principals	Selected Teachers	Selected Principals	Sample (n)
1	School A	26	1	11	1	**12**
2	School B	29	1	11	1	**12**
3	School C	37	1	11	1	**12**
4	School D	16	1	11	1	**12**
5	School E	25	1	11	1	**12**
6	School F	13	1	11	1	**12**
7	School G	15	1	11	1	**12**
8	School H	24	1	11	1	**12**
9	School I	21	1	11	1	**12**
10	School J	18	1	11	1	**12**
Total was 10 Selected Schools		**= 369**	**10**	**= 110**	**= 10**	**= 120**

3.6 Research Instruments

A questionnaire was used to collect data. The questions were both closed and open-ended. Closed-ended items facilitate consistency of data and open-ended items provide freedom of response. Closed-ended items elicit quantitative data and open-ended items elicit qualitative data.

3.7 Validity and Reliability of Instruments

This section consists of the methods used to validate and ensure the reliability of the instrument.

3.7.1 Validity of the Instrument

Validity is the degree to which the analysed data actually represents the phenomenon under the study(Orodho,2005).To establish validity of the questionnaire, the constructed items was checked by experts in research methodology from the University of Nairobi, so as to ensure no double-meanings or ambiguities are in all the items. Expertsô feedback was used to correct any anomalies. Content validity was established through two steps.First, consulting the supervisor who is an expert in the field and the second step through a pilot study .In this step a pilot study was conducted with two schools from the neighboring Katulani District where results were analysed critically for content validity.

3.7.2 Reliability of the Instrument

According to Sharelson(1981) a research instrument is reliable if it can measure a variable accurately and consistently to obtain the same results under the condition overtime. A pilot was taken as the first step to establish reliability of the research instrument, Nachimias,(1992) recommended split-half method to ensure reliability of a test to be used. After the pilot study was taken, the instrument was split into two with all odd numbers in one sub-set. The scores of all the odd numbers and even numbers items of the respondents in the pilot study were computed

separately. The odd numbered scores of all items was then correlated with the even numbered scores. The scores obtained were correlated using Pearson Product-Moment Correlation. If the correlation obtained is 0.6,it will be sufficient for high reliability Orodho,(2005).Those participants involved in the pilot study were excluded from the actual study sample.

3.8 Data Collection Procedures

A research authorization permit was obtained from County Director of Education (CDE)-Kitui County and a copy of the permit was submitted to the District Education Officer (S-CEO) of Kitui Central District in order to be allowed to collect data in the District. An initial survey of the schools was done to establish rapport with the respondents before the data collection date. The selected respondents were assured of identity anonymity to uphold privacy and confidentiality. A questionnaire was personally administered and adequate time was allowed around 20-30 minutes for filling in the data, completed questionnaires were personally collected.

3.9 Data Analysis

Data was grouped according to the three objectives of the study and analyzed using descriptive statistics where percentages and mean values were calculated using a scientific calculator. Findings were presented in frequency distribution tables and discussions were given in between tables. Data were analyzed in the following ways:

i. For socio-demographic characteristics of the principals and teachers, was analyzed using percentages and frequency distributions.

ii. For 5-point likert rating scale items the range of mean used were based on the following mean range values and interpretations as shown in Table 3.2.

Table 3.2 Mean Ranges for 5-Point Likert Scale during Data Analysis

Mean Range	Response Modes	Interpretations
3.4 ï 3.9	Strongly Agree	Very High
2.8 ï 3.3	Agree	High
2.2 ï 2.7	Not Sure	Fair
1.6 ï 2.1	Disagree	Low
1.0 ï 1.5	Strongly Disagree	Very Low

3.10 Ethical Considerations

The researcher will obtain a permit from the County Director of Education of Kitui County in order to be allowed to collect data. A copy of the permit was submitted to the S-CEO Kitui Central District, to seek permission to carry out this study in the area. A pre-visit of the schools to establish rapport before the actual data collection date was a done. Participants were assured of their personal identity anonymity to uphold privacy and confidentiality.

3.11 Operationalization of the study variables

In the operational definition of variables in this study; a table showing both the dependent and independent variables was drawn with the objectives of the study, their indicators, measurement scales and statistical tools of analysis as shown in Table 3.3.

Table 3.3 Operationalization of the Study Variables

Objectives	Variables		Indicators	Measure Scale	Tools of analysis	Types of tools
	Independent	Dependent				
To establish how initial cost of ICT Installation may influence its utilization in secondary schools	Initial cost of Installation of ICT in school	Utilization of ICT in secondary schools	-Cost of computer and maintenance -Cost ICT support infrastructure -Cost of Internet Access Per Unit	Interval Interval Interval	Descriptive Statistics Mean values -Percentages	Frequency tables, mean and Percentages
To establish how teachers competent in ICT influences ICT utilization in secondary schools	Teachersô ICT competency in teaching and management	Utilization of ICT in secondary schools	-Number of ICT trained teachers -Number of students per ICT classroom -Use ICT teaching methodology	Nominal Nominal Nominal.	Descriptive Statistics Mean values Percentages	Frequency tables, mean and -Percentages
To describe how principalsô ICT compliance influence on the utilization of ICT	Principalsô ICT compliance and ICT supportive management	Utilization of ICT in secondary schools	-Support ICT funds for projects -Principalôs ICT compliance -Security for ICT school equipment	Nominal Ordinal Nominal	Descriptive Statistics Mean values Percentages	-Frequency tables, mean and -Percentages

According to Table 3.3; the dependent variable of the study was the utilization of Information communication technology (ICT) in secondary schools. Independent variables were: influence of initial cost of ICT installation and infrastructure on utilization of the ICT in secondary schools, influence of teachersô competency in using ICT in teaching and management on utilization of the ICT and influence of principalsô ICT compliance and ICT supportive school management on its utilization in secondary schools.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter consists of data analysis presentation and interpretation. The subheadings of the chapter are: questionnaire response rate, respondents personal data, influence of initial ICT cost involved in the its installation and associated infrastructure, influence of teachersô competency in using ICT knowledge in school operations and influence of school principalsô ICT compliance and management on utilization of ICT in secondary schools.

4.2 Questionnaire Return Rate

Responses were received from 120 study participants. The researcher personally collected questionnaires from the respondents after notification that they were completely filled up. Therefore, the questionnaire response rate was 100 percent, adequate to authenticate the findings.

4.3 Respondents' Personal Data

In question one the participants were asked to indicate their gender as defined in the preset questionnaire as male or female. The study results from data analysis showed that 66.7 percent of the respondents were males while 33.3 percent of the respondents were females. This indicated that male teachers were $2/3^{rds}$ of the study population while female teachers were $1/3^{rd}$ of the selected sample for this study.

In óquestion twoô the study participants were asked to indicate their age in years from a preset distribution of age brackets as indicated in the questionnaire: Less than 30 years, between 31-35 years, between 36-40 years, between 41-45 years, between 46-50 years and over 51 years. The

responses were tabulated as shown in Table 4.1, which shows the sampled respondentsô distribution by age from Kitui Central District.

Table 4.1 Respondents' Distribution by Age

Respondents' Age in Years	Frequency (*f*)	Percentage (%)
Less than 30 years	9	7.5
Between 31-35 years	19	15.8
Between 36-40 years	62	51.7
Between 41-45 years	18	15.0
Between 46-50 years	7	5.8
Over 51 years	5	4.2
Total	**120**	**100.0**

As shown in Table 4.1 Majority 82.5 percent of the respondents were in the age brackets of between 31 years to 45 years old, where 51.7 percent of the respondents were in the age bracket of 36-40 years, 15.8 percent of the respondents were in the age bracket of 31-35 years and a few 15.0 percent of the respondents were aged between 41-45 years old. In óquestion three they were asked to indicate their level of education from education levels as indicated in the questionnaire by levels: diploma, degree, masters and Phd degrees/others to specify as shown in Table 4.2.

Table 4.2 Respondents' Distribution by Levels of Education

Level of Education	Frequency (*f*)	Percentage (%)
Diploma in Education	31	25.8
Bachelorsô Degree in Education	77	64.2
Masters Degree in Education	12	10.0
PhD Degree in Education	0	0.0
Total	**120**	**100.0**

As shown in Table 4.2 majority 90.0 percent of the respondents had Diploma and degree level of education, where 64.2 percent of the respondents had bachelors Degree no schooling and 25.8 percent of the respondents had Diploma in Education and 0.0 percent of the respondents had upto PhD Degree in Education.

4.4 Influence of Cost of Initial ICT Installation on ICT Utilization in Public Schools

In question four the respondents were asked to rate how Cost of Initial ICT Installation in Secondary schools had influenced on the ICT Utilization in their schools using the 5-point likert rating scale that was provided in the questionnaire. The findings were tabulated as shown in Table 4.3, which shows the role of initial ICT installation cost on its utilization in secondary schools where the selected teachers taught.

Table 4.3 Initial Cost of ICT Installation on ICT Utilization in Secondary schools

Cost of computers on utilization of ICT in schools		SA	A	AA	D	SD	Mean	Std D
Cost of Computers and accessories	**Frequency** (*f*)	74	40	6	0	0	1.43	1.67
	Percentage (%)	61.7	33.3	5.0	0.0	0.0		
Per student cost of Internet Access	**Frequency** (*f*)	39	41	22	12	6	2.21	1.39
	Percentage (%)	32.5	34.2	18.3	10.0	5.0		
Status of classrooms and furniture	**Frequency** (*f*)	47	39	24	10	0	1.98	1.41
	Percentage (%)	39.2	32.5	20.0	8.3	0.0		
Taxation rates on ICT equipment	**Frequency** (*f*)	20	46	38	16	0	1.83	1.09
	Percentage (%)	16.7	38.3	31.7	13.3	0.0		
Sources and cost of electricity supply	**Frequency** (*f*)	43	51	14	10	2	1.98	1.42
	Percentage (%)	35.8	42.5	11.7	8.3	1.7		

According to the results shown in Table 4.3; the grand mean value was obtained using the formula **mean** (ó) **= sum of (**ẽ) ð$_i$/5 where ð$_i$ = 1, 2, 3, 4, 5. Thus the grand mean value was calculated as ó = [1.43+2.21 +1.98+1.83+ 1.98]/5 = 9.43/5 = 1.89. Therefore, since the grand mean value was less than 2.5 it indicated that the respondents had ócagreedô with the fact that the initial ICT installation cost had significantly and negatively influenced the ICT utilization in secondary schools in Kitui Central District, Kitui County, Kenya.

Using an assumed mean A = 3; the standard deviation (Std D) as shown in Table 4.3 was calculated as:

Std D = ã[{74(1 ï 3)^2 + 40(2 ï 3)^2 + 6(3 ï 3)^2 + 0(4 ï 3)^2 + 0(5 ï 3)^2}/120]

= ã[{296 + 40 + 0 + 0+0}/120]

= ã{336/120}

= ã2.8

Std D = 1.67 as shown in row one the last column under the standard deviations. All other standard deviations were calculated using the same method and the standard deviations column was completed as shown in Table 4.3 above as: Row 2 std D = 1.39; Row 3 std D = 1.41 Row 4 std D = 1.09 and Row 5 std D = 1.42. Apart from row oneôs standard deviation calculated, the other four (4) out of the five (5) standard deviations were found to be within 1 (one) standard deviation from the mean, the researcher was 99% confident that the study findings were reliable. Therefore based on the above study results the study conclusions and recommendations were made.

This was in agreement with reviewed literature: According to the reviewed literature, although the Government of Kenya is committed to implementing ICT in secondary school education, the

process is hindered by a number of barriers. The barriers are categorized as external (first-order) or internal (second order) (Keengwe, Onchwari et al. 2008). According to Snoeyink and Ertmer (2001), first order barriers include lack of equipment, unreliability of equipment, lack of technical support and other resource-related issues.

Mumtaz (2000) stated that many scholars proposed that the lack of funds to obtain the necessary hardware and software is one of the reasons teachers do not use technology in their classes. Afshari, Bakar and Su-Luan et al. (2009) state that efficient and effective use of technology depends on the availability of hardware and software and the equity of access to resources by the teachers, students and administrative staff. These costs are in most cases inflated and cannot be provided by most developing countries, including Kenya. Second-order barriers to use of ICT include both school level factors, such as organizational culture and teacher level factors, such as beliefs about teaching and technology and openness to change. How these external and internal barriers negatively influence the use of ICT in secondary school education are described below.

Effective utilization of technology into secondary school education systems involves substantial funding, that is very hard to manage in developing countries like Kenya, where many people are living below the international poverty line. ICT-supported hardware, software, internet, audio visual aids, teaching aids and other accessories demand huge funds.

According to the reviewed literature, Kenya is one of the developing countries that lack the resources and appropriate infrastructure for implementing ICT in secondary school education. The effective use of ICT would require the availability of equipment, supplies of computers and their proper maintenance including other accessories. Most of the rural areas in Kenya do not have electricity and therefore one cannot even run a computer in the first place. On the other

hand most of the cities of Kenya do not get electricity more than eight hours in a day due to lack of electric supply.

The development of the ICT infrastructure in a country is dependent on the availability of a reliable electricity supply. Implementing ICT demands other resources, such as computers, printers, multimedia projectors, scanners, etc - which are not available in all the secondary school educational institutions. Besides, ICT requires up-to-date hardware and software.

Using up-to-date hardware and software resources is a key feature in the diffusion of technology (Gulbahar 2007) but a rare experience in secondary school educational institutions. High-speed internet connection is another prerequisite for integrating ICT into the teaching-learning situation. But unfortunately internet access is very poor.

According to the reviewed literature, In developing countries, many stakeholders, educators, government, and business leaders consider that ICT investment enhances the instructional use of computers and improves teaching and learning. Even so, neither providing computer tools in the classroom (Candiotti and Clark 1998) nor providing state- of-art technology by itself will make any desirable learning changes in secondary school education (Kent and McNergney 1999). This barrier mainly falls into two broad categories: (i) Government vision and plan and (ii) School Vision and plan.

4.5 Teachers' Competency in using Computers on Utilization of ICT in Public Schools

In question five the respondents were asked to rate how teachersô competency in ICT influenced on its utilization of in secondary schools they were teaching using the 5-point likert rating scale that was provided in the questionnaire. The findings were tabulated as shown in Table 4.4, which shows the

role of teachersô competency in ICT on the utilization of the ICT in secondary schools for both teaching and learning as well as in school management.

Table 4.4 Teachers' Competency in ICT on Utilization of ICT in Secondary Schools

Teachers' ICT competency in using ICTs		SA	A	AA	D	SD	Mean	Std D
Teachers are trained in teaching ICT	**Frequency** (*f*)	16	18	11	52	23	3.40	1.38
	Percentage (%)	13.3	15.0	9.2	43.3	19.2		
Number of students in ICT classroom	**Frequency** (*f*)	36	49	12	11	12	2.28	1.45
	Percentage (%)	30.0	40.8	10.0	9.2	10.0		
In use of ICT teaching methods	**Frequency** (*f*)	11	10	9	56	34	3.77	1.43
	Percentage (%)	9.2	8.3	7.5	46.7	28.3		

According to the results shown in Table 4.6; the grand mean value was obtained using the formula **mean** (ȯ) **= sum of (**ẽ) $\mathbf{y}_i$/3 where $\mathbf{y}_i$ = 1, 2, 3. Thus the grand mean value was calculated as ȯ = [3.40+2.28 +3.77]/3 = 9.45/3 = 3.15. Therefore, since the grand mean value was greater than 2.5 and less than or equal to 3.4999 such that [2.5 Ò $\bar{\mathbf{y}} \leq$ 3.4999] it indicated that the respondents had óa little agreedô with the fact that the teachersô competency in ICT had significantly influenced on ICT utilization in secondary schools at Kitui Central District in Kitui County, Kenya. Using an assumed mean A = 3; the standard deviation (Std D) as shown in Table 4.4 was calculated as:

Std D = ã[{16(1 ï 3)^2 + 18(2 ï 3)^2 + 11(3 ï 3)^2 + 52(4 ï 3)^2 + 23(5 ï 3)^2}/120]

= ã[{64 + 18 + 0 + 52+92}/120]

= ã{226/120}

= ã1.88

<u>Std D = 1.38</u> as shown in row one the last column under the standard deviations. All other standard deviations were calculated using the same method and the standard deviations column

was completed as shown in Table 4.4 above as: Row 2 std D = 1.45; and Row 3 std D = 1.43. Since all the three standard deviations were found to be within 1 (one) standard deviation from the mean, the researcher was 99% confident that the study findings were reliable. Therefore, based on the backing of these findings, the study conclusions and recommendations were made.

This was in agreement with reviewed literature: According to the reviewed literature, According to Pelgrum (2001), the success of secondary school educational innovations depends largely on the skills and knowledge of teachers. Teachers' lack of knowledge and skills is one of the main hindrances to the use of ICT in secondary school education both for the developed and underdeveloped countries (Mamun and Tapan, 2009).

Integrating ICT in the secondary school curriculum requires teachersô knowledge in the subject area, as well as an understanding of how students learn using the ICT and a good level of ICT technical expertise among the teachers (Morgan 1996). Moreover, Berner (2003) found that the faculty's belief in their computer competence was the greatest predictor of their use of computers in the classroom (Ihmeideh, 2009). Therefore, lack of knowledge regarding the use of ICT and lack of skill on ICT tools and software have also limited the use of ICT tools in teaching learning situation in Kenya.

4.6 Principals' ICT Compliance and Support on ICT Utilization in Secondary Schools

In question six the respondents were asked to rate the influence of the role played by principalsô ICT compliance and support on ICT utilization in secondary schools using the 5-point likert rating scale that was provided in the questionnaire. The findings were tabulated as shown in Table 4.5, which shows the role played by principalsô ICT compliance and support on ICT utilization in secondary schools

Table 4.5 Principals' ICT Compliance/Support on Utilization of ICT in Secondary Schools

Leaders' ICT compliance on using ICT in schools		SA	A	AA	D	SD	Mean	Std D
Strategies of financial plans for ICT	**Frequency** (*f*)	0	10	5	72	33	4.07	1.34
	Percentage (%)	0.0	8.3	4.2	60.0	27.5		
PrincipalsôICT compliance and support	**Frequency** (*f*)	16	18	14	43	29	3.43	1.42
	Percentage (%)	13.3	15.0	11.7	35.8	24.2		
Adequacy of security for ICT equipment	**Frequency** (*f*)	6	11	13	57	33	3.83	1.37
	Percentage (%)	5.0	9.2	10.8	47.5	27.5		

According to the results shown in Table 4.5; the grand mean value was obtained using the formula **mean** (ó) = **sum of (**ẽ) $\mathbf{y}_i$/3 where $\mathbf{y}_i$ = 1, 2, 3. Thus the grand mean value was calculated as ó = [4.07+3.43 +3.83]/3 = 11.33/3 = 3.78. Therefore, since the grand mean value was greater than 3.5 it indicated that the respondents had ódisagreedô with the fact that the role played by principalsô ICT compliance and support on ICT utilization in secondary schools was significant in influencing the utilization of ICT in secondary schools. Using an assumed mean A = 3; the standard deviation (Std D) as shown in Table 4.5 was calculated as:

Std D = ã[{0(1 ï 3)^2 + 10(2 ï 3)^2 + 5(3 ï 3)^2 + 72(4 ï 3)^2 + 33(5 ï 3)^2}/120]

= ã[{0 + 10 + 0 + 72+132}/120]

= ã{214/120}

= ã1.78

Std D = 1.34 as shown in row one the last column under the standard deviations. All other standard deviations were calculated using the same method and the standard deviations column was completed as shown in Table 4.5 above as: Row 2 std D = 1.42; and Row 3 std D = 1.37. Since all the three standard deviations were found to be within 1 (one) standard deviation from

the mean, the researcher was 99% confident that the study findings were reliable. Thus the study findings were used to make the conclusions and recommendations of the study.

This was in agreement with reviewed literature: According to the reviewed literature, Teachers' attitudes have been found to be major predictors of the use of new technologies in instructional settings (Almusalam, 2001). Mumtaz (2000) states that teacher' beliefs about teaching and learning with ICT are central to integration. To be successful in computer use and integration, teachers need ``to engage in conceptual change regarding their beliefs about the nature of learning, the role of the student, and their role as teacher'' (Niederhauser et al. 1999).

Hence the successful use of ICT into classroom largely depends on teachers' attitudes and belief relating to these. In fact, it has been suggested that attitudes towards computers affect teachers' use of computers in the classroom and the likelihood of their benefiting from training (Kluever, et al, 1994). It is found that less technologically capable teachers, who possess positive attitudes towards ICT, require less effort and encouragement to learn the skills necessary for the utilization of ICT in their design activities into the classroom. Therefore, teachers who have positive attitudes towards ICT itself was positively disposed towards using it in the classroom (Moseley and Higgins, 1999).

Moreover, Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. They concluded that changing individuals' negative attitudes is essential for increasing their computer skills. Therefore, if teachers want to successfully use technology in their classes, they need to possess positive attitudes to the use of technology. Such

attitudes are developed when teachers are sufficiently comfortable with technology and are knowledgeable about its use (Afshari et al, 2009).

Kenya, a developing country, has a shortage of teachers, and they are already burdened with heavy workload. Some of the institutions have already introduced two to three streams, without increasing the number of teachers. So teachers' teaching load has been increased due to increasing the number of classes in these double and triple streamed schools. Moreover, most of the teachers are also responsible for administrative tasks. In these circumstances teachers don't have time to design, develop and incorporate technology into the teaching learning situation (Afshari et al, 2009; Beggs, 2000; Newhouse, 1999; Ihmeideh, 2009).

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter consists of a summary of the study, discussion of the major study findings, conclusion of the study, recommendations of the study and suggestions for further research.

5.2 Summary of the Study

Based on the findings, this study suggested that the effective utilization of ICT in secondary school education in Kenya and particularly in the Kitui Central District, Kitui County has been impeded by a number of factors which cumulatively affects the adoption of the new information communications technology in secondary schools for both teaching/learning and the improved school management system.

Effective utilization of ICT in secondary school education requires commitment from all stakeholders in the education sector; starting with the government of Kenya, education administrators both in the ministry of education and local secondary school principals, teachers, parents, students, and the community. All stakeholders and responsible authorities including teachers and other staff should be aware of the importance of technology in developing student's learning and should strive to overcome the barriers which prevent the use of technology in classroom settings, so that students can benefit effectively from this ICT.

As shown in the reviewed literature Afshari et al, (2009) states that it is crucial to involve those who have a stake in the outcomes, including teachers, parents, students, and the community, and allow them to assist in the creation of the vision by contributing their knowledge, skills, and positive attitude.

5.3 Discussions of the Main Findings

Based on the findings, this study suggested that the effective utilization of ICT in secondary school education in Kenya and particularly in the Kitui Central District, Kitui County has been impeded by a number of constraining factors. Effective utilization of ICT in secondary school education requires commitment from the government of Kenya, administrators, teachers, parents, students, and the community.

All stakeholders and responsible authorities including teachers and other staff should be aware of the importance of technology in developing student's learning and should strive to overcome the barriers which prevent the use of technology in classroom settings, so that students can benefit effectively from this ICT. Afshari et al, (2009) states that it is crucial to involve those who have a stake in the outcomes, including teachers, parents, students, and the community, and allow them to assist in the creation of the vision by contributing their knowledge, skills, and positive attitude.

Lack of resources within secondary school educational institutions is another major hindrance to the utilization of ICT in a developing country like Kenya. Lack of computers (both hardware and software) and other ICT-supported tools in the classroom can seriously limit the use of it by a teacher. Limited resources results in lack of computer integration, which in turn results in lack of sufficient computer experience for both pupils and teachers (Rosen and Weil, 1995; Winnans and Brown, 1992; Dupagne and Krendl, 1992; Hadley and Sheingold, 1993).

Local software companies should be encouraged to work together with teachers to produce Kenya software programs suitable for the teachers and students who don't know English. In this regards Mumtaz (2000) states that software designers and teachers should work together and observe critically how a range of teachers teach in the classroom and how appropriate forms of

software supporting different skills and ways of teaching and learning can be better developed for teachers to use in subject teaching.

Effective utilization of ICT in secondary school educational institutions of Kenya largely depends on teachers and principals, who require in-depth professional development due to lack of knowledge and skills. Afshari et al, (2009) state that professional development is necessary for teachers to enable them to effectively use technology to improve student learning. In relation to this argument, Fullan (1992) suggested that training should not be one-shot workshops, but rather ongoing experiences so that learners/teachers can be kept up to date with ever-changing technologies. During their teacher training programs teachers need to be given opportunities to practice using technology more practically so that they can see ways in which technology can be used to augment their classroom activities (Rosenthal, 1999).

To implement computers in the classroom, teachers should feel confident and comfortable using computers, through the use of computers on a consistent basis for instructional activities. Teachers must understand the value of computing in secondary school education to be able to benefit their students and to support meaningful learning (Novak 1998).

In this connection, Mumtaz (2000) states that schools can go only so far to encourage ICT use; actual take-up depends largely on teachers' personal feelings, skills and attitudes. Even if teachers are provided with up-to-date technology and supportive networks, they may not be enthusiastic enough to use it in the classroom.

These studies reported lack of time as one of the biggest constraints to the integration of ICT into the teaching- learning situation. Teachers need time to learn how to use the hardware and

software, time to plan, and time to collaborate with other teachers. Teachers also need time to develop and incorporate technology into their curriculum. Some teachers are unable to make appropriate use of technology in their own classrooms, while others are unwilling to try because of anxiety, lack of interest, or lack of motivation (Duhaney, 2001).

In addition to the factors mentioned above, there are other factors that directly and indirectly influence the effective utilization of ICT in secondary school education in Kenya. They are: poor administrative support (Keengwe et al. 2008); lack of appropriate staff training and quality training for teachers and school principles (Copley and Ziviani, 2004; Mamun, M. A. and Tapan, S.M., 2009; Afshari et al, 2009); lack of qualified ICT coordinators who will assist teachers to integrate ICT in classroom and lab and favourable school culture (Afshari et al, 2009; Lim, C. P., 2002; Tearle, P., 2003).

The Government of Kenya has emphasized the implementation of ICT in secondary school education with "Vision 2030" - in order to improve the quality of the secondary school educational system and also to create an improved teaching and learning environment to empower and develop the proficiency of teachers and students in Kenya. Effective utilization of ICT in secondary school education is not merely a vision. Rather, it needs a proper plan, policies, execution and monitoring: which is really a major constraint for a country like Kenya.

Ertmer (1999) wrote, "A vision gives us a place to start, a goal to reach for, as well as a guidepost along the way" (p. 54). Many researchers have pointed out that a school's ICT vision is essential to effective ICT integration (Anderson and Dexter, 2000). In Kenya most of the secondary school educational institutions are far away from implementing ICT into teaching and learning situations. Also, there are few higher secondary school educational institutions in big

cities that have ICT facilities but cannot integrate it effectively due to lack of a proper vision and plan. So ICT integration is clearly related to actions taken at the school level, such as the development of an ICT plan, ICT support, and ICT training (Tondeur, van Keer et al. 2008) which is absent at most of the secondary school educational institutions in Kenya.

Sharma (2003) states that the most notable of the barriers to the use of ICT in secondary school education in developing countries seems to be the political will of the people in the corridors of power. The allocation of sufficient funds for the secondary school educational sector and ICT does not seem to be very attractive to the leaders. It can be seen from the budgetary allocations in third world countries that greater allocations may be for the defence forces rather than secondary school education. If the political leaders favour the technology, it will bloom. Here the case of India and Kenya are worth citing. After the death of Mrs Indira Gandhi in 1984, Mr. Rajiv Gandhi became Prime Minister of India. Since he was very fond of computers and telecommunications (he himself had a Pilot's License), India witnessed a tremendous growth of computerization and tele-networking in his time.

As a result, nowadays most of the schools (in the urban areas) have computers and are well connected to the Web. The new Government of Kenya came with a slogan "Digital Kenya". The prime minister would like to build Kenya as a digitalized one in all sectors. Hence they are also trying to implement information technologies in secondary school education as well. Unfortunately if this political government will change after five years due to the democratic election then "Vision 2030" might be changed due to antagonistic attitudes among the political parties of Kenya.

5.4 Conclusions of the Study

The application of information communication technology to secondary school education, requires computers, the Internet, broadcasting technologies (radio and television), and telephony that can facilitate not only delivery of instruction, but also learning process itself. The ICT as used in education has been identified as an important tool for realizing a new paradigm of learner-centered secondary school education that better supports learners' needs through differentiated and personalized instruction.

Therefore, there is no doubt that teachers and students in secondary schools in Kenya would have incredible resources available if they have access to Internet services, however, the high cost of installation of the information and communication technology support infrastructure has been prohibitive, especially in Kitui Central District where many of its inhabitants are poor. For example the poverty index in Kitui County stood at 66 percent by 2009 (Central Bureau of Statistics, 2009 Kitui County Population Census data bank).

After effectively integrating information and communication technology into secondary school curriculum, fundamental shifts in the way teachers teach and students learn would evolve. To integrate ICT into secondary school teaching/learning as well as school management in Kitui Central District and the whole of Kenya, there must be adequate financing of the ICT program, which needed to be entrenched into the ministry of education ICT policy framework. Therefore, there was need for Kenya to invest heavily in the Internet business and create a free enabling environment for secondary school students to participate in downloading useful academic work from the Internet. Measures to ensure that the students are secure from accessing destructive

Internet materials need to be provided by blocking some of the unhealthy destructive social sites in the Internet networks available to the students.

The ICT components provides interactive teaching/learning content, giving immediate feedback, diagnosing student needs, providing effective remediation, assessing learning, and storing examples of student work are critical elements in digital technology that is able to support learner-centered instruction for diverse learners in Kenyan secondary school education (Bush and Mott, 2009). Moreover, ICT utilization would promote international collaboration and networking in secondary school education and professional development for both the non-teaching and the teaching staff using this technology for teaching and school management.

As revealed from literature review, there exists a range of various ICT options, which can be used to meet the challenges faced by teachers in their utilization of ICT for both teaching/learning process and school management in Kitui Central District as well as in the entire Kenyan secondary school education sector. The various ICT options available for utilization in secondary school education include: Tailored websites for secondary school education teaching/learning and school management systems as well as videoconferencing through multimedia content delivery to specific school websites at a cost.

Given all the various range of ICT options available, this computer technology can provide additional pedagogical skills to the 21st century globalized secondary school teachers in the developing countries, where Kenya is also inclusive. This can be done with flexibility and in more effective ways, leading to improvement of the teachersô professional career development. With the ICT skillsô empowerment and development of the secondary school management, teachers and students would get enormous benefits in the utilization of ICT knowledge.

In addition to teaching/learning and school management systems, many other ICT benefits would not only be in Kitui Central District, but also in the entire country. More ICT beneficial prospects are underway as Kenya builds the regional ICT centre for East and Central African region; the Proposed Konza ICT City at Malili in Machakos County.

5.5 Recommendations of the Study

As noted in the reviewed literature and part of the study findings, secondary school students in developing countries like Kenya are already behind their peers in the developed countries, thus widening the global digital divide in acquisition of knowledge. Therefore, based on the aforementioned study findings the following recommendations for improvement of the current situation on the utilization of information and communication technology in secondary school education were suggested:

To help in alleviating the problem of high cost of computers and to get the much needed funds for ICT installation, Kenya needs to join the World Links Development Program, which was initiated by the World Bank in 1997. The World Links Development Program has been establishing computer laboratories and bringing Internet connectivity to secondary schools in developing countries around the world. The program is also training teachers in these countries to acquire skills necessary to integrate information and communication technology into their classroom practices.

All secondary school education stakeholders including parents, teachers, Board of Governors, sponsors and the ministry of education needed to come up with a clear vision for integration of information and communication technology into secondary school education program to be used for both school management and the teaching and learning process. The vision needs to have

been inclusively been shared by all members of the school community as well as all the external secondary school education stakeholders without discrimination. The vision should also be geared towards promoting effective utilization of the ICT knowledge enhancement tools for improvement of subject content delivery within the context of ICT enhanced teaching and learning process in the classroom.

There was need for provision of adequate ICT support infrastructure in terms of adequate strong well ventilated structural buildings as either computer laboratories or classrooms to ensure the security of the computer and their accessories. Adequate computer tailored furniture for all students need to be provided, along with adequate provision of the other ICT support associated facilities and resources for effective utilization of the ICT in school administration and learning process in the classrooms.

Teachers needed to be competent in utilization of ICT in teaching and learning as well as in the entire school managerial operations. The teaching staffôs ICT skills development should be collaboratively created based on the school level of financial inputs. Through this process, the teachers would be prepared in advance to use the ICT effectively in their teaching career. The teachersô ICT training should not consist of merely short workshops or training courses, because they would not be enough to build proper ICT knowledge and skills among the teachers. Therefore, it was recommended in this study that vigilant attention needs to be given to in-service teacher training for both teachers and principals and pre-service training for newly appointed teachers before joining the regular classes to acquaint them with the important role of ICT in secondary school settings and to train them on how to prepare and use the ICT competently.

Changing teachers' negative attitudes towards utilization of ICT in schools is essential for increasing their computer skills. Therefore, if teachers want to successfully use information technology in their classes, they need to possess a positive attitude to the use of technology. Such an attitude is developed when teachers are sufficiently comfortable with technology and are knowledgeable about its use in secondary schools.

To change the teachers' negative attitudes towards using ICTs in secondary schools, the teachers need to be given evidence that ICT can make their lessons more interesting, easier, more fun, enjoyable and motivating for them and to their students.

5.6 Suggestion for Further Studies

The use of ICT in schools is a relatively new field in the Kenya secondary school education systems, more in-depth research should be conducted related to integration of ICT into classroom situations, to show that ICT can make their lessons more interesting, easier and efficient.

Therefore, further studies were suggested on the following areas: The significance of ICT integration in secondary school education and effective utilization of ICT in classroom teaching and learning process.

Further studies were suggested on changing teachers' negative attitudes towards utilization of ICT in schools is essential for increasing their computer skills and studies on given evidence that ICT can make the traditional classroom lessons more interesting, easier, more fun, more enjoyable and more motivating for teachers and their students.

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APPENDICES

APPENDIX A: Transmittal Letter

Fridah S. Kivuli
University of Nairobi
P.O Box 30197-00200-Nairobi
8th.04.2013

To all Respondents,
Secondary schools,
Kitui Central District,
Kitui County,

Dear Sir/Madam,

RE: TRANSMITTAL LETTER

I am a Postgraduate student at The University of Nairobi pursuing a Masters Degree in Project Planning and Management. As part of the requirements for the award of this degree I am conducting a study on ***Factors Influencing Utilization of Information and Communication Technology in Secondary Schools at Kitui Central District in Kitui County, Kenya.*** You have been randomly selected together with others in the District to participate in this study. I request you to be free and respond to the questionnaire items honestly. Your responses will only be used for academic purpose and confidentiality was upheld to ensure your privacy. I kindly request you to co-operate in this exercise.

Thank you in advance,

Yours faithfully,

Signature_____

Fridah Syombua Kivuli.

APPENDIX B: Questionnaire for Teachers and Principals

The purpose of this questionnaire is to gather information on factors influencing utilization of information and communication technology in secondary schools in Kitui Central District, Kenya. Please indicate your option by putting a circle around one of the multiple choices and in the space provided write your chosen opinion(s).

PART A: Socio-demographic information of the respondents

1. Your Gender?

   a) Male ☐ b) Female ☐

2. Your age bracket in years?

   a) Less than 30 ☐ b)31-35 ☐ c) 36-40 ☐ d) 41-45 ☐ e) 46-50 ☐ f) greater 51 ☐

3. Your highest level of professional training and education?

   a) Diploma in Educ. ☐ b) B.Ed Degree ☐ c) Masters Degree in Educ. ☐ d) PhD ☐

   Any other Specifyé é

PART B: Factors influencing utilization of information communication technology in schools

In this part Use the key below to respond to all 5-point likert rated scale questions; please circle your rating number from the numbers provided after every statement for your selected option which corresponds to your best choice of rating. Kindly use the scoring system below to select the number:

Score	Interpretation	Response Mode	Description
5.	Strongly Agree	With No Doubt At All	Very Satisfactory
4.	Agree	to some extent	Satisfactory
3.	Not Sure	Neither Agree/Disagree	Not Satisfactory
2.	Disagree	to some extent	Fair
1.	Strongly Disagree	Disagree Completely	Poor

4. Cost of computers for use in secondary schools

How do you rate the influence of cost of computers on utilization of information communication technology? Indicate your level of agreement/non-agreement with the statements below.

a. Unit cost of hardware CPU and accessories	1	2	3	4	5
b. Per student cost of Internet Access	1	2	3	4	5
c. Taxation rates on ICT equipment	1	2	3	4	5
d. Sources and cost of electricity supply	1	2	3	4	5
e. Status of classrooms and school furniture	1	2	3	4	5

5. Teachers competency in utilization of ICT in secondary schools

i) Have you been trained in ICT computer applications to teaching and school management?

a) Yes ☐ b) No ☐

ii) If Yes from above how do you rate yourself in assisting studentsô computer-aided learning?

1 2 3 4 5

iii) If No from above how do you rate yourself in assisting studentsô computer-aided learning?

1 2 3 4 5

How do you rate the influence of Teachers competency in ICT on the utilization of information communication technologyin secondary schools? Indicate your level of agreement/non-agreement with the statement below.

a. Teachers are ICT trained	1	2	3	4	5
b. Number of students per ICT classroom	1	2	3	4	5
c. In use of ICT teaching methods	1	2	3	4	5

6. Influence of school administration in the utilization of ICTs in public schools

How do you rate the influence of school administration and compliance to ICT son the utilization of information communication technologyin secondary schools? Indicate your level of agreement/non-agreement with the statement below.

a. Strategies of financial plans for ICT 1 2 3 4 5

b. School leadershipôs ICT compliance 1 2 3 4 5

c. Adequacy of security for ICT equipment 1 2 3 4 5

7. Suggest possible ways of ensuring effective utilization of ICT in public sec. schools

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APPENDIX C: Target Population Distribution by School and Category of Enrolments

S/N	School Name	Teachers	Principals	Total
1	St. Charles Lwanga Sec School	26	1	**27**
2	St. Angelaôs Girls Sec School	29	1	**30**
3	Kitui High School	37	1	**38**
4	Kyangwithya Boys Sec School	16	1	**17**
5	St. Ursula Girls Secondary School	25	1	**26**
6	Kitui SDA Mixed Sec School	9	1	**10**
7	Mulutu Girls Secondary School	13	1	**14**
8	St. Maryôs Mixed Sec. School	15	1	**16**
9	Eng. Ngilu Mixed Sec. School	24	1	**25**
10	Tiva Mixed Sec. School	21	1	**22**
11	Kamandio Mixed Sec. School	12	1	**13**
12	Arch bishop Nzimbi Mixed Sec. School	6	1	**7**
13	Muslim Mixed Sec. School	11	1	**12**
14	Mutendea Mixed Sec. School	10	1	**11**
15	Kwa-Ukungu Mixed Sec. School	18	1	**19**
16	Ivaini Mixed Day and Sec. School	17	1	**18**
17	Kyamathyaka Mixed Sec. School	12	1	**13**
18	St. Pauls Mixed Sec. School	14	1	**15**
19	St. Patrickôs Mixed Sec. School	11	1	**12**
20	Mutukya Mixed Day Sec. School	11	1	**12**
21	Kabaa Mixed Day Sec. School	14	1	**15**
22	Kwa-Mwema Mixed Sec. School	3	1	**4**
23	St. Philipôs Mixed Sec. School	16	1	**17**
24	Kwa-Ngindu Mixed Sec. School	4	1	**5**
25	Katyethoka Mixed Sec. School	5	1	**6**
	Total = 25 Secondary Schools	**= 369**	**= 25**	**= 394**

Source: Kitui Central District (MoE-EMIS and TSC Data Returns, 2013)