FACTORS INFLUENCING TEACHERS READINESS TO USE ICT IN TEACHING IN PUBLIC SECONDARY SCHOOLS IN GATUNDU NORTH DISTRICT,

KIAMBU COUNTY, KENYA

BY

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DECLARATION

This Research Project Report is my original work and has not been presented for a degree in any other university.

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This Research Project Report has been submitted for examination with my approval as university supervisor.

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DEDICATION

This work is dedicated to my wife Lucy Lucas and our children, Bernice, Brian and Emmanuel.

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LIST OF ABBREVIATIONS AND ACRONYMS

DEO	District Education Officer.
ESP	Education Support Programme.
ICT	Information and Communication Technologies.
IT	Information Technology.
K.I.C.D	Kenya Institute of Curriculum Development.
MoE	Ministry of Education.
OECD	Organization for Economic Co-operation and Development.
OED	Oxford English Dictionary.
T.S.C	Teachers Service Commission.
UNESCO	United Nations Educational, Scientific and Cultural Organization.
USA	United States of America

ABSTRACT

This research focuses on factors influencing teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District, Kiambu County, Kenya. Research work has not been exhaustive especially on the area of teachers readiness to use ICT in teaching in secondary schools. In particular no known research on readiness to use ICT in teaching in secondary schools has been done in Gatundu North District. To fill this gap, this study singled out teachers and conducted an in-depth study into the extent of their readiness to use ICT in teaching in Gatundu North District. The key purpose of the study was to establish factors influencing teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District. The study was guided by the following objectives; to establish the extent to which personal characteristics influence teachers readiness to use ICT in teaching, to determine the extent to which prior computer training influences teachers readiness to use ICT in teaching, and the extent to which ICT infrastructure influences teachers readiness to use ICT in teaching. The sample consisted of head teachers and teachers in selected schools in Gatundu North District, Kiambu County. Data was collected by use of questionnaires and interview guide. The independent variables of the study were factors influencing teachers readiness to use ICT in public secondary schools while the dependent variable of the study was teachers readiness to use ICT. Statistical package for social sciences (SPSS) was used to analyze the quantitative data which was presented in tables while qualitative data from interview guide was analyzed by use of content analysis which involves a systematic, replicable technique for compressing many words of text into fewer categories. Relevant interpretation, discussions and recommendations were drawn from the analyzed data. A major finding of the study is that computer training influences teachers readiness because training makes the teachers acquire more knowledge. The acquired knowledge makes them more confident and competent. A major recommendation of the study is the need to have regular refresher courses in ICT as the findings revealed that not all teachers had good computer skills. Further, there is need to improve/install ICT infrastructure as lack of it negatively affected teachers readiness.The findings of the study may be adopted by administrators and planners in the field of education to improve to assess readiness to use ICT amongst teachers. Furthermore the findings of the study may contribute to the deeper understanding of readiness to use ICT by teachers with the aim of increasing access to ICT theory and equipment by teachers.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The adoption and use of Information and Communication Technologies (ICTs) in education institutions in developing countries remain very limited despite a decade of large investments in information and communication technologies (Trucano, 2005). Kenya like other developing countries struggles with high levels of poverty and this has an effect in adoption and access to ICT (OECD, 2004).The initial aim to introduce ICTs in education was primarily at developing ICT skills. However, with time focus has shifted to improve teaching and learning especially at secondary and post secondary levels. The availability and use of ICTs at various levels is still low. About 1300 secondary schools out of more than 6000 schools have computers, while most schools with computers use less than 40% of the available infrastructure and very few actually use ICT as alternative method for curriculum delivery. This shows a very slow ICT integration pace. (Kenya ICT Survey, 2007).

As stipulated in Kenya Vision 2030, Kenya aims to turn into globally competitive and prosperous nation with a high quality of life (Vision 2030). To achieve these goals, it is expected that education sector will help deliver this objective. Technology, especially information and communication technology (ICT) has a critical role to play in helping education deliver its mandate. The sessional paper no.1 of 2005 which is the current education policy captures stakeholders' recommendation on how education needs to be transformed to be responsive to the 21st century needs for education and training. ICT in education is well articulated in this policy document.

The government has heavily invested in the requisite ICT infrastructure. Key among the infrastructure put in place in the recent years include; the laying of the fibre optic cable across the country; facilitation of experiential growth of telecommunication industry (Proposed construction of Konza techno city; which will be ICT hub in Kenya); provision of computers, multimedia laboratories and related accessories to schools – a case in point is the current ESP- ICT project that aims at equipping 1050 schools with ICT infrastructure and most importantly, capacity building of teachers in the area in the integration (Millennium Goals status report for Kenya,2007).

In Kenya, the transition from teacher-centered learning to learner-centered learning is well on course. The use of ICT in curriculum delivery is viewed as central to learner-centered curriculum delivery. However, teaching is still mostly conducted in the same old way by a big margin of teachers. This is as a result of the false belief that one needs a whole suite of ICT to deliver the curriculum in learner-centered way. ICT can play a major role in accelerating paradigm shift as it can be used to actively engage students, make them collaborate and reflect on their living and through simulation it can contextualize content (Unwin, 2009). It is therefore paramount to research on how teachers are ready to use ICT in their teaching. Previous researches have shown that not much has been researched on teachers readiness to use ICT in teaching hence the need for this researcher to do it (Ministry of Education manual for teachers and school administrators on ICT integration in teaching and learning, 2011).

1.2 Statement of the Problem.

According to global Information Technology(2008-2009), the ICT readiness survey of 134 economies, ranked these countries as follows; Denmark, Sweden and United States as first, second and third in that order. Among the African countries Tunisia, Mauritius and South Africa were ranked numbers 38, 51 and 52 respectively.

Owing to its large infrastructure and more mature economy, South Africa is in a better position to implement ICT in education agenda. Many of the countries of North Africa have made excellent progress because of their resources and bandwidth connectivity they enjoy with Europe. Other countries that are moving steadily towards stable economies and that are placing a high priority on ICT application include Cameroon, Ghana and Botswana. However, majority of African countries are yet to embrace ICT in education institutions.

Readiness to use ICT in teaching and learning is of essence in that when teachers adopt the use of ICT in teaching, it enhances their productivity and course delivery. However, many teachers do not facilitate substantial student use of computers for learning activities (Becker, Ravitz & Wong, 1999; de Corte, 1990; Karsenti & Tchameni, 2007, Newhouse,1999).

Teaching and learning in secondary schools require various teaching apparatus. Researchers have pointed out that, computers have the capabilities to improve student knowledge and that "computer based technology gives teachers access to a rich variety of textual materials and graphic information". Woodsow (1994) explained that the use of computers provides new instructional strategies which the teachers and students can employ. These include sophisticated laboratory and simulation tools.

Yet, many teachers shy away from incorporating technology in the teaching and learning process despite the availability of computers in schools. Clark (2000) pointed out that few teachers use computer based technology for instructional purposes and observed that computers are not being integrated into most instructional curricular.

Many teachers perceive that adoption of ICT in schools will render them jobless due to foreseen benefits such as e-learning and efficiency in the mode of delivery (Kenya ICT survey, 2007).

An examination of the National ICT Policy (2006) and The National ICT Strategy for Education and Training revealed that the government recognizes the role of ICTs in education and development. Kenya Education Sector Support Programme (KESSP) (2005-2010), focuses on challenges facing the education sector and gives solutions on how to overcome them. The Education Options Paper discusses the ways in which ICTs can support and improve delivery of quality education to Kenyans. Although the ICT syllabus in secondary schools and teachers' colleges provides basic computer knowledge, skills and attitudes on use of computers, the focus is on the computer as the object of study.

It is perceived that only a handful of teachers in Gatundu North District has embraced the use of ICT in teaching. Most of these teachers are those from well established schools with computers and ICT infrastructure. However, no single factor has been identified that may have contributed to the limited use of ICT in teaching. A host of factors may be considered which may have led to the aforesaid scenario. This researcher chose three factors to establish the extent to which these factors have influenced the use of ICT in teaching. This study

therefore sought to investigate and analyze how the selected factors influence the teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District.

1.3 Purpose of Study

The purpose of this study was to assess teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District.

1.4 Objectives of the Study

This study was guided by the following objectives

1. To determine the extent to which personal characteristics influence teachers readiness to use ICT in teaching in secondary schools.
2. To assess to what extent computer training influences teachers readiness to use ICT in teaching in secondary schools.
3. To investigate to what extent ICT infrastructure influences teachers readiness to use ICT in teaching in secondary schools.

1.5 Research Questions

The study was guided by the following research questions

1. How do the personal characteristics influence teachers readiness to use ICT in teaching in secondary schools?
2. How does prior computer training influence teachers readiness to use ICT in secondary schools?
3. How does ICT infrastructure influence teachers readiness to use ICT in secondary schools?

1.6 Significance of the Study

Understanding the factors influencing teachers readiness to use ICT in teaching in secondary schools is important as it may provide the entire education cycle with information regarding readiness to use ICT by teachers in secondary schools .This information may in turn be used to design ways through which ICT may be integrated in teaching. The findings of the study may also help policymakers to identify challenges of ICT integration amongst teachers, offer solutions for the same and develop a policy framework which may lead to total adoption and embracing of ICT amongst teachers. Most importantly this information may guide the Kenya

Institute of Curriculum Development (KICD) personnel on how to approach the issue of teachers when working on modalities on how to integrate ICT in teaching in secondary schools.

1.7 Limitations of the Study

Mitchell, Wirt and Marshall (1986) define limitations of the study as those characteristics of design or methodology that set parameters on the application or interpretations of the results of the study. Time and financial resources were the main limitations of the study. Hence, the research was conducted only in sampled public secondary schools in Gatundu North District, Kiambu County, Kenya.

1.8 Assumptions of the study

This study made the following assumptions

1. Teachers and head teachers in sampled public secondary schools were willing to participate in this study.
2. ICT use by teachers could lead to increased ICT use by their students.

1.9 Delimitations of the study.

The delimitations of a study are those characteristics that limit the scope of inquiry (Mitchell, Wirt and Marshall, 1986). The study was restricted to public secondary school teachers and head teachers in Gatundu North District. This helped the researcher to have an overview of teachers readiness to use ICT in teaching in public secondary schools. The study focused on teacher readiness to use ICT in teaching although study can be done on readiness to use ICT in other areas besides teaching.

1.10 Definition of Significant Terms

Age: In this study it is the time during which an individual teacher has lived.

Attitude: This is ones emotion, or actions toward an object or person. In this study its teachers emotion or action towards ICT readiness.

Dependent variable: In this study, it is a group of factors which affect the readiness to use ICT in teaching.

Independent variable: Independent variable in the study is the readiness by teachers to use ICT in teaching.

Gender: This shows whether one is a male or female. It differentiates between masculinity and femininity.

Information and communication technologies (ICTs): These are different types of technology tools and resources used for creating, storing, managing and communicating information.

ICT infrastructure: This refers to the physical hardware used to interconnect computers and users.

ICT integration: This refers to the incorporation of technology in teaching and learning.

Personal characteristics: These are traits or attributes possessed by an individual

Prior computer training: This refers to skills on computer one may have learnt previously.

Readiness: This is the state or condition of being prepared.

Teaching experience: This refers to competencies and skills one possesses after teaching for some time.

1.11 Organization of the study

The study is organized into five chapters. Chapter One has laid emphasis on the basics of the study and covers background of study, statement of the problem, research objectives and research questions. It has also covered the significance of the study, limitations of the study, assumptions of the study, delimitations of the study and definition of significant terms. Chapter Two contains the review of the literature. In the literature reviewed, the following issues were addressed; ICT use in teaching, global ICT integration in teaching, ICT integration in teaching in Africa, ICT integration in teaching in Kenya, personal characteristics and readiness to use ICT in teaching, age and teachers readiness to use ICT in teaching, gender and teachers readiness to use ICT in teaching, attitude and teachers readiness to use ICT in teaching, teaching experience and teachers readiness to use ICT in teaching , prior computer training and teachers readiness to use ICT in teaching and ICT infrastructure and teachers readiness to use ICT in teaching. The chapter also contains theoretical framework and the conceptual framework. Chapter Three describes the research design and methodology the researcher used to conduct the study. It also covers target population, sample and sampling procedure, research instruments, reliability and validity of the instruments, data collection procedure and data analysis. Chapter Four consists of data analysis, presentation and interpretation. Chapter Five deals with the summary of the findings, discussion, conclusion and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter outlines literature from other studies that are directly or indirectly related to the teachers readiness to use ICT in teaching in secondary schools. The literature is reviewed under themes that are derived from objectives as follows; personal characteristics and teachers readiness to use ICT, prior computer training and teachers readiness to use ICT and ICT infrastructure and teachers readiness to use ICT.

2.2 ICT Use in Teaching

Information and Communications Technology (ICT) covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form, for example: personal computers, digital television, email and robots (Scholten, Velde & Manen, 2009). It is also concerned with the way these different uses can work with each other. Rangaswamy and Gupta (2000) describe adoption as the decisions that individuals make each time that they consider taking up an innovation. Similarly, Rodgers (2003) defines adoption as the decision of an individual to make use of an innovation as the best course of action available. Rodgers (2003) argues that the process of adoption starts with initial hearing about an innovation to final adoption.

Earle (2002) linked ICT integration with the concept of wholeness, when all elements of the system are connected together to become a whole. For instance, the two important elements of teaching and learning which are content and pedagogy must be joined when technology is used in a lesson. In other ways, if students are offered series of websites or ICT tools (for instance CD ROMs and multimedia) then the teacher is not integrating ICT into teaching since he or she is not tackling the pedagogical issues. Similarly, Williams (2003) described ICT integration as the means of using any ICT tool (Internet, e-learning technologies, CD ROMs) to assist teaching and learning. In this study, Williams' definition of ICT integration is adopted.

Several factors influencing the use and integration of ICT into teaching have been identified by researchers. Rogers (2003) identified five technological characteristics or attributes that influence the decision to adopt an innovation. Stockdill and Moreshouse (1992) also identified user characteristics, content characteristics, technological considerations, and organizational capacity as factors influencing ICT use and integration into teaching. Balanskat, Blamire & Kefalla (2007) identified the factors as teacher-level, school-level and system-level. Teachers' integration of ICT into teaching and learning is also influenced by organizational factors, attitudes towards technology and other factors (Chen, 2008, Tondeur; van Braak & Valcke, 2008; Lim & Chai, 2008; Clausen, 2007).

Sherry & Gibson (2002) claim the technological, individual, organizational, and institutional factors should be considered when examining ICT use and integration. Neyland (2011), identified factors such as institutional support as well as micro factors such as teacher capability influencing the use of online learning in high schools in Sydney.

2.2.1 Global ICT integration in teaching

There is no doubt that ICTs are seen as central to education in the 21st century. The Queensland Government has made a huge commitment to promoting the use of new communication technologies through its ICTs for learning initiatives. These initiatives are part of the Queensland Government's (2002) policy, Education & Training Reforms for the Future (Bindloss, 2002).

According to previous studies in Finnish schools (Lakkala, Lallimo & Hakkarainen, 2005; Lakkala, Ilomäki & Palonen, 2007), the implementation of technology-supported collaborative inquiry practice assumes teachers to design the educational setting as an integrated whole that provides students with relevant technological tools, directs them to collaborate effectively, and promotes epistemologically high-level and creative working with knowledge.

As Singapore's only pre-service teacher training institute, the National Institute of Education (NIE) was entrusted with the responsibility for integrating ICT into initial teacher training programs based on the nation's Master plan for IT in Education. Accordingly, the NIE developed and began implementing a new ICT plan in 1998, which identified four main areas that needed change: curriculum; physical and technological infrastructure; human resource infrastructure; and research and development in the use of ICT in education (Jung, 2001).

2.2.2 ICT integration in teaching in Africa

Africa has witnessed the development of ICTs in various sectors over the last decade including education. The change from teacher-centred education system to learner- centred education the world over in the past few years contributes to the use of ICTs in education. Borrowing from the word "Knowledge –Driven world" as conceived by Hawkins (2004) and Inwent (2004), education reform practices should focus on equal access and quality of education which should highlight the importance of change in the education sector through use of ICTs and equipping new generations with enhanced skills. The political crises and the long drawn-out conflicts in some African nations have had devastating effects on education as observed by Hare (2007).

In addition, the archaic modes of operation used in this region have adversely affected different sectors which have led to low levels of development. Education is one such sector which has been affected by dwindling economies and subsequent poverty. Faced with these and many other challenges, the East African countries were keen to embrace technology which can potentially be an important agent of development. This is because the positive effects of ICT use in the developed countries had continually been noted, and it became critically important for developing countries of Africa to embrace technology. The role of technology in national development was undeniably significant as Minishi-Majanja (2007) rightly puts it.

However, this emergence and use of ICTs were rather hasty and haphazard as noted by Waema (2005), and thus necessitated streamlining. At the turn of the millennium, most of the East African countries, with the aid of donor agencies, formulated ICT policies to curb the anomalies. The earliest of these reforms was referred to as the "Draft National Informatics Policy" in Kenya (Ochuodho and Matunga, 2004).

ICT policies in the East African Community began taking shape in the early 2000s. As noted before, there had been an increase in unregulated use of ICTs that prompted the need for governments to offer direction in the use of these technologies. According to the infoDev report, quoted in Farrell and Isaacs (2007), the initial ICT policies were comprehensive and included all sub-sectors of the education system. However, the formation of the policies has been a long and complicated process. In Kenya, for example, the earliest known ICT policy dates back to the 1980s and by 2000 it had not been completed as noted by Nduati and Bowman (2005). These ICT policies, nonetheless, were and still are comprehensive and stress access to ICT tools and internet connectivity (Hare, 2007; Farrell, 2007).

Information and Communication Technologies or ICTs are increasingly playing a leading role in education in Africa. ICTs have the potential to increase access to education, improve teaching and learning and improve the efficiency of educational management. However, Muuka, (2009) noted that ICTs are not a magic bullet; they are simply educational tools just like blackboards, pens and paper. A big mistake many ICT users in Education project make is to focus on the ICTs rather than focusing on the educational priorities, objectives and challenges.

2.2.3 ICT integration in teaching in Kenya

The earliest attempt at ICT policy formulation in Kenya dates back to the 1980s, but the process remained incomplete by 2000 (Nduati & Bowman, 2005). The formation of ICT policy in Kenyan education has its roots in the Ministry of Research of the time. The motivation was to develop national policy guidelines for the development of ICTs in the country in order to address the then prevailing haphazard growth of the sector. This was complemented by the readiness of donor agencies including UNESCO, in funding the current policy-making process. Reports by both Waema (2005) and Farrell (2007) seem to agree with the idea that fast and haphazard growth of information technology lacking direction and regulation provided an impetus for ICT policies as mentioned earlier. The second reason reported was a desire by the then Permanent Secretary (PS) in the then Ministry of Research, Technical Training and Technology (MRTTT) to develop national policy guidelines. This, as the Ministry expected, would steer the development of ICTs in the country in order to

address the haphazard growth that was taking shape. The third factor was the readiness by the donor agency and in this case UNESCO to fund the policy making process.

A national ICT policy for Kenya was adopted in January 2006 after many failed attempts in preceding years (Waema, 2005; Kariuki, 2009). The policy is based on four guiding principles: infrastructure development, human resource development, stakeholders' participation and appropriate policy and regulatory framework. On human resource development, the policy underscores the need to strengthen and streamline ICT training through (among others):Promoting ICT in education at primary, secondary, tertiary and community levels by developing ICT curricula and ensuring that teachers/trainers possess the requisite skills; Setting up a framework for evaluating and certifying ICT training programmes. (Kenya. Ministry of Information and Communications, 2006).

The policy further lays the framework for e-learning considered crucial to its development and utilization. Need is expressed to provide affordable infrastructure to facilitate dissemination of knowledge and skill through e-learning plat forms; and to promote the development of content to address the educational needs of primary, secondary and tertiary institutions. The e-learning framework further seeks to facilitate sharing of e-learning resources between institutions and to exploit e-learning opportunities to offer Kenyan education programmes for export (Ibid, 2006). The realization of these intentions is expressed in the national ICT strategy for education and training, the policy document for ICT in education (Kenya. MoE, 2006). These include, among others, (1) equipping education institutions with digital equipment to stimulate integration of ICT in education and (2) supporting initiatives that provide digital equipment to educational institutions, with priority to secondary and primary schools.

In Kenya, according to Marshall, Kinuthia and Taylor (2009), the challenge confronting our educational systems is how to transform the curriculum and teaching-learning process to provide students with the skills to function effectively in this dynamic, information-rich, and continuously changing environment. ICTs provide an array of powerful tools that may help in transforming the present isolated, teacher-centered and text-bound classrooms into rich, student-focused, interactive knowledge environments. To meet these challenges, learning

institutions must embrace the new technologies and appropriate ICT tools for learning and move towards the goal of transforming the traditional paradigm of teaching.

In Kenya, ICT integration is still far from being achieved as many rural schools still grapple with the lack of electricity and the high cost of ICT equipment. Public schools have complained of the lack of government employed teachers. They are forced to hire teachers thus draining the scarce resources which could have been used for upgrading the ICT facilities. In addition, parents are not willing to pay any extra fees because of free primary education. They feel it is the responsibility of the government to provide learning facilities (Commonwealth Secretariat, 2006)

It is in view of these perceived challenges that this study sought to establish factors influencing teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District. The focus was on teachers' age, gender, attitudes, teaching experience prior computer training, and ICT infrastructure.

2.3 Personal characteristics and teachers readiness to use ICT in teaching

For the purposes of this study, the personal characteristics of teachers that was discussed in the literature review include teacher's age, gender, and attitudes.

2.3.1 Age and teachers readiness to use ICT in teaching

In a study of projects to promote educational changes in America, Canada and the UK, Fullan (1991) found that one of the most fundamental problems in education reform is that people do not have a clear and coherent sense of the reasons for educational change, what it is and how to proceed. Thus there is much faddism, superficiality, confusion, failure of a change programme, unwarranted and misdirected resistance and misunderstood reform. They maintain that teachers who resist change are not rejecting the need for change but they are often the people who are expected to lead developments when they lack the necessary education in the management of change and are given insufficient long term opportunities to make sense of the new technologies for themselves.

Veenhof, Clermont and Sciadas (2005) in their study in Canada noted that older workers have fewer ICT skills and that this may result in a deterioration of their position in the labour force. They add that a 'generation gap' with respect to exposure to computers and other ICTs may explain a reduced opportunity to learn ICT skills. They also reported that young workers aged 25 and under are significantly more likely to grow up with a computer in the home than those aged 25 and above. They concluded that a significant decline in ICT use is found to occur after age 45 in several areas of the work force.

The impact of new ICT has significantly changed the speed of production, use and distribution of knowledge. Oliver (1994) identified the needs for student teachers to experience models of ICT use in their own learning before they can go ahead to implement same in their profession. However, informal observations reveal that older higher educators are naturally wary of ICT use in general. The popular saying "you can not teach old dogs new tricks" seem to describe this disposition. However, if this is so, the situation indicates a great danger and bleak landscape for poor and non existent use of ICT in secondary schools. This is because older teachers are in most cases the senior teachers occupying professional posts. Again, the task of curriculum design, development and revision rest largely on older teachers.

Similarly, the ICT behaviour becomes much more replicated in pre-service teachers than the ICT behaviour of the younger colleagues. Hawthorn (2000) noted that the effects of age become noticeable from the mid-forties onwards so that aging people are not just another minority group but an important segment of the population. This could also be the case among teachers and therefore the need for empirical evidence on the influence of age of teachers on readiness to use ICT. This study therefore seeks to provide information that will assist in making informed data-based decision regarding ICT-related curricular and instructional matter in relation to age of the teachers.

2.3.2 Gender and teachers readiness to use ICT in teaching in secondary schools

Majority of teachers' first priority is to maintain order in the classroom and to have a controlled learning environment. This implies that any suggestion of adopting very innovative teaching techniques such as using ICT is therefore seen as threatening this orderly

pattern and therefore not desirable. There is a genuine fear amongst many teachers about ICT and skepticism of its value to their students. Markauskaite (2005) noted that the introduction of ICT into the educational sector created new social stereotypes and gender inequalities. She also added that since the invention of the computer, ICT-related activities have been viewed as a male domain.

Volman and Eck (2001) also argued that old stereotypic gender differences in attitudes and achievements that previously existed in mathematics and technological disciplines were extrapolated to the area of ICT. Shapka and Ferrari (2003) in their research noted that males are more interested in ICT than females; they are more frequent users of computers , have more positive attitudes about computers and consequently outperform females in ICT literacy. The findings from the study further indicated that ICT-related differences between females and males lessen mainly in the access to ICT and basic computer skills. Volman and Eck (2001) further revealed that female teachers tend to be more anxious, less experienced and less confident about their ICT competencies and it is less likely that they will apply computers for various teaching and learning purposes. However, according to Veenhof et al. (2005), the findings for ICT use by gender are mixed. The findings indicated that in the European countries for example Italy, Norway and Switzerland, clear gender differences emerged but no such gap existed in North America. However according to Kuhlemeier and Hemker (2007), it was difficult to detect precisely what caused gender differences but the variation could influence the ICT literacy of an individual.

Gender differences and the use of ICT have been reported in several studies although studies concerning teachers' gender and ICT use have cited female teachers' low levels of computer use due to their limited technology access, skill, and interest (Volman & van Eck, 2001). Research studies revealed that male teachers used more ICT in their teaching and learning processes than their female counterparts (Kay, 2006; Wozney et al., 2006). Similarly, Markauskaite (2006), investigated gender differences in self reported ICT experience and ICT literacy among first year graduate trainee teachers. The study revealed significant differences between males and females in technical ICT capabilities, and situational and longitudinal sustainability. Males' scores were higher.

Jamieson-Proctor, Burnett, Finger and Watson (2006) also conducted a study on teachers' integration of ICT in schools in Queensland State. Results from 929 teachers indicated that female teachers were integrating technology into their teaching less than the male teachers. But the situation was different in mid-western US basic schools where Breisser (2006) found that females' self-perceptions about technology competence improved while males' self-perceptions about technological dominance remained unchanged in a lego-logo project. These findings were in agreement those by Adams (2002) that female teachers applied ICT more than the male teachers. This study confirmed a report by Yukselturk and Bulut (2009) that gender gap has reduced over the past years, presently, a greater number of females than males have used internet and web 2.0 technologies.

However, some studies revealed that gender variable was not a predictor of ICT integration into teaching (Norris, Sullivan, Poirot & Soloway, 2003). In a research conducted by Kay (2006), it was found that male teachers had relatively higher levels of computer attitude and ability before computer implementation, but there was no difference between males and females regarding computer attitude and ability after the implementation of the technology. However, Kay (2006) claimed that quality preparation on technology can help lessen gender inequalities. This study therefore sought to establish the extent to which gender influences teachers readiness to use ICT in teaching and learning in secondary schools.

2.3.3 Attitude and teachers readiness to use ICT in teaching in secondary schools

A study carried out by Harrison and Rainer (2002) using data compiled from a 1999 survey on 776 Knowledge and Information instructors and other workers from academic institutions in the southern United States, found that participants/ instructors with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt technology than those with positive attitudes. Accordingly, the negative attitude formed a barrier to quick acquisition of ICT skills.

Ropp (2000) notes that while many teachers have positive attitudes to the use of educational technologies, they do not necessarily believe in their own ability to use technology in a classroom with students. The author reported that learning and readiness in computers is aided by high levels of self-efficacy and a positive attitude.

In a study conducted by Jegede, Ojerinde and Ilori (2007) carried out in Nigeria, revealed that ICT attitude amongst teachers bears significant relationship with and also predicts competence. This is supportive of the finding of Zhang and Espinosa (1997). However, the study obtained that the components of the attitude that significantly predict competence are the affective and perceived usefulness. The implication of this is that the attitudinal component that would enhance good ICT competence and preparedness amongst teachers are freedom from ICT anxiety and the extent to which teachers believe ICT assists their work. It was further obtained that the attitudinal constructs that would predict ICT competence and preparedness include perceived control factor as well as affective component.

Lumumba (2007), in his study on the challenges facing e-learning in Public Secondary Schools, in Kenya, established that the e-learning project faced many challenges. He singled out negative attitude towards e-learning among students and teachers as key obstacles to the success of the e-learning project. According to Lumumba successful integration of ICT in the school environment is to a large extent influenced by the attitude held by the implementers.

Lumumba (2007) points out that it is not in doubt that the involvement of teachers is instrumental in unlocking potential gains which e-learning could offer to the learners, but teachers' negative attitude towards the use of e-learning will greatly limit the learners' chance of benefiting from e-learning.

Albirini, (2006) agrees with the sentiments of Lumumba and asserts one of the factors that greatly influence achievement of meaningful use of computer technology is the teacher's attitude towards the use of technology in teaching and learning process. The teachers' attitude is a major predictor of the acceptance and actual utilization of computers in the classrooms and in the management of their work. Hence it is important for teachers to have a positive attitude towards ICT as their attitude influences their e-readiness.

According Mulwa and Kyalo(2011), it is equally important to investigate the attitude that teachers themselves hold towards the adoption of e-learning in their schools as teachers are expected to carry out the implementation process and unless they have a positive attitude, it

will be a serious obstacle to the implementation. Accordingly the attitude held by implementers, towards e-learning is perceived as having some influence on the readiness to adopt e-learning.

2.4 Prior computer training and teachers readiness to use ICT in teaching in secondary schools

Computer competence is defined as being able to handle a wide range of varying computer applications for various purposes (Tondeur et al., 2004). According Bordbar (2010), teachers' computer competence is a major predictor of integrating ICT in teaching. Evidence suggests that majority of teachers who reported negative or neutral attitude towards the integration of ICT into teaching and learning processes lacked knowledge and skills that would allow them to make "informed decision" (Al- Oteawi, 2002, p.253, as cited in Bordbar,(2010). In a qualitative multiple case-study research on primary school competence and confidence level regarding the use of ICT in teaching practice conducted in five European countries, Peralta and Costa (2007) found that technical competence influenced Italian teachers' use of ICT in teaching. However, the teachers cited pedagogical and didactic competences as significant factors if effective and efficient educational interventions are likely to be implemented.

In Portugal, teachers reported different views regarding the most important competences for teaching with ICT. The experienced and new teachers stressed the need for technical skills and attitude, the innovative teachers emphasized curricula and didactic competences and the student-teachers cited technical competence and pedagogical efficiency as significant to integrate ICT in teaching and learning processes. According to Peralta & Costa (2007), teachers with more experience with computers have greater confidence in their ability to use them effectively. Jones (2004) reported that teachers competence relate directly to confidence. Teachers' confidence also relate to their perceptions of their ability to use computers in the classroom, particularly in relation to their children's perceived competence.

Research has been conducted on teacher's self-efficacy and reported to have greater effect on their use of ICT. Self-efficacy is defined as a belief in one's own abilities to perform an action or activity necessary to achieve a goal or task (Bandura, 1997). In real meaning, self-efficacy is the confidence that individual has in his or her ability to do the things

that he/she strives to do. Thus teachers' confidence refers both to the teachers' perceived likelihood of success on using ICT for educational purposes and on how far the teacher perceives success as being under his or her control (Peralta & Costa, 2007). Teachers' computer self-efficacy is described as a judgment of their capability to use a computer (Compeau & Higgins, 1995). According to Liaw, Huang and Chen (2007), teachers' computer self-efficacy influences their use of ICT in teaching and learning. Similarly, (Yuen & Ma, 2008) revealed that the Hong Kong teachers' implementation of ICT was depended on simplicity of computer use and perceived teacher self-efficacy.

Christensen and Knezek (2006) described computer self-efficacy as computer confidence in competence. Knezek and Christensen (2002) noted that teachers' competence with computer technology is a key factor of effective use of ICT in teaching. Peralta and Costa (2007) conducted a study on 20 teachers' competences and confidence regarding the use of ICT in classrooms. They revealed that in Italy, teachers' technical competence with technology is a factor of improving higher confidence in the use of ICT. In addition, teachers in Greece reported pedagogical and personal factors as those which mostly contribute to their confidence in ICT use. Also, innovative teachers in Portugal linked the perception of confidence in using ICT with the loss of fear of damaging the computer and at the same time possessing absolute control over the computer. However, they reported plenty of available time to work and practice ICT, support of experienced teachers and training as favorable conditions for gaining confidence in ICT usage.

The conventional teachers also reported organizational factors as a facilitating condition towards gaining confidence and finally new teachers stated that their confidence level in using ICT depended on personal factors. According to Jones (2004), teachers feel reluctant to use computer if they lack confidence. "Fear of failure" and "lack of ICT knowledge" (Balanskat et al., 2007) have been cited as some of the reasons for teachers' lack of confidence for adopting and integrating ICT into their teaching. Similarly, in a survey conducted by (Becta, 2004), approximately 21% of the teachers who were surveyed, reported that lack of confidence influence their use of computers in their classrooms. Becta (2004) stated that many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do.

Effective integration will depend to a larger extent on trained and supported teachers (UNESCO, Bangkok, 2003). The greatest challenge of the schools therefore has been the provision of adequate support to teachers in as far as acquisition of appropriate technical skills important for integrating computers in the classroom instruction is concerned. Despite the aforementioned efforts and the fact that ICT increases access to instructional material and several advantages to teaching, computers in many schools are under-used and as such the potential of computer technology is not being realized (Abrami,2001;Muir-Herzig,2004; Sutherland et al., 2004). While developed countries have reported up to 41%of integration of computers in instruction, the proportion remains substantially low in Africa (National ICT strategy for Education, Training and research, 2006). The ICT strategy adopted by the Kenyan government did not take into consideration teachers' reaction and attitudes due to their prior training in computer.

Again, an examination of the National ICT Policy (2006) and The National ICT Strategy for Education and Training revealed that the government recognizes the role of ICTs in education and development. Kenya Education Sector Support Programme (KESSP) (2005-2010), focuses on challenges facing the education sector and gives solutions on how to overcome them. The Education Options Paper discusses the ways in which ICTs can support and improve delivery of quality education to Kenyans. Although the ICT syllabus in secondary schools and teachers' colleges provides basic computer knowledge, skills and attitudes on use of computers, the focus is on the computer as the object of study. This study therefore seeks to establish the extent to which prior computer training influences teachers readiness to use ICT in teaching in secondary schools.

2.5 ICT Infrastructure and teachers readiness to use ICT in teaching in secondary schools

Albion (1999) states that decisions made by teachers about the use of computers in their classrooms are likely to be influenced by the accessibility and availability of the relevant software. However, according to the researcher, there is substantial evidence to suggest that, teachers' beliefs in their capacity to work effectively with technology, is a significant factor in determining patterns of classroom computer use. The researcher however recommends

acquisition of all relevant ICT equipment. According to him lack of relevant infrastructure hampers readiness by teachers to handle ICT content properly.

Castro (2003), however, cautions on the rash to implement new technologies in developing countries. He argues that the rich countries can afford most, if not all these technologies, even if they do not work well. He asserts that the best alternatives for developed countries are not necessarily the same for less developed countries and that despite the domestic controversies surrounding the inadequacy of teachers and teacher training in developing countries, the nature of the limitations is not the same. According to Castro (2003), the shortcomings of poorer countries are much more basic and the lack of preparation of teachers has a different order of magnitude.

Mbabu and Sakwa (2012) recommend an increased investment strategy for improving and equipping the schools with ICT-literacy training infrastructure and resources for both teachers and students in Kenya to address psychological and technical skill preparedness. Accordingly, this will leverage teacher's skills so as to reverse the slow rate of ICT adoption and improve the pace of diffusion in the secondary schools.

Lumumba (2007), in his study on the challenges facing e-learning in Public Secondary Schools, in Kenya, established that the e-learning project faced many challenges. The researcher singled out lack of adequate e-learning facilities (infrastructure) as a challenge facing adoption and readiness by teachers for ICT.

Ojwang (2012) conducted a study to investigate the status of e-learning readiness in Public Secondary Schools in Kisumu County, in Kenya given the agreement by educators and policy makers across the world on the importance of ICTs to the future of education. The main objective of the study was to investigate the effect of e-learning preparedness on e-learning adoption in secondary schools in Kisumu County, and specifically to assess the level of preparedness of public secondary schools in Kisumu County to implement e-learning so as to enhance access, equity and quality in secondary school education. The study revealed that public secondary schools in Kenya lack adequate ICT infrastructure and connectivity to support effective e-learning delivery.

The schools are facing various challenges which can make e-learning very difficult to implement. Only 11.6% of the schools confirmed that they get relevant e-learning materials while 45% confirmed that they were not receiving relevant materials from the internet. 45% of the schools confirmed availability of internet in the schools but only 14.8% of the internet is reliable to support e-learning. The region has frequent power outage with 68.1% of the respondents acknowledging that they experience more than 3 times power outage in a month on average. According to the study, the frequent power outage that hinders e-learning readiness and preparedness in various schools can also be reduced if the schools invest more on power back-up systems and alternative power sources (Ojwang, 2012).

It was evident from the study, readiness to adopt e-learning was positively and significantly influenced by ICT infrastructure. This means that successful adoption of e-learning is determined to a large extent by the extent to which schools have acquired the necessary ICT infrastructure including adequate connectivity, reliable sources of energy and ICT equipment. However, most schools in Kitui District, Kenya were found to lack adequate ICT infrastructure, hence not adequately ready to adopt e-learning. According to the study, internet connectivity is very crucial in determining readiness to adopt e-learning. It should also be noted that intranet connectivity and mobile network coverage would enhance a school's readiness to adopt e-learning especially because internet services could be accessed via mobile phones, hence mobile telephone network connectivity could suffice for internet connectivity particularly in the remotely located schools.

The study by Mulwa and Kyalo (2011) also concluded that availability of e-learning equipment will be a sufficient measure of schools readiness to adopt e-learning only if reliable sources of energy are available. It could be concluded that ICT equipment are a crucial requirement for readiness to adopt e-learning as it was evident from the study findings, infrastructure positively and significantly influenced readiness to adopt e-learning. This means that successful adoption of e-learning is determined to a large extent by the extent to which schools have acquired the necessary ICT infrastructure including adequate connectivity, reliable sources of energy and ICT equipment. However, most schools in Kitui District were found to lack adequate ICT infrastructure, hence not adequately ready to adopt e-learning.

No known study on teachers readiness to use ICT in teaching focuses on Gatundu North District. The current study proposed to assess teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District.

2.6 Theoretical Framework

This project was based on the theory of multimedia learning proposed by Mayer (1997).It is based on the theory that humans have two ways or "channels" of processing information; auditory and visual, otherwise known as the dual-channel assumption. By leveraging both of these meanings and by building connections between multiple representations of the same information, meaningful learning is more likely to occur (Mayer, 1997; Moreno and Mayer, 2003).

Another important contribution to the theory about learning with technology is the modality principle, closely related to the cognitive theory of multimedia learning. It postulates that using multiple modalities when presenting information leads to more learning transfer. Importantly, it also focuses on cognitive load, or the amount of information that can be processed and held in the working memory before loss occurs. Cognitive overload is often an impediment to retaining information and according to Mayer and Moreno (2003) can be managed by using specific instructional design principles. These theories and principles are the theoretical basis for bringing video, audio and other multimedia presentation and technology into the classroom.

2.7 Conceptual Frame Work

The conceptual framework shows that various inputs (independent variables) determine the teachers readiness to use ICT in teaching in public secondary schools. These variables include teachers' personal characteristics, prior computer training, and ICT infrastructure.

The factors are influenced a lot by such variables like Government policies and ICT policies in schools. The above moderating variables are beyond the control of the schools. However, there are intervening variables like, level of motivation, perceived benefits of using ICT.

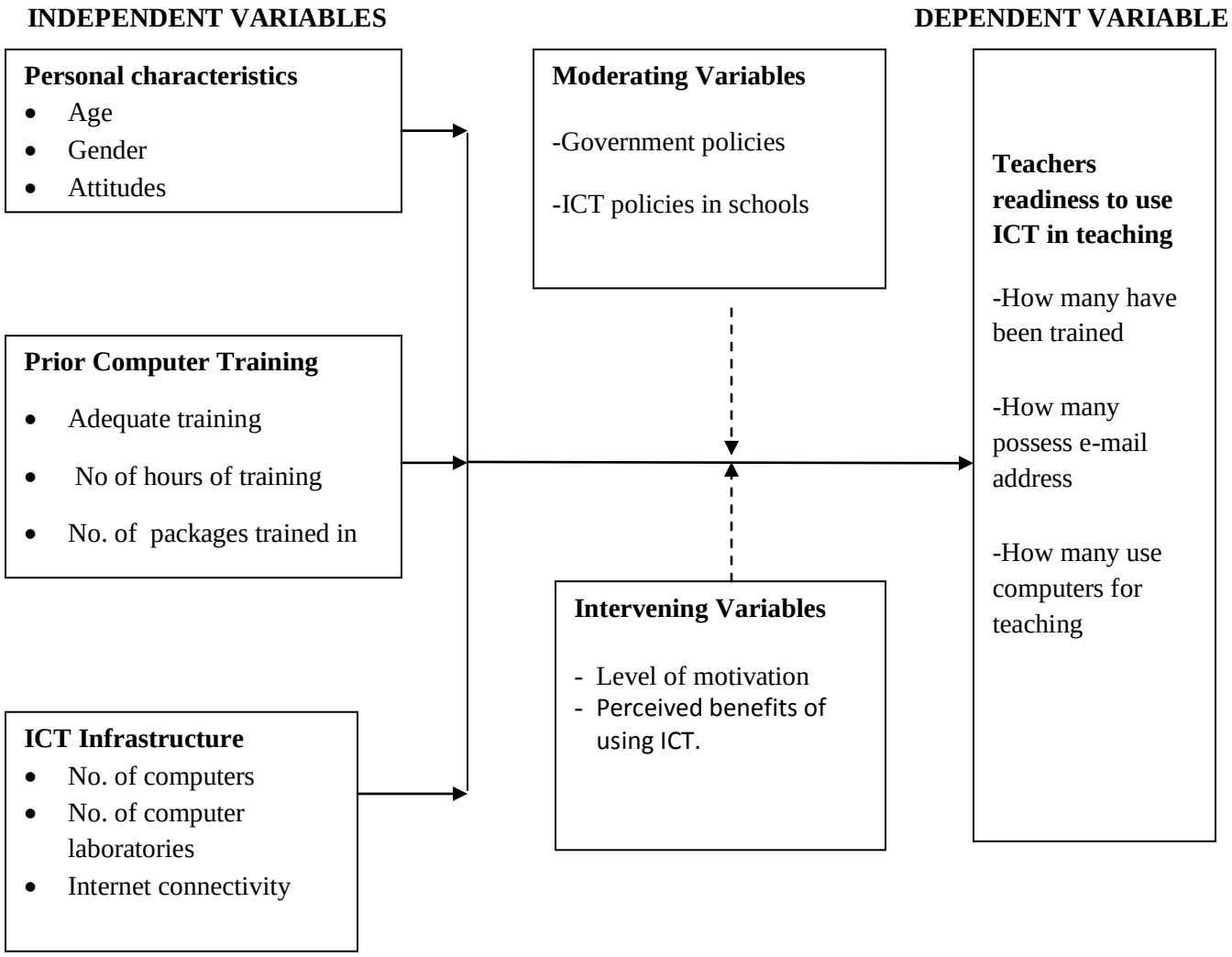

Figure 1.1 A diagrammatic representation of the study's conceptual framework.

2.8 Summary and Research Gaps

Chapter Two has looked into details on the literature associated with ICT integration in teaching. It started by outlining the use of ICT in teaching, global ICT integration, ICT integration in Africa and ICT integration in Kenya.

Studies and literature reviewed suggest that personal characteristics of a teacher, teacher's prior computer training, and availability of relevant ICT infrastructure, to some extent influence teachers readiness to use ICT in teaching in public secondary schools.

According to the literature reviewed, it is evident that all over the world teaching using ICT is being embraced. The developed nations are way ahead in implementing ICT in teaching as compared to developing nations. However, it has been noted that despite most nations' commitment to use ICT in teaching, some teachers are ready while others are yet to be ready. Kenya, like many other nations has teachers who are ready to use ICT in teaching while others are yet to be ready.

This study focused on teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District.In Gatundu North District no known study has been conducted to establish whether teachers are ready to use ICT in teaching or not.This study therefore focused on factors influencing teachers readiness to use ICT in teaching in public secondary schools.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This study sought to assess teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District. This chapter presents the research design, study location, target population, sample size and sampling procedure, research instruments, validity and reliability of the instruments, data collection techniques, data analysis method and ethical considerations.

3.2 Research Design

Research design is the arrangement of conditions for collection and analysis of data. It is a conceptual structure within which research is conducted (Orodho, 2008).

This study adopted a mixed method (both qualitative and quantitative) approach and employed a descriptive survey design. This design was appropriate for this study as it enhanced in depth investigation on teachers readiness to use ICT in teaching in public secondary schools. Quantitative approach allowed the researcher to collect data in numerical form using a questionnaire, while qualitative approach allowed the researcher to collect data qualitatively by the use of an interview guide. Qualitative approach also helped enhance in depth investigation.

This design was appropriate for this study as it enhanced an in depth investigation into teachers readiness to use ICT in teaching in selected public secondary schools in Gatundu North District by establishing whether personal characteristics may influence teachers readiness, how prior training in computers influence teachers readiness to use ICT in teaching and lastly how ICT infrastructure influences teachers readiness to use ICT in teaching.

Borg and Gall (1998) ascertains that descriptive survey research is intended to produce statistical information about aspects of education that interest policy makers and educators. The study used questionnaires and interview schedule as data collection instruments which suited the descriptive design.

3.3 The Study Location

Singleton et al (1996) states that the ideal setting for a research study is one that directly satisfies researcher's interests. In addition, Singleton et al notes that the ideal setting for any study should be easily accessible to the researcher and should be that which permits instant rapport with the informants.

The location of the study was Gatundu North District in Kiambu County in the Republic of Kenya. Gatundu North District is located to the west of Thika Town. It borders Gatundu South District to the South and Muranga County to the North. The District experiences predictable rains of more than 500mm annually.

3.4 Target Population

Target population constitutes all the items or people under considerations in any field of inquiry (Orodho, 2008).

The target population for this study was teachers in the selected public secondary schools in Gatundu North District, Kiambu County. Statistics from Gatundu North District District Education's office indicated that there were 31 public secondary schools out of which 4 were girls' secondary schools while 3 were boys' secondary schools the rest, 24, are mixed secondary schools. The teachers' population in these schools is 361.Out of this population, 216 teachers are male teachers while 145 are female teachers.

3.5. Sample size and Sampling procedure

A sample is a smaller group obtained from the accessible population while sampling is the process of selecting a number of individuals in such a way that they represent the large group from which they were selected (Mugenda and Mugenda, 2003).

Gay (1998) proposes a minimum sample of 10% and 20% for a large population and a small population respectively. The sample accounted for more than 20% of the total population which enhanced the study representation.

The researcher used random and stratified sampling to include teachers in Provincial schools, District boarding schools and District day schools. Since it was not be possible to study all the teachers in public secondary schools due to time and financial constraints, the study

sample size comprised of 88 teachers, which is approximately, 24% of the teachers' population of 361. Gender composition was 52 male teachers and 36 female teachers which was proportionate to the number of male and female teachers in the district. This ensured that both genders were well represented in the study. Also all the 20 head teachers of the randomly selected 20 schools took part in the study.

Table 3.1 Category of schools, population size and sample size of teachers

Category of School	Population size of teachers	Sample size of teachers
Provincial Schools	62	15
District Boarding Schools	124	30
District Day Schools	175	43
TOTAL	**361**	**88**

3.6 Research Instruments

The research instruments were questionnaire for the teachers and interview guide for the head teachers. Questionnaires offered the advantage of being easy and cost effective to administer to a large population (Borg, 1998). The questionnaires yielded quantitative data; while interview guides yielded qualitative data which despite being subjective is in-depth. The two instruments thus, complemented each other giving a true picture of the situation under investigation. The instruments had three sections covering the following areas: demographic information, extent to which personal characteristics influence readiness to use ICT in teaching, extent to which prior computer training influence readiness to use ICT in teaching and extent to which ICT infrastructure influences readiness to use ICT in teaching. Both open-ended questions and closed-ended questions were used to collect data. Open-ended questions allowed respondent to give an in-depth response to the subject of study. Close-ended questions restricted the respondent to YES or NO responses, matrix questions and contingency questions.

3.7 Validity of Research Instruments.

Validity refers to the degree to which the test/ instrument represents the content that the test is designed to measure (Orodho, 2009). The researcher assessed validity through the use of professionals or experts as advocated by Mugenda and Mugenda (1999). The researcher sought the supervisor's advice on whether the instrument accurately represented the concept under study. Two other experts validated the instruments as well. The instruments were revised accordingly.

3.8 Reliability of Research Instruments.

According to Orodho (2008), reliability of an instrument is the consistency in producing a reliable result at different times. A measure is considered reliable if a person's score on the same test given twice is similar. It is important to remember that reliability is not measured; it is estimated (Mustonen & Vehkalahti, 1997).

The split-half technique, according Babbie (2010), was used to test the reliability of the instrument. Responses were divided using odd numbers for one set and even numbers for the other set. The responses were then scored using the Pearson's Moment Product correlation coefficient formula:

$$\textit{Reliability of the overall test} = \frac{\textit{2 x reliability for ½ tests}}{\textit{1 + reliability for ½ tests}}$$

After the test a correlation co-efficient of 0.8 was got although the researcher was expecting a correlation co-efficient of 0.9. However, given that a reliability of 0.8 is acceptable, the instrument was considered to be reliable.

3.9 Data Collection Techniques

The researcher sought clearance to carry out the research from the National Commission for Science, Technology and Innovation which is based at the Ministry of Education after approval from University of Nairobi. Once in the field, further clearance was obtained from the Kiambu County Education office. In each school, further permission was sought from the head-teacher of the sampled schools. Further, informed consent was sought from all the study subjects before administering the questionnaires and interview guides. The respondents were given relevant instructions verbally and assured of confidentiality before being given the questionnaires. The questionnaires were later collected by the researcher.

3.10 Data Analysis Method

Data analysis involves sorting, coding, cleaning and processing and interpreting data (Kamindo, 2008). The purpose of data analysis is to find meaning in data (Burns, 2000). Descriptive statistics including frequency distribution and percentages were computed with the aid of computer software Statistical Package for Social Sciences (SPSS). Quantitative data was then presented in tables while qualitative data from the interview guide was analyzed using content analysis which involves a systematic, replicable technique for compressing many words of text into fewer content categories (Coolican, 1994). Relevant interpretations were drawn from the analyzed data.

3.11 Ethical considerations

To ensure anonymity and secure the privacy of the participants, the researcher did not require names and other means of identifying participants during the research. No identification numbers were assigned to the questionnaires before their return. This helped the participants to create trust in the researcher. Getting informed consent from respondents before administering the questionnaires and using information only for the disclosed purpose was also considered. Further, participation was also voluntary.

3.12 Operatizational Table

Operatizational Table shows how the various variables in the study were investigated. The variables were independent variables, 'the factors influencing teachers readiness to use ICT in teaching' and dependent variable, 'readiness to use ICT in teaching '.

TABLE 3.2 Operatizational Table

OBJECTIVE	INDEPENDENT VARIABLE	INDICATOR	MEASURE	MEASURING SCALE	TYPE OF ANALYSIS
To determine the extent to which personal characteristics influence teachers readiness to use ICT in teaching in public secondary schools	Personal Characteristics	- Age	-Number of years one has been using ICT in teaching	Ordinal	Descriptive
		- Gender	-Percentage of male and female	Nominal	Descriptive
		- Attitude	Frequency of ICT use for academic and non-academic purposes	Nominal	Descriptive
To assess to what extent prior computer training influences teachers readiness to use ICT in teaching in public schools	Prior computer training	Adequate training for teachers	Number of hours of training in use of ICT	Ordinal	Descriptive
To investigate to what extent ICT infrastructure influences teachers readiness to use ICT in public secondary schools	ICT infrastructure	Presence of computer laboratories	Number of computer laboratories	Ordinal	Descriptive
		ICT facilities present and those in use	Number of computers and printers and their usage	Ordinal	Descriptive
		Student access to computer use	Percentage of students using ICT	Ordinal	Descriptive
OBJECTIVE	**DEPENDENT VARIABLE**	**INDICATOR**	**MEASURE**	**MEASURING SCALE**	**TYPE OF ANALYSIS**
To assess if teachers readiness to use ICT in teaching is influenced by personal characteristics, prior computer training and ICT infrastructure	Teachers readiness to use ICT in teaching	-How many teachers have been trained	-No. of teachers trained	Ordinal	Descriptive
		-How many teachers possess e-mail address	-No. of teachers with e-mail address	Ordinal	Descriptive
		-How many teachers use computers for teaching	-No. of teachers using computers in teaching	Ordinal	Descriptive

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The purpose of this study was to assess teachers readiness to use ICT in teaching in public secondary schools in Gatundu North District, Kiambu County, Kenya. This chapter presents the findings of the study that includes analysis, interpretation and discussion of the data gathered from the field. This chapter is divided into five areas under which findings are discussed. This includes the questionnaire return rate, demographic information of the respondents, the extent to which personal characteristics (age, gender and attitude) influence teachers readiness to use ICT in teaching, the extent to which prior computer training influences teachers readiness to use ICT in teaching and the extent to which ICT infrastructure influences teachers readiness to use ICT in teaching.

4.2 Questionnaire return rate

The study targeted 88 teachers and 20 head teachers in collecting data with regard to readiness to use ICT in teaching in public secondary schools in Gatundu North District, Kiambu County, Kenya. This information is summarized in Table 4.1

Table 4.1: ***Survey Return Rate***

Respondents	**No. of Questionnaires Issued**	**Return Rate**
Teachers	88	80
Headteachers	20	18
Total	**108**	**90.7%**

From the study, 80 teachers and 18 head teachers filled in and returned the questionnaires making a response rate of 90.7%. This response rate was considered very successful and the main reasons may be because the respondents were well targeted and motivated.

4.3 Demographic characteristic of the respondents

Demographic information in this chapter included the personal information of the teachers and head teachers. It consists of age, gender and academic qualification of the teachers.

4.3.1 Distribution of age of the respondents

The study was conducted to a cross section of respondents with a range of different ages. The study sought to find out the age of the respondents. Table 4.2 presents the age of the respondents.

Table 4.2: ***Age of the Respondents***

Age in years	**Teachers**		**Headteachers**	
	FQ	**Percent**	**FQ**	**Percent**
Less than 30 years	16	20.0	-	-
31 – 40 years	26	32.5	4	22.2
41 – 50 years	18	22.5	9	50.0
51 – 60 years	20	25.0	5	27.8
Total	**80**	**100%**	**18**	**100%**

Majority of the respondents were between 30- 50 years of age. This indicates that most of the respondents are in their prime age and can be very dynamic.

4.3.2 Distribution of gender of the respondents

The researcher administered the questionnaires to both male and female teachers. Therefore, the study sought to find out the gender of the respondents. This was important in specifying the exact number of male and female respondents. The data is presented in Table 4.3.

Table 4.3: ***Distribution of Gender of the Respondents***

	Teachers		**Headteachers**	
Gender	**FQ**	**Percent**	**FQ**	**Percent**
Male	43	53.75	8	44.4
Female	37	46.25	10	55.6
Total	**80**	**100%**	**18**	**100%**

According to the findings 53.7% of teachers were male while 45.5% were female. Head teachers had 55.6% male respondents and 44.4% female respondents. This shows that either gender is well represented and therefore the results of the findings have not favored either gender.

4.3.3 Academic qualification of the respondents

The study was conducted to a cross section of respondents with different qualifications. This information is as shown below in Table 4.4.

Table 4.4: ***Academic Qualification of the Respondents***

	Teachers		**Head teachers**	
Level	**FQ**	**Percent**	**FQ**	**Percent**
Diploma	8	1.0	4	18.2
B.ED.	50	62.5	10	45.5
BA/BSC with P.G.D.E	5	6.25	3	13.6
Masters	17	21.25	5	22.7
Total	**80**	**100%**	**22**	**100%**

According to the findings, Diploma graduates accounted for 1% B.ED graduates 62.5%, those with BA/BSC with P.G.D.E 6.25% while those with Masters Degree accounted for 21.25% .This indicates that majority of the teachers are well educated since they have at least first degree.

4.4 Influence of personal characteristics on teachers readiness to use ICT in teaching

The teachers' personal characteristics that the study focused on were teachers' age, gender and attitude.

4.4.1 Influence of age on teachers readiness to use ICT in teaching

The study sought information regarding ICT-related curricular and instructional content in relation to age of the teachers. Table 4.5 gives a summary of the responses.

Table 4.5: ***Whether Age Determines Teachers Readiness***

Does the age of a teacher determine teachers readiness to use ICT in teaching?

	Frequency	**%**
Yes	43	53.8
No	37	46.2
Total	**80**	**100.0**

The findings indicate that majority (53.8%) of the respondents were in agreement that age determines teachers ICT readiness with 46.2% disagreeing. Some of the reasons given by the respondents who indicated that age determines teachers readiness to use ICT in teaching included, young people being eager to learn, ICT being latest idea in Kenya and ICT keep on evolving with time. However, those who did not agree indicated that one is able to adapt to changes regardless of age.

4.4.2 Teachers' views on the influence of age and teachers readiness to use ICT in teaching

The researcher further sought to establish teachers' opinion on some statements related to age on a 5-point liket scale. A mean score below 3.0 was an indication of disagreeing with the statement while a score above 3.0 was indication of agreement. This information is summarized in Table 4.6

Table 4.6 ***Teachers' Views on the Influence of Age on Readiness***

STATEMENT	SD		D		SWA		A		SA		Weighted Mean
	F	%	F	%	F	%	F	%	F	%	
Teachers readiness is dependent on age	7	8.8	12	15.0	8	10.0	37	46.3	16	20.0	**3.54**
Younger teachers are more ready than older teachers	4	5.0	8	10.0	7	8.8	33	41.3	28	35.0	**3.91**
Older teachers are computer shy	8	10.0	21	26.3	4	5.0	31	38.8	16	20.0	**3.33**
Younger teachers are fast at adopting newest ICT developments	8	10.0	4	5.0	8	10.0	26	32.5	34	42.5	**3.93**
Older teachers are not ready because they never used computers as students	4	5.0	8	10.0	22	27.5	31	38.8	15	18.8	**3.56**
Computers are new phenomena to older teachers as opposed to younger teachers	4	5.0	11	13.8	7	8.8	43	53.8	15	18.8	**3.26**
The cost of computers is inhibitive to older teachers as they have other family commitments	15	18.8	25	31.3	24	30.0	8	10.0	8	10.0	**2.45**

It was found that teachers agreed (mean score above 3.00) with the views that: teachers readiness is dependent on age; younger teachers are more ready than older teachers; older teachers are computer shy; younger teachers are fast in adopting newest ICT developments; older teachers are not ready because they never used computers as students and computers are new phenomena to older teachers as opposed to younger teachers. However, the respondents disagreed (with mean score of 2.45) with the views that the cost of computers is inhibitive to older teachers as they have other family commitments.

4.4.3: Influence of gender on teachers readiness to use ICT in teaching

The researcher sought to establish the influence of gender on a teachers readiness to use ICT in teaching. This information is summarized in Table 4.7

Table 4.7: ***Gender that is More Ready to use ICT***

	n	%
Male	69	86.25
Female	11	13.75
Total	**80**	**100.0**

The results in Table 4.9 indicates that majority (86.25%) of respondents cited male while a few (13.75%) cited female as the gender that is more ready to use ICT in teaching.

4.4.4 Why male teachers are more ready to use ICT in teaching

The researcher sought to find out why male teachers are more ready to use ICT in teaching than female teachers. This information is summarized in Table 4.8

Table 4.8: ***Why Male Teachers are More Ready***

	n	%
Males are experimental	39	48.75
Males have more time	24	30.00
Males have more access to computers	9	11.25
Males can multitask better	8	10.00
Total	**80**	**100.0**

The results in Table 4.8 shows that some (48.75%) of the respondents indicated that males are more experimental and love using gadgets with a further 30.00% noting that males have more time. The study also revealed significant differences between males and females in technical ICT capabilities, where males' scores were higher. The reasons given to the choice of male teachers as being more ready included: males being experimental and love using gadgets, having more time, having more access to ICT and being better in multi-tasking.

4.4.5: Teachers' opinion on gender and readiness to use ICT in teaching

The researcher further sought to establish teachers' opinion on some statements related to gender of a teacher on a 5-point like scale. A mean score below 3.0 was an indication of disagreeing with the stated statement while a score above 3.0 was indication of agreement.

This information is summarized in Table 4.9

Table 4.9: ***Teachers' Opinion on Gender and Readiness to use ICT***

STATEMENT	SD		D		SWA		A		SA		Weighted Mean
	F	%	F	%	F	%	F	%	F	%	
-Female teachers are ICT shy	4	5.0	26	32.5	31	38.8	12	15.0	7	8.8	**2.90**
-Male teachers are fast in at adopting newest ICT developments	0	0	19	23.8	8	10.0	37	46.3	16	20.0	**3.52**
-Female teachers are not ready because they lack enough time	7	8.8	12	15.0	22	27.5	32	40.0	7	8.8	**3.25**

The findings indicate that respondents agreed (mean score above 3.00) with the statement that male teachers are fast at adopting newest ICT development and female teachers are not ready because they lack enough time. Some respondents disagreed (a mean of 2.90) that female teachers are ICT shy.

4.4.6 Challenges encountered by female teachers in use of ICT

The researcher further sought to establish the challenges encountered by female teachers in their endeavor to be ready to use ICT in teaching. The responses are presented in table 4.10

Table 4.10 ***Challenges Encountered by Female Teachers in ICT use***

	Frequency	Percent
Lack of time due to other commitments	45	56.25
Lack of finances and exposure	16	20
Lack of access to computers	19	23.75
Total	**80**	**100.0**

Majority (56.25%) of the respondents indicated that female teachers lack time due to other commitments, 20% cited lack of finances and exposure while 23.75% indicated lack of access to computers.

4.4.7: Challenges encountered by male teachers in using ICT in teaching

The researcher also sought to establish the challenges encountered by male teachers in their endeavor to be ready to use ICT in teaching. This information is summarized in Table 4.11

Table 4.11: ***Challenges Encountered by Male Teachers in using ICT***

	Frequency	**Percent**
None	11	13.75
Financial problems	14	17.5
Computers not used at home	16	20
Lack of time for computer training	32	40
Some schools lack computers	7	8.75
Total	**80**	**100.0**

Some (40%) of the respondents reported lack of time for computer training while 20% reported lack of computers at home. A further 17.5% indicated financial problems while 13.75% reported no challenges at all. The least (8.75%) indicated that their schools lacked computers.

4.4.8: How to help teachers of both genders embrace ICT in teaching

The researcher further sought suggestions on how teachers of both genders could be helped to embrace ICT in teaching. This information is summarized in table 4.12

Table 4.12: ***How to Help Teachers of both Genders Embrace ICT in Teaching***

	Frequency	Percent
Use ICT in most school programmes	36	45
In-service training in ICT	36	45
Give equal opportunities to both genders	4	5
Assist teachers to acquire personal computers	4	5
Total	**80**	**100.0**

Table 4.12 shows that 45% of the teachers cited the use of ICT in most of school programmes, a further 45% cited the need for in-service training in ICT, 5 % cited the need to encourage and give equal opportunity to both genders and another 5% indicated the need to assist teachers to acquire personal computers.

4.4.9: Influence of attitude on teachers readiness to use ICT in teaching

The researcher sought to establish how teachers feel about using ICT in teaching. This information is summarized in table 4.13

Table 4.13: How teachers feel about using ICT in teaching and learning

	Frequency	Percent
I'm comfortable	69	86.25
Its tedious	7	8.75
Its bothersome	4	5.0
Total	**80**	**100.0**

Table 4.13 shows that majority (86.25%) of the respondents indicated that they are comfortable in using of ICT, 8.75% indicated that it is tedious with a further 5.0% indicating that it is bothersome.

4.4.10: Some negative aspects of using ICT in teaching

The researcher further sought to establish which are some negative aspects of using ICT in teaching. These suggestions are presented in Table 4.14

Table 4.14: ***Some Negative Aspects of using ICT in Learning***

	Frequency	Percent
Loosing work easily incase of power failure	20	25.0
One has to keep on saving work when typing	16	20.0
It entirely depends on some source of power	15	18.8
Some information in the internet is not correct	22	27.5
Typing is tedious	7	8.8
Total	80	**100.0**

Table 4.14 shows that some of the negative aspects of using ICT in teaching included: some information in the internet is not correct (27.5%); loosing work easily incases of power failure (20%); one has to keep on saving work when typing (20%); it entirely depends on some source of power (18.8%); and typing is tedious (8.8%).

4.4.11: Whether teachers have considered using ICT in teaching

Consequently, the researcher sought to establish whether teachers have considered using ICT in teaching. This information is summarized in Table 4.15

Table 4.15: ***Whether Teachers have considered using ICT in Teaching***

	Frequency	Percent
Yes	51	63.75
No	29	36.25
Total	**80**	**100.0**

Table 4.15 indicates that majority (63.75%) of the teachers considered using ICT in teaching while 36.25% did not consider use of ICT. The teachers' attitude is a major predictor of the acceptance and actual utilization of computers in the classrooms and in the management of their work. Hence it is important for teachers to have a positive attitude towards ICT as their attitude influences their readiness to use ICT.

4.4.12 Ways in which ICT can be used in teaching

Further, the researcher sought to establish the ways in which ICT can be used for teaching in the classroom. This information is summarized in Table 4.16

Table 4.16: ***Ways in which ICT can be used for Teaching in the Classroom***

	Frequency	Percent
Making schemes of work	22	27.5
Researching teaching topics / content	23	28.75
Making/keeping teaching notes	20	25.0
Making/keeping records of work	15	18.75
Total	**80**	**100.0**

The respondents cited: making schemes of work (27.5%); researching teaching topics/content (28.75%); making /keeping records of work (18.75%) and making/keeping teaching notes (25%).

4.4.13: Confidence in ability to use ICT in the classroom

The researcher also sought to establish the confidence of the teachers in their ability to use ICT in teaching in the classroom. This information is summarized in Table 4.17

Table 4.17: ***Confidence in Ability to use ICT in the Classroom***

	Frequency	Percent
Very confident	12	13.75
Confident	25	31.25
Fairly confident	24	30
Least confident	19	23.75
Total	**80**	**100.0**

Table 4.17 indicates that only 13.75% were very confident and 31% were confident about their ability to use ICT in teaching in the classroom, 30% are fairly confident while 23.75% are least confident. The implication of this is that the attitudinal component would enhance good ICT competence and readiness amongst teachers to use ICT in teaching.

4.4.14: General opinion on teachers' attitude towards the use of ICT in teaching

The researcher also sought to establish the general opinion on teachers' attitude towards the use of ICT in teaching. This information is summarized in table 4.18

Table 4.18: ***General opinion on Teachers' Attitude towards the use of ICT in Teaching***

	Frequency	Percent
Positive	52	65
Negative	28	35
Total	**80**	**100.0**

According to the findings, 65% of the respondents indicated that majority teachers had a positive attitude towards use of ICT in teaching while 35% of the respondents cited negative attitude.

4.4.15: Suggestions on changing teachers' attitude towards the use of ICT in teaching

The researcher sought suggestions on what can be done to change teachers' attitude towards the use of ICT in teaching. This information is summarized in Table 4.19

Table 4.19: ***Suggestions on changing Teachers' Attitude towards the use of ICT in Teaching***

	Frequency	Percent
Seminars / workshops	30	37.5
Be given more incentives	9	11.25
Expose teachers to technology	36	45
Inform teachers on the benefits of ICT	5	6.25
Total	**80**	**100.0**

Table 4.19 shows that some (45%) of the respondents cited the need to expose teachers to technology, 37.5% suggested the need for seminars or workshops on ICT, 11.25% indicated the need for incentives (motivation) on the use of ICT and a further 6.25% cited the need to inform teachers on the benefits of ICT use in teaching.

4.5 Influence of prior computer training and teachers readiness to use ICT

The researcher sought to establish the extent to which teachers' prior computer training influences their readiness to use ICT in secondary schools.

4.5.1 How Training in ICT impacts on teachers readiness to use ICT in teaching

All the teachers sampled indicated that computer training influences teachers readiness to use ICT in teaching. This information is summarized in Table 4.20

Table 4.20: ***How Training in ICT Impacts on Teachers Readiness***

	Frequency	**Percent**
More knowledge for teachers	45	56.25
Faster coverage of syllabus	10	12.5
Increases teachers' confidence	25	31.25
Total	**80**	**100.0**

The respondents indicated how training would improve teachers readiness in teaching. It was found that training would make teachers acquire more knowledge on ICT (56.25%), make teachers more confident (31.25%)and ensure faster coverage of the syllabus (12.5%).

4.5.2: Teachers' computer skills

Similarly, the researcher sought to establish the teachers' computer skills. This information is summarized in Table 4.21

Table 4.21 ***Teachers' Computer Skills***

	Frequency	**Percent**
Lack expertise	7	8.75
Fair	40	50
Good	19	23.75
Very good	10	12.5
Excellent	4	5
Total	**80**	**100.0**

According to the findings, 50% of the respondents indicated that their computer skills were fair, 23.75% indicated that it was good, 12.5% cited very good skills, 8.75% cited lack of expertise while 5% indicated excellent computer skills.

4.5.3: Competencies in computer in terms of emphasis in the College or University

The researcher further sought to establish the teachers' competencies in computer in terms of emphasis given to them in the college/university where the teachers trained in ICT skills and concepts on a 4-point liket scale. A mean score below 2.0 was indications of real emphasis on ICT skill and concepts while a score above 2.0 was indication of no emphasis. This information is summarized in Table 4.22

Table 4.22: ***Competencies in Computer in Terms of Emphasis in the College or University***

STATEMENT	Really Emphasized		Slightly Emphasized		Not Emphasized		Never Available		Weighted Mean
	F	%	F	%	F	%	F	%	
ICT skills and concepts	0	0	37	48.7	15	19.7	24	31.6	**2.83**
Use of ICT in planning, teaching, assessment and evaluation	7	9.7	12	16.7	29	40.3	24	33.3	**2.97**
Collaboration and networking amongst teaching professionals	8	11.1	23	31.9	14	19.4	27	37.5	**2.83**

From the findings, it was established that ICT skills and concepts, use of ICT in planning, teaching, assessment and evaluation as well as collaboration and networking amongst teaching professionals were all emphasized in the college or university where the teachers trained.

4.6 Influence of ICT infrastructure on teachers readiness to use ICT in teaching

The researcher sought to establish whether teachers have convenient access to computer at school and at home.

4.6.1: Teachers with convenient access to computer at school and at home

The researcher sought to establish whether teachers have convenient access to computer at school and at home. This information is summarized in Table 4.23

Table 4.23: ***Teachers with Convenient Access to Computer at School and at Home***

	Frequency	Percent
Yes	35	43.75
No	45	56.25
Total	**80**	**100.0**

Majority (56.25%) of the respondents indicated that they had convenient access to computer at school and at home.

4.6.2: Where teachers access computers from

In addition, the researcher sought to establish where teachers accessed computers from. This information is summarized in Table 4.24

Table 4.24: ***Teachers who own of Computers***

	Frequency	Percent
Self	42	52.5
School	11	13.75
Borrowed from elsewhere	4	5.0
Belongs to the whole family	9	11.25
Cyber café	14	17.5
Total	**80**	**100.0**

Majority (52.5%) of respondents indicated that they owned the computers, 17.5% cited from the cybercafé, 13.75% indicated from school, and 11.25% cited from the family and a further 5.0% cited borrowing from elsewhere.

4.6.3: What teachers use at home for research and lesson preparation

The researcher further sought to establish what the teachers used at home for research and lesson preparation. This information is summarized in Table 4.25

Table 4.25: ***What Teachers use at Home for Research and Lesson Preparation***

	Frequency	Percent
Text book and newspapers	60	75
Cyber café	20	25
Total	**80**	**100.0**

Majority (75%) of the respondents indicated use of textbooks and newspapers while 25% cited the use of cybercafé .

4.6.4 Whether the computers used have a working printer attached to it

The researcher sought to establish whether the computers have a working printer attached to it. This information is summarized in Table 4.26

Table 4.26: ***Whether the Computers used have a Working Printer Attached to it***

	Frequency	Percent
Yes	26	31.9
No	54	68.1
Total	**80**	**100.0**

Majority (68.1%) of the respondents indicated that their computer did not have a working printer attached to it while 31.9% indicated they have.

4.6.5: Teachers' views on ICT infrastructure and its influence on readiness to ICT

The researcher further sought to establish teachers' opinion on some statements related to ICT infrastructure on a 5-point liker scale. A mean score below 3.0 was an indication of disagreeing with the statement while a score of above 3.0 was indication of agreement. This information is summarized in Table 4.27

Table 4.27: ***Teachers' Views on ICT Infrastructure and its Influence on Readiness to use ICT***

STATEMENT	SD		D		SWA		A		SA		Weighted Mean
	F	%	F	%	F	%	F	%	F	%	
Inability to consistently access computer will affect teachers readiness	0	0	0	0	7	8.8	23	28.8	50	62.5	**4.54**
Lack of internet connection affects teachers readiness	8	10.0	4	5.0	18	22.5	18	22.5	32	40.0	**3.78**
Lack of personal computers limits teachers' use of ICT at home	0	0	8	10.0	19	23.8	23	28.8	30	37.5	**3.94**
The cost of buying personal computers negatively impacts on a teachers readiness	0	0	12	15.0	15	18.8	33	41.3	20	25.0	**3.76**

From the findings, it was found that teachers agreed (mean score above 3.00) with the views that; inability to consistently access computer will affect teachers readiness to use ICT in teaching; lack of internet connection affects a teachers readiness to use ICT in teaching; lack of personal computers limits teachers use of ICT at home and the cost of buying personal computers negatively impacts on a teachers readiness to use ICT in teaching.

4.6.6: Main ICT infrastructure challenge faced at home and at school

The researcher sought to establish the main ICT challenge faced at home and at school. This information is summarized in Table 4.28

Table 4.28: ***Main ICT Infrastructure Challenge Faced at Home and at School***

	Frequency	Valid Percent
Poor internet connectivity	39	54.2
Lack of electricity	19	26.4
Frequent electricity failure	14	19.4
Total	**72**	**100.0**

According to the findings, the main ICT infrastructure challenge that teachers face at home and at school included poor internet connectivity (54.2%), lack of electricity (26.4%) and frequent electricity failure (19.4%).

4.6.7: How ICT infrastructure can be improved

The researcher therefore sought suggestions on how ICT infrastructure be improved. This information is summarized in Table 4.29

Table 4.29: ***How ICT Infrastructure can be Improved***

	Frequency	**Percent**
Solar powered computers	7	8.75
Electricity installation with standby generators	19	23.75
Equipping schools with modern machines	29	36.25
Improved networking	25	31.25
Total	**80**	**100.0**

The findings indicate that 36.25% cited equipping teachers with modern machines, 31.25% indicated improved networking, 23.75% cited proper electricity installation with standby generators with a further 8.75% cited purchase of solar powered computers.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the research key findings, discussions, conclusion, recommendations of the study and suggestions for further research.

5.2 Summary of key findings

From the study it was established that personal characteristics, prior computer training and ICT infrastructure have to some extent some influence on teachers readiness to use ICT in teaching.

According to the study it was established that age of teachers had some influence on teachers readiness to use ICT in teaching.

The findings indicate that 53.8% of respondents were in agreement that age determines teachers readiness to use ICT in teaching with 46.2% disagreeing. Some of the reasons given by the respondents who indicated that age determines teachers readiness to use ICT included: young people being eager to learn; ICT being the latest idea in Kenya and ICT keep on evolving with time. However, those who did not agree that age determines teachers readiness to use ICT indicated that one is able to adapt to changes regardless of age.

Lack of time due to commitment to personal and family issues; lack of interest exposure and facilities; poor eyesight; older teachers are slow in grasping ICT concepts; lack of basic information in IT and lack of confident in computer usage were the challenges the older teachers encountered. These findings indicate that young teachers are more adaptable to the use of ICT than older teachers. Some of the suggestions on how to help older teachers included: organizing seminars on ICT use, encouraging teachers to create time for ICT, training the teachers in ICT and availing facilities to ensure teachers use ICT in their work.

From the study it was established that gender had some influence on teahers readiness to use ICT in teaching. Majority of respondents cited male while a few cited female as the gender that is more ready to use ICT in teaching. The reasons given to the choice of male teachers as being more ready to use ICT in teaching included: males are experimental and love using gadgets; females have more time; males have more access than females; males are better in multi-tasking and males have more time.

According to the study it was established that attitude had some influence on teachers readiness to use ICT in teaching. Majority of the respondents indicated that they like to use of ICT in teaching.

Some of the negative aspects of using ICT in learning included: loosing work easily incases of power failure; typing is hard; it entirely depends on electricity; some information in the internet is not true and one has to keep on saving work when tying. Majority of the respondents considered the use of ICT in teaching. The respondents also indicated that the ways in which ICT can be used for teaching and learning in the classroom included: making schemes of work; researching teaching topics/content; making /keeping records of work and making/keeping teaching notes.

Majority indicated that teachers had a positive attitude towards use of ICT in teaching while some of the respondents cited negative attitude. Majority of the respondents cited the need to expose teachers to technology, while others suggested the need for seminars or workshops on ICT, some indicated the need for incentives (motivation) on the use of ICT and others cited the need to inform teachers on the benefits of ICT use in teaching.

All the teachers sampled indicated that computer training influence a teachers readiness to use ICT in teaching. Respondents indicated that training would make teachers acquire more knowledge on ICT, make teachers more confident and ensure faster coverage of the syllabus. Some of the respondents indicated that their computer skills were fair. Respondents also indicated that ICT skills and concepts; use of ICT in planning, teaching, assessment and evaluation as well as collaboration and networking amongst teaching professionals were all emphasized in the college or university where the teachers trained.

The sampled teachers indicated that ICT infrastructure had some influence on teachers readiness to use ICT in teaching.

Majority of respondents indicated that they owned computers, others indicated they used computers from the cybercafé, their school their family and cited borrowing from elsewhere.

All the respondents indicated that the computers were electricity driven and that there is consistent supply of electricity at home and at school. The researcher further sought to establish how teachers prepare their lessons or research when they have inconsistent supply of electricity. The respondents indicated the use of other sources of information like textbooks, postponing lesson and cyber café.

5.3 Discussion of key findings

The findings discussed below include personal characteristics, prior computer training and ICT infrastructure and teachers readiness to use ICT in teaching.

The personal characteristics discussed here include age, gender and the attitude of the teachers.

Veenhof, Clermont and Sciadas (2005) noted that older workers have fewer ICT skills and that this may result in a deterioration of their position in the labour force. They concluded that a significant decline in ICT use is found to occur after age 45 in several areas of the work force. However, those who did not agree indicated that one is able to adapt to changes regardless of age.

From the findings of the study, 53.8% f the respondents were in agreement that age determines teachers readiness to use ICT in teaching with only 46.2% disagreeing. Some of the reasons given by the respondents who indicated that age determines teachers readiness to use ICT in teaching included: young people being eager to learn; ICT being the latest idea in Kenya and ICT keep on evolving with time.

The results further indicated that the lack of time due to commitment to personal and family issues; lack of interest exposure and facilities; poor eyesight; older teachers are slow in grasping ICT concepts; lack of basic information in IT and lack of confident in computer

usage were the challenges the older teachers encountered. These findings indicate that young teachers are more adaptable to the use of ICT than older teachers. The findings were in agreement with what other researchers had also found as indicated above.

Markauskaite (2005) noted that the introduction of ICT into the educational sector created new social stereotypes and gender inequalities. She also added that since the invention of the computer, ICT-related activities have been viewed as a male domain. Volman and Eck (2001) also argued that old stereotypic gender differences in attitudes and achievements that previously existed in mathematics and technological disciplines were extrapolated to the area of ICT.

Majority (86%) of respondents cited male while a few (14%) cited female as the gender that is more ready to use ICT in teaching. These findings are in line with that of Shapka and Ferrari (2003) who noted that males are more interested in ICT than females; they are more frequent users of computers have more positive attitudes about computers and consequently outperform females in ICT literacy. Similarly, Markauskaite (2006), investigated gender differences in self reported ICT experience and ICT literacy among first year graduate trainee teachers. The study also revealed significant differences between males and females in technical ICT capabilities, and situational and longitudinal sustainability where males' scores were higher.

In addition, some (49%) of the respondents indicated that males are more experimental and love using gadgets with a further 24% noting that males have more time. These findings are in line with those of Jamieson-Proctor, Burnett, Finger and Watson (2006) who also conducted a study on teachers' integration of ICT in schools in Queensland State. Results from 929 teachers indicated that female teachers were integrating technology into their teaching less than the male teachers.

Teachers disagreed with the statement that female teachers are ICT shy. These results contradict those by Volman and Eck (2001) who revealed that female teachers tend to be more anxious, less experienced and less confident about their ICT competencies and it is less likely that they will apply computers for various teaching and learning purposes. These

findings are however in agreement with those by Adams (2002) that female teachers applied ICT more than the male teachers. Respondents further agreed with the statement that male teachers are fast at adopting newest ICT development and female teachers are not e-ready because they lack enough time. This study therefore confirm a report by Yukselturk and Bulut (2009) that gender gap has reduced over the past years, presently, a greater number of females than males have used internet and web technologies.

Ropp (2000) noted that while many teachers have positive attitudes to the use of educational technologies, they do not necessarily believe in their own ability to use technology in a classroom with students. The author reported that learning and readiness in computers is aided by high levels of self-efficacy and a positive attitude. It is in view of this that the researcher sought to establish how teachers feel about using ICT in teaching and learning.

Majority (86.3%) of the respondents indicated that they like the use of ICT, 8.8% indicated that it is hard with a further 5.0% indicating that it is complicated. These results contradict the findings by Lumumba (2007), in his study on the challenges facing e-Learning in Public Secondary schools in Kenya where he singled out negative attitude towards e-Learning among students and teachers as key obstacles to the success of the e-learning project. In addition, the respondents cited that the advantage of using of ICT in teaching as being fast (52.5%) and easy (47.5%). Some of the negative aspects of using ICT in learning cited by respondents included: loosing work easily in cases of power failure; typing is hard; it entirely depends on electricity; some information in the internet is not true and one has to keep on saving work when tying.

Most (64%) of the teachers considered using ICT in teaching. These findings are in line with those by Albirini, (2006) who asserted that one of the factors that greatly influence achievement of meaningful use of computer technology is the teacher's attitude towards the use of technology in teaching and learning process. The teachers' attitude is a major predictor of the acceptance and actual utilization of computers in the classrooms and in the management of their work. Hence it is important for teachers to have a positive attitude towards ICT as their attitude influences their e-readiness. Further, the researcher sought to establish the ways in which ICT can be used for teaching and learning in the classroom.

These included: making schemes of work; researching teaching topics/content; making keeping records of work and making/keeping teaching notes.

Majority (64.4%) of the respondents indicated that teachers had a positive attitude towards use of ICT in teaching while 35.6% of the respondents cited negative attitude. These findings conquer with the sentiments by Ropp (2000) who noted that while many teachers have positive attitudes to the use of educational technologies, they do not necessarily believe in their own ability to use technology in a classroom with students. Some (46%) of the respondents cited the need to expose teachers to technology, 37% suggested the need for seminars or workshops on ICT, 11% indicated the need for incentives (motivation) on the use of ICT and a further 6% cited the need to inform teachers on the benefits of ICT use in teaching and learning.

Computer competence is defined as being able to handle a wide range of varying computer applications for various purposes (Tondeur et al., 2004). According Bordbar (2010), teachers' computer competence is a major predictor of integrating ICT in teaching. All the teachers sampled indicated that computer training influenced a teachers readiness to use ICT in teaching. The results of the study further indicated that training would make teachers acquire more knowledge on ICT, make teachers more confident and ensure faster coverage of the syllabus. 50% of the respondents indicated that their computer skills were fair, 24% indicated that it was good, 12% cited very good skills while 5% indicated excellent computer skills.

These findings indicate that the teachers had prior training in computer and therefore conquer with the sentiments by Knezek and Christensen (2002) who noted that teachers' competence with computer technology is a key factor of effective use of ICT in teaching. Similarly, according to Peralta & Costa (2007), teachers with more experience with computers have greater confidence in their ability to use them effectively.

Albion (1999) states that decisions made by teachers about the use of computers in their classrooms are likely to be influenced the accessibility and availability relevant software. Majority (56.3%) of the respondents indicated that they have convenient access to computer at home. In addition, majority (52.8%) of respondents indicated that they owned the

computers, 16.7% cited they use cybercafé, 13.9% indicated use computers in school, 11.1% cited they use family computers and a further 5.6% cited borrowing from elsewhere. majority (56.3%) of the respondents indicated they did not have reliable internet connection while 43.8% have reliable internet connection.

Teachers further agreed with the views that; inability to consistently access computer will affect teachers readiness; lack of internet connection affects a teachers readiness; lack of personal computers limits teachers use of ICT at home and the cost of buying personal computers negatively impacts on a teachers readiness. In addition, the main ICT infrastructure challenge that teachers face at home and school included poor internet connectivity, lack of electricity and frequent electricity failure.

The Findings of a study were in line with those of Mulwa and Kyalo (2011) who found out that ICT equipment is crucial requirement for teachers readiness to adopt e-learning in curriculum delivery. For the schools to be able to utilize this modern technology meaningfully, they must acquire the necessary ICT equipment. These would include computers, LCD projectors and mobile telephones among others.

5.4 Conclusion of the study

From the findings, it was established that teachers readiness to use ICT is dependent on age. Younger teachers are more ready than older teachers to use ICT in teaching. They are also fast in at adopting newest ICT developments. Older teachers are less ready to use ICT because they never used computers as students, computers are new phenomena and they are computer shy. However, the respondents disagreed with the views that the cost of computers is inhibitive to older teachers as they have other family commitments.

The respondents were not in agreement that readiness to use ICT in teaching is dependant on gender of the teacher although majority of respondents cited male as the gender that is more ready. The reasons given to the choice of male teachers as being ready included: males are experimental and love using gadgets, have more time, have more access and are better in multi-tasking than females.

The respondents indicated that female teachers were not ICT shy although male teachers were fast at adopting newest ICT development and female teachers are less ready to use ICT in teaching because of lack of enough time due to other commitments. Respondents suggested the use of ICT in most of school programmes; the need for in-service training in ICT, the need to encourage and give equal opportunity to both genders and the need to assist teachers of both genders acquire personal computers.

The respondents indicated that they liked the use of ICT the advantage of use of ICT in teaching as being fast and easy. Some of the negative aspects of using ICT in learning included: loosing work easily incases of power failure; typing is hard; it entirely depends on electricity; some information in the internet is not true and one has to keep on saving work when tying.

The teachers considered using ICT in teaching in making schemes of work; researching teaching topics/content; making /keeping records of work and making/keeping teaching notes. However, only few teachers are confident about their ability to use ICT in the classroom Consequently, the reasons given by the respondents on their ability to use ICT in classroom included: the younger generation being more apt with ICT; lack of enough computers in the school; having been trained in ICT, lack of proficiency in computing; lack much content on ICT and not being exposed to ICT facilities.

The findings indicated that teachers have a positive attitude towards use of ICT in teaching. Respondents suggested the need to expose teachers to technology, the need for seminars or workshops on ICT, the need for incentives (motivation) on the use of ICT and the need to inform teachers on the benefits of ICT use in teaching and learning.

All the teachers sampled indicated that computer training influence a teachers readiness in teaching. Respondents indicated that training would make teachers acquire more knowledge on ICT, make teachers more confident and ensure faster coverage of the syllabus. However not all teachers had very good computer skills although ICT skills and concepts; use of ICT in planning, teaching, assessment and evaluation as well as collaboration and networking amongst teaching professionals were all emphasized in the college or university where they trained.

The findings indicated that teachers had convenient access to computer at home than at school because some owned the computers. However, some indicated the use of textbooks and newspapers due to lack of reliable internet connection. The results also indicated that computers did not have a working printer attached to it. In addition, all the computers used are electricity driven with only some teachers indicating that there is consistent supply of electricity at home and school prompting the use of other sources of information like textbooks, and cyber café when there is no power.

Some challenges that teachers faced included; inability to consistently access computer that affected teachers readiness; lack of internet connection that affects a teachers' preparedness to use ICT; lack of personal computers that limits teachers' use of ICT at home and the cost of buying personal computers that negatively impacts on a teacher's e-readiness. The respondents' suggestions on how to improve ICT infrastructure included; equipping teachers modern machines, proper electricity installation with a standby generators, improved networking and purchase of solar powered computers. In addition, the findings pointed at the need for teachers to attend seminars or workshops on ICT; subsidizing the cost of computers; exposing teachers to ICT integration in teaching and provision of personal computers or laptops as ways improving teachers readiness.

5.5 Recommendations

Based on the conclusion, the following recommendations are made;

i. Most respondents were in agreement that age determines teachers readiness to use ICT in teaching because young people were ready to learn than older people. However, those who did not agree that age of a teacher determines teacher readiness indicated that one is able to adapt to changes regardless of age. Therefore there is need for the Ministry of Education to expose teachers to technology and provide incentives for those who use ICT in teaching irrespective of their age.

ii. The findings showed that teachers have a positive attitude towards use of ICT in teaching. The Ministry of Education should encourage the use of ICT in most of school programmes, in-service training in ICT and the need to assist teachers of both genders acquire personal computers.

iii. The results of the study indicated that computer training influence a teachers readiness to use ICT in teaching because training would make teachers acquire more knowledge on ICT, make teachers more confident and ensure faster coverage of the syllabus. The Ministry of Education should offer computer training in colleges and universities in order to enhance teachers' computer skills. There is also need for refresher courses in ICT skills and concepts for teachers who are in the service.

iv. The findings indicated that ICT infrastructure influenced teachers readiness to use ICT in teaching. The Ministry of Education may avail affordable computers to teachers. There is also need of equipping teachers with modern machines, proper electricity installation with a standby generators, improved networking and purchase of solar powered computers.

5.6 Suggestions for Further Research

In this study a number of issues could not be comprehensively covered because of a wide range of limitation hence the following areas were suggested for further study

1. This study focused on teachers readiness to use ICT in teaching in public secondary school in Gatundu North District. The researcher recommends that further research can be carried out to establish the extent of ICT integration in teaching in secondary schools in Kenya to enable proper decision making by the Ministry of Education.
2. In this study, teachers were the main focus. The researcher recommends further research to can be carried out to establish students readiness to use ICT in learning.

REFERENCES

Abrami, P. C. (2001). Understanding and promoting complex learning using technology. Educational Research and Evaluation. New Jersey, Hewith.

Adams, N.B. (2002). *Educational Computing Concerns of Postsecondary Faculty* Research on Technology in Education, vol. 34

Albion, R. (1999). Self-Efficacy Beliefs as an Indicator of Teachers' Preparedness for Teaching with Technology. Association for the Advancement of Computing in Education (AACE), Australia, Mars.

Baek, Y.G., Jong, J., & Kim, B. (2008). *What makes teachers use of technology in the classroom? Exploring the factors affecting facilitation of technology with a Korean sample.* Computers and Education, vol.50.

Balanskat, A., Blamire, R., & Kafal, S. (2007). A Review of Studies of ICT impact on Schools in Europe European. London, Schoolnet.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Becta. (2004). A review of the research literature on barriers to the uptake of ICT by teachers. Retrieved February, 2013, at http://partners.becta.org.uk/page_documents/research/barriers.pdf.

Bordbar, F. (2010). *English teachers' attitudes toward computer-assisted language learning.* International Journal of Language Studies, vol. 4.

Borg,W. R. $ Gall,D.M. (1992). *Educational Research, an Introduction* (5theds.). NewYork:Longman

Breisser, S. R. (2006). An examination of gender differences in elementary constructionist classrooms using Lego/Logo instruction. Computers in the Schools, vol. 22

Castro, C, M (2003). Are new technologies better technologies? For whom? In UNESCO. (2003). Adapting technology for school improvement: a global perspective. http://unesdoc.unesco.org/images/0013/001361/136149e.pdf

Chen, C. -H. (2008). *Why do teachers not practice what they believe regarding technology integration*? The Journal of Educational Research, vol. 102

Christensen, R.& Knezek, G. (2006). *Pathway for preparing tomorrow's teacher to infuse technology*. Computers in the schools, vol. 23

Clausen, J. M. (2007). *Beginning teachers' technology use: First-year teacher development and the institutional context's affect on new teachers' instructional technology use with students*. Journal of Research on Technology in Education,

Compeau, D.R., & Higgins, C.A. (1995). *Computer self-efficacy: Development of a measure and initial test.* MIS Quarterly, vol.23.

Earle, R.S. (2002). *The integration of instructional technology into public education: Promises and challenges*. ET Magazine, vol. 42

Fullan (1991).The new meaning of Educational Change. London: Cassell.

Gay, L. (1992). .Educational Research Competencies and for Analysis and Application. Ohio: Bell Howell Publishers.

Giordano, V. (2007). *A professional development model to promote internet integration Into P-12 teachers' practice: A mixed method study*. Computers in the schools, vol. 24.

Gorder, L. M. (2008). A study of teacher perceptions of instructional technology integration in the classroom. Delta Pi Epsilon Journal, vol. 50, no. 2, pp. 63-76.

Granger, C.A., Morbey, M.L., Lotherington,H., Owston, R.D.& Wideman, H.H. (2002). *Factors contributing to teachers' successful implementation of IT. Journal of Computer Assisted Learning, vol. 8, pp. 480-488.*

Hernandez-Ramos, P. (2005). *If not here, where? Understanding teachers' use of Technology in Silicon valley schools.* .Journal of Research on Technology in education, vol. 38.

Jamieson-Proctor, R. M.,Burnett, P. C., Finger, G., & Watson, G. (2006). *ICT Integration and teachers' confidence in using ICT for teaching and learning in Queensland state schools.* Australasian Journal of Educational Technology, vol, 22, no. 4, pp. 511-530

Jegede p,Ojerinde j and Olugbenga.M(2007) *Relationships between ICT competence and Attitude among some Nigerian tertiary institution lecturers* Educational Research and Review Vol. 2 (7).

Jones, A. (2004). *A Review of the Research Literature on Barriers to the Uptake of ICT by Teachers. British Educational Communications and Technology Agency.*

Kamindo,M.C.(2008).Instructional Supervision in an Era of Change:Policy and practice in Primary Education in Kenya.Durham university school of Education United Kingdom.

Kay, R. (2006). *Addressing gender differences in computer ability, attitudes and use: The laptop effect*. Journal of Educational Computing Research, vol. 34.

Knezek, G. & Christensen, R. (2002). Impact of New Information Technologies on Teachers and Students. Education and Information Technologies, vol. 7, no. 4, p. 369–376.

Kuhlemeier, H& Hemker, B. 2007. The impact of computer use at home on Student Internet Skills. *Computers and Education*, 49(2): 460-480. UK: Elsevier Science Ltd.

Lau & Sim. (2008). Exploring the extent of ICT adoption among Secondary school teachers in Malaysia. International Journal of Computing and ICT Research, vol. 2, no. 2, pp. 19-36.

Liaw, S., Huang, H., & Chen, G.(2007). Surveying instructor and learner attitudes toward Elearning. *Computers & Education*, vol. 49, no. 4, pp. 1066-1080

Lim, C. P., & Chai, C. S.(2008). Teachers' pedagogical beliefs and their planning and conduct of computer-mediated classroom lessons. British Journal of Educational Technology, vol. 39, no. 5, pp. 807–828.

Markauskaite, L. (2006). Gender issues in pre-service teachers' training: ICT literacy and online learning. Australasian Journal of Educational Technology, vol. 22, no. 1, pp. 1-20.

Marshall S., Kinuthia W., & Taylor W. (2009). Bridging the Knowledge Divide: Educational Technology for Development. Charlotte: IAP.

Mugenda, O.M. & Mugenda, A. G. (2003) Research Methods :Quantitative and Qualitative Approaches. Nairobi: Acts Press

Muir-Herzig, R. G. (2004). *Technology and its impact in the classroom.* Computers and Education, Vol.4

Mulwa, A &Kyalo, D (2011) The influence of Ict infrastructure on readiness to adopt e-learning in secondary schools in Kitui district, Kenya.

National ICT Policy (2006, March 24). *The Kenya Gazette*. Nairobi: Government press.

Nchunge D, Sakwa,M & Mwangi , W (2012)on User's Perception on Ict Adoption *International Journal of Humanities and Social Science, Vol. 2 No. 10 [Special Issue May 2012]*

Neyland, E. (2011). Integrating online learning in NSW secondary schools: Three schools perspectives on ICT adoption. Australia Journal of Educational Technology,vol. 27.

Niederhauser, D.S. & Stoddart, T. (2001). Teachers' instructional perspectives and use of educational software. Teaching and teacher eduaction, vol. 17

Norris, C., T., Sullivan, J., Poirot., & Soloway, E. (2003). No access, no use, no impact: Snapshot surveys of educational technology in K-12, Journal of Research on Technology in Education, vol. 36 , no. 1, pp. 15-27

Ojwang, C, O (2012) E-learning adoption among Secondary Schools in Kisumu County, Kenya http://erepository.uonbi.ac.ke:8080/xmlui/handle/123456789/13251

Oliver, R. (1994). Information Technology Courses in Teacher Education: The Need for Integration. *Journal of Information Technology for Teacher Education, 3(3), 135-146*.

Orodho ,A. (2004*)*. Techniques and Social Science Research Methods Nairobi.; Masola Publishers Review. *Research in Higher Education, VOL.39*.

Peralta, H. & Costa, F.A. (2007). Teachers' competence and confidence regarding the use of ICT. Educational Sciences Journal, vol. 3.

Rangaswamy, A. & Gupta, S. (2000). Innovation adoption and diffusion in the digital environment: some research opportunities.

Rogers, E.M. (2003). Diffusion of innovations. New York: Free Press.
Russell, M., O'Dwyer, L. M., Bebell, D., & Tao, W. (2007). How teachers' uses of technology vary by tenure and longevity. Journal of Educational Computing Research, vol. 37

Ropp, M.(1999). Exploring individual characteristics associated with learning to use computers in pre-service teacher preparation. New York, Hethi Press,

Russell, M., Bebell, D., O'Dwyer, L. and O'Connor, K. (2003). Examining teacher technology use: Implications for pre-service and in-service teacher preparation. Journal of Teacher Education, vol. 54.

Scholten H. J., Velde R. V. & Manen N. V. (2009). Geospatial Technology and the Role of Location in Science. Heidelberg: Springer.

Shapka, J. D. & Ferrari, M. (2003). Computer-related attitudes and actions of teacher candidates. *Computers in Human Behaviour,* 19(3): 319-334.

Sherry, L., & Gibson, D. (2002). The path to teacher leadership in educational technology. Contemporary issues in technology and teacher education, vol. 2.

Stockdill, S.H., & Morehouse, D. L. (1992). *Critical factors in the successful adoption of technology: A checklist based on the findings.* Educational Technology, vol.34.

Sutherland, R., Armstrong, V., Barnes, S., Brawn, R., Breeze, N., Gall, M., et al. (2004). *Transforming teaching and learning: Embedding ICT into everyday classroom practices.* Journal of Computer Assisted Learning,20,413-425.

Tondeur, J., Valcke, M., & van Braak, J. (2008). A multidimensional approach to determinants of computer use in primary education: Teacher and school characteristics. Journal of Computer Assisted Learning, vol. 24, pp. 494–506.

Underwood, J. (1997). *Breaking the cycle of ignorance: information technology andthe professional development of teachers.* In Passey, D. & Samways, B. (Eds. Information Technology. supporting change through teacher education. London: Continuum International Publishing Group

UNESCO Bangkok (2003). Report of the Experts' Meeting on Documenting Experiences in the use of ICT in Education and Schoolnet Operations. Bangkok: UNESCO Bangkok. Retrieved.

U.S. Department of Education. National Center for Education Statistics. (2000). Teachers' tools for the 21st Century: A Report on teachers' use of technology.

Veenhof, B., Clermont, Y. & Sciadas, G. (2005). *Literacy and Digital Technologies: Linkages and Outcomes.* Research Paper for Science, Innovation and Electronic Information Division (SIEID), Statistics Canada. Ontario: Ministry of Industry.

Volman M. & Van Eck, E. (2001). *Gender equity and information technology in education: The second decade.* Review of Educational Research, vol. 71.

Williams, M. D. (2003). Technology integration in education. In Tan, S.C. & Wong, F.L. (Eds.), Teaching and Learning with Technology. An Asia-pacific perspective. Singapore: Prentice Hall.

Wong, E.M.L. & Li, S.C. (2008). Framing ICT implementation in a context of Educational change: A multilevel analysis. School effectiveness and school improvement, Hong Kong, Pria

Wozney, L., Venkatesh, V., & Abrami, P.C. (2006).*Implementing computer technologies: Teachers' perceptions and practices.* Journal of Technology and teacher education, vol. 14,no.1, pp. 173-207.

Wyse, D. (2006). The good writing guide for education students. Los Angeles: SAGE.

Yuen, A. H. K., & Ma, W. W. K. (2008). Exploring teacher acceptance of E-learning technology. Asia-Pacific Journal of Teacher Education, vol. 36,no.3,pp.229-243.

Yukselturk, E., & Bulut, S. (2009). Gender differences in self-regulated online learning

APPENDICES

APPENDIX

LETTER OF INTRODUCTION TO RESPONDENT

University of Nairobi
P.O. BOX 30197
NAIROBI
14th July, 2014.

Dear Sir/ Madam,

RE: FACTORS INFLUENCING TEACHERS READINESS TO USE ICT IN TEACHING IN PUBLIC SECONDARY SCHOOLS IN GATUNDU NORTH DISTRICT, KIAMBU COUNTY, KENYA

I am a Master of Distance Education student at the University of Nairobi. I am carrying out a research on the above topic. The purpose of this study is to assess the factors influencing teachers readiness to use ICT in teaching in Gatundu North District, Kiambu county, Kenya.

Kindly respond to the questionnaire given as correctly and honestly as possible. Be assured that your identity and response will be treated with utmost confidentiality. For this reason, do not write your name on the questionnaire.

I look forward to your assistance and cooperation.

Thank you

Yours sincerely,

Lucas M.Chege

APPENDIX 2

QUESTIONNAIRE FOR THE TEACHERS

1. This questionnaire contains four sections. Please respond to all questions.

SECTION A- DEMOGRAPHIC INFORMATION

1. Indicate your Gender.

Male [ ] Female [ ]

2. Indicate your age in the appropriately box

(a) Less than 30 years [ ] **(b)** 31 – 40 [ ]

(c) 41 –50 [ ] **(d)** 51 – 60 [ ]

3. What is your highest Academic qualification?

(a) Diploma [ ] **(b)** B.ED [ ]

(c) BA/BSC with PGDE [ ] **(d)** Masters [ ]

(e) Ph D

4. How long have you been in the school?

(a) Less than 5 yrs [ ] **(b)** 6 – 10 yrs [ ]

(c) 11- 15 yrs [ ] **(d)** 16- 20 yrs [ ]

(e) Over 20 yrs [ ]

6. What is the category of your school?

(a) District day school [ ] **(b)** District boarding [ ]

(c) Provincial school [ ]

SECTION B:

THE EXTENT TO WHICH PERSONAL CHARACTERISTICS INFLUENCES TEACHERS READINESS TO USE ICT IN TEACHING

(i) Influence of age on a teachers readiness to use ICT in teaching

1. How would you rate your level of expertise in computer use?

Very Good [ ] Good [ ] Average [ ] Weak [ ]

2. Do you agree with the statement that age determines teachers readiness to use ICT?

(a) Yes [ ] **(b)** No [ ]

Explain your answer in 2 above…….

3. Using the scale of 1 to 5 below (where 1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = agree, 5 strongly agree) Please say how much you agree or disagree with each statement.

	STATEMENT	**1**	**2**	**3**	**4**	**5**
	Teachers readiness to use ICT is dependent on age	☐	☐	☐	☐	☐
	Younger(below 35 yrs) teachers are more ready to use ICT than older teachers	☐	☐	☐	☐	☐
	Older teachers are computer shy	☐	☐	☐	☐	☐
	Younger teachers are very fast at adopting newest ICT developments as compared to older teachers	☐	☐	☐	☐	☐
	Older teachers are not ready to use ICT because they never accessed computers when they were students	☐	☐	☐	☐	☐
	Computers are a new phenomenon to older teachers as opposed to younger teachers	☐	☐	☐	☐	☐
	The cost of buying personal computers is inhibitive to older teachers as they have other family commitments	☐	☐	☐	☐	☐

4. What challenges do think older teachers encounter in their endeavor to be ready to use ICT?.....

5. What do you think should be done to help older teachers embrace ICT more? .....

……

(ii)Influence of gender on a teachers readiness to use ICT in teaching

1. Do you believe that teachers readiness to use ICT is dependant on gender?

Yes [ ] No [ ]

2. In your opinion which gender is more ready to use ICT?

(a) Male [ ] **(b)** Female [ ]

Why? .....

5 Using the scale of 1 to 5 below (where 1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = agree, 5 strongly agree) Please say how much you agree or disagree with each statement.

	STATEMENT	1	2	3	4	5
	Male teachers are more ready to ICT than female teachers	☐	☐	☐	☐	☐
	Female teachers are computer/ ICT shy	☐	☐	☐	☐	☐
	Male teachers are very fast at adopting newest ICT developments as compared to female teachers	☐	☐	☐	☐	☐
	Female teachers are not ready to use ICT because they never have enough time to access computers	☐	☐	☐	☐	☐

4. What challenges do you think female teachers encounter in their endeavor to be ready to use ICT? …….....

5. What challenges do you think male teachers encounter in their endeavor to be ready to use ICT? …….....

6. What do you think should be done to help teachers of both genders embrace ICT in teaching?.....

(iii) Influence of attitude on a teachers readiness to use ICT in teaching

1. How do you feel about using ICT in teaching?

(a) I like it [ ] **(b)** Its hard [ ] **(c)** I don't like it [ ] **(d)** Its complicated [ ]

……

From your perspective, what are some of the positives of using ICT in teaching?
(a) Its fast [ ] **(b)** It easy [ ] **(c)** Other, state……..….

2. What do you believe are some of the negative aspects of using ICT in teaching? Indicate with a tick (√) where it's true and a cross (x) where not true.

a) Loosing work easily in case of power failure [ ]

b) One has to keep on saving work when typing [ ]

c) It entirely depends on electricity [ ]

d) Some information in the internet is not true [ ]

e) Typing is hard [ ]

3. Have you considered using ICT in your teaching? **a)** Yes [ ] **b)** No [ ]

……

4. What are some of the ways that you might expect to use ICT, for teaching in your classroom?

(a) Making schemes of work [ ] **(b)** Researching teaching topics [ ]

c) Making/ keeping teaching notes [ ] **(d)** Making, keeping records of work [ ]

e) other, state……..……

5. (i) How confident are you about your ability to use ICT in the classroom?

a) Very confident [ ]

b) Confident [ ]

c) Fairly confident [ ]

d) Least confident [ ]

ii) Give reasons for the above choice

……

6. What problem do you experience in the use of ICT in your classroom?

…….

7. What can be done to positively change teachers' attitude towards the use of ICT in teaching? …….....

8. In one word, how would you summarize the attitude of teachers towards the use of ICT in teaching in your school? ……...…….

SECTION C:

THE EXTENT TO WHICH PRIOR COMPUTER TRAINING INFLUENCES TEACHERS READINESS TO USE ICT IN TEACHING

1. Does computer training influence a teachers readiness to use ICT in teaching?

Yes [ ] No [ ]

If yes, how do you think training would improve teachers readiness to use ICT in teaching? ……..……..

2. Place a tick against the appropriate statement about your computer skills

Level of Expertise	Tick the one that applies
NO EXPERTISE: Can not use computer at all	☐
FAIR: Able to operate basic computer functions and word processing application	☐
GOOD: Able to use office application (Word processing, spreadsheets, presentation software) for school assignment	☐
VERY GOOD: All the above skills including use of internet and internet resources	☐
EXCELLENT: All of the above including use of e-mail, internet surfing and searching; development of web page, participation in e-learning and online classes	☐

3. Information and communication techniques in teacher education can be clustered around the competencies given below. Please rank the competencies in terms of emphasis given to each in the college/university where you trained

1 = Really emphasized 2 = Slightly emphasized 3 = Not emphasized 4 = Never available	4	3	2	1
ICT skills and concepts				
Use of ICT in planning, learning, teaching, assessment and evaluation	☐	☐	☐	☐
Collaboration and networking amongst teaching professionals				

SECTION D:

THE EXTENT TO WHICH ICT INFRASTRUCTURE INFLUENCES TEACHERS READINESS TO USE ICT IN TEACHING

1. Do you have convenient access to computer at school? Yes [ ] No [ ]

……

2. Do you have convenient access to computer at home? Yes [ ] No [ ]

……

a) If yes, who owns the computer?

i) Mine [ ]

ii) Belong to the school [ ]

iii) Borrowed from elsewhere [ ]

iii) Other, explain …….

b) If no, what do you use at home for research and lesson preparation?

.....

3. Do you have reliable internet connection? Yes [ ] No [ ]

4. Does your computer have a working printer attached? Yes [ ] No [ ]

5. Are the computers you access solar or electricity driven?

i) Solar [ ]

ii) Electricity [ ]

6. If the computer is electricity-driven, is there consistent supply of electricity at home?

Yes [ ] No [ ]

7. Is there consistent supply of electricity of power at school? Yes [ ] No [ ]

8. If no, what happens when you want to prepare your lessons or do research on internet and there is no electricity? Explain……...……..

9. Using the scale of 1 to 5 below (where 1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = agree, 5 strongly agree) Please say how much you agree or disagree with each statement

	STATEMENT	**1**	**2**	**3**	**4**	**5**
	Inability to consistently access computer will affect teachers readiness to use ICT	☐	☐	☐	☐	☐
	Lack of internet connection affects a teachers readiness to use ICT	☐	☐	☐	☐	☐
	Lack of personal computers limits teachers use of ICT at home	☐	☐	☐	☐	☐
	The cost of buying personal computers negatively impacts on a teachers readiness to use ICT	☐	☐	☐	☐	☐

10. What is the main ICT infrastructure challenge that you face at home and in school?

a) Poor internet connectivity [ ]

b) Lack of electricity [ ]

c) Frequent electricity failure [ ]

d) Other (explain) ……..

11. How can the ICT infrastructure be improved……..……

……

12. In your opinion, what should be done in order to improve teachers readiness to use ICT?

....……..…….**.....**……

APPENDIX 3

INTERVIEW SCHEDULE FOR HEADTEACHERS

This interview schedule is designed to gather information on head teachers extent of readiness to use ICT in teaching in secondary schools from the head teachers.

SECTION A

DEMOGRAPHIC INFORMATION

1. Indicate your gender

a) Male [ ] b) Female [ ]

2. What is your highest level of academic qualification?

Ph D [ ] BA/BSC with PGDE [ ]

Masters [ ] Diploma [ ]

B.Ed [ ]

3. For how long have you been a head principal?

1-5 years [ ] 11-15 years [ ]

6-10 years [ ] 16-20 years [ ] Over 20 years [ ]

5. What is the category of your school?

(a) District day school [ ] (b) District boarding [ ]

(c) Provincial school [ ]

SECTION B:

THE EXTENT TO WHICH PERSONAL CHARACTERISTICS INFLUENCES TEACHERS READINESS TO USE ICT IN TEACHING

(i) The extent to which age influences teachers readiness to use ICT in Secondary schools

1. How are the teachers in your school distributed age-wise?

a) Young (39years and below) [ ]

b) Older (40 and above) [ ]

2.In your opinion, which ones amongst the teachers are more ready to use ICT in teaching ?

a)Younger [ ] **b)**Older [ ]

3. Do you agree with the statement that age determines teachers readiness to use ICT? a) YES [ ] b) NO [ ]

4. If you agree with the statement what are the reasons behind this state of affairs..……

5. What do you think should be done to help teachers more ready to use of ICT in teaching? .....

ii) The extent to which gender influences teachers readiness to use ICT in teaching

1. How the teachers in your school are distributed gender wise?
a) Male [ ] b) Female [ ]

2. In your opinion, which gender is more ready to use ICT in teaching? .....……

3. i. Do you agree with the statement that gender influences teachers readiness to use ICT?
a) YES [ ] b) NO [ ]
ii.If you agree with the statement, what are the reasons behind this state of affairs?
……

4. What do you think should be done to help teachers of both genders embrace ICT in teaching ? .....

iii) The extent to which attitude influences teachers readiness to use ICT in teaching

1. Do you have computers in your school a) YES [ ] b) NO [ ]

2. Do the teachers use the computers to prepare for their lessons? a) YES [ ] b) NO [ ]

3. Do the teachers use the internet to access educational resources? a) YES [ ] b) NO [ ]

4. Are the teachers in your school taking part in ESP-ICT project by the Ministry of Education? a) YES [ ] b) NO [ ]

5. How often are computers in the school used for teaching ?

……..…….……

6. In your opinion do the teachers like utilizing ICT in the teaching process?

…….....

7. In your opinion, what would make teachers not utilize ICT in teaching when computers are available? .....

8. How can the teachers' attitude towards ICT be modified for the better so as to help them embrace the use of ICT in teaching ?

…….....

9. In one word, how would you summarize the attitude of teachers towards ICT use in your school? .....

(iv). The relationship between teaching experience and teachers readiness to use ICT in teaching

1. When do the teachers in your school begin to use ICT in their teaching?

……

2. Did the teachers start using ICT in teaching as soon as they were employed or did they take some time before using ICT? a) YES [ ] b) [ ]

3. Do you think the teachers' use of ICT has been improving over the years?
   a) YES [ ] b) [ ]

4. In your opinion does teaching experience influence teachers readiness to use ICT? a) [ ] b) [ ]

SECTION C:

THE EXTENT TO WHICH PRIOR COMPUTER TRAINING INFLUENCES TEACHERS READINESS TO USE ICT IN TEACHING

1. Are there teachers in your school who have skills/training to use computers in teaching?
   a) YES [ ] b) [ ]
2. Do you believe that computer training of teachers is important in imparting and improving teacher's ICT skills a) YES [ ] b) NO [ ]
3. If yes, how would training help improve teachers readiness to use ICT?
   .....
4. Do you have enough educational resources (e.g. e-content) to integrate ICT in teaching?
   a) YES [ ] b) NO [ ]
5. Have all the teachers in your school attended ICT training? a) YES [ ] b) NO [ ]
6. If no, why haven't all teachers in your school attended ICT training?
   .....
7. In your opinion, does a teacher's prior computer training influence teachers readiness to use ICT in secondary schools? a) YES [ ] b) NO [ ]

SECTION D:

THE EXTENT TO WHICH ICT INFRASTRUCTURE INFLUENCES TEACHERS READINESS TO USE ICT IN TEACHING

1. Do teachers in your school have convenient/ consistent access to computer at school?
   a) YES [ ] b) NO [ ]
2. Do you have reliable internet connection in the school?
   a) YES [ ] b) NO [ ]
3. Do the computers have your computer have working printers attached to them?
   a) YES [ ] b) NO [ ]
4. Are the computers you access solar or electricity driven?
   a) Solar [ ] b)Electricity [ ]
5. If they are electricity driven, is there consistent supply of electricity of power at school?
   a) YES [ ] b) NO [ ]

6. Are teachers also expected to do some lesson preparation at home?

a) YES [ ] b) NO [ ]

7. Are teachers provided with computers to use at home for research and lesson preparation? a) YES [ ] b) NO [ ]

8. Do you think that ICT infrastructure influences teachers' e-readiness to use ICT in secondary schools? a) YES [ ] b) NO [ ]

9. In your opinion does your school have the right ICT infrastructure?

A) YES [ ] b) NO [ ]

10. In your opinion how can ICT infrastructure be provided/ improved?

……

11. In your opinion, what should be done to improve teachers readiness to use ICT?

……..……

12. What plans do you have of expanding ICT program in your school?

……

13. In your view, what is the major challenge of integrating ICT in teaching?

…….....

THIS IS TO CERTIFY THAT:
MR. LUCAS MUNANU CHEGE
of UNIVERSITY , 89-1030 GATUNDU,has
been permitted to conduct research in
Kiambu County
on the topic: *FACTORS INFLUENCING TEACHERS' READINESS TO USE ICT IN TEACHING IN PUBLIC SECONDARY SCHOOLS IN GATUNDU NORTH DISTRICT, IN KIAMBU COUNTY, OF KENYA.*
for the period ending:
28th November,2014

Permit No : NACOSTI/P/14/3079/1588
Date Of Issue : 14th July,2014
Fee Recieved :Ksh 1,000

.....
Applicant's Signature

.....
Secretary
National Commission for Science, Technology & Innovation

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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When replying please quote

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NAIROBI-KENYA

Ref: No.

Date:

14th July, 2014

NACOSTI/P/14/3079/1588

Lucas Munanu Chege
University of Nairobi
P.O.Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Factors influencing teachers' readiness to use ICT in teaching in public secondary schools in Gatundu North District, in Kiambu County of Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for a period ending **28th November, 2014.**

You are advised to report to **the County Commissioner and the County Director of Education, Kiambu County** 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.

SAID HUSSEIN
FOR: SECRETARY/CEO

Copy to:

The County Commissioner
The County Director of Education
Kiambu County.