

**SCHOOLBASED FACTORS INFLUENCING INTEGRATION OF
INFORMATION COMMUNICATION TECHNOLOGY IN PUBLIC
SECONDARY SCHOOLS, MIGWANI DISTRICT, KITUI COUNTY, KENYA**

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DECLARATION

This research project is my original work and has not been presented for the award of a degree in any other university

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DEDICATION

This research work is dedicated with a lot of love, respect and appreciation to my beloved wife Tabby Ngui and our children Mwikya Ngui, Matuku Ngui and Ndunda Ngui.

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LIST OF ABBREVIATIONS AND ACRONYMS

EMIS	Education Management Information System
GOK	Government of Kenya
ICT	Information and Communication Technology
KCSE	Kenya Certificate of Secondary Education
KNEC	Kenya National Examinations Council
MHEST	Ministry of Higher Education Science and Technology
NACOSTI	National Commission for Science Technology and Innovation
NEPAD	New Partnership for Africa's Development
NGO's	Non-governmental Organizations
NICE	Network Initiatives for Computers in Education
T.T.C	Teachers Training College

ABSTRACT

Many schools are restructuring their infrastructure to accommodate ICTs as it is of great help in providing multimedia information and allow access to a broader range of instructional resources. The purpose of the study was to investigate school based factors influencing integration of information communication technology in public secondary schools, Migwani district, Kitui County, Kenya. The objectives of the study were to establish the influence of ICT infrastructural capacity on integration of ICTs, to determine the influence of teacher's ICT knowledge and skills on integration of ICTs, to establish the relationship between ICT technical support to teachers and integration of ICTs, to establish the influence of school administration support on integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County. The researcher adopted a descriptive survey to gather data. The target population of the study was all the 40 principals 300 teachers and 2400 form 3 students. From the total population of 2400 form three students 331 students were sampled using simple random sampling. The number of teachers sampled were 100 which is over 30% of the population. All the 40 principals were sampled. The study findings have revealed that integration of ICTs in the secondary schools is hindered by factors such as: Inadequate infrastructure, teachers have poor pre-service training in ICT because only very few have a diploma in ICT, Students on the other hand lack the skills to use computers in their schools, technical help is inadequate despite regular computer breakdown of the old computers. The administrative practices include financing computer programmes in school and facilitating in-service training of the teachers as well as employing teachers to teach computer skills. Most schools lack ICT policies that would enable proper integration of ICTs in teaching and learning. The researcher concluded that the interplay of factors have negatively influenced and slowed the use of ICTs in teaching and learning in secondary schools in Migwani District, Kitui County. These includes unavailability and inappropriate ICT infrastructure in the secondary schools; limited ICT knowledge and skills for both the teachers and the students characterized by inadequate time for in-service courses for teachers; limited technical support during teaching and learning process and restrictive administrative practices mainly limited budgetary allocations and lack of proper ICT policies in the secondary schools. Therefore there has been limited use of ICTs in class presentation in secondary schools in Migwani District, Kitui County.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Education is the cornerstone of economic growth and development. Education helps to mitigate poverty and its effects by developing human capital consequently increasing the level of social and private benefits. Delivery of education can be enhanced through integration of Information Communication Technology (ICT), in teaching and learning which encompasses wide range of technologies including telephone, fax machines, televisions, video, audio recorders, CD players, CD Roms, personal organizers, programmable and remote operated toys as well as computers (Ohara, 2004).

The developed countries (G7) that is Japan, Germany, Britain, Canada, France, Italy and America led in Information Technologies and Integration of ICT into their education systems. Generally the Western countries including USA and those in Europe have high internet host access, more personal computers and telephone ownership. They have a high internet host of over 300 per 1,000 and also a high telephone ownership of over 600 people per 1,000. This has led to unprecedented explosion of knowledge due to these technological developments hence overall socio-economic growth. The integration of ICT into virtually all aspects of the economy and

society is creating a digitally-enabled economy that is responsible for generating economic growth and prosperity (Bollou, 2006). Maguire (2003) further notes that the ICT sector has the potential to generate economic development and create pathways into the Knowledge Economy. The adoption of ICT into the practice of education is not something that began with the emergence of the new digital technologies; technologies such as radio, telephone and television have been and are still being used at present; what is new are the many ways that they can be combined and mixed with the new technologies which mainly consider use of computers (Farrell, 2007). There is a growing interest in using computers at the secondary level to improve instruction which involves a variety of applications, mainly utilizing Internet access (Murphy, Anzalone, Bosch and Moulton, 2007) and create the opportunity to exchange ideas, consult experts, take students on virtual field trips, and access online libraries (Wartkins, 2009). According to Spence and Smith (2009) ICT-enabled communications build human capabilities and freedoms and also offer students the opportunity to learn how to use electronic tools to access information and develop research skills in solving problems. United Nations and the World Bank reported that ICT can increase access to education network for students, train teachers and, broaden availability of quality education material for emerging global economies (World Bank 2003).

Many schools in Kenya are gearing up to accommodate ICT in their programmes. In Migwani District, several schools have acquired at least a computer in their school. However, very few of these schools are using them for teaching and learning. There are several barriers that have made this process to move slowly. Muntaz (2002) points out that lack of infrastructure such as computers, software etc can seriously limit what teachers can do in the class room with regard to integration of ICT.

Newhouse (2002) found that many teachers lacked the knowledge and skills to use computers and hence were not enthusiastic about change and integration of ICT.

In Silicia's study (2005), ICT technical support to teachers was found to be a major barrier for teachers to integrate ICT. Technical barrier impede the smooth delivery of lessons and hence delay in delivery of lesson objectives. According to Mulwa (2012), secondary schools should employ technical support staff before embarking on full scale e-learning.

Studies have also shown that leadership or school administrative support plays vital role in ICT integration. The failure by educational institutions to integrate ICT in education and imprint it on minds of teachers has been attributed to lack leadership capacity Schiller (2003). The variables mentioned above are also seen as some of the possible contributions to low ICT integration rates in teaching and learning in Migwani District of Kitui County.

Integration of ICT in teaching and learning in public secondary schools has been slow in Migwani district as compared to the neighbouring districts of Mwingi central and Kitui west district which are in the ecological zone as shown in the table 1.1 below.

Table 1.1 Number of public secondary schools which have integrated ICT in teaching and learning in Migwani, Mwingi central and Kitui west district.

District	No. of schools	2009	2010	2011	2012	2013
Migwani	40	1	1	2	2	3
Mwingi Central	26	0	3	3	4	5
Kitui West	21	4	3	4	4	6

Source: County Director of Education Kitui 2013

This research is therefore; set to establish the constraints and barriers leading to the slow pace in ICT integration and also the haphazard integration of ICT in secondary schools in the district, so as to narrow the digital divide in schools.

1.2 Statement of problem

According to Waihenya (2005), schools in rural areas still lag behind in terms of ICTs integration in teaching and learning. Implementation of ICT in education fits within the broad e-government policy which aims at mainstreaming ICT in all government operations and service delivery. It has

a specialized component, Education Management Information System (EMIS), which aims at providing education managers and administration with accurate and timely data to enable them make better and informed decisions. Although several studies have been conducted as reviewed none account directly to the factors influencing ICT integration in secondary schools in Migwani district. The study seeks to investigate the factors influencing integration of information and communication technology (ICT) in the teaching and learning process in public secondary schools in Migwani district, Kitui County.

1.3 Purpose of the study

The purpose of the study was to investigate the school based factors influencing integration of information and communication technology (ICT) in public secondary schools in Migwani district, Kitui County.

1.4 Objectives of the study

- i. To establish the influence of ICT infrastructure on integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County.
- ii. To determine the influence of teacher's ICT knowledge and skills on integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County.

- iii. To establish the relationship between ICT technical support to teachers and integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County.
- iv. To establish the influence of school administration support on integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County.

1.5 Research questions

- i. What is the influence of ICT infrastructure on integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County?
- ii. How does the level of teacher's ICT knowledge and skills influence integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County?
- iii. How does provision of technical support to teachers influence integration of ICT in the teaching learning process in public secondary schools in Migwani District, Kitui County?
- iv. How does school administration support influence integration of ICTs in teaching and learning process in public secondary schools in Migwani District, Kitui County?

1.6 Significance of the study

The findings of the study may help the Ministry of Education (MoE) to use the findings to formulate the appropriate ICT policies in line with the National ICT Policy (2006). The school administration may use the findings in making decisions on the type of ICT infrastructure to acquire as well as the technical support necessary. The curriculum developers would find the result of the study important in developing ICT curriculum that would maximize the potential of ICT in education. The teachers may understand how technology affects their instructional materials in class and may find it necessary to adopt the available ICT in their schools. The teacher training colleges may find the results crucial in developing educator courses to enhance pre-service ICT training on better application of ICT in classrooms.

1.7 Limitations of the study

Due to the tight schedule of the principals and teachers some of them were not available for the interview. To mitigate this, efforts were made to make prior booking on the date the researcher met the respondents. Some respondents hesitated to provide useful information for the study due to fear of exposing the state of their institutions. The researcher overcame this by assuring the respondents that the findings of the study are for research purpose and their identity will remain confidential.

1.8 Delimitations of the study

The study only focused on the factors influencing integration of information and communication technology (ICT) in the teaching and learning process in public secondary schools in Migwani district, Kitui County considering factors such as ICT infrastructural capacity, teacher's ICT knowledge and skills, ICT expertise and school administrative practices. The study respondents included principals, teachers and students.

1.9 Assumptions of the study

This study was based on the following assumption:

- i. That there was low integration of ICT in teaching and learning in public secondary schools.
- ii. The other assumption is that the respondents gave genuine responses.
- iii. The teachers in the school had basic ICT skills and knowledge.

1.10 Definition of Significant terms

Administrative practices: refers to school support and planning towards provision of the necessary finances to acquire ICT and use in learning and teaching in schools.

Digital age: a period in the last quarter of the 20th century when information becomes easily accessible through publications and through the manipulation of information by computers and computer networks.

Digital divide: refers to inequality of access to ICT services such as telephone, computer and internet.

ICT infrastructure capacity: physical equipment/hardware and software that enables a network to function.

Information communications technologies: refers to technologies both traditional (for example radio, television, print, video) and newer technologies for example (internet virtual reality, distance education, mobile phones etc) that are intended to fulfill information processing and communication.

Innovation: is an idea, practice, or object that is perceived as new by an individual.

Integration of ICT: Refers to the adoption of ICT in schools and its application in teaching and learning process.

IT capacity building: as the process of creating or enhancing local human and organizational abilities to use IT to perform specific tasks in organizations in order to attain organizational objectives, and it is based on the idea of human capital.

Knowledge-based economy: an economy directly based on the production, distribution and use of knowledge and information.

Knowledge divide: refers to the inequality in the capability and skills to generate and use knowledge.

Pedagogy: is commonly defined as the science and art of education. It refers to the actual teaching skills a teacher uses to impart content knowledge related to a specific subject.

Technical support: basic skills to overcome technical problems when ICT are applied. It can be provided by in-school staff or external service provider.

1.11 Organization of the study

This study is organized into five chapters. Chapter one consists of the introduction of the study which includes; background, statement of the problem , research objectives and research questions, significance of the study, limitations and delimitations of the study, basic assumptions of the study and definitions of terms. Chapter two comprises of literature review of previous publications related to ICT integration in schools as carried out by other scholars. Summary of literature review and the theoretical and conceptual framework. Chapter three outlines the research methodology which is made of the research design, target population, sample size and sampling procedure, research instruments, validity and reliability of instruments, data collection procedures and data analysis techniques. Chapter four consists of analysis, interpretation and discussion of the study findings. Chapter five provides the summary of the study, conclusion, recommendations and suggestion for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section discusses literature related to integration and use of ICT in schools. First the section discusses the integration and use of ICT in schools globally, Africa and Kenya respectively. The section then discusses empirical literature based on study variables. Theoretical review and conceptual framework are also discussed.

2.2 Benefits of integration of ICT in secondary schools

Use of ICTs enhances all forms of information exchange, observation, learning and decision-making. Business transactions are expanded and speeded up with ICTs and business opportunities easily identified and markets operate more efficiently (Labelle 2005). ICTs promote access to information for private and professional decision-making which expand the range of choices and opportunities by facilitating greater access to economic, educational and development-related information. They create more awareness of factors affecting individual well-being and greater ability to influence and participate in decision-making.

However, a successful exploitation of the potential of ICTs for enhancement of secondary education depends more on pedagogical and inter-organizational strategies than ICT issues. While secondary education is the domain of interest, e-school projects are premised on collaborative

partnerships, alliances and consortia of corporate and government bodies. The projects have many prospects and challenges that must be resolved to ensure its sustainability (Evoh, 2009).

2.3 Overview of ICT Globally

Contemporary discourses on development consistently identify ICT as a requirement for economic growth and the improvement of social conditions (Korpela 2003). The link between ICT and development has been articulated in the alarming terms of the 'digital divide' and the widening of the gap between 'developed' and 'developing' countries. There is concern that developing countries are deprived of the opportunities for economic growth and life improvement generally enjoyed by advanced economies because of the scarcity of ICT, particularly limited Internet connectivity. Capacity of a country's information and communication technology capability can potentially bring about development (Kamal & Qureshi, 2009). Countries like Singapore and Malaysia were more like Kenya at the time of independence; they have recorded a remarkable economic development because of the heavy investment in ICT. Malaysia is committed to the use of ICTs to achieve its development objectives and to transform Malaysia successively to an information society, a knowledge society and finally a values-based knowledge society.

Shetty (2007) says that globally ICT can be used to promote greater access to education and information of good quality and thus help bridge the digital divide. Thus ICT has led to unprecedented explosion of knowledge due to rapid scientific and technological developments. The effect has been overall socio-economic development witnessed among the G7 countries that include Japan, USA, Germany, Britain, Canada, France and Italy that are the most industrialized countries in the world. An important milestone has been the integration of ICT into education globally. This has been made the process of teaching and learning cost and time effective. Kailikia (2005) notes that since the mid 1990s, the average growth of real GDP, labour productivity and total factor productivity of the European Union have fallen behind those of the United States of America. This is to show that investments in ICT by any country pay high dividends. This has prompted the UN through its organs to adopt ICT into their education system.

2.4 Overview of ICT in African countries

There has been increasing debate about information and communication technology (ICT) as an engine of growth that could lift developing nations. Kamal and Qureshi (2009) provides insights for the ways in which information technology (IT) can be used as a tool for economic development and can help in the achievement of the Millennium Development Goals (MDGs). African governments have liberalized their information and communication technologies (ICT) sectors and invested huge portions of

their annual budgets in ICT (Bollou,F. and Ngwenyama,O. 2002) amid other necessities like hunger and combating of diseases. There are challenges that confront sub-Saharan Africa as a whole which pose challenges in striking a balance between technology and the need for local development. Slow connectivity in Africa is characterized by; scarce resources, absence of access or the lack of ICT, the lack of integration of the local languages into the system, varying and updating the contents of materials that are posted on the websites (Kamel and Weigler, 2001). Many rural areas do not yet form part of the national electricity grid” (Conradie et al., 2003, p.31) this is particularly an acute problem since technology and the Internet can only be very effective if it is generated by electricity.

Table 2. 1: Number of Internet users

Region	Number of Users in million	
	2010	2013
Africa	4.72	6.21
Asia/Pacific	108.43	163.41
Europe	132.1	182.33
Middle East	3.52	5.71
Canada & USA	187.11	196.13
Latin America	18.5	28.34
World Total	454.38	582.13

Source: UNHD 2013

Jensen (2002) observes that prohibitive cost and sparse and unreliable telecommunication networks form the major hindrance for many people in

Africa to use ICTs. Findings show that the greatest number of Internet users in Africa resides in either South Africa or Kenya in the sub Saharan region or in Morocco and Egypt in the northern region. South Africa has a well developed Internet infrastructure in business and academia, and its degree of connectivity places it in the top 25 in the world. (Langmia 2005)

2.5 ICT in policy in Kenya

Like many other countries in the world, Kenya has developed National ICT Policy (2006). It sets out the nation's aims, principles and strategies for the delivery of Information and Communications Technology to improve the livelihoods of Kenyans. Ministry of Education (MoE) introduced the National ICT Strategy for Education and Training (Farrell 2007). The ICT policy gives an opportunity for establishment of grass root based infrastructure for knowledge sharing (Mureithi and Munyua 2006). Kenya has a government ICT Board whose main objective is to avail quality and affordable technical support to the Digital Villages to enable their smooth operation. The board has technical support focus points of standardized method for the testing and implementation of new software, the upgrading of hardware and the overall tracking of licenses and equipment. It also develops a collaborative relationship with the person responsible for Technical support and encourage them to include capacity building in the planning of future changes. The board works closely with the education institutions to ensure quality technical services as well as the

internet providers. From research, the attempt to integrate ICT in Kenyan secondary schools is faced by various challenges such as Lack of adequate number of computers in the schools, inability to acquire sufficient computers or update those which are obsolete due to lack of finances, fast changing technology and high overhead costs, loaded curriculum which make it difficult to find time to prepare ICT teaching materials, resistance by teachers to use ICT in teaching and learning and the lack of government employed teachers, hence the schools are forced to hire teachers thus draining the scarce resources which could have been used for upgrading the ICT facilities (Kidombo 2009, Oloo 2009, Farrel 2007). This is backed by the government report on ICT capabilities in secondary schools in Kenya (MHEST and NCST 2010).

2.6 ICT integration in education

There has been a high level of investment in information and communications technology (ICT) in education over a prolonged period of time throughout the 'developed world' (Twining 2002). Interest in ICT in education in England stretches back to at least the mid-1960s, when the original National Council for Educational Technology was first formed (CET 1975). At this time the main focus was often on further and higher education rather than on schools. Later there was expansion to the schools starting with secondary then primary schools through government funding. Twining (2002) outlines some of the policies employed by

government in England in order to meet the government targets for ICT in education. Funding was made available for; The National Grid for Learning (NGfL), connecting every school in the country to the Internet; providing additional computer equipment for every school; training every teacher in state schools in the United Kingdom (UK) to make effective use of ICT as a tool to support teaching: cutting bureaucracy in schools through the use of ICT and setting up of a number of Centres of Excellence for IT and High Technology training and Skills Challenge projects. Integration of ICT in schools in developing countries especially in Africa, is slow and uneven as indicated by the table below which provides some estimates of numbers of the schools reached with computers in a sample selection of African countries through NEPAD e- schools project (Farrel and Shafika, 2007)

Table 2. 2: Computer Penetration Ratios at Schools African Countries

Country	Number of Schools	Schools with Computers	% of Schools with Computers
Egypt	26,000	26,000	100%
Ghana	32,000	800	2.5%
Mozambique	7,000	80	1.1%
Namibia	1,519	350	22.1%
South Africa	25,582	6,651	22.6%

Source: NEPAD e- schools project, (2013)

Technological literacy, or the ability to use ICTs effectively and efficiently, is thus seen as representing a competitive edge in an increasingly globalizing job market. ICTs can enhance the quality of education by increasing learner motivation and engagement, by facilitating

the acquisition of basic skills, and by enhancing teacher training to empower students for lifelong learning. ICTs enable new ways of teaching and learning which constitute a shift from a teacher-centered pedagogy to one that is learner-centered. This literature proves that there is a big technological gap between the developed countries and African countries which represent a digital divide. African governments should work quickly to bridge digital divide so that the African states can be up to date technologically.

2.6.1 Influence of ICT infrastructure in integration of ICT in teaching and learning process

Schools should be equipped with the necessary ICT infrastructure in order to provide the next generations with the needed tools and resources for access and use and to attain the expected skills (Gulbahar&Guven 2008). Schools should be equipped with different kinds of technological infrastructure and electronic resources available; hardware, software and network infrastructure must be available to integrate ICT in education (Afshari 2009). He further argues that limited access to computers is a barrier to effectively using computers in classes. Mumtaz (2000) states that many scholars proposed that the lack of funds to obtain the necessary hardware and software is one of the reasons teachers do not use technology in their classes.

Efficient and effective use of technology depends on the availability of

hardware and software and the equity of access to resources by teachers, students and administrative staff. Use of ICT in teaching and learning must be accompanied by a corresponding change in curriculum. Tin (2002) explains that proper integration of ICT may require substantial pedagogical component in the IT curriculum of any teacher education program. He cautions that teaching ICT as an isolated discipline is not an effective way to encourage the use of ICT in learning. Clearly, the curriculum must be adapted or re-designed so that it is ready for ICT integration. This shows a big gap between the traditional teaching methods and use of print content and the modern methods using the ICTs and soft copies of curriculum materials. There is a need to develop original educational content, adapt existing content, and convert print-based content to digital media.

2.6.2 Influence of teachers ICT knowledge and skills in integration of ICT in teaching and learning process

Teacher professional development is a crucial component of the educational improvement (Tin 2002). Thus the teacher pre-service and in-service training in ICT is a must for proper integration of ICT in the education system in any country. Teachers need to be prepared to empower students with the advantages technology can bring. More to this the teacher is responsible for establishing the classroom environment and preparing the learning opportunities that facilitate students' use of technology to learn, and communicate (UNESCO 2008). Research finding have revealed that

most teacher training courses focused on basic computer operations rather than advanced computer skills and subject-specific pedagogical applications (Tin 2002).

The focus of teaching is to arouse students' curiosity and motivation to think, act, and learn. The change from the traditional chalk-n-talk pedagogy to new modes of pedagogy within secondary schools might introduce much uncertainty which tend to induce teachers' anxiety and cause them to feel frustrated in work. Hence many teachers have been found to offer stiff resistance to change involving technology intervention, technology integration and technology incorporation (Albirini 2007). Preparing students for real life in our technological and diverse world requires that teachers embed ICT in significant learning experiences (Braun & Kraft 1995). Research findings indicate that the use of ICTs alone does not change traditional teaching practices and that ICTs need to be supported by innovative pedagogic techniques to enhance students' self-learning and active interaction.

2.6.3 Influence of technical support to teachers in integration of ICT in teaching and learning process

To reduce the anxieties associated to the use of new technologies by the teachers, there has to be a reliable professional support. The technical experts should be employed to do things the teachers might struggle to do. There is a serious need for technical support staff with high level expertise

in the maintenance aspects of ICTs. Because of poor maintenance and insufficient skills to diagnose system problems and swap parts, there are many out-of-commission machines which could easily be re-activated and used. The problem of technical expertise is two faceted. In the first place, there are not enough people qualifying or attaining ICT specialist skills at the speed at which the technologies are adopted. Secondly, the problem of brain-drain whereby the few experts opt for better paying jobs overseas (Minishi-Mananji 2007).

Having technical staff available also allow them to provide assistance to students in using software applications, when they are not engaged in servicing the equipment. Whether provided by in-school staff or external service providers, or both, technical support specialists are essential to the continued viability of ICT use in a given school. Without on-site technical support, much time and money may be lost due to technical break downs. In the Philippines, for example, one of the major obstacles to optimizing computer use in high schools has been the lack of timely technical support. In some extreme cases involving schools in remote areas, disabled computers take months to be repaired since no technician is available in the immediate vicinity and so the computers have to be sent to the nearest city hundreds of kilometers away. The gap exists where access of ICT technical support to teachers in integration of ICT in teaching and learning process is lacking.

2.6.4 Influence of school administration support on integration of ICT in teaching and learning process

For successful integration of ICT in teaching and learning there has to be proper planning at the school level. This is because the school is expected to provide the necessary ICT resources for the teachers and the students to use. An ICT integration plan provides a detailed blueprint of the steps and methods needed to translate the school ICT vision into reality (Afshari 2009). A plan is a guide to action not a substitute for it; the existence of a written ICT plan and strategy does not guarantee the comprehensive use of ICT in schools, nor does the absence of an ICT plan necessarily equate to the lack of ICT integration in a given school (Bryderup and Kowalski 2002). Morrison (2001) asserts that the role of School management is crucial in ICT integration in any school. School management comprises of the B.O.M, P.T.A and in some instances the school patron. They are mandated to govern the school by the Minister of Education who endorses their appointment (Republic of Kenya, 2001). The roles or functions of the school managers are to facilitate the management of schools. They make decisions on the priorities in terms of school development and assist in resource mobilization School management, consequently, can prioritize the integration of ICT or be an impediment, especially where the B.O.M members are faced with inadequacies of illiteracy and technophobia. School management politics could also lead to stagnation of schools and hence slow adoption of ICT this can further be compounded by vested interests and corruption. The school

head should be much enlightened to give direction on the need and benefits of ICT, integration taking into account the other challenges

2.7 Summary of Literature Review

The review of the past studies has revealed that ICT integration in secondary schools was still in its nascent stages and its development was very slow. A task team mandated to develop ICT in Africa took stock of the progress and concluded that much more was needed to make this a reality, (Wangari, 2008). A study by (Wacera, 2012) dealt on the issue of making school managers ICT proficient. However, school managers chart the way forward for the school. Consequently, they need to be sensitized on the benefits of using ICT in administration, teaching and learning so that they can cascade the same down to their schools. Therefore, this study tried to establish the role of school managers and other players in facilitating ICT integration in Secondary schools.

According to Oloo (2002), teachers play a dual role of teaching and support in most instances. The importance of having well trained teachers is therefore, important. Ironically however, other than the fresh graduates from T.T.C.s majority of the teachers are not ICT proficient. This is so because the Ministry of Education has not required them to do so and only those who do it for their own reasons have acquired the proficiency. This lack of adequate number of teachers who are ICT proficient make ICT integration in secondary schools difficult. It was upon this study to determine the reason behind a majority of teachers being ICT illiterate and seek

suggestions of correcting this situation, as only ICT proficient teachers can impart and use ICT knowledge in teaching and learning.

2.8 Theoretical framework

The study was based on Roger's theory of Diffusion of Innovations. The theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures. The original diffusion research was done as early as 1903 by the French sociologist Gabriel Tarde. Diffusion research centers on the conditions which increase or decrease the likelihood that a new idea, product, or practice is adopted by members of a given culture or a social system. This was extended by Rogers (2003) hence at present is commonly known as Roger's theory of diffusion of innovation. Innovation diffusion research has attempted to explain the variables that influence how and why users adopt a new information medium, such as the Internet. The diffusion of information technology and telecommunications hardware, software, and services turns out to be a powerful driver of growth, having an impact on worker productivity (Bollou, 2002).

Robinson (2009) observes that, instead of focusing on persuading individuals to change, the theory sees change as being primarily about the evolution or "reinvention" of products and behaviours so they become better fits for the needs of individuals and groups. This theory has four elements: (i) Innovation-is an idea, practice, or object that is perceived as new

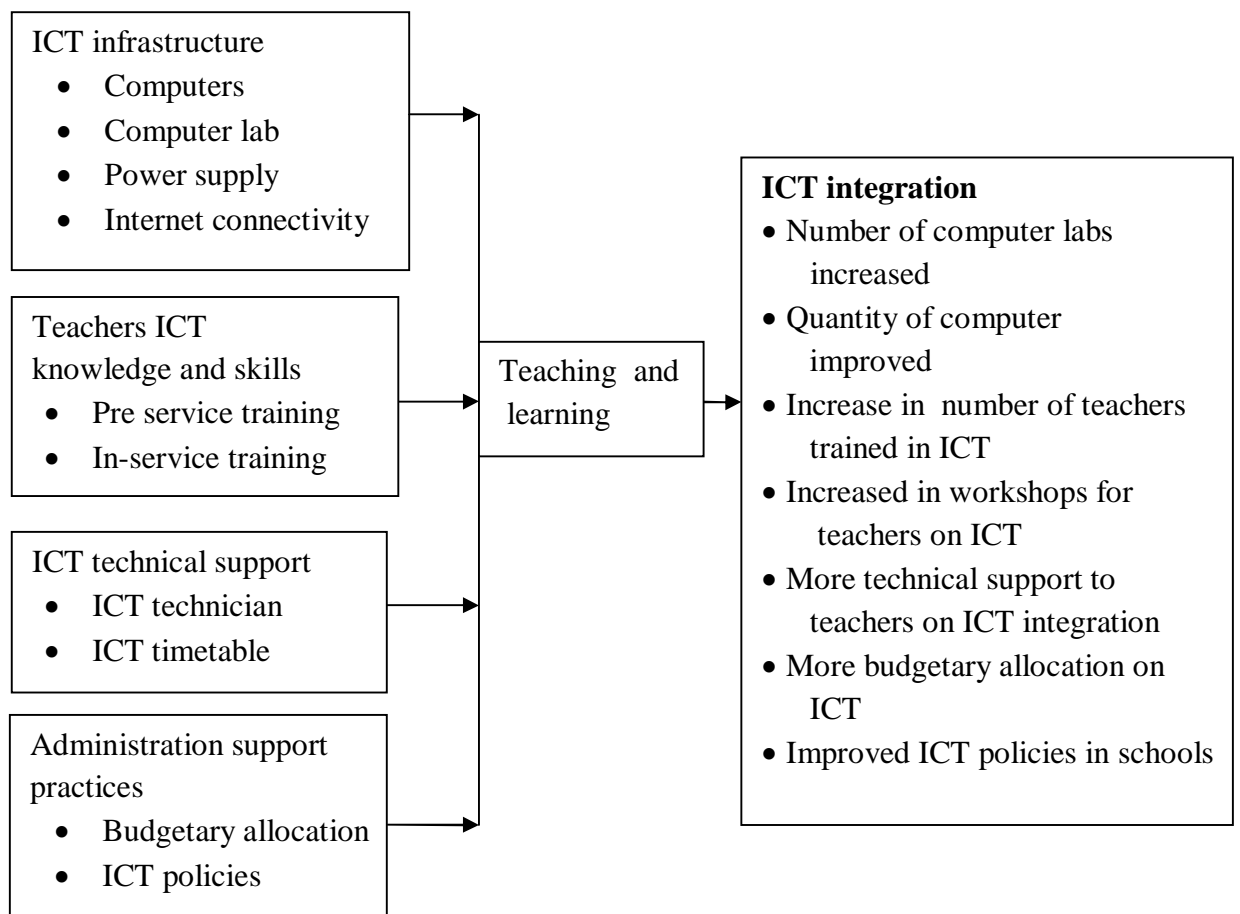
by an individual. (ii) A communication channel- is the means by which messages get from one individual to another. (iii)Time- is the length of time required to pass through the innovation-decision process. Rate of adoption is the relative speed with which an innovation is adopted by members of a social system. (iv) Social system- is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. Each member of the social system faces his/her own innovation-decision that follows a 5-step process; Knowledge; person becomes aware of an innovation and has some idea of how it functions. Persuasion; person forms a favorable or unfavorable attitude toward the innovation. Decision; person engages in activities that lead to a choice to adopt or reject the innovation. Implementation; person puts an innovation into use. Confirmation; person evaluates the results of an innovation decision already made (Orr 2003, Sahin 2006). This compels the user to continue adoption or later reject the technology.

The adoption or rejection of innovations is characterized by; the relative advantage, compatibility, simplicity, trial-ability and observability. So the understanding and utilizing diffusion networks can aid strategy aimed at quickly inducing system-wide change (Orr 2003, Robinson 2009, Sahin 2006). Given that the education stakeholders are aware of the ICT innovations across the world, the rate of adoption is still very low and especially in the developing states. Rogers' diffusion of innovations theory is

the most appropriate for investigating the adoption of technology in higher education and educational environments (Medlin 2001; Parisot 1995). This theory is therefore suitable for this study as it will help the study address the factors that affect integration and use of ICTs in teaching and learning process given the relative advantage.

2.9 Conceptual Framework

Figure 2. 1: The factors influencing integration of information and communication technology in teaching and learning



The study presumes that ICT infrastructure capacity, teachers ICT knowledge and skills, ICT technical support and school administrative practices as the independent variables influences the dependent variable integration and use of ICT in teaching and learning process. The study therefore seeks to establish the insight of this presumption. The study focused on the interaction between the variables that influence the integration of ICT in secondary schools in Migwani District, Kitui County. The independent variables are the variables the researcher cannot manipulate or change which include the ICT facilities and infrastructure, ICT knowledge and skills and School administration. Learning and other outcomes is the dependent variables. The ICT innovation and infrastructure in schools include hardware, software, internet connectivity and electrification. The kind of infrastructure available in schools depends on the users and their knowledge and skills which is pre-service and the in- service training. For efficient performance of ICT, there has to be adequate technical support and computer consultants to help solve technical problems for the teachers and the students to minimize time waste because of technical problems. The school administration should formulate ICT policies and plans as well as set ICT budget. These would influence innovations purchase in the schools in terms of quality and quantity. The administration should organize for staff development especially in- service training for teachers. The teaching load and the time schedule determine if the teacher have time to prepare

ICT learning materials. The result of all these relationships is better learning and other outcomes such as; technology integrated lessons, change in teaching methods, and development of ICT curriculum and efficient use of computer by the students.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter contains the research design to be used in carrying out the research, the target-population, the sample size and sampling procedure, research instruments, validity and reliability of instruments, data collection procedures and data analysis techniques.

3.2 Research Design

The research adopted a descriptive survey to gather data. Kombo and Tromp (2006) define a descriptive survey as a method of research which gathers data at a particular point in time with the intention of describing the nature of existing conditions of, or determining specific information. This method is thought to be an effective way of collecting data from a large number of sources relatively cheaply and within a short time. It also enables a researcher to gather data at a particular point in time and use it to describe the nature of the existing conditions (Colen at al-2000).

3.3 Target Population

Borg and Gall, (1989) defines the target population as the population to which the researcher wants to generalize the result of the study. Migwani District has got 40 public secondary schools, 300 teachers, 2400 form three

students. The target population of the study was all the 40 principals 300 teachers and 2400 form 3 students.

3.4 Sample Size and Sampling Procedure

A sample is a subset of the population to which research intends to generalize the results (Wiersma, 1986). From the total population of 2400 form three students 331 students were sampled using simple random sampling. The number of teachers sampled were 100 which is over 30% of the population. According to Mugenda and Mugenda a sample size of 30% is sufficient. All the 40 principals were sampled when the population is small the whole population is taken as the sample. 20 students were selected from each of the extra county school making a total of 80 students, 15 students were selected from each of the county school making a total of 90 students and 6 students were selected from each of the district day school.

Table 3. 1: Sample survey

School Category	Total number	Sample size	Percentage of total schools
Extra county	4	4	100 %
County	6	6	100 %
District Day	30	15	50 %
Total Respondents	40	25	62.5 %
Teachers	300	100	33%
Principals	40	40	100%
Students	2400	331	13.80%

3.5 Research Instruments

The research instruments used included questionnaires, interview schedule and observation schedule. According to Oppenheim (1992) a questionnaire offers considerable advantages in its administration. It can be used for large numbers of population simultaneously and also provide the investigation with an easy accumulation of data. (Gay 1992) maintains that questionnaires give respondents freedom to express their views or opinions and also make suggestions. Interview schedule enables the researcher to collect detailed information. Both questionnaires and interview schedule were used to collect both quantitative and qualitative data. The observation schedule included presence of a computer laboratory, the number of computers in the school, the main location of computers, presence of other telecommunication facilities and electricity supply and a generator for power back-up.

3.5.1 Validity of the instruments

Validity indicates the degree to which an instrument measures what it purports to measure. To ensure instrument validity, content validity was tested. Mugenda and Mugenda (2003) describe content validity as the degree to which the test items represent the domain of indicators or content of a particular concept being measured. The items to be tested were written down and the questions checked against these items to ensure that all the items are adequately represented. Experts in the field of education research

from the University of Nairobi went through them for content validity and made structural changes for purpose of improvement and reinforcement of the instrument before embarking on actual data collection.

3.5.2 Instrument reliability

Reliability is a measure of the extent to which an instrument will consistently yield the same result after being administered several times to the same respondents (Khan and Best, 1998). To establish the reliability of the research instruments, the test retest method whereby the pilot study respondents were issued with questionnaires for them to fill and the same questionnaires subjected to a retest to see how the response was. The reliability coefficient was computed using Pearson's Product Co-relation Co-efficient.

$$r = \frac{\sum xy - \frac{\sum x \sum y}{N}}{\sqrt{\left[\frac{\sum x^2 - (\sum x)^2}{N} \right] \left[\frac{\sum y^2 - (\sum y)^2}{N} \right]}}$$

Where r= Pearson co-relation co-efficient

x= results from the first test

y= results from the second test

N= Number of observations

A correlation coefficient of between 0.7 to 1 was considered reliable according to Mugenda and Mugenda 2003.

The reliability from the teachers questionnaire was 0.84 that from students questionnaire was 0.76 and that from the principal guide was 0.86. The

researcher therefore found that the instruments were reliable enough to be used for the study.

3.6 Data collection procedures

The researcher sought research permit from the National Commission for Science Technology and Innovation (NACOSTI) before embarking on the study. The researcher then paid a courtesy call to the Sub County Commissioner and the District Education officer Migwani District and explained his intention to carry out the research. The researcher then made appointment with the public secondary school principals. On arrival at the secondary school on the agreed dates, the researcher created rapport with the principal, teachers and students and explained the purpose of the study and then administered the research instruments to them. The respondents were assured that strict confidentiality would be maintained in dealing with their identity. The researcher personally administered the research instruments to the respondents. The secondary school teachers accompanied the researcher in their classes, introduced him to the students and allowed him to administer the questionnaires. The researcher collected the questionnaires immediately after they had been filled.

3.7 Data Analysis Techniques

This is the process of summarizing the collected data and putting it together so that the researcher can meaningfully organize, categorize and synthesize

information from the data collecting tools. Data gathered was coded for analysis. This was done after editing and checking out whether all questions have been filled in correctly. The research yielded both qualitative and quantitative data. The researcher employed descriptive statistics to analyze quantitative data. Descriptive statistics are indices that describe a given sample, for example, measures of central tendency and measures of dispersion. In this study, mean and standard deviation were used to compute quantitative analysis. In this case the quantitative data were presented in the form of frequency tables, pie charts, percentages and bar graphs. Qualitative data from the open or unstructured items in the questionnaires and principal's guide were arranged according to themes in the research objectives and presented in continuous prose.

3.8 Ethical considerations

Since the research involved human being the researcher ensured that ethical requirements were upheld in the study. The researcher informed and explained to the respondents the purpose of the study in which they were being asked to participate and the benefits that were expected from the study. The researcher requested the respondents to answer the questionnaires on their own free will. The respondents were also asked not to write their name or that of the school on the questionnaires.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Introduction

This chapter presents the data analysis procedures employed to find out the factors that affect the effective integration of ICTs in teaching and learning in secondary schools in Migwani District, Kitui County. The study sought to assess the extent of ICT infrastructural capacity for teaching and learning; to determine the level of teacher's ICT knowledge and skills in application of ICT in; to establish the ICT technical support to teachers in teaching and learning and to establish the school administrative practices that supports the use of ICT in teaching and learning in public secondary schools in Migwani District, Kitui County.

4.2 Response rate

A total of 100 questionnaires were distributed to the teachers in Migwani District. A total of 85 questionnaires were duly filled and collected making a 85% response rate. This is an acceptable rate and could be attributed to the fact that the questionnaires were physically dropped to the respondent and collected at the agreed date. All the 40 principals were interviewed which is 100% response rate and all the 311 students were interviewed which is 100% response rate.

The response rate were as per table 4.1.

Table 4.1: Response rate

Category	Targeted Sample Size	Response Rate	%Response Rate
Principals	40	40	100
Teachers	100	85	85
Students	311	311	100
Total	451	436	95

4.3 Demographic information

The researcher sought to establish demographic information of the respondents.

4.3.1 Gender of respondents

The researcher sought to establish the gender of the respondents in Migwani District.

Table 4.2 shows the findings.

Table 4.2: Gender of Respondents

Gender	Frequency	Percent
Male	251	56
Female	200	44
Total	451	100

Table 4 shows that 56% of the respondents were male while 44% of the respondents were female. This indicates that in general there were more male respondents than female respondents. The researcher observed that this was due to the fact that there were more male respondents compared to the other gender in the entire target population.

4.3.2 Academic qualification of the teachers

The researcher sought to understand the academic qualification of teachers by establishing whether they hold master degree, bachelor degree, post graduate diploma in education or diploma certificate. The table below presents the details on academic levels of the teachers sampled in the study.

Table 4.3: Level of education of teachers

Education level	Frequency	Percent	Cumulative Percent
Masters	6	7	7
Degree	52	61	68
PGDE	12	14	82
Diploma	15	18	100
Total	85	100	100

Out of the 85 teachers sampled in the research, 52 teachers are degree holders which represent 61%, 15 are diploma holders which is 18%, 6 are master degree holder which is 7% and the rest are PGDE holder which is 14%. Majority of the teachers who responded had less than five years of teaching experience at 47.9%, 5-9 years of experience were 20.8%, 10 -14 years were 10.4% while those with teaching experience of above 15years were 20.8%.

4.3.3 Average number of lessons per week and lessons per day

The researcher sought to establish the number of lessons taught per week and per day. He established that 75% of the teachers had an average of 25 lessons and above per week.

He also established that majority of the teachers had an average of 5 lessons per day i.e. 54.2% and 16.7% had 6 lessons per week. This implies that the teacher have a very high teaching load to have time to prepare the ICT materials required in class .

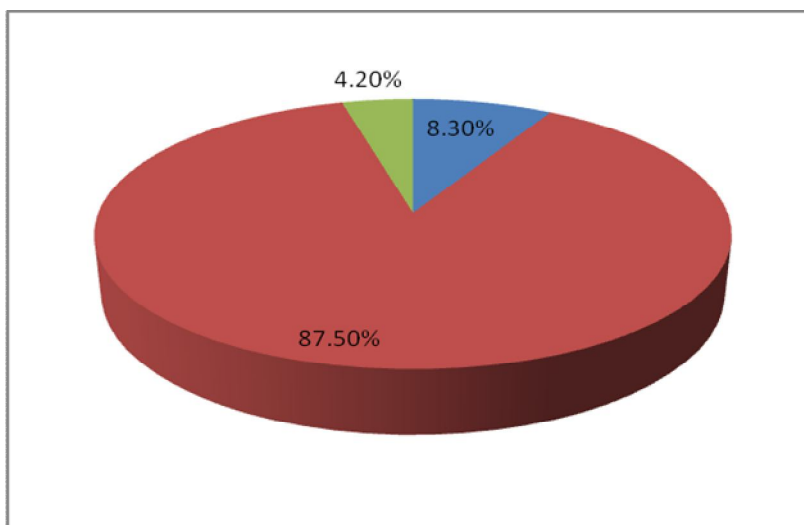
4.4 ICT infrastructure

The researcher sought to establish the influence of ICT infrastructure on integration of ICT in teaching and learning process.

4.4.1 Schools with computers

The researcher sought to establish whether the schools had computers. It was observed that most of the secondary schools had computers. Schools also had other ICT infrastructure which includes radio, televisions and DVDs which are mostly used for entertainment. The figure below shows schools with computers in percentage.

Fig.4.1 Schools with computers

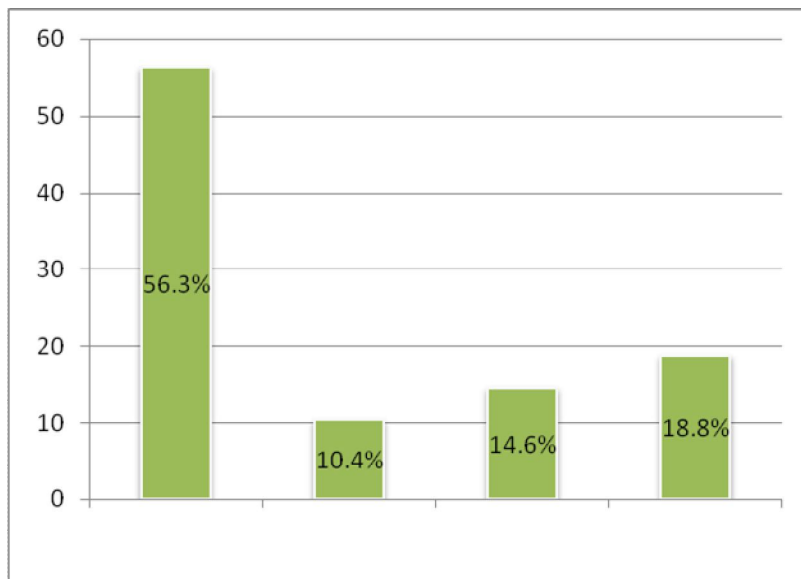


The figure above shows that 87.5% of the schools sampled had computers in their schools while 8.3% had none and 4.2% did not respond hence referred to as non respondents. This was evidence that most schools had some ICT equipment which can be used in teaching and learning.

4.4.2 Number of computers in schools

The researcher sought to establish the number of computers in the schools. The findings were as shown in figure 4.2 below.

Fig.4.2 Number of computers in school



< 5 comp 10-15comps 15-20 comps >20 comps

The researcher observed that 56.3% had less than five computers, 10.4% had ten to fifteen computers, 14.6% had fifteen to twenty computers while 18.8% of the total number of the schools sampled had 20 computers and above. Most of the day schools

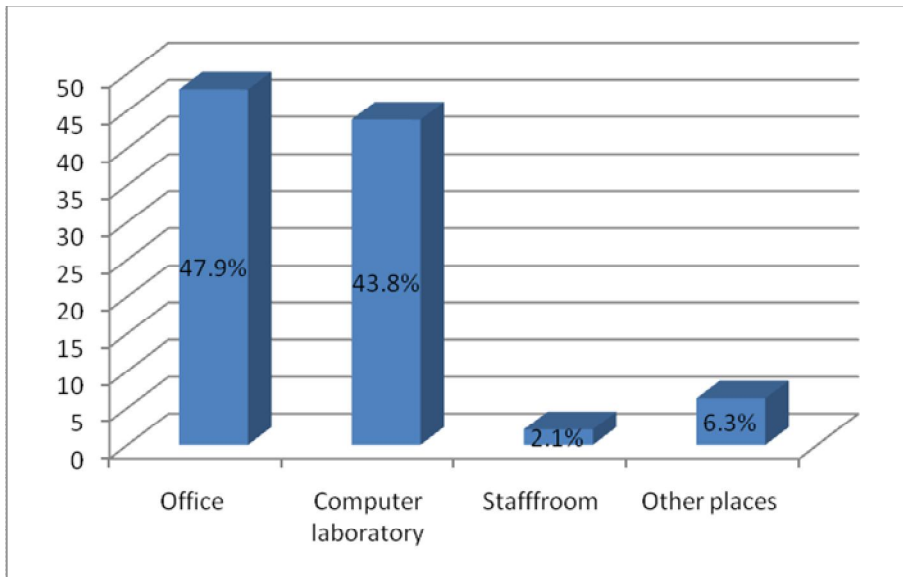
sampled falls in the 56.3% which worsen the situation given that majority of the schools in the sub-County are day schools.

Although the schools had computers they are too few compared to the users in the schools. This not only limits the access but it also becomes difficult to rely on them in teaching and learning.

4.4.3 Location of the computers in the schools

The researcher sought to establish the location of computer in the schools. The figure 4.3 below show where the computers are placed in schools.

Fig. 4.3 Location of computers in the schools



The researcher established that most of the computers in the schools are found in the office represented by 47.9%, 43.8% have their computers in the computer laboratory. Only 2.1% have a computer in the staffroom while 6.3% have their computers in

other places. This implied that the teachers and the students do not easily access the computers for teaching and learning.

The location of the computers in the school determines if they are accessible for use in the teaching and learning.

The observation schedule revealed that most of the day schools had less than five computers most of which are used for clerical work in the school. Most of the schools did not have computers in the staffroom. This limits the teachers to use computers to prepare their class presentation. In addition only one school had a projector. This meant that even presenting the work prepared by the teachers could only be done through hard copies.

4.4.4 How often the teachers access the computers

The researcher sought to establish how often the teachers access computers. Table 4.5 below show how often teachers access the computer.

Table 4.4 How often teachers access computers

How often the computers are accessed	Frequency	Percent	Cumulative percent
No response	2	2.3	2.3
Daily	17	20	22.3
Weekly	30	35.2	57.5
Monthly	20	23.5	81.0
Once a term	5	5.8	86.8
Never	11	13.2	100

The researcher established that 20% of the teachers were able to access the computers daily, 35.2% access them weekly and 23.5% access them monthly while 5.8% of the teachers access them, once per term and 13.2 never accessed computers during the term. 2.3% did not reveal how often they accessed computers in the schools. These findings implied that majority of the teachers are not able to access computers often.

The research sought to establish the purposes for which the teachers used the computers. He established that those who accessed the computers had varied uses ranging from personal use to official use. The main use of computer among the teachers was to access the CDROMs and prepare assignments and test which was mainly done in the office. Research through the internet and encyclopedia was highly out of use by majority of the teachers.

4.4.5 Internet connection in schools

The researcher sought to establish the internet connectivity in the schools. The findings were as shown in table 4.6 below.

Table 4.5 Internet connection in school

Internet connection	Frequency	Percent	Cumulative percent
No response	30	35.2	35.2
Prepaid modem	50	58.8	94
Internet server	5	6	100

The research established that 58.8% of the internet connection in schools is through prepaid modems and only 6% are connected through a server while 35.2% did not respond. This means that the access to internet is not only erratic but also very expensive because the prepaid modems are provided by the mobile phone service providers who are exorbitant in charges.

4.4.6 Infrastructure and use of ICT in class presentation

The researcher sought to establish the extent of which certain infrastructural factors affected their use of ICTs in class presentation. Table 4.7, below present's percentages of how they responded to the statements presented in the questionnaire. SA- strongly agreed, A-agreed, u-uncertain, D-disagreed and SD-strongly disagreed.

Table 4.6 The extent to which ICT infrastructure affect its use in class

ICT infrastructure factors	SA	A	U	D	SD
Inadequate number of computers	41.7	45.8	4.2	8.3	0
Lack of internet connectivity	29.3	56.3	4.2	8.3	2.1
Lack of access to computers	31.3	50.0	2.1	14.2	2.1
Insufficient or irregular power supply	12.5	35.4	8.3	29.2	14.6
High cost of hardware and software	31.3	45.8	8.3	10.4	4.2
Unavailability of appropriate software	16.7	52.1	14.6	6.3	10.4

41.7% of the teachers strongly agreed that inadequate number of computers hinder them from using them in class, while 45.3% agreed, 4.2% were uncertain while 8.3%

disagreed and none strongly disagreed. Teachers also felt that lack of internet connectivity also contributed to the slow use of ICTs in teaching and learning; 29.3% strongly agreed, 56.3% agreed, 4.2% were uncertain while 8.3% disagreed and 2.1% strongly disagreed.

Teachers revealed that they lack regular access to the computers in their schools; 31.3% strongly agreed, 50.0% agreed, 2.1% were uncertain while 14.2% disagreed and 2.1% strongly disagreed. This makes it even harder to prepare ICT based class lessons. More to this, there was insufficient or irregular power supply in the schools; 12.5% strongly agreed, 35.4% agreed, 8.3% were uncertain while 29.2% disagreed and 14.6% strongly disagreed. High cost hardware and software made it challenging for the teachers to acquire appropriate ICT facilities in schools; 31.3% strongly agreed, 45.8% agreed, 8.3% were uncertain while 10.4% disagreed and 4.2% strongly disagreed. The teachers also pointed out the little hardware and software available was not appropriate for efficient use in class; 16.7% strongly agreed, 52.1% agreed, 14.6% were uncertain while 6.3% disagreed and 10.4% strongly disagreed.

The use of ICTs in class has the potential to improve the presentation in class; but there is limited use of ICTs in the secondary schools. The research findings attributed this limited use to: Limited number of computers in schools: The number of computers in the schools was evidently low where 56.3% have less than five computers, 10.4% had ten to fifteen computers, 18.8% had fifteen to twenty computers while 14.6% of the total number of the schools sampled have 20 computers and above. This makes them inadequate and inaccessible for use by the

teachers and the students because most of them are found in the office. Very few schools use them to access video compact disk or even listen to the radio broadcast as aired by the Kenya Institute of Curriculum Development (KICD). In the literature review Afshari (2009) states that limited access to computers is a barrier to effective use of class.

Limited internet connectivity: There is low internet connectivity in the secondary schools. 66.7% of the total internet connection is dependent on the prepaid modem while only 2.1% have their connection through the internet server. The over reliance on the modem as the main access to the internet is expensive and often disrupted by slow connectivity. It was evident that the use of the internet is mainly personal to communicate with friends -and search for personal materials from the internet 39.6%. Only 27.1% use the internet to research for teaching learning materials.

Jensen (2002) in his research finding had outlined unreliable telecommunications networks form a major hindrance for many people in Africa to use ICTs, this also applies on education. The insufficient power supply in most of the secondary schools in the region had contributed to the slow integration of ICTs in the schools. This was because most of the secondary schools were in the rural areas where there is inadequate electricity supply especially in the day schools coupled with inadequate power backup.

Conradie (2003) had observed that many rural areas in Africa do not yet form part of the national electricity grid. This is particularly an acute problem since technology and internet can only be effective if it is generated by electricity. Unavailability of

appropriate software: Though there is general agreement that ICTs can improve class presentation, there is lack of appropriate software for presenting this information in class for both the teachers and the students. Tin (2002) explains that proper use of ICTs require substantial pedagogical component in IT curriculum and development of specific software for use in teaching and learning.

4.5 Teachers ICT knowledge and skills

The researcher sought to determine the influence of teachers ICT knowledge and skills on integration of ICT in teaching and learning process.

4.5.1 Level of ICT training

The researcher sought to establish the teachers' level of ICT knowledge and skills that would enable them to use computers at personal or professional level. The table 4.4 below outlines the level of ICT training among the teachers who took part in the study.

Table 4.7 Level of ICT training

Level of ICT training	Frequency	Percent	Cumulative percent
Unknown	5	6	6
Proficiency computer Packages	60	70.5	76.5
Diploma in ICT	20	23.5	100
Total	85	100	100

It was observed that 70.5% of the teachers have certificate in computer application packages and 20% had a diploma in ICT while 6% did not disclose the level of ICT

training. This showed that a big percentage of the teachers have the ability to use the computers although their ICT skills are not so advanced.

4.5.2 The impact of using ICTs in teaching and learning

The researcher undertook to understand what were the feelings of the teachers in use of ICTs in teaching and learning. All the teachers strongly agreed that use of computers would improve efficiency and effectiveness in school. Table 4.8 below present's percentages of how they responded to the statements presented in the questionnaire. SA- strongly agreed, A-agreed, U-uncertain D-disagreed and SD strongly disagreed.

Table 4.8 The impact of using ICTs in teaching and learning

The impact of using ICTs in teaching and learning	SA	A	U	D	SD
There is increased use of micro-soft applications	37.5	35.4	18.8	4.2	4.2
There is increased instructional materials in. the internet	39.4	45.8	6.3	4.2	4.2
ICT would improve the presentation in class	45.8	45.8	8.3	0	0
The use of ICTs would improve productivity in class	33.3	52.1	6.3	6.3	2.1

There is increased use of micro-soft office applications in general where 35.4% agreed and 37.5% strongly agreed. 18.8% were uncertain while, 4-2% disagreed and 4.2%strongly disagreed. To add to this, the teachers conquered that there is increased

instructional materials in the internet where 39.4% strongly agreed, 45.8% agreed 6.3% were uncertain, 4.2 disagreed and 4.2 % strongly disagreed. More to these the teachers agreed that ICT would improve the presentation of work in class where 45.8% strongly agreed, 45.8% agreed and 8.3% were uncertain. In addition, 33.3% strongly agreed, 52.1% agreed, 6.3% uncertain, 6.3% disagreed while 2.1% strongly disagreed that ICTs would improve class productivity.

The researcher established that the teacher training programs have not adequately incorporate ICT training in the teacher training programmes. This is because lack of proper curriculum in pedagogy of ICT integration in TTCs and other teacher training institutions.

4.6 ICT technical support to teachers

The researcher sought to establish the relationship between ICT technical support to teachers and integration of ICT in teaching and learning process.

4.6.1 Technical support to teachers in teaching and learning

The research sought to establish how technical support to teachers on ICT in schools affected teaching and learning. The following were the findings in relation to ICTs technical support in schools. Table 4.9 below indicates percentages of how the teachers agreed or disagreed to the technical related factors in use of ICTs in class.

SA- strongly agreed, A-agreed, U-uncertain, D-disagreed and SD-strongly disagreed.

Table 4.9 ICT Technical support to teachers

ICT Technical support to teachers	SA	A	U	D	SD
Lack of technician to help teachers with the computer hardware or the software	20.8	56.3	2.1	18.8	2.1
High cost of computer maintenance and upgrading	29.2	45.8	4.2	12.5	8,3
High cost of staff training on computer maintenance	6.3	47.9	8.3	31.3	6.3
Fear of computer and technology breakdown during teaching process	8.3	33.3	10.4	31.3	16.7
Frequent breakdown of computer and other digital equipment	10.4	35.4	8.3	33.3	12.5

Access to technical support by the teachers on hardware and software was a big challenge. 20.8% strongly agreed that there was lack of technical support, 56.3% disagreed, 2.1% were uncertain, 18.8% disagreed and 2.1% strongly disagreed. High cost of the computer maintenance and upgrading also limited teachers where 45.8% agreed, 29.2% strongly agreed, 4.2% were uncertain while 12.5% disagreed and 8.3% strongly disagreed. The teachers also felt that there were high costs of staff training on simple basic skills of computer maintenance; where 6.3% strongly agreed, 47.9% agreed, 8.3% were uncertain while 31.3 % disagreed and 6.3 % strongly disagreed.

There was mixed responses on the assumption that teachers feared computer and technological breakdown as they teach. Where 8.3% strongly agreed and 33.3% agreed 10.4% were uncertain while 31.3 % disagreed and 16.7 %strongly disagreed.

Frequent breakdown of computers and other digital equipments during teaching and learning had the following results; 10.4% strongly agreed, 35.4% agreed 8.3% were uncertain while 33.3 % disagreed and 12.5 % strongly disagreed.

The researcher established that there was limited technical support to the teachers on integration of ICT and this negatively influenced integration of ICT in the teaching and learning process.

4.7 School administrative support that influence the use of ICT in schools

The researcher sought to establish the administrative practices that influence use of ICT in schools. He established that the computers in the schools are mainly located and used in the office for office practices. Out of the four principals interviewed, only one that had a school policy on use of ICTs in school contained in this school's strategic plan office years. The others did not have a clear cut strategy on how to integrate use of ICTs in teaching and learning in their school. The interviews conducted to the principals had the following outcome. Two of the principals had 6-10 years of experience as principals in different institutions.

The other two had experience of 1-5years. One of them was newly posted to the institution. They all had one thing in common that there was lack of technological culture in teaching and learning in their schools. Two principals in the day and mixed boarding/day schools revealed that in their schools there was no clear ICT budget and the costs of ICTs are integrated in other vote heads like tuition this represented 50% of the total interviewed. One of the other principal in the district boarding

school-25% revealed that their ICT budget is purely financed by the parents which include human resource. The principal of the provincial school was reluctant to respond on budgetary issues.

None of the principals interviewed had benefited from the government economic stimulus programme of providing ICTs in secondary schools. The principals also noted out that they did not have specialized ICT teachers in their schools and employing teachers was an additional strain to already an over stretched budget. This was very common in the day schools which did not ask for extra money from the parents apart from the fees as guided by the ministry of education.

The principals interviewed confirmed that the cost of hardware and the software is high hence a major hindrance in the integration of ICT in teaching and learning. Budget constraints in the schools cannot allow the principals to make investment in training their teachers on the use of computer programs in the class. At the same time the heads of the schools fear that after training the teachers they can also transfer to other schools making the training given to these teachers inappropriate use of the already scarce financial resources in the schools. Frank (2007) observed that constraints exist due to lack of commitment of school administrators to new modes of instructional practices.

The researcher established that the cost of computer maintenance is high. The schools work on a constrained budget that is highly regulated by the government. Any extra charges are restricted while on the other hand there is very little support by

the government in the support of ICT programs in schools which includes poor staffing in the schools.

Cost of computer accessories is high as the principals disclosed. To save on these costs they are forced to develop policies restricting the use of computer related materials which further disadvantages the teachers and the students. The MHEST and NCST (2010) also revealed the financial constraints in the integration of ICTs in schools.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, discussions, conclusions and recommendation of the research. The chapter also contains suggestions of related studies that may be carried out in the future.

5.2 Summary of the study findings

The study findings have revealed that integration and use of ICTs in the secondary schools in Migwani District, Kitui County is hindered by very many factors.

Inadequate infrastructure: this includes inadequate number of computers in the schools, inadequate power supply, limited internet connectivity and inappropriate hardware and software. Teachers have poor pre-service training in ICT because only very few have a diploma in ICT. This is coupled by lack of enough time for in-service training and a high teaching load which leaves them with very little time to prepare the teaching and learning materials for use in class. Students on the other hand lack the skills to use computers in their schools.

Technical help is inadequate despite regular computer breakdown of the old computers. This not only wastes time but also leaves the teachers unable to continue using ICTs in class. The administrative practices include financing computer programmes in school and facilitating in-service training of the teachers as well as employing teachers to teach computer skills. This support is not readily available due to scarce resources in schools. Most schools lack ICT policies that would enable

proper integration of ICTs in teaching and learning. High cost of ICT maintenance pushes the principals to cut down on the use of ICTs in teaching and learning.

5.3 Conclusion

The ICTs have great advantage in improving all sphere of life including education. The researcher therefore concludes that the interplay of factors have negatively influenced and slowed the use of ICTs in teaching and learning in secondary schools in Migwani District, Kitui County. This includes unavailability and inappropriate ICT infrastructure in the secondary schools; limited ICT knowledge and skills for both the teachers and the students characterized by inadequate time for in-service courses for teachers; limited technical support during teaching and learning process and restrictive administrative practices mainly limited budgetary allocations and lack of proper ICT policies in the secondary schools. Therefore there has been limited use of ICTs in class presentation in secondary schools in Migwani District, Kitui County.

5.4 Recommendations

Based on the findings of the study, the researcher recommends that:

The government should invest heavily to provide adequate number of computers in schools and also enhance internet connection in the schools to ensure easy access to teaching learning materials in the web. Electrification should be diversified in the rural areas to enhance the use of computers. Alternative sources of energy can be used in the remote places where it is very expensive to provide electricity adequately. Power back up system can help solve the problem power interruption.

The ministry of education should, develop pre-service and in-service staff training programmes that are tailored to the school programmes to keep teachers up to date with the technological changes which will promote proper integration of ICTs in teaching and learning. More teachers should be deployed to the schools to train the students on the use of computers to increase the confidence when learning using ICTs. There should be ICT technician at the regional education levels to help teachers with the computer hardware or the software. This would assist the teachers handle computer breakdown.

The school administration should familiarize themselves with the national ICTs policies and especially in education in order for them to develop school ICT policy that would enable them integrates use of ICTs in teaching and learning in class. Government should make available avenues in which the schools can acquire computers at a reduced cost. This can be done through tax waiver on computers meant for learning in the secondary schools.

5.5 Suggestions for further studies

1. This study was carried out in one sub-County only; a similar study could be carried out in the other sub-Counties in the County as well as in the country.
2. A study could be carried out to find out the factors that influence the use of ICTs private secondary schools.

3. A study can be carried out to determine the cost- benefit analysis of using ICTs in secondary schools.
4. A comparative study can be carried out on the impact of using ICTs in secondary school performance academically.

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APPENDICES

APPENDIX: 1: INTRODUCTORY LETTER

Dear Sir/Madam,

REF: RESEARCH PROJECT

I am a student pursuing a Master of Education degree at University of Nairobi. I am undertaking a research project on Factors influencing the integration of ICT in teaching and learning in secondary schools in Migwani District, Kitui County. Kindly assist in the study by providing the information sought in the various items. The questionnaires and interview schedule are specifically meant for this study and therefore, no name of a respondent or that of your school will be required.

Your assistance and support on this matter will be highly appreciated.

Thank you,

David Ngui Mwikya

APPENDIX 2: QUESTIONNAIRE FOR TEACHERS

INTRODUCTION

The researcher is carrying out a research on factors affecting the integration of ICT in teaching and learning in secondary schools in Migwani District, Kitui-County. Please do not write your name on the questionnaire. Answer the questions objectively and provide accurate information to the best of your knowledge. Use a tick (√) to show your response where applicable, response can also be written.

A. BIO-DATA

- (i) Gender Male () Female ()
- (ii) Level of professional training
 Bachelor degree () Masters degree () PGDE ()
 Diploma () Others specify
- (iii) Teaching experience
 Below 5 years () 5-9 years ()
 10-14 years () 15 years and above ()
- (iv) What is your level of ICT training?
 Certificate Proficiency packages ()
 Diploma in ICT ()
 Others specify
- (v) What are your average teaching lessons per week?.....
- (vi) What are your average lessons per day?

B. SCHOOL BACKGROUND

- (i) Category of the school Extra County ()
 County schools ()
 District / Sub County day school ()
- (ii) Does your school have computers?
 Yes () No ()
 If yes how many?.....
- (iii) Where are the computers placed?
 Office () Staffroom ()
 Computer lab () Classroom ()
- (iv) How often do you access the computer?
 Daily () Weekly () Once a term ()
 Monthly () Never ()

(v) How do you use the computers available?

.....

(vi) Do you have internet connection in schools?

Yes () No ()

If yes, how are you connected? Pre- paid modem ()

Internet server ()

(viii) How do you use the internet?

.....

(ix) Apart from computers, what are the other telecommunication facilities in school?

Facility	RADIO	TV	DVD	VCR
Number				

(x) How are the facilities used?

.....

C. ICT INTEGRATION IN TEACHING AND LEARNING

Indicate the extent to which you agree with the following on ICT integration in teaching and learning. **SA-Strongly agree, A-Agree, U- Uncertain, D- Disagree, SD- strongly disagree**

Impact	SA	A	U	D	SD
There is increased use of micro-soft office applications in my school					
There is increased instructional materials in the ICT would improve the presentation of work in class					
Students use the multimedia technology					
Provision of professional support through the internet					
Improve productivity					

D. ICT INFRASTRUCTURE AND LEARNING / TEACHING PROCESS

Indicate the extent to which the following factors affect the use of ICT in teaching and Learning. **SA-Strongly agree, A- Agree, U- Uncertain, D- Disagree, SD- strongly disagree**

Factor	SA	A	U	D	SD
Inadequate number of computers					
Lack of internet connectivity					
Lack of access to computers					
Insufficient or irregular power supply					
High cost of hardware and software					
Unavailability of appropriate software					
Structural arrangement of computers					
Computers are very old and slow					

E. ICT KNOWLEDGE AND SKILLS

Can computer improve the efficiency and effectiveness in teaching and learning in schools? Yes () No ()

The following are problems related to ICT knowledge and skills, please tick your level of satisfaction for each statement? **SA-Strongly agree, A- Agree, U- Uncertain, D- Disagree, SD- strongly disagree**

Reasons	SA	A	U	D	SD
Lack of finance to train on use of ICT programs					
Insufficient amount of pre-service training on ICT					
Lack of time for in-servicing staff on ICT					
Lack of familiarity with good practice rooted on understanding of how learners learn					
Lack of adequate students training on how to use the computers					

F. TECHNICAL SUPPORT

Indicate to what extent the following factors influence integration of ICT in teaching and learning. **SA-Strongly agree, A- Agree, U- Uncertain, D- Disagree, SD- strongly disagree**

Factors	SA	A	U	D	SD
Lack of technician to help teachers with the computer hardware or the software					
High cost of computer maintenance and upgrading					
High cost of staff training on computer during teaching process					
Fear of computer and technology breakdown during teaching process					
Frequent breakdown of computer and other digital equipment					

G. SCHOOL ADMINISTRATION SUPPORT

1. How would you rate management support in ICT Integration?
a) Very Highly b) Highly c) Slightly High d) Low e) Very Low
2. To what extent do they impact on ICT Integration?
a) Very greatly affects b) Greatly Affects c) Moderately Affects
d) Slightly Affects e) No Effect
3. In your opinion as a major stakeholder in the development of education in the region give suggestions that could provide the much needed impetus towards ICT integration in secondary Schools.
 - i) _____
 - ii) _____
 - iii) _____

THANK YOU

APPENDIX: 3: INTERVIEW GUIDE FOR PRINCIPALS

1. Does your school have ICT policy and plan?
2. Does your school have a culture of technology use i.e. in teaching and learning?
3. How many computers do you have in your school?
4. How did you acquire the computers?
5. Is your school connected to the internet?
6. For what purpose is internet used in the school?
7. What is the estimate budget of ICT in you school and how do you finance the budget?
8. Does the government grant any extra funds for the ICT education at your school?
9. If yes how do you use the budget allocation?
10. What tasks are undertaken by use of computers by both teaching and non- teaching staff?
11. Does your school have a teacher(s) who specialize in ICT education?
12. Who pays ICT teachers?
13. Are the teacher given a chances and opportunities to learn to integrate computers into their classroom practices?
14. Do you believe that teacher's are motivated adequately to use ICT in teaching and learning?
15. Do you think teaching load for teaching influence use of technologies in teaching and learning?
16. In your opinion what factors have a major impact on effective use of ICT in your school?

APPENDIX 4: QUESTIONNAIRES FOR STUDENTS

1. Does your school have computers? Yes () No ()

2. Does your school have a computer lab?

Yes () No ()

3. Does your school use ICT in teaching and learning? Yes () No ()

4. Is your school connected to the internet?

Yes () No ()

5. How do you use internet in your school?

6. Does your school have a teacher(s) who specialize in ICT education? Yes () No ()

7. Does your school have a computer technician?

Yes () No ()

8. Do you think the school administration supports integration of ICT in teaching and learning in your school? Yes () No ()

9. If yes above how does it support?

APPENDIX 5: OBSERVATION SCHEDULE

Upon visiting the schools the researcher will seek to make the following observations in the schools.

1. Presence of a computer laboratory
2. The number of computers in the school
3. The main location of computers
4. Presence of other telecommunication facilities
5. If there is electricity supply and a generator for power back-up

APPENDIX 6: KREJCIE AND MORGAN TABLE

Table for Determining Sample Size for a Given Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
 "S" is sample size.

Source: Krejcie & Morgan, 1970

APPENDIX 7: RESEARCH AUTHORIZATION LETTER



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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NAIROBI-KENYA

Ref: No.

Date:

24th September, 2014

NACOSTI/P/14/6110/3409

David Ngui Mwikya
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“School factors influencing information communication technology integration in teaching and learning in public secondary schools in Migwani District, Kitui County, Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Kitui and Machakos Counties** for a period ending **20th October, 2014**.

You are advised to report to **the County Commissioners and the County Directors of Education, Kitui and Machakos Counties** before embarking on the research project.

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


DR. S. K. LANGAT, OGW
FOR: SECRETARY/CEO

Copy to:

The County Commissioner
The County Director of Education
Kitui County.

National Commission for Science, Technology and Innovation is ISO 9001: 2008 Certified

