AN EVALUATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) USE BY TEACHERS IN SECONDARY SCHOOLS IN KIAMBU COUNTY, KENYA

By

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DECLARATION

This project is my original work and has not been presented for any of the study programmes in any other university

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This research project has been submitted for examination with my approval as the university project supervisor.

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DEDICATION

I wish to dedicate this work to my wife Irene Wairimu, our sons Ndung'u Kahura and Thuo Kahura and all those who seek to promote technology use in education.

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ACRONYMS AND ABBREVIATIONS

BA	Bachelor of Arts
BSc	Bachelor of Science
BOP	Business Outsourcing Process
CAI	Computer Assisted Instruction
CBL	Computer-Based Learning
CCK	Communications Commission of Kenya
CD-ROMS	Computer Disc-Read Only Memory
DVDs	Digital Versatile Discs
EFA	Education for All
ICT	Information and Communication Technology
IT	Information Technology
IDRC	International Development and Research Center
K.C.S.E	Kenya Certificate of Secondary Education
MDGs	Millennium Development Goals
NEPAD	New Partnership for Africa's Development
NGOs	Non-Government Organizations
PS	Permanent Secretary
PTTCs	Primary Teacher Training Colleges
SSA	Sub-Saharan Africa
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWW	World Wide Web

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ABSTRACT

In this study the researcher sought to establish the extent to which teachers in Kiambu County use Information and Communication Technology in the teaching-learning process. This urge was driven by the fact that the use of technology in education has become very important in the modern world. The use of ICT is believed to have the potential of improving learning in schools as it creates interest in the learners by engaging them directly in the learning process because they are able to discover for themselves as they learn. This heuristic method is very effective in the teaching-learning process. Various studies all over the world indicate that there is a deliberate attempt by various governments and organizations to equip schools with ICT facilities in order to facilitate the integration of technology in education. In Kenya, the use of ICT in schools is provided for in the Vision 2030 as one of the three pillars of development. Therefore there is need to carry out a study to establish the extent to which the use of ICT has been integrated in the teaching-learning process by secondary teachers in the Kiambu. It is believed that the findings of this study will form a basis for similar studies in other counties in Kenya.

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Background to the Problem

Although there is no one universal definition of Information and Communication Technologies (ICT), I looked at some definitions that fit my working. According to UNESCO World Communication and Information Report (1999), "ICTs are a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information".

On the other hand, the Free Online Dictionary of Computing defines ICT as "mediums that utilize both telecommunication and computer technologies to transmit information". It further defines ICT as "any electronic communication and storage tools, including radio, television, data bases, websites, and mailing lists" or "Technologies and tools that are generally used to share, distribute, gather information and communicate with one another, either as an individual or a group of persons through the use of computers and inter-connected computer networks". In this study the latter was used as the working definition.

ICT has played an educational role in formal and non-formal settings in programmes provided by governmental agencies, public and private educational institutions for profit corporations and non-profit groups and secular and religious communities. (UNESCO 1999) The Internet is the main carrier of electronic information and has transformed how people are finding and using information.

In his contribution to the UNECSO (1999) report quoted above, Professor C. Blurton says, "Today, ICT in education encompasses a great range of rapidly evolving technologies such as desktops, notebooks, and hand-held computers; digital cameras, local area networking, the Internet and the World Wide Web, CD ROMS and DVDS and applications such as word processors, spreadsheets, tutorial, simulations, electronic mail (e-mail), digital libraries, computer-mediated conferencing and virtual reality.

It should also be noted that the use of newer ICT is being integrated with the use of older technologies. For example, it is common to find text books sold with CD-ROMS containing multimedia materials or links to related websites.

For more than a decade now, the use of ICT in Kenya has increased tremendously. Computers, projectors, printers, lap tops, e-black boards, mobile phones and lately IPads and IPods have become easily accessible to Kenyans for use in their day to day activities. This has greatly changed how people communicate. The education sector has not been left behind by this wave of change in technology use.

Based upon the afore-mentioned background, this study thus aimed at evaluating the level and extent of use of ICT by teachers in selected secondary schools in Kiambu County of Kenya. The study sought to identify the technologies that are available for use by teachers in integration of teaching and learning in schools. It endevoured to find out if the schools under the study have complete software for the whole school which captures various operations in different departments such as the accounts, library, stores, kitchen, discipline and the main administration. Such software could also be used by teachers to keep such records as academic progress of their students, discipline appraisal of the students among others. The school

administrators should be able to access any information about the school from their computer at the click of a button.

Previous studies indicate that the use of ICT in secondary education is getting more wide-spread. This study therefore attempted to find out to what extent this claim is true in regard to Kiambu and also sought to identify challenges that hinder the appropriate use of ICT by teachers in the teaching-learning process and recommend strategies of utilizing ICT in order to improve educational outcomes.

Problem Statement

Despite the rise in demand for ICT mediated services in various aspects of learning, ICT use has not been utilized by teachers to the optimum. This observation is based on my experience as a teacher in secondary school and going by various literature reviews which will be covered elsewhere in this paper. This therefore forms the problem of this study. In the study, I investigated how teachers use ICT in performing various teaching and administrative duties such as research, communication with parents, colleagues, teachers in other schools and with students.

In this study I sought to establish the percentage of teachers who have access to their schools' computers, their ICT literacy skills level and the level of ICT integration in school subjects and the challenges that they face. I also attempted to establish how effectively institutions have invested in ICT for education purposes.

The researcher also wanted to establish how the use of ICT has improved the quality of service delivery in schools in various aspects and how teachers have been coping with this new demand.

Finally, this study sought to identify the shortcomings that abound in the use of ICT in schools by identifying gaps in training on ICT, competence in use of ICT, use of ICT-aided teaching techniques in various subjects and provision of ICT equipment in schools.

1.2 Justification for the Study

The use of ICT in education has the potential to enhance the quality of teaching and learning, the research productivity of teachers and students, and the management and effectiveness of institutions (Kashorda et al. 2007).

Studies by other scholars indicate that students' attainment improves when using ICT because they spend more time working at or practicing the skills being studied and tested. Many students enjoy using computers and one benefit of computers may also be the combination of such motivation and the increased practice at particular tasks. Computers can therefore help by increasing the amount of time students spend on particular activities, by increasing their motivation and engagement when doing these activities and providing practice at an appropriate level (Higgins n.d).

There has been extensive research into Computer-Assisted Instruction (CAI) and Computer-Based Learning (CBL).Most of the studies on the use of ICT in teaching- learning has been

broadly done in Sub-Saharan Africa (SSA), Malaysia and elsewhere. Closer home, a similar study was done by Kiptalam et al in 2010 in selected secondary schools in Keiyo District.

Therefore this study attempted to shed light on the state and level of ICT use by teachers in Kiambu, and add into the stock of information on ICT use in teaching-learning in the said County and compare the scenarios in the two counties. Kiptalam's study was done in the year 2010 and a lot is likely to have changed since then in regard to the availability of ICT equipment and the level of technological development in the country in general. Therefore, this study sought to identify the changes that might have taken place since the referred study and assess its impact on issues regarding the teaching-learning approach in our secondary schools.

1.3 Purpose of the Study

Based upon the review of literature and the needs indicated previously, this attempted to find out if and what type of access to ICT and training influences teachers' use of computer- based technology.

The information gathered from this study should:

i. Provide school administrators with data to help them make more informed decisions on the placement of computers and appropriate teacher training and support for use of ICT technology for instruction in schools.

ii. Provide more up-to-date information on the current ICT technology uses in secondary schools.

iii. Provide information which will give educators an understanding of what influences teachers to integrate the use of ICT in the teaching-learning process.

iv. The study will identify current practices in the use of ICT by teachers since the previous studies.

v. It compared the use of ICT by secondary school teachers in Kiambu and those in other parts of the country and on the other hand compared those in national schools and district schools in the county.

It is believed that the findings of this study will enable book publishers identify information gaps in teacher training with a view of coming up with better and/or adequate training materials such as books, manuals, pamphlets etc.

Policy makers in the Ministry of Education will also find the findings of this research useful in identifying the training needs of teachers on ICT use in their pedagogical tasks.

The new constitution has brought about devolution in the running of social-economic affairs in the country. In the education sector, education affairs will be managed by county governments. As such, this research will enable the Kiambu County Government identify the extent of the ICT use in teaching-learning process in secondary schools in the county. It will also enable education planners in the county to identify the shortcomings that may impede the optimum utilization of ICT resources by teachers and their students in schools. As a result, it will enable the said Government make sound and realistic budgetary allocation to cater for requisite training on ICT use and resource provision.

The findings of this study will form basis for further and future studies on a wider scale. Such a study can be replicated in other counties in Kenya and elsewhere. Therefore, the study,

though regional based, will be of national importance in regard to the extent of ICT use in secondary school education and its challenges.

1.4 Research objectives

1.4.1 General objective

To evaluate the used of information and communication technology by teachers in secondary schools in Kiambu County, its impact on education and challenges.

1.4.2 Specific objectives

1. To establish the role of ICT in secondary school education.
2. To establish to what extent teachers in the County integrate ICT in the teaching process.
3. To find out what were the intended benefits of integrating the use of ICT in teaching.
4. To establish the government policy on ICT in secondary school education.

1.4.3 Research Questions

i. What is the role of ICT in secondary school education?

ii. How much do teachers in the County integrate ICT in the teaching process?

iii. What are the intended benefits of integrating the use of ICT in teaching?

iv. What is the government policy on ICT in secondary school education?

1.5 Theoretical Framework

This study was based on the 'Technology Adoption and Diffusion" theory that was propounded by Everett Rodgers in 1995.This is mainly because the use of ICT in education is a technology adoption whose effect in education is known to be immense.

'Adoption' refers to the stage in which a technology is selected for use by an individual or an organization. 'Diffusion' on the other hand refers to the stage at which the technology spreads to general use and application, and gains acceptance by members of a certain community. Factors that influence the diffusion of an innovation is the innovation itself, how information about the innovation is communicated, time and the nature of the social system into which the innovation is being introduced (Rodgers 1995).

This theory combines four other theories, which according to Rodgers are: Innovation Decision Process, Individual Innovativeness, Rate of Adoption and Perceived Attributes Theory. Under Perceived Attributes, perceptions of compatibility, complexity, and relative advantage have been found to play a significant role in IT- related adoption studies. Wyner (1974) and Holloway (1977) each found relative advantage and compatibility to be significant perceptions among potential adopters of instructional technology in high schools. This theory will therefore be very appropriate in our study as we try to identify how teachers use ICT in teaching and the motivating factor behind it, which is the 'Relative Advantage'.

The traditional adoption/diffusion continuum recognizes five categories of participants in a new technology. These are the innovators who tend to be experimentalists and interested in technology, early adopters who may be technically sophisticated and are interested in technology for solving professional and academic problems, early majority who are pragmatic users and process oriented, late majority who are less comfortable with technology and are skeptical, and laggards who may never adopt technology. In this regard, we shall therefore seek to identify which category most teachers under this study belong in regard to adoption of ICT use in their teaching related activities.

Unlike most of the previous technologies which were never available for individual or private use due to cost, ICT is individually available to teachers and their students. Indeed, today's education generation sees personal computers, the Internet and the Word Wide Web (www) as technology's new wave. This typically means that the adoption of this technology for education purposes has signaled a confidence in its potential either to alleviate certain pedagogical problems or to make certain work easier or more efficient or all of these.

In a study on the availability and access to the Internet, Kenya School Net (2003) found that e-mail was yet to be recognized as a tool for collaboration among students and teachers. In the schools under survey, access to Internet was severely limited and when available was only used for administrative duties. Availability and accessibility of ICT resources (e.g. hardware, software and communication infrastructure) determines how effectively technology is introduced into schools. It is therefore crystal clear that if technology cannot be accessed by the teacher, then it will not be used at all in pedagogical endeavours. It is a fact that state funding for such resources is scarce and ICT resources in most cases tend to be more available in urban than rural areas.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter the researcher looked at various studies that have been done globally, in Africa and in Kenya so as to have a wider scope of reference. While emphasizing on the need for information technology in education, Manuel Castells asserts that, "We live in the midst of a revolution in communication technologies that affect the way in which people feel, think and behave. The mass media (including the web-based media) has become the space where political and business power strategies are played out; power now lies in the hands of those who understand or control communication." This assertion points to the fact that in the current technical context, mass communication goes beyond traditional media and includes the Internet and mobile communication.

2.1 Background of the Study

Globally

According to Nancy, L et al, "A major theme running through education policy recommendations in many parts of the world is the importance of education to prepare it's citizenry for life in the 21st Century. This has brought about changes in the school curriculum as well as plans for the integration of IT in the teaching and learning process to foster the development of 21st Century skills in students." They explored whether there is evidence that these education policy initiatives impact on how teaching and learning take place in schools and on students' learning outcomes. They looked at the initiatives that have taken place in Hong Kong since 1998, when the first 'IT in Education' master plan was launched with particular focus on evaluation study of students' information literacy skills conducted as part of the valuation

of the effectiveness of the implementation of the first and second ICT in education master plan.

As an integral part of the policy goal for Hong Kong to become a 'leader', not a 'follower' in the information world of tomorrow, a five year strategy on ICT in education was formulated in 1998. The vision was to help students develop an understanding of the pervasive impact of ICT on their daily lives and society as a whole, as well as higher order thinking skills and abilities to seek,evaluate, organize and present information.

ICT therefore has the potential to be used in support of new education methods as tools of enabling students' learning by 'doing'. ICT can make it possible for teachers to engage students in self-paced, self-directed problem-based or constructionist learning experiences; and also test students learning in new interactive and engaging ways that may better assess deep understanding of content and processes (cf Stomen and Lincoln, 1992:US Department of Education, 1993).

Although there does not exist comprehensive data on ICT in schools worldwide, it's clear from many national examples that schools are increasingly being equipped with ICT. It is also apparent that ICT equipment and Internet connectivity is still much more abundant in North American schools than elsewhere (UNESCO 1999 Report). The report goes on to say that in the US, the ratio of students per computer dropped from 63:1 to 6:1 from 1985 to 1997 while the number of schools with Internet access has grown from 35% in 1994 to 72% in 1997. In UK in 1998 the pupil to computer ratio was 16:1 in primary schools and 9:1 in secondary schools, while 43% of schools were connected to the Internet. The government planned to connect all schools, colleges, universities, libraries and as many learning centers as possible to the Internet by 2002.

In Germany the 'Schulen ans Netz' initiative begun in 1996 to connect 10,000 schools to the Internet by mid 1999 and by late 1997, only 500 schools had been connected. In Italy, the national programme in 1995 saw 120 schools being supplied with multimedia equipment and the target was to have installation done in 15,000 schools by the year 2000. Japan had on the other hand targeted to have all its schools connected by 2003 and finally, in the People's Republic of China, the central government would increase funding for basic, vocational and higher education projects over a period of two years.

In Africa

In a study in the influence of classroom use of ICT in Sub-Saharan Africa, Hennessey et al (2010) says, "It was noted that introducing technology into schools is largely dependent upon the availability and accessibility of ICT resources." However it was noted that schools are increasingly being equipped with computers for teaching, learning and administrative purposes/duties. There is marked improvement in connectivity and students are more eager to use computers for learning despite lack of the equipment. Teachers were found to use ICT for two main reasons. They feel that their own use of computers benefits the learners, and that the learners benefit from using the computers themselves. A survey that assessed the World Links Schools Programme (1998 – 1999) cited lack of ample time in class, and in the planning schedules and lack of national policy on the use of computers in schools as the biggest barriers to the use of computers by teachers (Kozma et al. 2004).

Some countries are developing digital content for use across the curriculum. Even though, the access and usage of ICT remain sporadic, just as the electricity supply is. The undersea cables currently being installed to run around the entire SSA coastline by 2011, and already

in position down the Eastern Coast, bring the promise of widespread access to broadband connectivity for the first time. However, it will undoubtedly take time for funding to connect schools to materialize (Hennessy et al. 2010).

Studies carried out report that ICT use enhances teachers' professional knowledge and capabilities (Leach et al. 2005). These include planning and preparation for teaching to be more efficient and developing the range of teachers' existing pedagogical practices. Teacher confidence is found to have been boosted in programmes like DEEP that featured use of personal computer, a project partner, joint evaluative activities and strong initial technological and pedagogical training.

The optimum utilization of ICT in schools is largely dependent upon the readiness by teachers for the use of ICT. This is because even though the ICT hardware could be available in schools, its usefulness will be fully realized if the teachers embrace ICT first by having a positive attitude and secondly by updating their skills in ICT use. It is therefore in this regard that Bokaye et al (2008) measured the teachers' readiness for use of ICT from schools in Benin, Cameroon, Ghana and Mali to determine if teachers were involved in the process of integrating ICT into education in those countries.

Teachers were asked about their skills with regard to ICT and its use in teaching; 71% of those interviewed said that they had never used the computer in class; while 10% used it for classroom activities, 49% used it in preparing lesson notes; which included using the computer in internet searches for content, typing out lesson notes and designing teaching and learning materials. About 60% had knowledge of web browsing with 71% of them using e-mail. Another interesting finding of the study is that about 78% learnt on their own how to use

computers. Even though some teachers did not use ICT at all, they were in agreement that the computer had changed the way teaching is done in secondary schools.

In Kenya

In another study on the availability and access to the Internet, Kenya School Net (2003) found that e-mail was yet to be recognized as a tool for collaboration among students and teachers. In the schools under survey, access to the Internet was severely limited and when available was only used for administrative duties. Availability and accessibility of ICT resources (e.g. hardware, software and communication infrastructure) determines how effectively technology is introduced into schools. It is crystal clear that if technology cannot be accessed by the teacher, then it will not be used at all in pedagogical endeavours. It is a fact that state funding for such resources is scarce and ICT resources tend to be more available in urban than rural areas.

Although no similar study has been done in Kiambu, a number of studies have been done over the last decade to evaluate the use of ICT in secondary schools and other institutions of learning in Kenya and Southern-Sahara Africa. A review of these studies revealed that there are significant differences in the quality and use of ICTs in those institutions. According to Makau and IDRC (1990) most computer-assisted lessons were observed to be in mathematics and sciences. In addition, it was found that in most computer-assisted lessons, teachers were passive most of the time, thus leaving students to do whatever they chose on the computers. On average, students regarded both formal and informal sessions on the computer as time for relaxation and not for serious learning. This was explained to be as a result of the perception of the computer as an object of study as opposed to the integration of the technology into the existing curriculum.

It is expected that the computer should instead be used to assist in learning-teaching other subjects in order to make learning more exciting and much easier. The study further found out that computer lessons were conducted in the computer laboratory. These lessons were given more priority over computer assisted lessons in other subjects.

According to the findings of a study that was done by Kiptalam and Rodrigues (2010), in eleven secondary schools in Keiyo District; majority of the teachers using ICT did not receive any prior ICT training during their formative years at the teacher training colleges or universities before joining the teaching profession. About 55% stated that they did not receive any ICT training at all. But 51% had taken the self-initiative to undergo ICT training over the last 3 years they had been employed. This is in contrast to the scenario in Ghana where 24% of teachers had received some pre-service training in ICT but little training in the use of ICT to teach; according to Kiptalam (ibid).He says that some teacher training schools have begun involving ICT in teaching though it will take time. This observation can be said to be true as regards teacher training institutions in Kenya.

In regard to accessibility, the study by Kiptalam found that the availability of the computers in schools was 98% and access to internet was 82.7%. On the other hand, 53.1% of the teachers had computers at home, with 23.5% of them having access to the Internet. This, Kiptalam says, could be attributed to the fact that as at the end of January 2010, the four licensed mobile phone operators in Kenya had a combined subscriber base of 19.4 million (50% of the total population), with mobile data / Internet subscribers accounting for 1,981,048 out of an estimated 3,995,664 number of Internet users, which is a 10% penetration

rate (CCK 2010). 78.6% of the teachers had access to cyber cafés and 36.7% through ICT training centers that offered short term courses during the school holidays.

The National ICT Policy in Kenya was promulgated in January 2006 with an aim of improving the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services. The National Policy has several sections, including information technology, broadcasting, telecommunications and postal services. However, it is the section of information technology that sets out the objectives and strategies pertaining to ICT and education.

2.1 Education Sector

The Ministry of Education introduced the National ICT Strategy for Education and training in June 2006. The Ministry was given the mandate to lead the monitoring and evaluation of the strategy's implementations, guided by overall government policies on education and ICT, specific education strategic documents for implementing its mandate and global goals such as education for all (EFA) and the millennium development goals (MDGs).

This mandate is carried out through a ministerial ICT committee that meets monthly and reports quarterly on progress. The committee is chaired by the PS and supported by the Ministry's ICT unit. It has representation from stakeholders involved in implementing the strategy and mobilizing resources such as donors and private sector partners

In 2004, Kenya ICT Trust Fund was formed as part of implementation strategy. Its aim was to spearhead ICT initiatives in education. Membership is open to public sector organizations such as ministries and other government institutions, private sector, donor partners, civil so-

ciety and educational institutions. Following are goals that the Fund intended to achieve within five years:

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

2.3 Infrastructure

Few people have a computer at home due to limited access to electricity and phone lines. However, there has been rapid increase in the number of mobile phones and internet uses due to increase in number of Internet (cyber) cafés, shops and access centers available in urban areas. But usage may be affected because most sites on the Internet are in English which is widely used in Kenya.

2.4 Schools

Challenges concerning access to and use of ICT in Kenya include high levels of poverty, limited rural electrification and frequent power disruptions. Very few secondary schools have sufficient ICT tools for teachers and students. Even in schools that have computers, the student-computer ration is 150:1. Most of the schools with ICT infrastructure have acquired it through initiatives supported by parents, the government, NGOs and the private sector, including NEPAD e-schools programme. Attempts to set up basic ICT infrastructure in primary schools are almost negligible.

According to Farrell (2007), the core problem is that Kenya lacks adequate connectivity and network infrastructure. Although a small number of schools have direct access to high-speed

connectivity through an Internet provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas.

Consequently, there is limited access to dedicated phone lines and high-speed connectivity for Internet. Even where access to high speed connectivity is possible, high costs remain a barrier to access.

2.5 Vision 2030 on ICT in Kenya

The Kenya Government has initiated some major steps in order to bridge the digital divide, lower the cost of telecommunications and promote the use of ICT throughout the country.

As well as introducing innovative, on-the-ground schemes such as mobile banking for rural communities, the government has identified wider areas of ICT that will receive specific attention to cement the country's vision of becoming a regional technology hub.

The government acknowledges the potential of ICT to help grow a knowledge-based economy and has developed the ICT Sector plan to enable its people and outside investors, to get involved. The plan, based on Kenya's Vision 2030 will see the implementation of four major programmes, business outsourcing process (BOP), national ICT infrastructure, e-government strategy and development of local digital content.
Under Vision 2030, ICT will be a major contributor to attaining the target of a 10% growth rate thereafter.

2.5.1 ICT Sector Plan

Kenya's ICT Sector plan is based on the national priorities of poverty reduction, infrastructure development, trade promotion and industrial development as outlined in Vision 2030.

2.5.2 Establishment of a Computer Supply Programme

Project Profile

Under the Vision 2030 on ICT in Kenya on education, the Ministry's ICT initiatives target mainstreaming of Information Technology in 20 public primary schools, 6,000 public secondary schools, 22 PTTCs, 2 diploma colleges and 10 model e-learning centers for adult and continuing education.

Project Progress

During the year 2010/11, the ministry strengthened the co-ordination office to help co-ordinate and harmonize ICT to educational issues particularly integration of ICT in teaching and learning. This has been done by the setting up of institutional framework at the Ministry to cater for both the technical and the pedagogical aspects of ICT.

Key along the institutions set up includes; the ICT integration team, the ICT Unit and the ICT 4E Unit. Multimedia Project (TELEVIC) to equip 240 secondary schools with content delivery systems begun in 2009 and so far 120 schools are equipped. Teachers drawn from 20 schools have been capacity built on the use of this equipment.

The National ICT Integration and Innovation Centre have been established at former Kenya Science Teachers' College premises at an initial cost of Ksh.34m with the support of WOB funding.

In 2008/2009, the Ministry under the e-learning programme equipped 213 public secondary schools with ICT infrastructure and 1065 teachers were trained from the beneficiary institutions in the use of ICTs. Three schools from each of the 71 districts in existence at the time benefited.

To strengthen the impact of ICT integration, the Ministry of Education is engaged in a number of private public partnerships that target a diversity of areas in broad sector of ICT integration in education.

2.6 Objective and Intended Benefit

The main objective is to equip students with modern Information and Communication Technology (ICT) skills in order to achieve Vision 2030 goal of mainstreaming information technology in schools.

The intended benefit is improved access to ICT services in schools countrywide by mainstreaming of information technology in schools.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This Chapter describes the research methodology that the study used. It discusses the research design used, methods and tools of data collection and methods of analyzing that data. It also discusses the selection of the sample from the target population and how piloting of the questionnaire was done.

3.1 Research Design

A research design is the roadmap to a research project. Punch (2005) says that a research design includes all that is involved in planning and executing a research project. This, according to him, encompasses all that is involved in identifying the research problem, carrying out the research and then reporting the results. The research design guides the research and helps the researcher to be able to rule out possible explanations of the relationships under investigation. Without it, the researcher does not have much to keep the research focused on what they are interested in. Punch (ibid) identifies four main areas a research design focuses on. These include the strategy that the researcher used in his research, the conceptual framework that was followed, the objects (people or things) that were studied and the tools and procedures that were used for data collection. It is therefore a road map that the researcher prepares to guide the research process. Data was collected in June 2012 and analysis done using SPSS in July and August 2012.

3.2 Scope of the Study

The proposed study drew its sample from a teacher population of teachers of Alliance High School, Maryhill High School, Limuru Girls School, Gichuru High School, Kahuho Uhuru High School and Rungiri Secondary School. The first three are national schools while the last three are district schools. This sample population was intended to constitute 10% of the total number of teachers in the County. In case the sample does not make up the said 10%, the researcher would have increased the number of schools under the study so as to make up the required percentage.

3.3 Sampling

A representative sample was selected using stratified random sampling method to ensure that all the teachers in every school have an equal chance of being selected. A sampling frame was made by getting the total number of teachers in the county from the district education office. The sample will be 10% of the total number of teachers in the district represented in the schools. Each teacher sampled was given a questionnaire to fill out.

The choice of the schools for this study was based on the assumption that because Nairobi is the hub of ICT use in the country and because Kiambu is close to the city, these schools have more access to ICT than many other rural schools in the country. The national schools selected are likely to be better equipped with ICT hardware than the county ones hence giving a good comparison of the situation of ICT use. This is because it is possible to find two extremes of ICT divide in the two categories of schools as we are also likely to find some County schools in Kiambu that are quite backward as regards ICT compliance. It is likely to give reliable information on ICT use and the results can be used to make a general assumption on the current state of ICT use in other schools in the country, both private and public.

3.4 Piloting of the Questionnaire

Piloting is important for it helps the researcher to know whether the research tool is reliable or not. It is all easy for one to think that the questions they have on their questionnaire are easy to respond to, but a pilot is the one that makes this clear to the researcher. A pilot study was done on a representative sample of teachers in Light Academy and Karen C Secondary School. After piloting, some adjustments were made on the questionnaire in order to make certain questions more clear for the respondents to comprehend easily while more questions were included to enable the researcher acquire more information from the respondents.

3.5 Data Collection

Triangulation method of data collection was used. Triangulation involves the comparison of two or more forms of evidence with respect to an object of research interest. In this case observation was made on the availability and state of ICT materials in the schools under the study so as to ascertain the information given by the school administrators and teachers in regard to the availability and use of those materials. "Underlying most uses of triangulation is the goal of seeking convergence of meaning from more than one direction" (Lindlof, T R et al 2002) If data from two or more methods seem to converge on a common explanation, the biases of the individual methods are thought to 'cancel out' and validation of the claim is enhanced. In this study therefore, the researcher gathered information from multiple sources and key informant interviews were used. A key informant is a person (or a group of people) who has unique skills or professional background related to the issue or intervention being evaluated, is knowledge about the project participants, or has access to the information of interest to the evaluator (Fetterman, 1989). People with information on ICT use in schools in the County such as district education officers, school principals, ICT specialists and ordinary

teachers were interviewed to give their opinion on the use of the technology in schools and the level of ICT compliance in the County.

Survey and field observations were conducted in order to get first-hand information on the state of ICT hardware availability and use by teachers and students in the teaching-learning process in the identified schools. Multiple methods of triangulation were applied as the researcher looked for converging interpretation in field notes, interviews, documents and any other evidence in relation to the subject of this research

Structured open-ended and closed questions that provided the researcher with qualitative data on frequency of usage, different levels of usage and type of content were used in order to get as much information as possible. Some questionnaires were left in the schools for the teachers to fill out and then they were collected later.

Because questionnaires limit the respondents' expression, there is need for oral interviews. Interviews provide physical, emotional and psychological relationship hence the questioner is able to tell honesty through body posture, movement, tonal variation etc. Therefore, interviews with other stakeholders were carried out physically while at the same time ensuring that too much time was not consumed by these interviews.

Data collection was done in the months of June 2012 and the analysis and compilation of the initial report done in July and August. Care was taken during the process to ensure that subjects were not led to give particular answers. Respondents were assured that the information they gave would not be used against them by the school administration. This was ensured by maintaining confidentiality and avoiding asking for personal information since it did not have much to do with the objective of the study.

3.6 Methods of Data Analysis

After the survey, the researcher developed a coding frame for both the pre-coded and the open-ended questions and created a code book and coding instructions, coded the questionnaires, transferred the values to a computer, then analyzed the data using SPSS to establish answers to the research questions. Percentages were also used in ratings to give quantitative data in order to enhance and reinforce the qualitative data thus collected.

3.7 Summary

The use of triangulation made the data more reliable and generalizations drawn from it more realistic. The use of interviews helped in gaining an in-depth understanding of the problem and established certain trends. Though this is qualitative data, the information strengthened the conclusions that were drawn from the quantitative approach.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.0 Introduction

The main objective of the study was to establish to what extent teachers in secondary schools in Kiambu County use information and communication technology (ICT) in education. Qualitative data was analyzed through quantitative analysis. Graphs, pie charts and tables were used to present the data.

Enough questionnaires were dropped at the selected schools by the researcher and picked at a later date and enough time was given in order to allow the respondents to fill-in the questionnaires adequately at their own time. Once the respondents filled in the questionnaires, data was then coded and analyzed using the SPSS.

4.1 Response Rate

The study targeted 140 respondents from the various schools that are outlined in chapter three. From the study, 115 respondents out of the 140 sample respondents filled-in and returned the questionnaires. This makes up a response rate of 82.1%. According to Babbie (2003) return rates of 50% are acceptable to analyze and publish results, 60% is good and 70% is very good. Since the response rate in this study was 82.1% it is correct thus to assert that the response rate was very good. This reasonable response rate was achieved because the researcher took a personal initiative of making personal calls and physical visits to remind the respondents to fill-in and return the questionnaires. It was not difficult to convince the targeted respondents to fill the questionnaires because there is awareness that most people are going for post-graduate studies in the area and therefore many researchers have been fre-

quenting the schools collecting data for their various studies. The schools selected are also easily accessible due to their proximity to all-weather roads.

4.2 Professional qualifications

Table 4.1: Professional qualifications

Qualification	Frequency	%
Diploma in Education	9	6.4
Bachelor of Education	45	32.1
BA/BSc	38	27.3
PGDE	12	18.2
Master of Education	11	16.7
Total	**115**	**100.0**

Source: Researcher, 2012

It was established from the study that 6.4% of the total respondents had a Diploma in Education while 32.1% had Bachelor of Education degree as their professional qualification. On the other hand, 27.3% of the respondents had attained Bachelor of Arts/ Science. Those that had Post Graduate Diploma in Education comprised 18.2% of the respondents while 16.7% had a Master of Arts/Science in Education and this implies that all the respondents were qualified in their fields of profession and thus the data that was provided by them was credible.

4.3 Respondents' training on computer use

Table 4.2: Respondents' training on computer use

Response	Frequency	%
Yes	104	90.4
No	11	9.6
Total	**115**	**100**

Source: Researcher, 2012

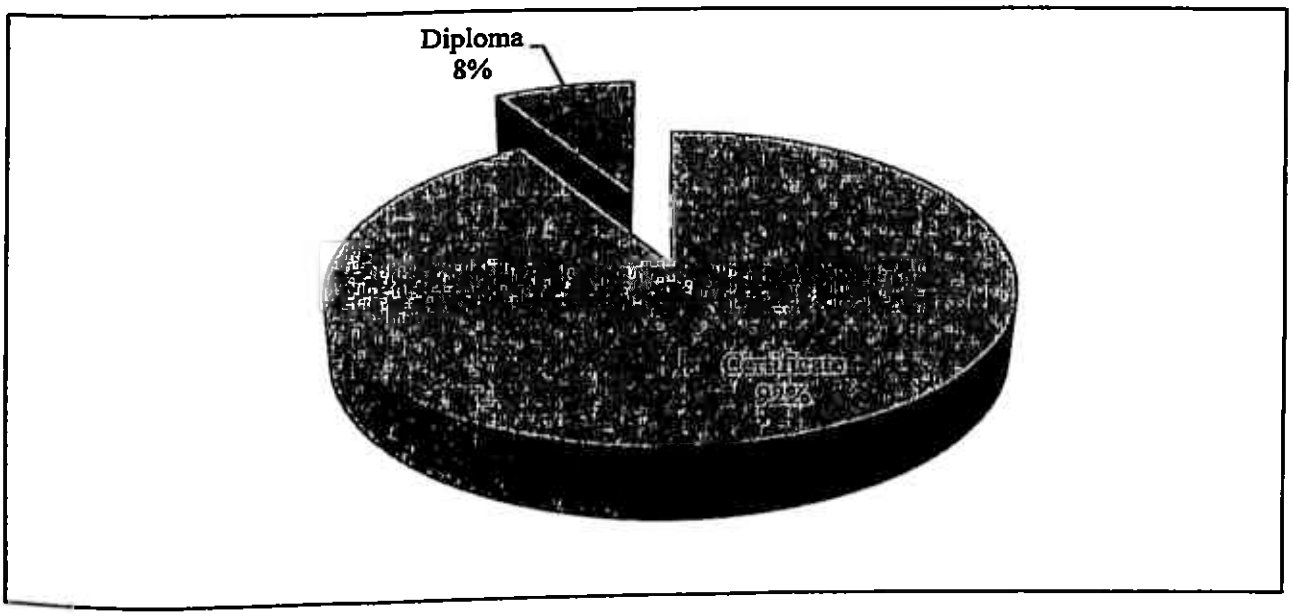
It was established from the study that 90.4% of the total number of the respondents were trained on the use of the computers while a mere 9.6% of them had no training on the use of the computers but they could use them for their basic operations. However, most of those who claimed to have training on computer use had only done so at certificate level which is just sufficient for them to perform their basic personal tasks. Most of them asserted that they did not acquire these skills at teacher- training colleges or universities as would be expected; rather they acquired the certificates at some back street colleges after graduation so that they could fit in the world of technology. They appreciate the fact that IT skills are very vital in modern life especially in the field of education. These teachers therefore lack competent skills to use computer-assisted technology in the teaching/learning process in their areas of specialization to handle complicated tasks.

On the other hand, 9.6% of respondents had no training at all in computer use and hence they did not use computer-related technology in any way. However those who were physically interviewed admitted that they knew the importance of using the said technology in education

but because it is not yet a government policy, they did not see the urgency of acquiring those skills. These are the laggards who take too long to adopt technology in their work.

4.3.1 Computer training qualifications

Figure 4.1: Computer training qualifications



Source: Researcher, 2012

The study established that majority (92%) of the respondents had certificates as their computer qualifications which were attained after they were employed through their own initiative and those who had diploma as their qualifications for the use of the computers were 8% and this correspondents to the above findings. Most of those are the ones who were trained to teach IT as a subject while in teacher-training colleges.

4.4 Respondents' competence in handling the tasks

Table 4.3: Respondents' competence in handling the tasks

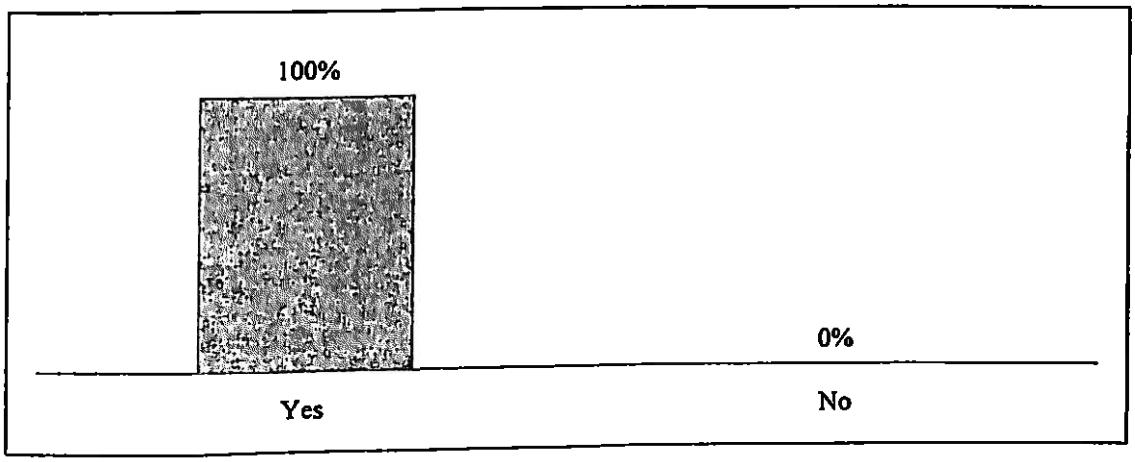
Tasks	Poor		Fair		Average		Good		V. Good	
	FQ	%	FQ	%	FQ	%	FQ	%	FQ	%
Basic skills such as typing, data processing	4	6.1	12	18.2	22	33	18	27.3	10	15.2
Using search services such as Google, Twitter	0	0	10	15.3	18	27.3	21	31.8	17	25.8
Preparing professional records e.g report cards	0	0	2	3.03	25	37.9	30	45.5	9	13.6

Source: Researcher, 2012

The researcher found out that on the competence of the teachers in performing the basic skills such as typing and data processing, 33% of the respondents said that they were average, 27.3% said that they were good and those who said that they were very good made up 15.2% of the total number of the respondents. On the issue about using search services such as Google and Twitter 31.8% of the respondents said they were good, 27.3% said that they were average on the use of the services, 25.8% of them said that they were very good and those who said they were fair constituted a mere 15.3% of the total number of the respondents. In regard to preparation of professional records such as report cards, 45.5% of the total respondents said they were good and they were followed by those who said that they were average were 37.9%. 45.5% of the respondents were good while 13.6% were very good. This shows that majority of the respondents were very familiar with the use of the computers in their schools and could apply them to perform various tasks.

4.5 Respondent's school having access to ICT facilities

Figure 4.2: Respondent's school having access to ICT facilities



Source: Researcher, 2012

The study established that all the schools (100%) had access to the ICT facilities and this has been attributed to the fact that the government and other stakeholders have been trying to equip the learners with the neceesary skills in the use of the computers to suit well in the modern business environment. However, these facilities were not accessible to all the teachers and students due to various challenges and limitations that are mentioned elsewhere in this chapter.For instance, in all the three district schools there are no computer laboratories where students could access the computers and thus even IT is not taught as a subject as one would expect. Teachers in those schools accessed the computer in staffrooms or their various departmental offices.

In most of these schools computers were placed in particular offices such as departmental offices, typing pools,and administrative offices so that they could be used to perform various official communication tasks such as preparing fees statements and receipts for the students, report cards and for official communication.In two schools they have computers that were

donated through the Computer for Schools Programme way back in the year 2004 and therefore most of the computers are either too slow or old to perform certain tasks while others are obsolete. Another school recently acquired 40 computers, 5 printers and 1 projector from a Non- Governmental Organization but they do not have a library to put the uquipment. Therefore teachers and students are unable to access these vital materials for academic use. The School Board of Governors is thus having a herculian task of sourcing for funds to put up a building that will house the ICT library although this was not provided for in their current five-year expansion programme. Therefore this might take a longer time to accomplish and until then the ICT equipment donation will be wasting away in the cramped store.

4.6 ICT facilities used by the respondents to access academic work

Table 4.4: ICT facilities used by the respondents to access academic work

Facilities	Frequency	%
Computer	115	100
Fixed Telephone	0	0
Projector	26	22.6
Ipad/ IPod	0	0
Internet	115	100
Cell phone	40	34.8

Source: Researcher, 2012

It was established from the study that computer and the internet were the most commonly used ICT facilities that were used for the access of the academic work and they had 100% usage. Use of the projectors is another very important ICT facility which was used for presentation of the academic work. This mode of communication was mainly used by those teaching IT as a subject when they taught their students certain skills, these comprised 22.6% of the respondents. It was also discovered that projectors were used for other functions like during Sunday Chapel service or when they have big functions that assemble all students and parents such as prize giving. However, only a paltry 16% of the other respondents reported to have used them in teaching in their academic fields such as drama in the Languages. Cell phone use had 34.8% response and thus was one of the ICT which was not commonly used for the academic purposes. The use of iPads and the fixed telephone lines were not used for the access of academic work such as consulting the other professional peers on academic matters. This is mainly because the use of ipads and ipods is not yet widespread in the country and they are also costly and out of reach for most of teachers. The traditional fixed telephone is fast being replaced by the cell phone which is more convenient and classy to use.

4.7 Where the respondents Access the ICT

Table 4.5: Where the respondents Access the ICT

Where they access ICT Facilities	Yes		No	
	FQ	%	FQ	%
At school	110	95.5	3	4.5
At a cyber café	13	19.7	92	80.3
At home	98	85.2	17	15.15

Source: Researcher, 2012

The study revealed that majority of the respondents (95.5%) concurred to the statement that they accessed ICT facilities at school and this proved that most of the schools did provide these facilities though at a limited rate while 19.7% of the respondents said that they accessed these facilities at cyber cafés and those who accessed at their homes comprised 84.8% of the total respondents. This implies that all the teachers had access to the facilities either at their place of work or in their homes or both. Therefore it is correct to say that the use of ICT among the secondary school teachers in the County is widespread.

4.8 Frequency of use of ICT facilities

Table 4.6: Frequency of use of ICT facilities

Use of ICT	Frequency	%
Daily	91	79.1
Once per two days	14	12.5
Weekly	7	6.1
Occasionally	3	2.4
Total	**115**	**100.0**

Source: Researcher, 2012

The researcher established that 79.1% of the total respondents used the ICT facilities daily and this was expected as it was heavily used for their personal academic purposes while those who used it once per two days were 12.5% and the number of those who used them on weekly basis and occasionally were 6.1% and 2.4% respectively. This implies that they heavily relied on the use of ICT facilities for their day to day communication as well as for their personal academic work.

4.8 Respondents' response to the use ICT to perform the following duties:

Table 4.7: Respondents' response to the use ICT to perform the following duties:

Duties	Frequency	%
Teaching	18	15.7
Academic research	46	39.9
Preparing report cards	40	34.8
Preparing lesson plans	22	18.8
Preparing schemes of work	58	50.4
Consulting with other teachers	38	33.04
Communicating with parents	28	24.3
Communicating with students	40	34.8
Marking students attendance	62	53.9
Making lesson notes	7	6.1

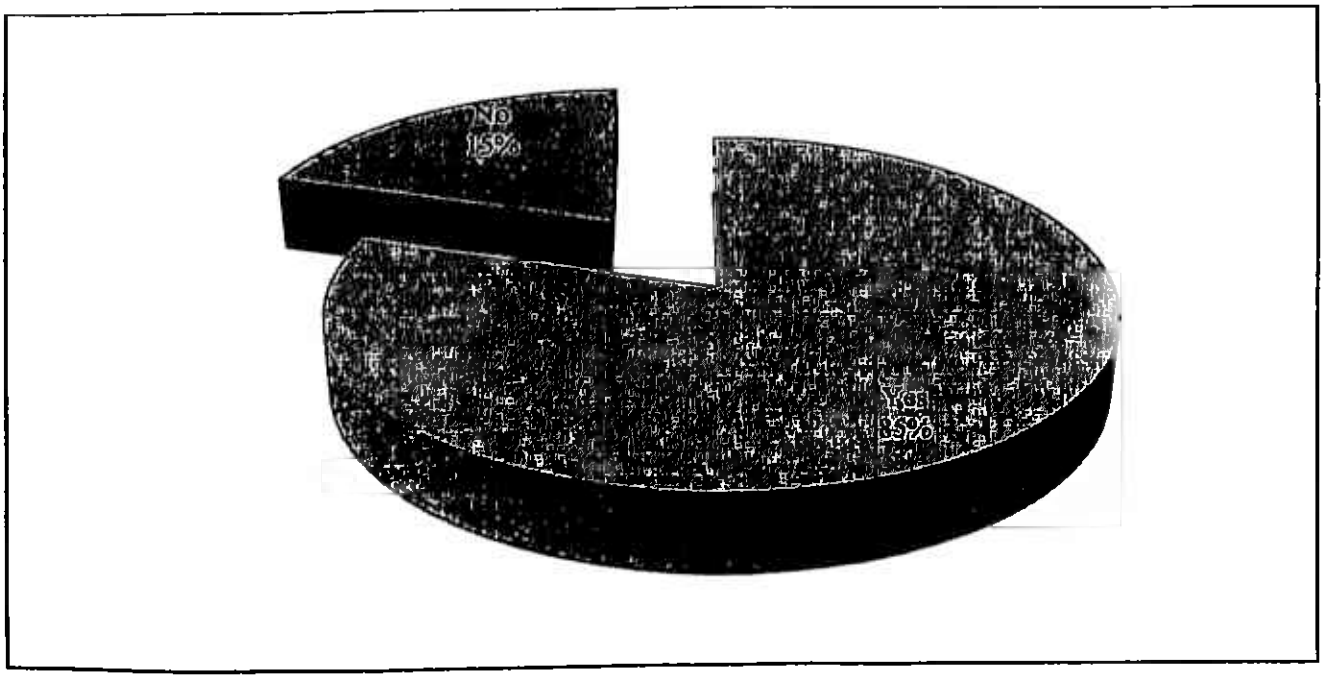
Source: Researcher, 2012

It was established from the study that ICT facilities were scarcely used for teaching because only 18% of the respondents used it. ICT facilities were fairly used for academic research as it was preferred by 39.9% of the total respondents and this was expected for the purpose of expounding their knowledge. It could also be attributed to the fact that a fair number of the respondents are pursuing further studies in various areas to upgrade their professional skills. On the statement about consulting with other teachers, only 24.3% of the respondents consented to having used the ICT facilities while preparation of report cards and lesson plans had 34.8% and 18.8% respectively, this low response was not expected as these activities heavily

relied on the use of the computer. But on the ground, most teachers hardly prepare the said professional documents as they believe that they do not need them. All of the respondents said that they used the ICT facilities in the preparation of lesson notes as this would show a high level of organization.

4.10 If the respondents allow students to access computers during their lesson

Figure 4.3: If the respondents allow students to access computers during their lesson



Source: Researcher, 2012

The study revealed that 85% of the respondents did not allow their students to access computers during their lessons while only a paltry 15% of them allowed students to use computers during their lessons. This is mainly because most teachers who teach other subjects other than Computer Studies as a subject did not use computer-assisted technology to enhance teaching/learning in those subjects. The 15% of teachers who asserted that they allow students to use computers during their lessons are the ones who teach Information Technology (IT) which is mainly Computer Study and therefore they must use the computer. In this case

the computer is used as a tool of study; it is the one being studied as opposed to the use of the computer as a tool for study in order to enhance teaching/learning in various areas. Consequently, the students were not taught to use the computer mediated technology to learn other subject areas.

On the other hand, students did not have access to computers during other lessons mainly because their teachers rarely use computer-assisted technology to enhance teaching of the other subjects. It was shocking to find that this applied even in the national schools under study where one would expect ICT to be used to enhance learning at a wider magnitude.

In one of the national schools, the Head of Mathematics Department complained that the school administration had adamantly refused to purchase certain computer softwares which could go a long way in enhancing the teaching of certain areas in Mathematics. The case also applied to the Sciences and the Languages, though funds were readily available. The school principal is vehemently opposed to the use of computer mediated technology despite himself being a Science teacher.

Many of those interviewed felt that most school administrators were reluctant to provide the necessary ICT materials because they do not value the importance of the technology in learning. These are the laggards who are a hindrance to technology adoption in education. Even where ICT materials like computers and projectors were available albeit in small numbers, most teachers were not keen to use them to teach. They instead stuck to the traditional method of teaching where the teacher is the source of information and students are just passive participants.

4.11 Students' use of the computer

Table 4.8: Students' use of the computer

Students' use of the computer	Frequency	%
Playing games	96	30
Class work	224	70
watching movies	0	0.0
Total	**320**	**100.0**

Source: Researcher, 2012

It was discovered from the study that 70% of the students used the computers for class work while 30% of them played computer games while non-used of them the computers for watching movies. This shows that a bigger number of the students were much concerned with their studies using the computers rather than for other uses. They also used the computer under strict supervision of their IT teachers during computer lessons. Those taking Computer Studies as a subject at K.C.S.E level have to undertake a project which is examinable by the Kenya National Examinations Council and they thus have to do a lot of practice on the computer in preparation for their final examination.

4.12 Respondents' response on the frequency they use e-mail for communication.

Table 4.9: Respondents' response on the frequency they use e-mail for communication

Use of E-mail for communication	Never		Rarely		Occa-sio-nally		Fre-quently		V. Fre-quently	
	FQ	%	FQ	%	FQ	%	FQ	%	FQ	%
Exchange academic ideas with peers	12	10.4	15	13.3	38	33	12	10	38	33
Communicate with parents and students	4	3.8	38	33	35	58	2	3	3	2.6
Official communication	3	5	57	50	25	42	1	2	3	2.6
Sending report cards	2	3	35	58	2	3	38	33	3	2.6

Source: Researcher, 2012

It was established from the research that 33% of the respondents very frequently and occasionally used the email for exchange of academic ideas with peers while 10% frequently used emails for communication. 58% of the respondents' said that they used them to communicate with parents and students and 33% of them said that they rarely did that. For official communication purposes, 42% of the respondents said that they did so while on the same statement, 50% said that they rarely used them. 58% of the respondents said that they rarely used the emails for sending report cards while 33% of them said that they frequently used it for that purpose. This implies that sending of report cards using the emails as a method of communication was not commonly or widely used by teachers.

The reason given for the above scenario is that these are treated as administrative duties which are either carried out by class teachers in some schools or the deputy principals. Majority of the teachers agreed that they had access to computer both at school and at home. Further, most teachers used computers at school in the staff room and in the computer library. Most teachers agreed that they very often used computers for finding and accessing educational materials and teaching specific subjects comprising 76%, and 64% respectively. However, they rarely used computers to communicate with parents and for preparing lessons as was shown by 78% and 68% each. None of the respondents reported to have used computer-assisted technology in the teaching of other subjects other than computer studies.

The study concludes that the use of computers had led to various changes that the teachers had seen in their pupils which can be attributed to usage of computers and this included increased performance and better understanding by the students. The teachers cited that computers offered easier explanations, relevant information, many sources of information and learning different subjects by students on their own. In schools where there has been introduction of computers, there has also been improvement of grades, motivation and discipline in classrooms. This is attributed by the fact that computers have the potential to change schools so that learning in them is more student-centered and collaborative and more successful in terms of academic results.

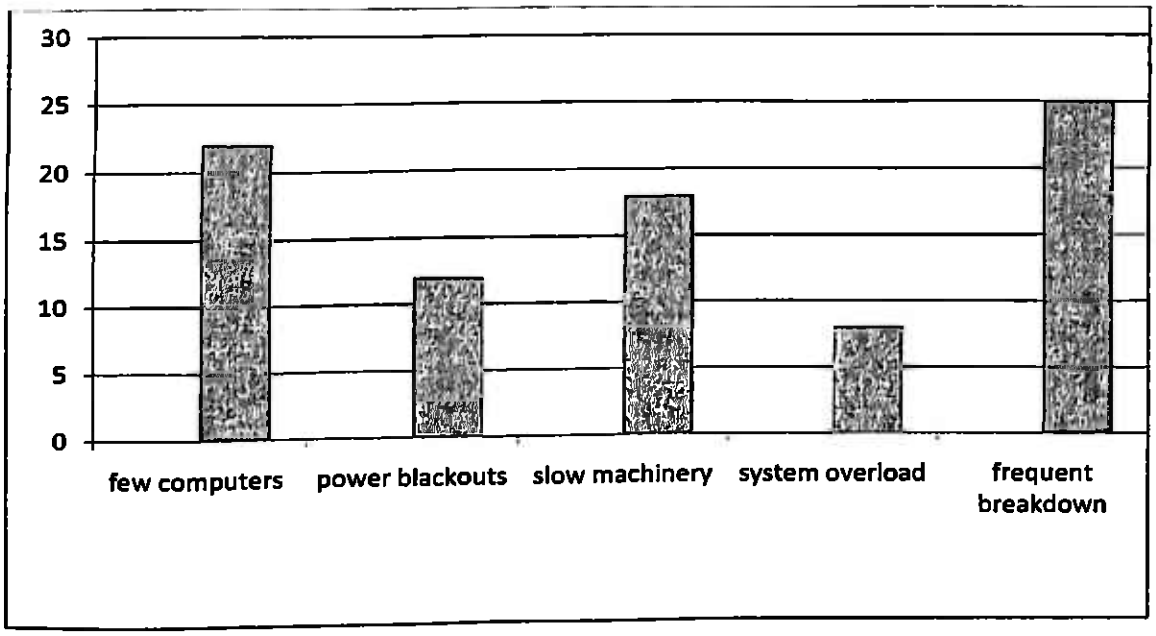
The study further concludes that there were various challenges in the use of computers and these included system overloads, lack of adequate supervision of students when using computers due to inadequate manpower, unavailability of computers, and lack of financial support, slow machinery, power blackouts, and frequent breakdown. Well-designed software can provide prompts after a number of attempts by the students, and automatically offer higher

levels of challenge by monitoring patterns of answers inputted by the student. These navigational aids and self paced learning features give students independence in their learning activities and help them stay on the task. They are able to concentrate on a given task because learning is made more student-centered

The research concluded that for the school to accrue the many benefits of using of computers to enhance teaching and learning among the students; the school management should fully support this initiative. This can only be made possible through allocation of enough financial resources to implement this initiative. The school management should also put in place a policy to guide the implementation of this programme. The schools are to gain benefits of using computers in teaching all subject including the sciences, mathematics, humanities and languages among others. To enhance teaching and students learning using computes the schools should consider either hiring or outsourcing qualified IT personnel to ensure that the hardware and the software are well maintained and to spearhead the ICT integration process in the schools. Enough rooms are also required for the storage and easy access of these computer hardware and software by all students. Unfortunately, in some schools they do not even have such hardware available for use by students because funding is a big hindrance.

4.13 Challenges of Using Computers in Schools

Figure 4.4 Challenges of using computers in schools



Source: Researcher, 2012

Teachers said that most of the computers that they used in school were old models whose speed was very low thus they tended to be very slow in operation, these comprised of 18% of the challenges. Power blackout at 12%, was another challenge that affected computer use. The respondents said that this challenge was compounded by the fact that their schools did not have power backups and that they had to wait until power resumed. The challenge of frequent breakdown was also very common in schools, this was at 25%. The schools' computers were of poor quality since the schools could not raise enough funds to purchase high quality computers. In addition the schools did not have IT trained personnel to repair and maintain the computers and computer hardware every time they broke down. 22% of the teachers disclosed that there were very few computers in their schools which had to be shared among very many users. This led to over-use of those machines hence frequent breakdown and slow or poor performance. This is owing to the fact that the schools could not raise enough funds to purchase enough computers for all the students. They further concurred that most of the

computers that they used in their school were old the models whose speed was very slow thus they tended to be very slow in operation and in most cases frustrating to use. This made it difficult to access the internet in search for information. Another major problem that was cited by 15% of the respondents was shortage of computers. As mentioned earlier, in two schools there were no computers available for use by the students and thus Computer Studies was not offered as a subject in those schools although it is supposed to be one of the elective technical subjects as per the Ministry of Education requirement for the schools offering the Kenya National curriculum of education.

CHAPTER FIVE

SUMMARY OF THE FINDINGS AND RECOMMENDATIONS

5.0 Introduction

The chapter provides the summary of the findings from chapter four, and it also gives the conclusions and recommendations of the study based on the objectives of the study and the data that was collected in the field.

5.1 Summary of the Findings

The study revealed that most teachers in the County are well trained to teach in their respective areas and thus well placed to help the millennium goal on education. This is so because 31.8% of the total respondents had Bachelors of Education as their professional qualification and they were followed by 27% of the respondents who had attained Bachelors of Art as their professional qualification. Those that had Post Graduate Diploma in Education comprised 18.2% of the respondents while 16.7% had Masters in Education. On the other hand 92% of the total number of the respondents had some basic training on the use of ICT while a mere 8% of them had no training at all on the use of ICT but they could use it for the basic operations.

However, most of these teachers were not adequately equipped in line with Kenya's Vision 2030 on ICT Policy on education which is contained in the ICT Sector Plan. The main objective of the Plan is to equip students with modern information and communication (ICT) skills in order to achieve Vision 2030 goal of mainstreaming information technology in schools. This is because the government acknowledges the potential of ICT to help grow a knowledge-based economy. It also aims at making the country become a regional technology hub. The study established that majority of the respondents had certificates as their computer qua-

lifications and only 8% had diploma as their highest qualifications in ICT. This indicates that there is a very wide training gap in this area that needs to be filled urgently.

The researcher found out that 33% of the respondents said that they were average in the basic skills such as typing, data processing, 27.3% said that they were good and those who admitted that they were very good were 15.2% of the total number of the respondents. On the issue about using search services such as Google and Twitter 31.8% of the respondents said they were good, 27.3% said that they were average on the use of the services, 25.8% of them said that they were very good and for those who were fair constituted a mere 15.3% of the total number of the respondents. Concerning preparation of professional records such as report cards, 45.5% of the total respondents said they were good followed by those who said that they were average and were 37.9%.13.6% of the respondents were very good. This shows that majority of the respondents were very familiar with the use of the computers in their schools and could apply them. However, due to the shortcomings and challenges that were cited elsewhere in this study, these teachers are unable to impart the same basic skills to their students or use them to improve their teaching.

The study established that all the schools (100%) had access to the ICT facilities and this has been attributed to the fact that the government other stakeholders have been trying to equip the learners with the neceesary skills in the use of the computers to suit well in the modern business environment. The computer-besed technology has become the way of life as it makes work easir and faster. It can be used in learning to make learning more ineresting and more easy. Unfortunately, the gonernment has not done enough to facilitate the use of ICT in scools especially for teaching and learning.

Computer and the internet were the most commonly used ICT facilities that were used for the access of the academic work and they comprised of 100% use. Use of the projectors was yet another ICT facility which was used for presentation of the academic work. Cell phone use had 34.8% and was one of the ICT which was not commonly used for the academic purposes. The use of iPad and the telephone were not used for the access of academic work.

The study discovered that majority of the respondents (95.5%) concurred to the statement that they accessed ICT facilities at school and this proved that most of the schools did provide this facilities 19.7% of the respondents said that they accessed these facilities at cyber cafés and for those who accessed at their homes comprised 84.8% of the total respondents. This implies that all of the teachers had access of the facilities at their place of work as well as in their homes. Those interviewed agreed that ICT has become an integral part of their day to day operations and hence the need to strengthen sits use in pedagogical pursuits.

The researcher established that 78.8% of the total respondents used the ICT facilities daily and this was expected as it was heavily used for the academic purposes while for those who used once per two days were 13.6% and the number of those who used them on the weekly basis and occasionally were 6.1% and 1.5% respectively. This implies that they heavily relied on the use of ICT facilities for their day to day teaching.

It was established from the study that ICT facilities were used for teaching and had 86.4%. Academic research used the ICT facilities heavily as it had 95.5% of the total respondents and this was expected for the purpose of expounding their knowledge. On the statement about the Consulting with other teachers, 83.3% of the respondents used the ICT facilities while preparation of report cards and lesson plans had 72.7% and 78.8% respectively and this was

expected as these relied on the use of the computers. All of the respondents said that they used the ICT facilities in the preparation of lesson notes as this would show a high rate of organization. It was discovered from the study that 69.8% of the students used the computers for research purposes while 30.1% of them played games while non-used the computers for watching movies. This shows that a bigger number of the students were much concerned with their studies using the computers rather than for other uses.

It was established from the research that 33% of the respondents very frequently and occasionally used the E-mail for exchange of academic ideas with peers while 10% frequently used emails for communication. 58% of the respondents' said that they used them to communicate with parents and students and 33% of them said that they rarely did that. 42% of the respondents said that they used it for official communication purposes, while on the same statement, 50% said that they rarely used them. 58% of the respondents said that they rarely used the E-mail for sending report cards while 33% of them said that they frequently used it for that purpose. This implies that sending of report cards using the emails as a method of communication was not commonly or widely used.

5.2 Conclusions

From the study, it can be concluded that though most of the teachers were qualified as professional teachers and that they had some training on ICT they could not give lessons to students using ICT to make learning more fun and enjoyable. Most of the respondents had the basic ICT skills such as typing, data processing and they knew how to use search services such as Google and Twitter and other basic applications that are used in the computer.

However, most of the respondents did not have the requisite skills to teach their subjects using computer-mediated technology such as power point and projectors. This explains why they don't use the same technology to enhance teaching/learning in their subjects. In regard to teachers training in ICT, it was proved that most of them got the skills after their professional training. This implies that the government does not follow the ICT training policy in the teacher training colleges and universities for teacher trainees as envisioned in the Kenya's Vision 2030 on ICT. Therefore most of them qualify as teachers without adequate computer skills and hence they can hardly appreciate the use of ICT in education.

Most of the respondents used the computers and other ICT facilities for academic work and official communications such as sending the emails to the school administration as well as to their fellow colleagues for consultation. In addition, preparation of academic materials was done using the ICT facilities and this was mainly obtained from the internet especially by those undertaking further studies.

The researcher concluded that most of the respondents' schools were equipped with the ICT facilities and they accessed them both at the school, at homes and the cyber café for their convenience. Most of the respondents used the facilities almost daily for presentations and other tasks that required them and this shows that equipping schools with these facilities is very vital as they are going to become the teaching items in the near future.

The study further found that a few teachers were yet to appreciate the importance of ICT in the teaching/learning process mainly because some of them belong to the old generation that is yet to embrace technology fully. These are the late technology adopters that Everett Rogers said are slow in adopting technology and when they finally do, they only use technology to

perform very basic duties, probably just to survive. Interestingly, some respondents recognize the place of ICT in their professional duties but were very slow in adopting it.

5.3 Challenges

Most of those interviewed cited various challenges that hinder the integration of ICT in education. Lack of funds was cited by most school administrators who admitted that although they acknowledged the importance of ICT in modern life, there were other pressing needs in their schools that were given priority when allocating funds.

Maintenance of computers is another impediment mainly because of poor storage; add to this the lack of trained personnel in schools to repair those machines whenever they break down and the high cost of computer stationary and hardware. During power rationing and numerous unprecedented blackouts, ICT lessons are interrupted. At times computers are damaged whenever there is power surge.

Insecurity in the area has also led to the loss of computers and computer hardware to thieves and replacing them has been very costly. One school that experienced such theft is yet to fully re-equip its computer department.

As mentioned earlier, some school administrators are yet to appreciate the role of ICT to enhance the teaching and learning of other subjects and therefore they have failed to support teachers who are yearning to adopt the technology in teaching their subjects. Some teachers have also been slow to adopt technology. For instance some teachers of humanities and languages did not understand how they could use computer-mediated technology in those areas, for example to teach drama. But there those who know very well the use of ICT in various

areas but they are unable to use it due to those problems mentioned above and therefore they are helpless.

The education officials in the area who were interviewed conceded that they are aware of the various challenges highlighted above but they admitted that the government was doing very little to facilitate the use of ICT in schools in the area and the entire country in general.

5.5 Recommendations

From the study the following recommendations can be made, the government and other stakeholders should supply all schools in the country with the ICT facilities so as to equip the students with the necessary skills in the use and application of the computers and other ICT facilities in learning. Teachers must be given in-service training on ICT so that they can integrate it in teaching/learning. ICT training should be made mandatory in the teacher-training colleges and universities.

The teachers who are employed by the government and private schools should have the basic skills on the use of computers and other ICT facilities so that they won't be an impediment in the use of computer-mediated technology and also be able to equip learners with the necessary skills on the use of ICT in learning other subjects. This will enhance the rate at which the students become computer literate in addition to making learning more interesting as it will be student-centered.

In addition, the study recommends that there is need to emphasize the use of ICT in all formal schools in teaching and learning of all subjects. The computer should be used as a tool for

study and not a tool of study. Further, there is need to establish a detailed curriculum for the ICT application in the said areas. The study further recommends that in collaboration with school boards of governors, parents should promote this technology use by facilitating funds to support ICT development in schools.

Computers and computer laboratories were found to be inadequate in all the schools under the study though the magnitude of the shortage differed to some extent. National schools were relatively more equipped than the district schools in this regard. The study recommends that teachers try to enhance teaching using computers through acquiring ICT skills in order to make learning more effective by demystifying certain concepts. They must also change their attitudes towards technology adoption in education.

On its part, the Government must, as a matter of urgency put enough measures in place to allocate funding via county offices to help fund ICT projects in all secondary schools as well as lay more emphasis on IT training for teachers. The rural electrification programme should be speeded up to cover all parts of the country to enable all schools use ICT.

5.5 Suggestions for further studies.

This study recommends that a similar study should be carried out in other counties in Kenya to find out if the same results would be obtained. There is need to identify whether the situation is the same in those other counties to enable the government plan adequately for a nationwide programme to equip all secondary schools with ICT facilities and sensitize all the stakeholders on the urgent need to adopt technology in education in order to achieve the Vision 2030. Failure to roll out a comprehensive programme on ICT use in secondary schools in Kenya will render the country's Vision 2030 a mirage.

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APPENDICES

Appendix: QUESTIONNAIRE

The information sought here is purely for academic purposes and I would appreciate if you would fill it truthfully.

1. i) Name of your school_____

iii) Teaching subjects_____, _____

v) Professional qualifications (Tick) Diploma { } Bed { } BA { } PGDE{ }

Med { } Any other (specify)_____

vi) Do you have any training on computer use? Yes { } No { }

vii) If your answer to (vi) above is 'yes', please state your qualifications

_____

2. Please indicate your competence in handling the tasks listed below on the scale of: (1) Poor (2) Fair (3) Average (4) Good (5) V. Good

	1	2	3	4	5
a) Basic skills such as typing, data processing	[ ]	[ ]	[ ]	[ ]	[ ]
b) Using search services such as Google, Twitter	[ ]	[ ]	[ ]	[ ]	[ ]
c) Preparing professional records such as report cards	[ ]	[ ]	[ ]	[ ]	[ ]

3. i) Do you have access to ICT facilities? (Tick as appropriate)Yes { } No { }. If the answer to the above question is 'yes', proceed.

iii) State the ICT facilities that you access in your academic work:

a) Computer { }

b) Telephone { }

c) Projector { }

d) Ipad/ Ipod { }

e) Internet { }

f) Cell phone { }

iv) Where do you access the ICT?

a) At school? (Tick) Yes { } No { }

b) At a cyber café (Tick) Yes { } No { }

b) At home? (Tick) Yes { } No { }

c) On all the above (Tick) Yes { } No { }

iii) How often do you use ICT? (Tick)

a. Daily { }

b. Once per two days { }

c. Weekly { }

d. Occasionally { }

e) A number of times per day { }

iv) Do you use ICT to perform the following duties? (Tick appropriately)

a) Teaching { }

a) Academic research { }

b) Preparing report cards { }

c) Preparing lesson plans { }

d) Preparing schemes of work { }

e) Consulting with other teachers { }

f) Communicating with parents { }

g) Communicating with students { }

h) Marking students attendance { }

i) Making lesson notes { }

j) Other use (specify)_____

ix) Do your students have access to computers during your lesson? Yes { } No { }

x) If the answer to the above question is 'yes' what do they use the computer for?_____

_____

_____

_____

4. Please explain how you use computer-mediated technology to teach your subject.

_____

4. Please list down the main challenges of using computers in teaching in your school.....

.....

.....

.....

5. Please indicate the frequency with which you use e-mail for the following types of communication on the scale of (1) Never (2) Rarely (3) Occasionally (4) Frequently

(5) V. Frequently

	1	2	3	4	5
a) Exchange academic ideas with peers	[ ]	[ ]	[ ]	[ ]	[ ]
b) Communicate with parents and students	[ ]	[ ]	[ ]	[ ]	[ ]
c) Official communication	[ ]	[ ]	[ ]	[ ]	[ ]
d) Sending report cards	[ ]	[ ]	[ ]	[ ]	[ ]

Thank you for taking your precious time to respond to my questions.