FACTORS INFLUENCING INTEGRATION OF INFORMATION AND COMMMUNICATION TECHNOLOGY IN TEACHING AND LEARNING IN PUBLIC SECONDARY SCHOOLS IN KENYA: THE CASE OF KIRINYAGA EAST DISTRICT, KIRINYAGA COUNTY

BY

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DECLARATION

This is to declare that this research project is my own original work and it has not been presented to any other University for any award.

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DEDICATION

I dedicate this Research Project to my wife Penina Wanjiku who has been a a strong pillar in my studies and my life as a whole. I am glad for the constant support that you have accorded me in my studies. May the Lord God bless you.

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LIST OF ACRONYMS

CCK-Communication Commission of Kenya.

CLE-Constructivists' Learning Environment.

DEO- District Education Officer

DQASO-District Quality Assurance Officer

ICT- Information and Communication Technology

IDRC- International Development Research Centre.

ISP-Internet Service Provider

LCD-Liquid Crystal Display

NAT-National Schools

NEPAD-New Partnership for African Development.

OECD- Organization for Economic Cooperation and Development.

PD- Public Day Schools

TTC- Teachers Training Colleges

TV -Television

UNESCO-United Nations Educational, Scientific and cultural Organization.

ABSTRACT

The importance of integration of Information and Communication Technologies (ICTs) in teaching and learning processes in Kenya and globally cannot be overemphasized. It is becoming increasingly apparent that all aspects of people's lives including the way education is taught and delivered are greatly influenced by developments in Information and Communication Technologies (ICTs).This study sought to investigate the status of ICT integration in teaching and learning in Public Secondary Schools in Kenya given the recommendations placed by a task force on the re-alignment of the education sector to the constitution of Kenya 2010 and Vision 2030. There has also been an agreement by educators and policy makers across the world on the importance of ICTs to the future of education. The main objective of the study was to assess the factors that influence ICT integration in teaching and learning in Public Secondary Schools in Kirinyaga East district so as to enhance access, equity and quality in secondary school education. The study used descriptive survey design. The study had its target population as the subject teachers, heads of departments, principals of public secondary schools, the District Education Officer (DEO) and the District Quality and Standards Officer (DQASO) in Kirinyaga East District. The target population was stratified into five strata using simple stratified sampling technique.Simple random sampling technique was used to select ten (10) public secondary school principals,forty (40) Heads of department and sixty eight (68) subject teachers. After coding the responses manually, data was entered into the Statistical Package for Social Sciences (SPSS) computer program for analysis. Descriptive statistics such as frequencies, percentages and mean were used to analyze the data quantitatively. Qualitative data obtained from the open-ended questions was analyzed according to themes based on the study objectives and the research questions and thereafter, inferences and conclusions were drawn. The findings indicated the existence of a large number of staff who had no prior training in ICT and could not help in the integration of ICTs. The schools did not have adequate ICT infrastructure necessary for integration of ICT in teaching and learning for example; LCD Projectors, computers and internet connectivity. The influence of principal leadership on ICT integration was indicated. The principals do not observe the strategic leadership aimed at availing and integrating ICT in teaching and learning. There were low levels of ICT literacy among the respondents and this could have hampered ICT integration.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

According to Mutuma (2005), there has been an exponential growth in the use of ICTs during the past decade which has pervasive impacts on both society and our daily lives. There is increasing interest, attention and investment being put into the use of ICT in education all over the world. In addition to the efforts to employ ICT to improve learning, the emergence of the knowledge economy has also brought about much greater emphasis on education. With the endless effort of the government, the hefty expenditure budgeted for providing schools with computers, networking system and the schools computer concept, ICT integration is meant to be cross curricula. Every classroom teacher is expected to use learning technologies to enhance students' learning in every subject. Principals and teachers are faced with a huge task of managing and re-inventing schools and classrooms in a society that has been transformed by digital technologies and feel overwhelmed by the mandate to integrate ICT in the classrooms. Many important changes have occurred in the last few years in the education sector which require teachers and school leaders to upgrade and refine their technology skills. Some of these changes are due to changes in government policies related to the use of Information and Communication Technologies (ICTs) in schools while others are due to developments in state of the art pedagogical practices. Integrating ICT in education refers to incorporation of Information and Communication tools and Technologies into the classroom delivery of content, learning process and school management with the aim of enhancing the teaching, learning and school management processes. This Information and Communication tools and technologies include; the Internet, education Portals, Virtual Community Networks, Blogs, Online encyclopedia e.g. Wikipedia and webopedia, Audio and Video conferencing, Smart boards and interactive boards, mobile phones, computers, cameras, LCD projectors and projector screens among other tools and technologies (Mutuma,2005).

Kenya had not had an ICT policy until 2005. Following recommendations of the Koech report (1999), the government through the ministry of education formulated a policy framework for

education training and research (Republic of Kenya*Sessional Paper No*. 1 of 2005). In this paper the government outlined its plan for the governance of the education sector in the 21st century. The paper included a discussion on Information, Communication, and Technology (ICT) in the policy draft. In the policy framework, the government recognizes that the overall goal of education is to achieve education for all by 2015, so the ministry of education set a number of specific objectives to be achieved. The most important and relevant issue was to promote and popularize ICT in schools as well as Science and Technology in education by 2008. In an effort to fulfill its obligation, the government supplied computers and ICT to teacher training colleges and some schools. Further on the implementation of this policy on ICT education, TTC incorporated ICT education in their curriculum.

The advent of computers has led to the developments and changes not only in business sectors but also in education. It is because of the technology revolution that many countries worldwide talk of integrating ICT into the curriculum. In the 1980s we talked of computers and education, but recently a new concept has emerged; "integration of ICT into the curriculum" The idea of using computers in education is not completely different from that of integrating ICT into the curriculum, the difference between the two is the manner in which computers were used in the past and the manner in which computers are used presently. Technological changes imply changes in their use in education (Ravenscroft 2001). This means that the integration of ICT in teaching and learning should address the present curriculum needs. Kirinyaga East district is part of the larger Kirinyaga county. The district presented 2343 candidates in the 2012 KCSE examination and has 33 Public Secondary schools.

1.2 Statement of the Problem

The concept of ICT integration into teaching and learning is understood differently by those who perceive themselves as "integrating ICT into the curriculum. According to Morrison, Lowther and De Meulle (1999) "integration" is successful when students use computers for their learning thus giving them a chance to engage deeply and critically with computers.

Previous studies report that the integration of ICT into the curriculum remains problematic in the school context (John 2005). Amongst the problems encountered in the process of integrating ICT into the curriculum are teachers' perceptions of ICT. Teachers' perceptions of ICT in education are not only influenced by the discourse of official documents and guidelines, but also by their

own experiences of using ICT (Loveless 2003). Seemingly, some teachers view ICT as a tool that reduces their workload (Granger, Morbey, Lotherington, Owston & Wideman, 2002).In the 1960s the developers of computers foresaw computers replacing many teacher's positions, therefore the unwillingness of teachers to participate in the ICT development plan (Edward & Roblyer,2000).

According to Mooij and Smeets (2001) the lack of interest that has been displayed by teachers in most countries may be due to the misconception of the concept of "integration" which is due to the insufficient knowledge they posses. Training would bridge this gap for the effective ICT integration (Kennewell, et al., 2000). Furthermore, the attitude of the management in supporting the process of integration is also viewed as influential to teachers' use of ICT (Schiller,2003).Mumtaz (2000) identifies some inhibiting factors in integration of ICT into the curriculum; amongst these is lack of computer availability, lack of financial support and insufficient knowledge possessed by teachers.

Information and communication technologies are already a vital factor in successful development of education. Education for new emerging societies requires ICT to facilitate more meaningful learning. Information and scientific knowledge are not simply means of improving society only, but main products of improving teaching and learning. ICT has become a critical tool for professional training. The sooner learners know how to use products of ICT, the easier they can find their way to capture the newest knowledge. However many may find themselves incompetent to handle ICT as instructional delivery, (Okoro,2009). From the background information provided above, the need for accessibility and utilization of ICT facilities by the academic in secondary schools education system cannot be over emphasized. Therefore, given the importance of the ICT integration in teaching and learning, this study sought to find out the factors that have influenced it in the public secondary schools with an aim of identifying them for purposes of being addressed in future endeavors of ICT integration.

1.3 Purpose of the Study

The purpose of the study was to investigate the factors influencing integration of information and communication technology in teaching and learning in public secondary schools in Kirinyaga East district, Kirinyaga, County.

1.4 Objectives of the Study

The study had the following objectives:

i. To examine the extent to which Human Resource Capacity influences ICT integration in teaching and learning process by public secondary schools.

ii. To determine the influence of availability and access to ICT infrastructure on ICT integration in teaching and learning process by public secondary schools.

iii. To establish the influence of the School's Leadership on ICT integration in teaching and learning process by public secondary schools.

iv To assess the Level of ICT Literacy among the teachers and its influence on ICT integration in teaching and learning process by public secondary schools.

1.5 Research questions

This study sought to answer the following broad questions:

i. To what extent does Human Resource Capacity influence ICT integration in teaching and learning process by public secondary schools?

ii. How does availability and access to ICT infrastructure influence ICT integration in teaching and learning process by public secondary schools?

iii. To what extent does the School's Leadership influence ICT integration in teaching and learning process by public secondary schools?

iv. What is the influence of ICT Literacy on ICT integration in teaching and learning process by public secondary schools?

1.6 Significance of the study

Information and communication technology has a direct role to play in education and if used in the right way can bring many benefits to the classroom as well as education and training process in general. Its use will provide new opportunities for teaching and learning, including offering opportunities for more students' centered teaching, opportunities for teacher-teacher and student-student communication and collaboration, greater opportunities for multiple technologies delivered by teachers, creating greater enthusiasm for learning amongst students, and offering access to wide range of courses (Sessional Paper No.1,2005).

This study stands to benefit numerous stakeholders in the field of teaching, learning and management. The study sought to examine the hindrances that ICT integration in public secondary schools' teaching and learning process is faced with. Therefore, there will be appropriate coping mechanisms applied as a result of studying the presence or absence of hindrances, their extent and the available alternatives. The significance of the study will be to make recommendations on how these challenges can be addressed at policy formulation level, integration level as well as instructional level.

The education sector in Kenya will have firsthand situational report on current practices whereby institutional and operational bottlenecks will be exposed so as to embrace the industry best practices to enhance competitiveness in ICT integration. Industry players will also be in a position to take advantage of the findings and recommendation of the study. The study was carried out at a time when a Taskforce on the Re-alignment of the Education Sector to Constitution 2010 and Vision 2030 has made recommendations to integrate ICT into teaching and learning. As a result the study sought to collect data when it is timely enough in order to reflect the gaps that exist in terms of policy frameworks, institutional preparedness as well as infrastructural capabilities. The Ministries of Education and that of Information and Communication are likely to benefit from the findings of this study greatly in their contexts since it will highlight any areas that require their attention.

1.7 Limitations of the Study

Time and financial constraints were expected to be a problem in this study. However the use of questionnaires helped to save time in the data collection process. The concept of ICT integration into teaching and learning is a complex concept to teaching/ learning institution. This concept also is relatively new to many institutions of learning in Kenya. The researcher thus acquired secondary sources of data from other countries to supplement the limited data available. In addition this was carried out in an area that is geographically expansive and offered a challenge in terms of transport. This was overcome by use of motorbike which made it easier to maneuver through all the routes and collect the data.

1.8 Delimitations of the Study

The study was designed to examine factors influencing integration of information and communication technology in teaching and learning in public secondary schools The scope of

the study under educational institutions was narrowed down to public secondary schools in Kirinyaga East District. The population under study was limited to the schools that were selected in the sampling process.

1.9 Assumptions of the Study

The assumptions of the study were that the respondents were available to respond to the items in the questionnaire. The respondents availed themselves as evidenced by the high questionnaire return rate. The researcher also presupposed that the questionnaires were filled by respondents of good will, who had the districts best interest at their hearts. The researcher, therefore, did explain the importance of the study to the respondents before collecting data in an endeavor to get their good will.

1.10 Definition of significant Terms

Information- This is textual, pictorial, video or audio ideas. It can be looked at as radio broadcast, still images motion pictures or multimedia presentations.

Communication- This is the transmission of information through an appropriate media form the sender to the receiver. The transmission is through such media as network cables, wires, satellite links wireless networks etc.

Information and communication Technology (ICT)- This is a diverse set of technological tools and resources used to create, disseminate, store and manage information. These technological tools include computers, the internet, Projecting technologies, Smart boards and interactive boards, broadcasting technologies (audio and visual), mobile telephony etc. Basically ICT includes both the tools and the technologies accompanying them. It can be hardware or software. In this educational context, ICT mainly will refer to various resources (hardware) and tools (software) presented on the computer.

Human Resource Capacity – This refers to the level of ability of the staff and the entire team carrying out the integration in ICT. This constitutes training in ICT.

Teaching/ Learning Process- This is the process of delivering instructions that are structured within a certain framework with an objective of building on the ideas

previously held or changing attitudes. Every time teaching occurs, a change of behavior or attitude is expected to occur thereafter (learning). Therefore Teaching/Learning process is looked at as a synchronized process in this study.

ICT Infrastructure- These refer to all the necessary software as well as the hardware that are required for effective Integration of ICT in teaching and learning.

School's Leadership- It refers to the school principal's ability at planning for acquisition, training and use of ICT tools in ICT integration in teaching and learning.

ICT Literacy- It is the ability of the teachers and the implementation team to effectively handle and manipulate ICT tools for purposes of producing the desired results.

ICT Integration- This is the process of introducing technological tools (both hardware and software) into the instructional process with an aim of improving content delivery or provoking the creativity and innovativeness among the learners.

1.11 Organization of the Study

This study was organized into five chapters namely; Introduction, Literature Review, Research Methodology, Data Analysis, Conclusion and Recommendation. The introductory chapter served to explore the background information on the area of ICT integration and identified the knowledge gaps that exist in this area of study. On the Literature Review, the researcher gathered existing literature relating to the study and organized it as global literature, regional literature and literature in Kenyan context. The Chapter on Research Methodology outlines the target population, sampling design, and the data collection instruments that were used to collect data. The Data collected was analyzed as indicated in Chapter Four while the last Chapter illustrates the conclusions that were drawn from the analysis and the recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, the available literature on integration of ICT in the teaching and learning process was looked at. In addition, the section explored the use of ICT in secondary schools, its role, the impact of ICT on delivery of content when used in a learning experience and the challenges faced in the ICT integration process in these secondary schools. In addition, ICT policies globally in Africa and in Kenya were explored with an intention of forming the framework for carrying out the study.

2.2 ICT Policy on ICT Integration

In 1997, the Government of Kenya released the Telecommunications and Postal Sector Policy Guidelines that created an environment for competition in several market segments and paved way to the enactment of the Kenya Communications Act of 1998 which repealed the Kenya Posts and Telecommunications Act. The ICT sector in Kenya lags behind those of Tanzania and Uganda because of regulatory control and the lack of focus and coordination in addressing ICT challenges and opportunities. Attempts to develop a national ICT policy have failed twice in the recent past because the government neglected to include all public and private sector stakeholders and failed to link ICT policies to other national development plans. Determined to avoid these pitfalls and a third failed attempt which would inhibit economic and social development in the country, the government of Kenya commissioned the international development research centre(IDRC) of Canada in 2003 to support a consultative, participatory and inclusive process for developing, implementing and assessing the national ICT policy (IDRC,2003).

Many aspects of people's lives in Kenya including the way education is delivered have been greatly influenced by developments in Information and Communication Technologies. The Kenyan government through the key ministries of education, science and technology and Information and Communication Technology has developed several policy and strategy documents to guide the integration of ICT in education. These include; National ICT Policy 2006, Sessional Paper No. 1,2005, Kenya Education Sector Programmed (KESSP 1), 2005-2010

and a more recent recommendation by a Taskforce on Re-alignment of the Education Sector to the Constitution of Kenya ,2010. After several years of effort, Kenya promulgated a National ICT Policy in January 2006 that aims to "improve the livelihood of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services". The National Policy has several sections, including information technology, broadcasting, telecommunication and postal services. However, it is the section on Information Technology that sets out the objectives and strategies pertaining to ICT and education. The relevant objective in this section states that the government will encourage the use of ICT in schools, college's universities and other educational institutions so as to improve the quality of teaching and learning. The ministry education developed a Kenya Education Sector Support Programme (KESSP) in 2005 that featured ICT as one of the priority areas with the aim of mainstreaming ICTs into the teaching and learning process. The National ICT Policy embedded this intent as a national priority and provided the impetus for the ministry to develop its sector policy on ICT in education. The ministry moved quickly and in June 2006 introduced the National ICT Strategy for Education and Training. This document referred to as The ICT Policy for the Education Sector Consists of the following components, each with its own statement of strategic objectives and expected outcomes; ICT in Education Policy, Digital Equipment, Connectivity and Network Infrastructure, Access and Equity, Technical Support and Maintenance, Harnessing Emerging Technologies, Digital Content, Integration of ICT in Education, Training (Capacity building and professional development) and Research and Development.

2.3 ICT Integration in Teaching and Learning

Many people consider ICT integration as 'having a computer in a classroom' or as 'doing the basic operations on the computer'. These, however, are common misconceptions about integration of ICT in teaching and learning .Often teachers are just expected to integrate technology without a working definition of the concept (Dias, 1999).

The term ICT has had a long history in its evolutionary process. According to Pelgrum and Law (2003), towards the end of the 1980s, the term 'computers' was replaced by 'IT' (Information Technology). This signified a shift of focus from computing technology to the computer's enhanced capability to store and retrieve information. This was followed by the introduction of the term 'ICT' around 1992, when email started to become available to the general public.

ICT Integration into teaching and learning is not a new concept. It may be as old as other technologies such as radios or televisions. However, with the rapid development of emerging technology, such as web technology, ICT integration has increasingly attracted the attention of educators. Technology should be used not because it is available or it has been shown effective in some cases. It should be used to enable the process and enhance learning. Inappropriate use of technology can lead to negative effects (Johnson &Aragon, 2003; Russel, 1999) ICT integration is more a process rather than a product. A simple placement of hardware and or software will not make integration naturally follow (Earle, 2002).

Numerous studies comparing traditional classroom-based instruction with technology-enhanced have found insignificant differences in student satisfaction, attitudes, and learning outcomes (Johnson &Aragon, 2003).The primary factor that influences the effectiveness of learning is not availability of technology but the pedagogical design for effective use of ICT(Mandell,Sorge&Russell,2002)

2.4 Case for ICT Integration

Many studies have found that using computer- based instruction can increase achievement scores by at least one standard deviation although this is neither uniform nor consistent across all areas of study (Schacter, 1999). The technology has been used successfully for teachers to give students feedback that is timelier and more individual (Committee on Developments in the Science of Learning, 2000). Studies have shown increased achievement in special needs children when computer are used (Schacter, 1999). Use of ICT provides greater access to information, leading to increased interest in teaching and experimentation as well as more time to engage with students, leading to greater productivity (Cradler & Bridgforth, 2002).

According to Alade (2005), the quality of education in many developing countries particularly in Sub-Saharan Africa has been negatively affected by factors such as low economic growth rates , political and ethnic conflicts HIV/AIDS epidemic among other factors. The high levels of debt in these countries have also aggravated the low level of development particularly in education. The basic instructional tool in most schools at primary and secondary level therefore has remained as the chalk and the blackboard. Research shows that the use of ICT can support new instructional methods such as simulation or cooperative learning more feasible (Roblyer, Edwards & Havriluk, 2004).Moreover, educators commonly agree that ICT has immense

potential to improve student learning outcomes and effectiveness if it is used properly (Wang, 2001).ICT Integration has a sense of completeness or wholeness (Earle, 2002), by which all essential elements of a system are seamlessly combined together to make a whole. In education, simply handing out to students a collection of websites or CD-ROM programs, taking your students to the computer laboratory once a week or using an electronic worksheet is not necessarily ICT integration. In a properly crafted ICT integrated lesson, ICT and other crucial educational components such as content and pedagogy are molded into one entity. As a result the quality of the lesson would somehow be diminished if the ICT ingredient were taken away from the ICT-integrated lesson (Williams , 2003).ICT helps link various learning communities together in new and different ways (Taylor, 2000). Research shows that the use of ICT can support new approaches and make hard-to-implement instructional methods such as simulation or cooperative learning more feasible (Roblyer, et al, 2004).

According to Hepp, et al (2004) and Osin (1998) children enjoy learning using technology. Therefore, the high dropouts experienced in schools in developing countries could be curbed by integration of ICTs. Gomez and Martinez (2001) highlighted how using the Internet in education programs for street children in Colombia enticed a higher than usual number of children back to school. Several researchers, academicians and Policy makers have suggested several ways in which ICT can contribute to solving educational problems in developing countries (Whims and Lawler,2007). With the shortage of teachers in Sub-Saharan Africa being estimated at 25 percent by GeSCI (2004), ICTs can be used to address it faster training of teachers.

According to Mutuma (2005), ICT integration has several benefits including; increasing access to remote learning resources which would be difficult when solely relying on printed books, promoting collaborative learning, provoking learners' curiosity by use of videos, television and multimedia computer software that combine the power of text, sound, colorful moving images and ensuring student-centered learning. He further argues that integration of ICT in teaching and learning results to raising of the quality of education since interactive radio instruction project has been found to be the most comprehensively analyzed, saving on time and money used on excursions and promoting a lifelong learning experience for both the teachers and the learners.

Moreover, Roblyer et al (2004) suggests the following for rationalizing the ICT integration; high motivation, unique instructional capabilities such as helping students visualize data/problems or tracking learning progress, support for innovative instructional approaches such as collaborative learning and problem based learning and increase teacher productivity and student knowledge instruction.

Information and communication technology revolution is gradually affecting the nature of learning and production of knowledge and transforming the world in an unexpected way (Arunachalam, 2005). This has facilitated a paradigm shift from the traditional instructional material or traditional pedagogical methods to a more modern and innovative technological based teaching and learning methods. The impact of ICT is becoming more pronounced worldwide such that rarely is anything mentioned in any area of human endeavors without reference to this type of technology. ICT refers to the process of gathering, accessing and disseminating of data for an enhanced learning (Miller and Akume, 2009). ICT has also simplified education through the application of electronics media, internet etc. According to Ndukwe (2006), the production and introduction of calculators and computers in the education system worldwide has helped in simplifying teaching and learning in schools, thereby promoting national stability and economic survival.

New instructional techniques that use ICT provide a different modality of instruments. For the students, ICT use allows for increased individualization of learning. In schools where new technologies are used, students have access to tools that adjust to their attention span and provide immediate feedback for literacy (Emuku and Emuku, 1999 & 2000).

2.5 Factors that affect ICT integration in Teaching and Learning

Previous studies report that the integration of ICT into the curriculum remains problematic in the school context (John, 2005). The core factors that influence the integration and diffusion of ICTs in education have been identified in many studies and project reports such as UNESCO Meta survey on the use of Technologies in Asia and the Pacific and in the context of East Africa, by IDRC in its thorough analysis of ICT policy-making in the region.

2.5.1 Human Resource Capacity

Capacity building refers to developing an organization's or individual's core skills and capabilities to help it, (him/her) achieve its (his/her) development goals. This significant definition suits the context of ICT well as it assumes knowledge of the existence of development goals without which ICTs are unlikely to be of much value. The full realization of the potential of ICTs requires skills, training, individual and institutional capacity among the users and beneficiaries (Kandiri, 2006).

ICTs in the form of Multimedia Community Centers/Telecentres especially at the rural levels can act as a nodal point for community connectivity, Local capacity building, content development and communications and serve as hubs for applications, such as distance education, electronic commerce, telemedicine and environmental management (Havris, 2004). According to Mooij and Smeets (2001), the lack of interest that has been displayed by teachers in most countries may be due to the misconception of the concept 'integration' which is due to the insufficient knowledge they posses. A further inhibiting factor would seem to be the lack of or inadequate teacher training. It is through the training of teachers that the objective of ICT integration can be clarified (Kennewell et al, 2000). Furthermore, the attitude of the management in supporting the process is also viewed as influential to teachers' use of computers (Schiller,2003).

Lau and Sim (2008) established that teachers need training which should be offered on a continuous rather than a one-off, basis so that their IT knowledge is upgraded over time. They further proposed the need to put in place measures to ensure that adequate access to technical support is provided. According to them a teacher with ICT competency be appointed as ICT coordinator in each school to provide technical and pedagogical support to teachers.

According to Baylor and Ritchie (2002), regardless of the amount of technology and its sophistication, technology will not be used unless members have skills, knowledge, and attitude necessary to infuse it into curriculum. Karsenti and Larose (2011) stated that a major obstacle to adequate use of technology across all grade levels and the curriculum is the lack of a critical mass of teachers who feel comfortable in using technology and who can provide support and exemplary instances of good practice to those who are still not well versed with technology.

A research study by Wims and Lawler (2007) that used both quantitative and qualitative survey in three secondary schools in the expansive Rift Valley province in Kenya revealed that there was an absence of educational software, lack of internet access and use of email in the schools. Some 35-40 percent of secondary school teachers had never used a computer. the study revealed that exposure to computers in schools influenced the career choices of former students. The main issue of concern that came out of the study included staff training, mainstreaming of ICT across the curriculum and provision of adequate ICT equipment.

The costs of ICT training have been identified to be high so much that some schools cannot meet the expenses of making provisions for the teaching and learning of computers. In some cases teachers who have trained in ICT have done so at their own expense. Even where training has been organized by schools and computer centers, payments in many of these cases have been from personal purses (Jegede, 2009).

Mumtaz (2000) identifies some inhibiting factors in integrating ICT into the curriculum; amongst these factors is lack of computer availability, lack of financial support and insufficient knowledge possessed by teachers. The need for the school management in the planning committee remains crucial for funding purposes. In the event that the school organization is willing to meet the demands of ICT, there is the likelihood that teachers may take up the opportunities afforded by ICT ((Kennewell et al,2000).

2.5.2 Availability and accessibility of ICT infrastructure

Okwudishu (2005) discovered that the unavailability of ICT components in schools hampers teachers' use of ICTs. Lack of adequate search skills and access points in the schools were reported as factors inhibiting the use of the internet by secondary school teachers (Kaku,2005). The absence of ICT equipment in most Nigerian secondary schools leads students to result to cybercafés for internet access. Most cybercafé clients in Nigeria are students (Adomi,Okiy and Ruteyan,2003).

In Kenya, ICT integration in education is more recent, of a smaller scale and experimental in nature as seen in Cyber Schools and NEPAD program (Keiyoro, 2010). However, the use of computers in education has progressed slowly from the acquisition of basic computer skills to computer-aided teaching, communication and research. Kenya's infrastructure was considered to

be one of the best in Africa during the 1970s. In the past decade, however, the infrastructure has deteriorated significantly owing to the suspension of the donor funding and increased public sector corruption, which has resulted in long and cumbersome procurement processes for construction, maintenance and rehabilitation of public infrastructure (OECD, 2004). Cost has been reported as one of the factors which influence provision and use of ICT services (Adomi, 2006). The cost of computers is too high for many to afford. Monthly internet rates are exorbitant and charges for the satellite television are unaffordable for most people in Africa (Brakel & Chiseuga, 2003).

Although various factors contribute to the cost and speed of internet access in a community, a critical factor is competition. In markets where connections tend to be more affordable and faster, customers have access to at least three competitive Internet Service Providers (ISPs) offering similar plans. In the majority of the U.S. cities, most consumers have a choice between a local telephone company and local cable company. According to the 2010 National Broadband Plan, 78 percent of households in the U.S. have a choice between two providers while an additional 13 percent have just one option (Ward 2012). High interest subscription cost in Kenya has been a hindrance to wide internet connectivity in the country despite the government's huge investment in undersea cable as well as a zero rating of duty on ICT equipment. Most Kenyans are struggling with a high cost of living that has been attributed to unstable currency and fuel fluctuations with majority of Kenyans living under U.S. $ 1.25 per day Economic indicator Survey (2010).

A recent survey released by ICT board indicated that only 2.2 percent of the about 6 percent of households with computers have internet connections. The survey further states that while internet speeds have improved; prices have remained above the reach of average Kenyans. The report reveals that 58 percent of Kenyans have no internet connections for lack of computers, while 28 percent who have computers cite cost of internet subscription as a hindrance. Although there is low number of connections in Kenya, internet usage in the country is high indicating that most connections are shared and largely compromise businesses which includes public accessible connections such as Cyber café and educational institutions. According to a survey dubbed 'Julisha' , 80 percent of the respondents indicated they use mobile phones or internet enabled mobile phones to access the internet, followed by 71 percent using desktop computers,

34, percent using laptops and 15 percent using smart phones. While most ISPs in Kenya will offer one just more than 256kbps or close to this, one has to consider other factors such as cost and consistency to make sure he/she gets the best deal (CCK, 2012). Table 2.5.1 shows the internet service providers in Kenya.

Table 2.1 Internet Service Providers in Kenya and their Speeds

ISPS IN KENYA	ADVERTISED SPEED	ACTUAL SPEED
Zuku Wananchi Online	8Mbps	1.97Mbps
Safaricom 3G	7.2 Mbps	0.68-3 Mbps
Safaricom EDGE/GPRS	3.6 Mbps	0.15-3.5 Mbps
Access Kenya	1.3 Mbps	0.3-1.3 Mbps
Kenya Data Networks	8 Mbps	0.09-1.25 Mbps
Airtel	3.75 Mbps	0.09-1.25 Mbps
Orange 3G	21.1 Mbps	Not available
Orange 3G+	31.7 Mbps	Not available

Source: CCK, (2012)

Since year 2000, transport and communications have been fastest growing sectors of the Kenyan economy. This is due to investments in telecommunications particularly in mobile phone services, internet provisions, radio and TV operations. As result many new businesses such as public pay phones and internet cafes have sprung up in major towns as well as rural areas. There are 19462 community pay phones and there has been an increase in the number of mobile phone subscribers from 2.2 million in 2004 to 4.6 million in 2005 and in geographical coverage of the country (CCK, 2006).

There are currently about 400,000 fixed lines serving 34.7 million people located mostly in the main urban areas between the cities of Nairobi, Mombasa and Kisumu and its penetration is very low compared to other regions as seen on Table 2.5.2.

Table 2.2 Internet World Statistics for Africa

Country	Population (2007 estimates)	Internet users (2000 estimates)	Internet users (2007)	Population penetration
Botswana	1,893,526	15,000	60,000	**3.2%**
Burundi	8,075,188	3,000	25,000	**0.3%**
Ethiopia	73,872,056	10,000	113,000	**0.2**
Kenya	35,062,192	200,000	1,054,900	**3.1**
Malawi	11,553,163	150,000	52,500	**0.5**
Mozambique	20,356,242	30,000	138,000	**0.7**
Rwanda	8,959,095	5,0000	38,000	**0.4**
Namibia	2,083,405	30,000	75,000	**3.6**
S.Africa	49,660,502	2,400,000	5,100,000	**10.3**
Tanzania	38,870,348	115,000	333,000	**0.9**
Uganda	28,574,909	40,000	500,000	**1.7**
Zambia	11,486,812	20,000	231,000	**2.0**
Zimbabwe	12,398,897	50,000	1,000,000	**8.1**

Source: Internet World Statistics for Africa.
[Online] Available: http://www.internetworldstats.com/stats/html accessed on 24/08/2012

A teacher must not only have access to a 'working' ICT tool kit, but this skill set must be matched by pedagogical compatibility, and social awareness (Zhao, Pugh, Sheldon and Byers,2002). Variations in access to ICTs and levels of school based ICT infrastructure are also critical to the successful uptake of ICTs in the classroom (Loveless,1996); this is deeply connected to the levels of teacher and systems support, such that the stronger the ICT culture of a school, the more likely it is to 'use' ICTs as a teaching and learning platform (Lim,Khine,Hew,Wong,Shant & Lim 2003; Bitner &Bitner,2002).

2.5.3 School's Leadership

According to Mutuma (2005), managing the use of school ICT is challenging and it requires perseverance from every member of an organization. With the large amount of money spent by the government, the school leader must work in concert with the government's policy in managing ICT in education. Therefore the school leader's command of technology is important

as leaders who are technologically literate are more aware of their staff members needs. In order to stay ahead and becoming competitive person keeping abreast with the latest technology such as wireless technology and so forth, are pertinent for school leaders.

Among the various studies carried out to establish the status of ICT integration and the variables influencing it, some have focused on the role of the manager in the adoption and use of ICT in education. Many scholars have agreed that school principals as institutional managers have a key role to play in facilitation of educational change (Schiller, 2003; Gronow, 2007 and Tondeur et al,2007). The school principals have been identified as key and critical persons for establishing and maintaining learning environments compatible with student-centered approaches to teaching and learning with ICT (Afshari *et al*.,2008). They are also seen as curriculum and pedagogy leaders and are considered by stakeholders as central figures in leading processes for creating the conditions to teach and learn with ICT.

According to Brannigan (2010), leadership is one of the several critical components in successful integration of ICTs in education. The locus of leadership influences the degree to which ICT integration can become embedded in educational institutions as well as the role of leadership in championing ICT. The failure by educational institutions to integrate ICT in education and imprint it on the minds of teachers has been attributed to lack of leadership capacity (Moyle,2006). As a result today's school principals must not only manage the day to day routine activities of a school but also focus on how students learn, performance standards, evidence based decision making and continuous improvement efforts. In line with this idea, Fullan (2003) stated that administrators should understand the elements and characteristics of long–range planning for the use of current and emerging technology; demonstrate an ability analyze and react to technology issues, concepts and proposals; posses a vision of technology in education and schools; use technology to communicate efficiently with staff, parents and the community; use technology directly to collect and analyze data and information that can improve decision making and other management functions; understand how current and available technologies can be integrated effectively into all aspects of the teaching and learning process; understand the legal and ethical issues related to technology licensing and usage; and use technology appropriately in leading and communicating about school programs and activities.

The principal as a learning leader specifically, can impact multiple areas of the school setting such as ICT integration (Elmore, 2000). Furthermore, the attitude of the management in supporting the process is also viewed as influential to teachers' use of computers and effective leadership is essential when implementing school improvement initiatives (Schiller,2003).

Although school heads generally support ICT use, they do not seem to have a particular vision and strategy of ICT integration into education (Gakuu and Kidombo,2010). Some literature has delved into the crucial role of leadership in ICT integration in education, and shows how school leadership can hinder or facilitate school's adoption of ICT (Fullan, 2003 and Elmore, 2000). For instance, when the ICT integration tasks are given to one teacher or to a small team of teachers who focus more on infrastructural management rather than technological innovation in teaching, staff development and ICT research are more likely to suffer. According to Fullan (2001), the reason why this role is not played effectively is still not clear hence the need for more studies.

2.5.4 ICT Literacy Levels

Literacy is the ability to read and write own name and further for knowledge and interest write coherently and think critically about the written word. The inability to do so is called illiteracy or analphabetism. Visual literacy includes in addition the ability to understand all forms of communication, be it body language, pictures, maps, or video. Evolving definitions of literacy often include all the symbol systems relevant to a particular community. Literacy encompasses a complex set of abilities to understand and use the dominant symbol system of a culture for personal and the community development.

In a technological society, the concept of literacy is expanding to include the media and electronic text, in addition to alphabetic and number systems. These abilities vary in different social and cultural contexts according to need and demand, Lottor (1995).

A survey due by Kenya National Bureau of statistics on adult literacy rate is 61.5 percent and numeracy rate is 64.5 percent with male literacy at 64.2 percent and females at 58.9 percent. Similarly, the male numeracy rate was at 67.9 percent compared to females at 61.4 percent Nairobi province had highest literacy at 87.15 percent while North Eastern had 8.1 percent. Eastern province had 54.7 percent literacy rate.

The primary sense of literacy still represents the life long, intellectual process of gaining meaning from a critical interpretation of the written or printed text. Key to all literacy is reading development, a progression of skills that begins with the ability to understand spoken words and decide written words and culminates in deep understanding of text.

The diffusion of innovation theory holds that a new idea-or a communication idea- begins at its point of origin and spreads through the surrounding geographical areas or from person to person within a specific area, Little John (1996).

Amendola and Graffard (1988) noted that a "new", expanded interpretation of the process of innovation has emerged. Less emphasis is on the actual absorption of a given technology, and more importance is placed on the actual process through which a new technology is developed step by step. To a great extent, the snowball effect is visible in the diffusion of the internet; by reaching its critical mass point, it allows the web to take off at a considerable accelerating rate, Chen and Crowston (2001).

According to Rogers (1983), innovators or the "venturesome" are people who are eager to launch new ideas in the social system by importing the innovation from outside of the system's boundaries. Thus, the innovator plays a gatekeeper role in the flow of ideas into a social system. As for early adopters, they are a more integrated part of the local social system than are innovators.

Innovators and early adopters of a technology are important to the diffusion of any innovation Rogers (1995). These individuals (or organizations or countries) are among the first to try out an innovation. They have high degree of innovativeness, which is the degree to which an individual or other unit of adoption is faster in adopting new ideas than other members of a social system (William *et al*, 1988).

Rogers (1995) believes that the rapid evolution of the internet presents a unique opportunity to revisit theories about diffusion of innovations. The internet differs from previous innovations in that it is an extra ordinarily dynamic innovation; its recently developed capabilities include animation and extended interactivity (for instance, Java applets). This phenomenon demonstrates how a dynamic technology such as the internet may adapt to areas beyond those originally intended Chen and Crowston (2001). He also noted that adoption and implementation of the internet take place on at least two levels- organizational and individual. An organization may

implement web browsers throughout the organization, but individuals may not choose to use technology. On the other hand, individuals may choose to implement web browsers but the organization fails to implement it. This draws attention to cases where organizations with existing computer communication systems may find the internet to be incremental innovation. Others may find the internet to be a radical innovation, which for example, introduces e-mail and changes the organization's communication channels.

In another study, Rogers (2000) noted that the internet has mainly diffused in urban areas among the comparatively wealthy and educated. He noted that much of ICT infrastructure needed for the rapid diffusion of the internet is not found in the rural areas in India. Many villages in India do not have central electricity or telephone service and no one in these rural areas can afford to own a computer.

Devraj (2000) noted that even literate South Asians cannot benefit from the IT revolution without a working knowledge of English language because of poor "localization"- a highly technical process by which computer programs are translated into another language. A study done by consumer insight in Kenya, 2008, established that 74 per cent of residents in Nairobi-Kenya have used a computer at least once. The second and third best countries in computer literacy are Lagos- Nigeria and Kampala- Uganda at 69 and 68 per cent respectively. Lusaka-Zambia was ranked last with 32percent. This study found that high computer literacy rate can attributed to a general rise in literacy levels as well as concerted efforts by the government and other stakeholders in pushing the information technology agenda forward. This study dubbed 'maisha' established that browsing the internet was the most communication use across the eleven leading commercial cities in African countries namely; Kenya, Uganda, Tanzania, Ethiopia, Rwanda, Burundi, Zambia, Nigeria, Madagascar,Namibia and Angola (Consumer insight,2008).

2.6 Theoretical Framework

Technology is developed to solve problems associated with human needs in more productive ways. If there is no problem to solve, the technology is not developed and /or not adopted. Applying this principle to educational technology would mean that educators should create and adopt technologies that address educational problems, of which there are many. Further, a technology will not be adopted by educators where there are no perceived needs or productivity gain. This according to Lankshear and Snyder (2000) is workability principle. When discussing

applications of computer technology to education the question must always be asked "What educational problem(s) needs to be addressed?". This question needs to be asked at all levels of decision making, from the teacher planning a programme, to a school administrator purchasing hardware and software, to an educational system officer developing policy and strategic plans.

A critical component of theories of constructivism is the concept of proximal learning, based on the work of Vygotsky (1978), which posits that learning takes place by the learner completing tasks for which support is initially required. This support may include a tutor, peer or a technology such as the application of computers. This has led to the use of the term computer supported learning. Therefore the technology is used to create the types of learning environments and the types of support for learning that are known to be ideal, that Glickman (1991) argues have been ignored or failed to be implemented in the past. The aim is to create learning environments centered on students as learners and a belief that they learn more from what they do and think about rather than from what they are told.

2.7 Conceptual Framework

In this study, the researcher identified a number of factors that influence integration of Information and Communication Technology (ICTs) into teaching and learning process in Public Secondary Schools. In the Study, the survey design was used to explain the relationship between the independent variables and the independent variables and showed how independent variables influenced the dependent variables (Nachmias & Nachimius,2008). There were also moderating and intervening variables. The independent variables in the study were; Human Resource Capacity, Availability and access to ICT infrastructure, School's Leadership and ICT Literacy Levels. The researcher also considered the government's Policy as a moderating variable; age and gender of the instructor were deemed as intervening variables. The dependent variable for the study was Information and Communication Technology integration into teaching and learning processes in Public Secondary Schools. Each of these variables had its indicators as shown in Figure 1.

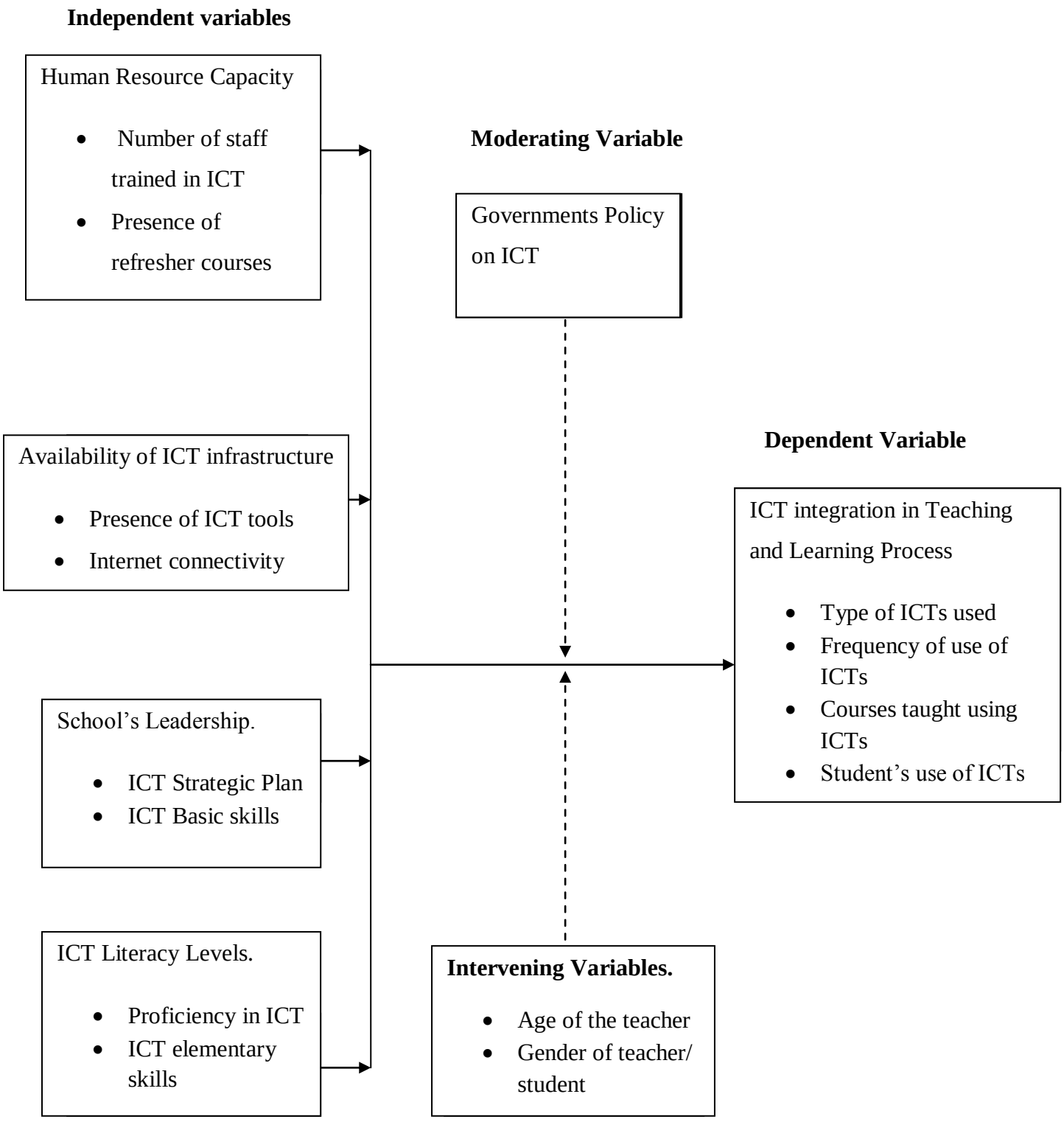

Figure 1: Conceptual Framework

2.8 Summary

In conclusion it seems that appropriate use of ICTs in an institution has the potential to change its processes, working methods and culture. This may impact positively when it leads to an increase in productivity making ICT a valuable resource to that organization. In addition ICT facilitates exchange of information even across continents without wasting of time and cost of travel and help to reduce not only space used for data storage but also the time taken for its retrieval. It's worth noting that increased use of computer today has been aided by a drastic reduction in their cost, increase in power, usefulness and popularity.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology that was used in the study. It details the research design, population of the study, sampling techniques and sample size, research instruments, validity and reliability of the instrument. The chapter also explains data collection techniques and methods of data analysis and presents an analysis of the approach and tools that will be used to conduct the study.

3.2 Research Design

The researcher used a descriptive survey design which is appropriate for data collection about characteristics of a large population. Wiesma (1985) pointed out that a survey design is concerned with gathering of facts or obtaining pertinent and precise information concerning the current status of phenomena and where possible draws possible draws possible conclusions from the facts obtained. Creswell (2003), notes that a descriptive survey design helps to gather information about the present and existing condition of a phenomena under study. The purpose of employing this design was to describe the nature of the situation as it exists at the time of the study and to explore the cause(s) of that particular phenomenon. A survey research is often used to assess thoughts opinions and feelings. It can be specific and limited or it can have more global, widespread goals. With survey research design, a population comprising of all the subjects under study is represented by a sample which bears the characteristics of the population. The goal of the survey research is not to describe the sample but the larger population. This generalizing ability is dependent on the representativeness of the sample .

3.3 Study Area

The study was carried out in Kirinyaga East District which is one of the districts in Kirinyaga County. The schools that were targeted were the Public Secondary Schools in this District as shown on Appendix IV which served as the sampling frame.

3.4 Target population

The target population in this study comprised of one DQASO, one DEO, 33 principals, 132 Heads of Departments and 243 teachers from the 33 public secondary schools in Krinyaga East District. The total population for the study was therefore 410 respondents as shown on Table 3.1

Table 3.1 Target Population

Category	Target Population
DQASO	1
DEO	1
Principals	33
Head of Departments	132
Subject Teachers	243
Total	**410**

3.5 Sampling Procedure

Sample is a representative portion of an entire population under study. The portion is expected to fully represent the characteristics of the entire population and free of personal bias thus reducing sampling variability. Sampling is the process of choosing the units of the target population which are to be included in the study. This is normally done because a complete coverage of the population is not practically possible. Slavin, (1984) observed that due to limitation in time, resources and energy, a study can be carried out from a carefully selected sample to represent the entire population. It has been recommended that at least 20% - 30% sample is a good representation (Borg and Gall, 1989). This study considered the public Secondary Schools in Kirinyaga East District in which the researcher used both non probability and probability sampling technique to select the sample. Purposive sampling technique and Stratified Sampling technique were the techniques were also used. The researcher used purposive sampling to select the District Quality assurance Officer, the District Education Officer. Purposive sampling allows a researcher to use cases that have the required information with respect to the objectives of the study (Mugenda and Mugenda,2003).The researcher conducted a simple random sampling on the

33 Public schools to select ten schools and from these ten principals. The target population was stratified into five strata namely; DQASO, DEO, Principals, HODs and the Subject teachers.

3.6. Sample Size and Distribution

The study used Fisher's formula in calculating the sample size which is based on the sample for proportions,

$$n = \frac{Z^2 \times P \times Q}{E^2}$$

Where: n= The desired sample size

Z= The value corresponding to the level of confidence required (in this case 1.96 corresponding to 95% level of confidence)

P= Estimated level of an attribute that is present in the population (0.1 variability)

Q%= Estimated level of the attribute that is not present in the population

E%= Desired level of precision (in this case 5%)

The adjusted minimum sample size was collaborated by use of the formula for correlation for finite population. These were computed as :

$$\frac{1.96^2 \times 0.1 \times 0.9}{0.05^2} = 138$$

This was adjusted using the formula : $n_1 = \frac{n_0}{1+ (n_0/N)} = \frac{138}{1+138/410} = 103$

Where: n_1= adjusted minimum sample size

n_0= Minimum sample size as arrived at in the previous formula

N= the total known population

A sampling frame derived from listing all the Public Secondary School in Kirinyaga East District was done and then the member schools were allocated corresponding numbers which were used

to get respondents. The researcher used purposive sampling to select one DQASO and one DEO. The sample size and distribution was as shown on Table 3.2.

Table 3.2 Sample size and Distribution

Category	Target Population	Sample Size
DQASO	1	1
DEO	1	1
Principals	33	10
HODs	132	40
Subject Teachers	243	68
Total	**410**	**120**

3.7 Data Collection Instrument and Procedure

The study utilized descriptive survey design with the respondents as the District Education Officer, the District Quality Assurance Officer (DQASO), principals, Heads of departments and teachers from the schools selected as the sample. In these, three primary methods were used in data collection; self administered questionnaires, observation and semi-structured personal interviews. The questionnaire constituted of structured or close ended and unstructured or open ended items with the use of a Likert scale to measure a range of opinions from "strongly disagree to "strongly agree". The significant agreement or otherwise with the notion being tested will be determined by evaluating the mid-point value of the index. The following formula was used to determine the mid-point value.

$$X_i = \frac{\sum FiRi}{\sum Fi}$$

Where; F_i is the frequency

R_i is the rank

This means that any result significantly different from this uncommitted or unsure value was assumed to be either positive or negative to the notion being tested .The questionnaire, which was self administered to the respondents, was adopted because it could assist in gathering large amounts of qualitative data in a cost effective and timely manner. Structured observation was used to check on the physical presence of computers in the institutions, their use and even the programs being used. Then, a semi- structured interview with coordinators and principals of various institutions will followed up to supplement the questionnaire. The questionnaires were self administered to collect data. Dates of collecting the questionnaires were one week after the first visit. The date for interviewing the principals coincided with collecting their filled questionnaires.

3.7.1 Instrument Validity

Validity is the accuracy and meaningfulness of inferences, which are based on the research results. It is the degree to which results obtained from the analysis of the data actually represents the phenomenon under study (Mugenda and Mugenda,2003).To enhance validity of the questionnaire , the researcher sought advice from supervisors on validity and relevance of the questions to the topic under study. Comments and suggestions were considered in formulating the final copy. Care was taken in constructing the questionnaire and pretesting was done to identify and change any ambiguous, awkward or offensive questions as emphasized by Copper and Schindler (2003). Expert opinions were requested to comment on the structure of the tools. This will helped in the improvement of the content validity of the data that was collected.

3.7.2 Reliability of the Instrument

Instrument reliability refers to the level of internal consistency, on the stability of the measuring device (Thorndike and Hagen, 1961). It is the degree to which test scores are free from measurement errors (Best, 1981). The sample questionnaire was pre-tested by distributing to respondents in schools that were not to be part of the main study. After pre-testing, the responses were scored. The two parts of the instrument were treated as parts of the instrument. The scores of the two parts were then correlated mathematically using Spearmans correlation coefficient and the value noted. With the Spearmans correlation coefficient value being 0.83 which is close to a unit, then the instruments were regarded as reliable. Each of the two sub-sets was treated

separately and scored accordingly. The scores were computed and the two halves correlated using Pearson's correlation coefficient.

3.8 Data Analysis and Presentation

The data collected was examined and edited, to correct errors and omissions. The responses to every question in the filled questionnaires from the respondents were edited, tabulated, analyzed and computed to percentages by use of a Statistical Package for Social Sciences (SPSS). Descriptive statistics such as mode, mean, percentages, standard deviations and correlation coefficients were computed and information presented in form of tables and frequency distributions.

3.9 Operational Definition of Variables

Operationalization of variables means describing of the Research objectives into measurable terms, for purposes of conducting the actual research. The research topic was translated to observable and measurable objectives. The variables were identified and measurable indicators specified. Table 3.3 shows operationalization of variables.

Table 3.3 Operational Definition of Variables

Objectives	Variables	Indicators	Measurement	Measurement Scale	Tool of Analysis	Type of analysis
To determine the extent to which Human Resource Capacity influences ICT integration into teaching and learning	**Independent** Human Resource Capacity .	-Certification in ICT. -Number of Staff Trained in ICT and Level of ICT. - Presence of training Forums.	-Professional certification -Number of ICT trained personnel -Professional Training on ICT	Nominal Ordinal/ Interval Nominal	Frequency, percentage Frequency, percentage	Descriptive Descriptive
To determine the influence of availability and access to ICT infrastructure on ICT integration into teaching and learning.	**Independent** Availability and access to ICT infrastructure	-Number of Computers. -Connectivity to the Internet.	-Number of computers ready for use Connectivity to the Internet by modems	Nominal Ordinal	Frequency, percentage Frequency, Percentage	Descriptive Descriptive
To access the influence of the School's leadership on ICT integration into teaching and learning.	**Independent** School leadership Commitment to Information	Vote head on ICT in the School Budget. Schools policy/	Amount ICT Policy	Nominal Ordinal	Frequency, percentage	Descriptive

	and communication technology.	Strategic Plan on ICT		Nominal	Frequency, Percentage.	Descriptive.
To determine the Level of ICT Literacy among the teachers and examine its influence on ICT integration into teaching and learning.	**Independent** Possession of elementary ICT skills. Proficiency in ICT.	Basic Operations on computers. Use of ICT tools in search of new knowledge, solving complex mathematical problems etc.	Academic and Professional Qualification Training in ICT	Nominal Nominal	Frequency percentage Frequency percentage	Descriptive Descriptive
	Dependent ICT Integration in Teaching and Learning	Use of Technological Tools Application of technology in problem solving and search for new knowledge	Use of basic application software Numerical analysis, word processing	Norminal Ordinal	Frequency Percentage Frequency Percentage	Descriptive Descriptive

3.10 Ethical Considerations

The decision to participate in the study was on voluntary basis and no coercion was applied Respondents were not required to write their names on the questionnaire in order to observe confidentiality. Permission to access the respondents was sought from the County Director for Teachers Service Commission in Kirinyaga East.

3.11 Summary

This chapter explains how the research designs, site of the study, target population, sampling design and sample size were conducted. It also shows how the data collection methods and tools were used and how validity and reliability was ascertained. The chapter, in addition explains how the data that was collected was later analyzed.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTEPRETATION

4.1 Introduction

This chapter focuses on data analysis and presentation of the findings from the research questions that are an investigation of whether Human Resource Capacity, Availability and accessibility of ICT infrastructure, School Leadership and ICT Literacy Levels influence ICT Integration into teaching and learning in Public Secondary Schools. The findings were presented using frequency tables and graphs for easy analysis and interpretation. Statistical analysis of the findings was done using frequencies and percentages.

4.2 Questionnaire Response and Return Rate

The questionnaires administered to the DQASO and the DEO were both returned. Out of the ten questionnaires administered to the principals, 8, accounting for 80% questionnaires were returned, there were 35 questionnaires accounting for 87.5% returned from the Heads of Departments and 51 questionnaires accounting for 75 % were returned from the subject teachers The questionnaires response and return rate was as shown on the Table 4.1

Table 4.1: Questionnaire Response and Return Rate

Category	**No of questionnaires administered**	**No of questionnaires filled and returned**	**Percentage %**
DQASO	1	1	100
DEO	1	1	100
Principals	10	8	80
HODs	40	35	87.5
Subject teachers	68	51	75
Total	**120**	**96**	**88.5**

Out of the one hundred and twenty questionnaires distributed by hand ninety six were returned This brought the responses effectively to 88.5% and the response was considered adequate as according to Idrus and Newman (2002) a response rate of 50% is good enough for social studies.

4.3 General Information on Respondents

This is basically the information on the population interviewed in this study. It is the demographic characteristics of the sampled population. The research sample included the DQASO, the DEO, Principals, Heads of Departments and the subject teachers. This section has analyzed gender issues, education and professional information and work experience for all the categories of respondents in the study.

4.3.1 Gender Distribution of the Respondents

The population under study was stratified into males and females with the distribution as shown on Table 4.2

Table 4.2: Gender Distribution of the Respondents

Gender Distribution	**Frequency**	**Percentage %**
Male	53	55.2
Female	43	44.8
Total	**96**	**100**

Out of the 96 employees under study, 53 accounting for 55.2% were male while 43 accounting for 44.8% were female. This information shows a slight gap in gender balance. With both of the two supervisory posts- DQASO and DEO being taken by males, its evident that more women need to come up and take up these roles in the workforce.

4.3.2 Age Distribution of the Respondents

It was also necessary to have background information with regard to age distribution s among the respondents. The respondents were asked to indicate the age group they fit in and the responses were as shown on Table 4.3

Table 4.3: Age Distribution of the Respondents

Age Distribution	Frequency	Percentage %
Below 20 Years	9	9.4
21-30 Years	19	19.8
31-40 Years	30	31.3
41-50 Years	26	27
Above 51 Years	12	12.5
Total	**96**	**100**

The findings indicate that only 9 (9.4%) of the respondents were aged below 20 years, 19(19.8%) of the respondents were aged between 21 and 30 years, most of the respondents 30 (31.3%) were in the 31-40 years age bracket. In the 41-50 age brackets there were 26 respondents accounting for 27% while merely12 respondents (12.5%) were above 51 Years. The 9.4% was attributed to the population majorly comprising of peer teachers.

4.3.3 Distribution of the Highest Educational Level of the Respondents

The educational levels attained by the respondents showed a notable variation in terms of the respondents' academic qualifications. This is as shown on the Table 4.4

Table 4.4: Highest Educational Level of the Respondents

Educational Level	Frequency	Percentage %
Post graduate	9	9.4
Graduate	50	52.1
Diploma	29	30.2
K.C.S.E.	8	8.3
Total	**96**	**100**

From the findings of the study, it was clear that most of the respondents (50) accounting for 52.1% had attained a graduates level of educational qualification, a small proportion 9.4% had post graduate qualification,8 respondents accounting for 8.3% had Kenya Certificate of Education qualification while 29 respondents accounting for 30.2% had a diploma level of qualification.

4.3.4 Length of Service of the Respondents

The study sought to know the length of service of the respondents and the findings were as shown on the Table 4.5

Table 4.5: Length of Service of the Respondents

Length of Service	Frequency	Percentage %
Less than 5 years	18	18.8
6-10 years	10	10.4
11-15 years	15	15.6
More than 16 years	53	55.2
Total	**96**	**100**

Out of the 96 respondents in the study, 18 accounting for 18.8% have been in service for less than 5 years while 10 (10.4%) have been in service for a period of between six years and ten years.15 respondents, accounting for 15.6%, have been in service for a period of between eleven

years and fifteen years. Majority of the respondents (53), accounting for 55.2%, indicated to have been in service for a period exceeding sixteen years.

4.4 Responses on ICT Integration

The respondents were requested to give information on ICT integration into teaching and learning processes in their schools. The researcher sought to find out the influence of human resource capacity, availability and accessibility to ICT infrastructure, school's leadership and ICT literacy levels on integration of ICT into teaching and learning in public secondary schools. The findings were as shown in the following section.

4.4.1 ICT Integration into Teaching and Learning

The following section presents the findings of the study on the integration of ICT in teaching and learning. The researcher paid keen attention on the common ICTs used, use of computers and access to the internet.

4.4.1.1 Common ICTs used

The respondents were asked to indicate the most common types of ICTs they used in the course of teaching and learning. The findings were as shown on Table 4.6

Table 4.6 Common ICTs used

ICTs	Frequency	Percentage %
Printers & Scanners	72	75
L.C.D Projectors	3	3.1
Modems & Routers	10	10.4
Digital Cameras	11	11.5
Total	**96**	**100**

The study found out that 72 respondents representing 75% used printers and scanners, 11 respondents accounting for 11.5 % used digital cameras, 10 respondents accounting for 10.4 % use modems and routers while only 3 (3.1%) used L.C.D projectors.

4.4.1.2 Use of Computers

The researcher sought to know whether the respondents used computers in their institutions. The respondents were asked to indicate if they used computers in their institutions and the findings were as shown on Table 4.7

Table 4.7 Use of Computers

Response	Frequency	Percentage %
YES	53	55.2
NO	43	44.8
Total	**96**	**100**

The study found out that 53 respondents accounting for 55.2% indicated that they used computers in their institutions while 43 respondents accounting for 44.8% indicated that they do not use computers in their institutions.

4.4.1.3 Access to the Internet

This study sought to find out the level of access to the internet by the respondents. The respondents were asked if they had the internet facility in their institution. The findings with regard to this item were as shown on Table 4.8

Table 4.8 Access to the Internet

Response	Frequency	Percentage %
YES	34	35.4
NO	62	64.6
Total	**96**	**100**

The findings of the study indicate that a minority of the respondents 35.4% have internet facility in their institution while majority of the respondents 64.6 % indicated that they do not have access to internet facility in their institution.

4.4.2 Influence of Human Resource Capacity on ICT Integration

Among the factors that the researcher was investigating was human resource capacity. The findings of the study were as indicated in the section.

4.4.2.1 Training in ICT

The researcher sought to find out if the respondents had any training on ICT and posed the question 'have you had any training in ICT? The findings were as indicated on Table 4.9.

Table 4.9 Training in ICT

Response	Frequency	Percentage %
YES	40	41.7
NO	56	58.3
Total	**96**	**100**

Table 4.9 indicates that out of the 96 respondents, only 40(41.7%) had prior training in ICT while a majority 56(58.3) % had not acquired prior training in ICT.

4.4.2.2 Highest level of ICT Training

Among the respondents who indicated to have had prior training in ICT, the researcher enquired on their highest level of training in ICT. The findings were as shown on Table 4.10

Table 4.10 Highest level of ICT Training

Level	Frequency	Percentage %
Degree/ Diploma in ICT	2	2.1
Certificate in ICT	5	5.2
Basic Packages in ICT	22	22.9
On the Job Training	15	15.6
No Training	52	54.2
Total	**96**	**100**

The study found out that majority of the respondents 52 (54.2%) had not acquired any training in ICT. Of those who had ICT training, only 2 (2.1%) had either a degree or a diploma in ICT, 5 (5.2%) had certificate in ICT, 22 (22.9%) had basic computer packages while 15 (15.6%) had acquired on the job training.

4.4.3 Influence of Availability and accessibility of ICT Infrastructure on ICT Integration

The researcher sought to find out issues regarding availability and access to ICT infrastructure and their influence on ICT integration into teaching and learning. The following statements relating to ICT infrastructure adequacy and internet connection installation were provided to the respondents and they were requested to indicate the extent to which they either agreed or disagreed with the statements. Table 4.11 shows the responses.

Table 4.11 Availability and accessibility to ICT Infrastructure

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
ICT Infrastructure is inadequate for ICT Integration	43%	35%	14%	8%
We do not have the necessary Infrastructural capacity to allow ICT integration	49%	34%	10%	7%
We cannot afford to Install Internet connection	52%	34%	9%	5%

Table 4.11 shows that 78% of the respondents agree to the construct that ICT Infrastructure is inadequate for ICT Integration. 83%of the respondents indicated that they do not have the necessary Infrastructural capacity to allow ICT integration while 86% of the respondents indicated that they could not afford to install Internet connection.

4.4.4 Influence of School Leadership on ICT Integration into Teaching and Learning

The study sought to find out a number of issues regarding the influence of school's leadership on the integration of ICT into teaching and learning. These issues included the school leader's capacity in ICT, management's commitment to ICT Integration, Possession of ICT Strategic Plan and the Government's policy on ICT integration. The constructs given on Table 4.12 presents the findings of the study.

Table 4.12 Influence of School Leadership on ICT Integration

Construct	Strong Influence	Some Influence	Little Influence	No Influence
School Leaders Capacity in ICT	30%	40%	20%	10%
Management's commitment to ICT Integration	46%	32%	13%	9%
Possession of ICT strategic plan	33%	29%	20%	18%
Governments Policy on ICT Integration	40%	34%	16%	10%

According to the study, 70% of the respondents were of the view that School Leaders Capacity in ICT had an influence in ICT integration in teaching and learning, 76% said that Management's commitment to ICT Integration also had an influence and the Government's Policy on ICT Integration too had an influence on ICT integration in teaching and learning. Regarding possession of ICT strategic plan, there was only 38% agreement that this had an influence on ICT integration in teaching and learning. Therefore ICT strategic plan appeared to have little or no influence on ICT integration.

4.4.5 ICT Literacy Levels among Teachers and its Influence on ICT Integration

The study sought to find out the ICT literacy level among the teachers and principals. Table 4.13 shows the findings of the study.

Table 4.13 Level of ICT Proficiency among the teachers and Principals

ICT Proficiency Level	Frequency	Percentage %
Very High	9	9.3
High	12	12.5
Low	35	36.5
Very Low	40	41.7
Total	96	100

From the findings of the study, majority of the respondents 75 (78.2%) had their level of ICT proficiency ranging from low to very low.12 respondents accounting for 12.5% had high proficiency level while only 9 respondents accounting for 9.3 % had 'very high Level' of ICT proficiency.

4.5 Summary

This chapter presented quantitative data analysis of the study using frequencies and percentage. The findings were in line with the objectives of the study and revealed how human resource capacity building influenced ICT integration; availability and accessibility to ICT Infrastructure influences ICT Integration; Leadership influences ICT Integration and ICT Literacy Level among the teachers influences ICT Integration.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This Chapter entails a summary of findings from the questionnaire items administered to the DQASO, DEO, Principals, Heads of Departments and the Subject teachers and discussion of findings in regard to the literature review. Conclusions were drawn from the findings of the study in regard to the literature review and the objectives of the identified for the study. The recommendations drawn were based on the outcomes of the study and suggestions for further studies.

5.2 Summary of Findings

The respondents under the study were classified into two broad categories, these are the management cadre comprising of the DQASO, the DEO and the Principals and the operational cadre consisting of the Heads of departments and the subject teachers. The questionnaire response and return rate was 88.5%. Out of the 96 respondents under study 55.2% were male while 44.8% were female. The findings revealed that majority of the respondents accounting for 31.3% were aged between 31 and 40 years. All the employee respondents had acquired secondary level of education. Most of the respondents accounting for 55.2% have been in the service for more than 16 years. The findings indicate that younger teachers and teachers with less teaching experience are more likely to have higher levels of ICT competence which is consistent with Jegede & Adelodun (2003). The study revealed a general state of low level of training in ICT, inadequate ICT Infrastructure and general low proficiency in the use of ICT.

5.3 Discussion of the Findings

The findings of the study answered the research questions since the influence of; Human resource capacity, Availability and accessibility to ICT Infrastructure, School Leadership and ICT Literacy on ICT Integration have been quantified by descriptive statistics and the

coefficients of determinations. The discussion and related literature were presented for each of the four variables of the study.

5.3.1 Human Resource Capacity and ICT Integration

Human resource capacity in Kirinyaga East generally lacked in terms of training in ICT. The use of computers and ICTs for delivery of instructions and enriching the learning processes was clearly not widespread in the district. Effective teaching practices ensure effective learning takes place which generally results in independent, self motivated learners (Waimsley,2010). Cradler (2002) gave some requirements for effective use of ICT in education and among them were providing both in-service and pre-service training, providing time for teachers to plan and learn how to integrate technology and providing for ongoing technical support for technology use. Clearly a vast majority of the respondents who participated in this study indicated there being a great need to enable their capacity in terms of training. For teachers who are already in the education system, in-service training would greatly improve their capacity in the handling of the ICT integration.

However, it's worth noting that ICTs impacts positively on teaching and learning processes in Public Secondary Schools, even though the impacts have not been maximized. This may be attributed to the fact that most school leaders, Heads of departments as well as subject teachers as end users to ICT lacked adequate training on ICT use. Teachers need to continually work at updating their skills and knowledge in the operation and use of ICT. This is in addition to their need to be up-to-date with the curriculum content pedagogy. It is therefore important that they be supported very carefully in practical and motivating ways. A number of other studies have found out that, personal access for teachers to a computer for the purpose of preparation and planning is one of the strongest influences on the success of ICT training and subsequent classroom use (Office for Standards in Education, 2002)

Curriculum and technical teacher support requirements may be viewed in terms of supporting users, implementation an appropriate pedagogy. user problems are probably the most obvious in that much of the resistance from classroom teachers to the use of computers across the curriculum is put down to a lack of knowledge and skills in operating ICT. However, the

implementation of computer applications has been hampered by the lack of experience of teachers and the lack of consideration of appropriate educational problems to solve. All of these barriers may be addressed by considering technical and curriculum support for teachers (Becta, 2002)

5.3.2 Availability and Accessibility to ICT Infrastructure and ICT Integration

In Kirinyaga East district, ICT infrastructure influenced ICT Integration in teaching and learning since the analysis showed that schools did not have adequate resources and this factor influenced ICT Integration. This is as confirmed by Olatunde, (2010) who asserted that resources are vital factors that make a system function. It is the provision of these resources that determine the success or achievement of the set goals of the system (Olabanji,2010; Ekundayo,2010)

It was not that computer as ICT tools were often used to carry out their functions but generally applied in administrative duties. The overall use of ICTs was notable. This is in tandem with Kathy et.al (2008), who said that ICTs are becoming more popular, allowing communication even with users. It also enables sharing of files, comments on changes and posting relevant requests for information leading to efficiency in communication with stakeholders. This is in line with Oladapo (2006) that organizations are able to access and exchange information where there is internet connectivity.

Educational technology should influence education outcomes and costs. If the most appropriate educational technology is selected by a teacher then student learning should be optimized, which means an increase in the value of the outcomes. However, the use of some technologies is more expensive than others. ICTs tend to be relatively expensive to procure, install, maintain and support users and this must be compared with the potential outcomes (Lankshear & Snyder,2000). While it is important to consider educational productivity this should not be the only consideration in deciding to use a technology. There are situations where a certaion technology should be used because it solves a major problem in teaching and learning. (Lankshear & Snyder,2000)

As most schools are not designed to include ICT, redesigning takes time and expense (Eadie, 2000). Even the physical security of hardware and software and of students taking computers home have provided challenges for the physical structures as well as the practices of most schools. The process of redesigning the classrooms to accommodate ICT Integration has turned

out to be a major hurdle for many schools and as a result barred many schools from achieving ICT Integration.

5.3.3 Leadership and ICT Integration

In Kirinyaga East district, principals promoted an atmosphere of trust and sharing of resources but were not resource providers. The study revealed that although the school management had a role of clearly cutting out the route to be taken in terms strategic plan and provision of resources for ICT Integration, the management in this case did not play their role effectively. The findings indicate that the development of ICT skills and knowledge among school principals is slow and may explain the low levels of ICT integration in Schools. These findings are consistent with other studies such as Keiyoro, (2010); Afshari et al. (2008) and Bass et al. (2003) which have reported similar findings. The principals did not seem to have enthusiasm in their endeavor to integrate ICT in teaching and learning.

According to Becta, (2002) supportive, enthusiastic and visionary leadership has a positive impact on teacher's attitudes and behavior. Teachers need support in making use of new technologies to enhance their personal work before learning to use them in their teaching. (Lankshear & Snyder,2000). From the research findings, it was also noted that training on use of ICT was mainly done to those in management level, which indicated a relationship between training in ICT use and ICT integration.

However, ICT has not realized its full potential as most of the respondents, even those at management level still lacked training on ICT use which concurs with Kandiri (2006) who noted that there has been insufficient training and re-skilling of ICT end users as well as technical staff. This has tremendous influence on ICT integration. As transformational leaders, principals should show that they also live the values they advocate. This consistency between words and deeds is believed by transformational leaders to build their credibility (Starcher, 2006 effective he principal as a learning leader, specifically, can impact multiple areas of the school setting such as ICT integration (Elmore, 2000). Effective leadership is essential when implementing school improvement initiatives (Rutledge, 2009). A study by Rutledge (2009) , on the implementation of New American Schools (NAS) designs found that schools reporting strong principal leaders

had implementation levels over half a standard deviation above schools at sample average. Other such as Keiyoro et al. (2010) show that only 9.5% of teachers from both NEPAD schools and Cyber e- Schools in Kenya indicated that the school principals were supportive of ICT integration and the support was linked to principals' belief in the usefulness of ICT. Findings suggested that effective and supportive leaders were most likely to both increase and deepen ICT integration in a school. Principals are, therefore, likely to make the dream of ICT integration in teaching and learning possible in leading through modeling and taking an active role in towards this effort.

5.3.4 ICT Literacy Levels among the teachers and ICT Integration

The study findings revealed that the level of ICT proficiency among the teachers is generally low. This was a great hindrance to ICT integration in teaching and learning. This is consistent with the studies done by Ya'acob et.al.(2005) and So and Swatman (2006) on teacher's readiness for ICT generally, which suggest that there is a long way to go before schools can embrace modern technology. They also found out that the learning potential of ICT is deprived as many teachers are still not fully ICT Literate and do not use it in the instructional process. It was also clear that a reasonable number of teachers acquired their training in ICT while on the job.

Bouman, (1994), established that illiteracy leads to difficulties in overseeing books and records which could in turn lead to poor management of ICT Integration. Teachers are a key component in learning environment and therefore the ICT literacy among the teachers and the strategies they employ to facilitate the environment are critical. There sometimes appears to be an assumption that using ICT to support learning requires change for all teachers whereas clearly some teachers have been creating appropriate learning environments for years without using ICT. However, these teachers tend to use ICT because they readily perceive that in doing so they will provide even better such environments (Becker et al, 1999). To help teachers to avoid developing a resistance to ICT it is important that they be encouraged to reflect on the impact of ICT in a learning environment.

5.4 Conclusions of the Study

The study that was carried out to investigate the factors influencing integration of information and communication technology in teaching and learning in public secondary schools in Kirinyaga East District, Kirinyaga County revealed that Human resource capacity significantly influenced ICT Integration in teaching and learning negatively. This is because the implementers (teachers) lacked adequate ICT skills. The findings also revealed that inadequate ICT Infrastructure was available and accessible for use in ICT Integration. In addition, the study revealed a positive correlation between the commitment of leadership to ICT and the actual ICT Integration in teaching and learning. ICT Literacy was found to influence ICT Integration in that low proficiency led to there being low level of ICT Integration in teaching and inability to handle technological tools necessary for ICT integration.

5.5 Recommendations of the Study

It is evident that ICT integration into teaching and learning in public secondary school plays a major role in the teaching and learning institutions. In practice ICT integration has not had much support in capacity building. The study found out that ICT Integration in teaching and learning is a continuous process but not an occasion. Therefore, following the findings of this study the researcher recommends that the Teachers Service Commission County Director should organize an ongoing training for the Principals, Heads of Departments and other teachers in order to have their capacity built over a long duration but not on a one off workshop. The Counties, also, should consider acquiring ICT infrastructure for the school in their regions. It is important to carry out training needs assessment before carrying out training on the principals and teachers to conduct ICT integration. The training will raise the levels of ICT Literacy among the teachers for purposes ICT integration in teaching and learning in public secondary schools. Since various types of training have different level of influence in performance, it is always important to rank trainings in order of influence and concentrate more on those that have highest performance output.

5.6 Suggestions for Further Study

The ICT integration in teaching and learning is of critical importance in a school set up. This study was conducted on public secondary schools. The researcher recommends the following:

1. Similar study to be carried out in the County involving Factors Influencing ICT Integration in Private Secondary Schools for comparison purposes.
2. Similar study should be carried out in other Districts in other Counties for comparison purposes.

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APPENDICES

APPENDIX I: LETTER OF TRANSMITTAL

GEOFFREY M. GICHOVI,
P.O. BOX 867-60100,
TEL: 0721722504,
EMAIL: jeffgichovi@gmail.com

DEAR RESPONDENT,

I, Geoffrey M. Gichovi, a master's student at the University of Nairobi am conducting a research on the factors influencing integration of ICT into teaching and learning in public secondary schools in Kirinyaga East district.

You are therefore, kindly, requested to give relevant information for the success of this research. The information provided will be kept confidential and will be purely used for research purposes only. Provided below are statements you can either give information by ticking and or giving further information in spaces provided.

Thanks, in anticipation.

Geoffrey M. Gichovi
0721-722 504

APPENDIX II: PERMISSION TO COLLECT DATA

TEACHERS SERVICE COMMISSION

Email: cdirkirinyaga@tsc.go.ke
Web: www.tsc.go.ke

When replying please quote

Ref. N°:KE/TSC/532191
and date 14TH August 2013

KIRINYAGA COUNTY
KIRINYAGA EAST SUB COUNTY
P.O BOX 249 - 10301
KIANYAGA, KENYA

Geoffrey Mbogo Gichovi
TSC/532191

Thro'
The principal
Rwambiti Sec School
P. O. Box 247
KIANYAGA.

REF: PERMISSION TO COLLECT DATA

Your letter dated 12/8/2013 refers.

Permission is hereby granted to collect data in our schools between August and September 2013 to enable you complete part of coursework.

For TSC COUNTY DIRECTOR
KIRINYAGA COUNTY

C.W.KIBUCHI
For: TSC County Director
KIRINYAGA COUNTY

APPENDIX III: QUESTIONNAIRE

INTRODUCTION

The researcher is conducting a district survey on the **Factors influencing Information and Communication Technology (ICT) integration into teaching and learning in Public Secondary Schools in Kirinyaga East district**.

INSTRUCTIONS

Kindly provide your honest opinion on all the items in the questionnaire. All information provided herein will only be used for the intended purpose of the study and will be kept confidential.

PART I: BACKGROUND INFORMATION.

Tick [√] where appropriate

1. Gender
   - □ Male
   - □ Female

2. Age
   - □ Below 20 years
   - □ 21-30 years
   - □ 31-40 years
   - □ 41-50 years
   - □ 51 and above

3. Highest academic qualification
   - □ Post Graduate
   - □ Graduate
   - □ Diploma
   - □ KCSE

4. Length of Service.
   - □ Less than 5years
   - □ 6-10 years
   - □ 11-15 years
   - □ More than 16 years

Part II: ICT INTEGRATION IN TEACHING AND LEARNING.

1. In the table below, please list the main technologies (equipment, gadget, technology or machine) you use to collect, process, store, and share information in your institution.

S/No	Technology	Use
1		
2		
3		
4		
5		
6		

2. How do you pass and/or share information with your students and fellow colleagues? (**Tick the appropriate and could tick more than one**)

- ☐ Mobile
- ☐ E-mail
- ☐ Fax
- ☐ Face to face
- ☐ Loud speaker

Others (specify) …….

……..**.....**

3. Do you use a computer in your institution? Yes /No ……

If no, explain why …….....

……

4. Do you have an internet facility in your institution? Yes / No ……..**.....**

5. In what areas is the Internet used?

- ☐ Search for knowledge.
- ☐ Networking with other learning institutions
- ☐ Administrative processes
- ☐ Both administrative and learning purposes

6. In the table below, please indicate the customized or general computer software installed in your computer and their uses in the institution?

S/No	**Software**	**Use**
Eg	**Malcoms sec. Exam Analysis**	**Exam analysis**
1		
2		
3		
4		
5		

7. Which of the following factors are responsible for preference of the choice of the methods of information and communication you use in your institution currently (**Please tick the most appropriate**)

- Cheap
- Fast
- Reliable
- Multiple usage

8. Generally, how would you describe the access and use of ICT in your institution?

(**Tick [√] where appropriate)**

- Very high
- High
- Average
- Low
- Very low

Part III: FACTORS THAT AFFECT ICT INTEGRATION INTO TEACHING AND LEARNING.

Section 1: Human Resource Capacity.

1. Have you had any training on ICT? Yes/No. ……

2. What is the highest level of ICT training you have acquired Education level
(**Tick [√] where appropriate)**

- No Training at all
- On Job Training
- Basic Computer Packages
- Certificate in ICT
- Degree/ Diploma in ICT

3. In a range of 1 to 4, please rate the following variables regarding the extent to which you agree or disagree with the following statements. (Tick **[√] where appropriate)**

S/No	**Variable**	**4 Strongly Agree**	**3 Agree**	**2 Disagree**	**1 Strongly Disagree**
1	I have no prior training on ICT use.				
2	I do not see the importance of using ICT in delivery of teaching and learning content.				
3	ICT use in a learning environment does not improve instructional process				

4. The knowledge level of the instructor has an influence on ICT integration into Teaching and Learning. (**Please tick [√] one**)

- Strongly agree
- Agree
- Disagree
- Strongly disagree

5. Please explain briefly in support of your answer.

……
……
……
……..

Section 2: Availability and Accessibility to ICT Infrastructure.

1. In a range of 1 to 4, please rate the following variables regarding the extent to which you agree or disagree with the following statements.(**Tick [√] where Most Appropriate)**

SNo	Variable	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree
1.	The general ICT infrastructure in my institution location is inadequate and cannot allow use of ICT				
2.	In my institution, I do not have the necessary infrastructural capacity to allow adoption and use ICT				
3.	Internet connection requires connection to a fixed telephone line which I cannot afford to install.				
4.	The internet modems on offer are too expensive for the institution.				

2. Generally, ICT and communication infrastructure has a great influence on the adoption and integration of ICT in learning institutions (**Please tick one**).

- Strongly agree
- Agree
- Disagree
- Strongly disagree

3. The accessibility to ICT infrastructure in our institution is adequate. (**Please tick one**).

- Strongly agree
- Agree
- Disagree
- Strongly disagree

4. Please explain briefly in support of your answer……...

……
……

5. Briefly describe the status of ICT infrastructure in your school.
……
……

Section 3: School's Leadership.

1. In the table below, please indicate the extent to which each of the factors influence ICT integration into Teaching and Learning Processes. (**Tick [√] where most Appropriate**)

S/No	**Factor**	**Influence in ICT integration in teaching/ Learning.**			
		4 Strong Influence	**3 Some Influence**	**2 Little Influence**	**1 No Influence**
1	School Leader's Capacity in ICT.				
2	Management's Commitment to ICT integration.				
3	Possession of ICT Strategic Plan.				
4	Governments Policy on ICT integration.				

2. The school leadership plays a major role in ICT Integration in teaching and Learning.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

3. What role has the school's leadership/ management played in contributing to ICT Integration in teaching and learning?

.....
.....
.....
.....

4. The government plays a major role in preparing the school's leadership to Integrate ICT into teaching and learning.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

5. Briefly state the contribution of your schools leadership in ICT Integration in teaching and learning in your school.

……
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Section 4: ICT Literacy Levels

1. What is the Level of ICT proficiency among the teaching Staff?

- Very High
- High
- Low
- Very Low

2. The level of ICT Literacy among the teaching staff is not adequate to assist in ICT Integration .

- Strongly agree
- Agree
- Disagree
- Strongly disagree

3. Indicate the extent to which you agree or disagree with the following statements.

(**Tick [√] where most Appropriate**)

S/No	**Factor**	**Influence in ICT integration in teaching/ Learning.**			
		4 Strong Influence	**3 Some Influence**	**2 Little Influence**	**1 No Influence**
1	Level of ICT Literacy among School Leaders (Principals).				
2	Level of teachers ICT Literacy.				
3	Presence of Technical Support.				

4. List some possible hindrances to ICT literacy among the teaching staff in your institution.

……
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……

5. Please suggest possible measures that can be put in place to help in integration of ICT in teaching and Learning.

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THANK YOU FOR YOUR TIME AND RESPONSES.

APPENDIX IV: LIST OF SCHOOLS IN KIRINYAGA EAST DISTRICT.

SN	SCHOOL	TYPE	STUDENTS
1	KABARE	NAT	185
2	NGIRIIAMBU	CGB	164
3	KIANYAGA	CBB	203
4	KIAMUTUGU	CBB	134
5	KIBURIA	CGB	179
6	MUGUMO	CGB	103
7	MUTIGE	CBB	97
8	KIAMWATHI	PD	78
9	RUKENYA	PD	81
10	KAVOTE	PD	46
11	ST. MARYS	CBB	164
12	GACHATHA	PD	57
13	KARUCHO	PD	77
14	UPPER HILL	PRGE	58
15	MIA	PRGE	40
16	KIANGUENYI	PD	36
17	GATUNGURU	PB	53
18	RWAMBIITI	PB	98
19	KIAUMBUI	PB	40
20	GACIONGO	PB	17
21	MWANIANJAU	PB	15
22	KANJUU	PB	48
23	KIMICIRI	PB	26
24	NGARIAMA	PB	41
25	ST ANN	SCGB	74
26	KIMUNYE	PD	23
27	ST. LUOIS	PD	16
28	MUCARAGARA	PD	44
29	KIANYAMBO	PD	30
30	THUMAITA	SGB	76
31	ST. ELIAS & G	PRD	34
32	NGUNGU	PD	21
33	KIAMUGUMO	SGB	53
34	GATUGURA	PD	19
35	GITHURE	PD	19
36	KIANDAI	PD	26
	TOTAL		**2475**

Source;DEO Kirinyaga East,(2013**)**