

**AN ASSESSMENT OF PUBLIC SECONDARY SCHOOL TEACHERS  
PREPAREDNESS IN INTEGRATING ICT FOR INSTRUCTION: A CASE OF  
RUIRU DIVISION, THIKA DISTRICT**

**BY**

**MIGWI CATHERINE NJERI**

**E55/10504/06**

**RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF  
THE REQUIREMENT FOR THE DEGREE OF MASTER OF  
EDUCATION, DEPARTMENT OF EDUCATION MANAGEMENT,  
POLICY AND CURRICULUM STUDIES, KENYATTA UNIVERSITY**


**2009**

## DECLARATION

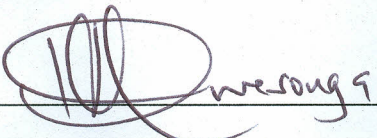
This research project is my original work and has not been submitted in any other university.

Signed  Date 2/12/09  
**Migwi Catherine Njeri (E55/10504/2006)**

This research project has been submitted with our approval as the University Supervisors.

Signed  Date 2/12/09

**Dr. Norbert Ogum Ogeta**  
Lecturer  
Department of Education Management,  
Policy and Curriculum Studies,  
Kenyatta University

Signed  Date 4/12/2009

**Mr. D. M. Wesonga**  
Lecturer  
Department of Education Management,  
Policy and Curriculum Studies,  
Kenyatta University

## DEDICATION

This research work is dedicated to my husband Kibe Macharia and our children Ruth Nyawira and Victor Macharia

## ACKNOWLEDGEMENTS

This research work has been made possible due to the support given by several people. First, I am grateful to my supervisors Dr Norbert Ogeta and Mr. Daniel Wesonga for their outstanding guidance and encouragement throughout this work. In addition I would like to thank both Dr Wycliffe Otieno and Mr. Gatimu Kiranga who made indispensable contribution towards this work.

Special thanks go to my husband Kibe Macharia who supported me whole heartedly through out the duration of the study. I am also greatly indebted to my friends Alice Njeri for sharing with me information on how to get a study leave and Beth Wambugu who constantly read my work and gave me directions for the way forward despite her tight schedule.

I owe many thanks to my course mates Grace, Purity, Nancy and George. You were always there for me in many special ways. I thank my prayer partner Damaris Chuchu for upholding me in prayers even when I seemed to have reached the end of the road.

Finally, I am greatly humbled as I give thanks to the Almighty God in whom all things are possible.

## TABLE OF CONTENTS

DECLARATION .....	i
DEDICATION.....	ii
ACKNOWLEDGEMENTS.....	iii
LIST OF FIGURES .....	viii
LIST OF TABLES.....	ix
ACRONYMS AND ABBREVIATIONS.....	x
ABSTRACT.....	xi
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background to the Study.....	1
1.2 Statement of the Problem.....	4
1.3 Purpose of the Study.....	4
1.4 Objectives of the Study.....	5
1.5 Research Questions.....	5
1.6 Significance of the Study.....	5
1.7 Assumptions of the Study.....	6
1.8 Delimitation of the Study.....	7
1.9 Limitations of the Study.....	7
1.10 Theoretical Framework.....	7
1.11 Conceptual Framework.....	9
1.12 Operational Definition of Terms.....	10
CHAPTER TWO: REVIEW OF RELATED LITERATURE .....	13
2.1 Introduction.....	13
2.2 Use of ICT in Education in the Developed Countries.....	13
2.3 Recent Studies on ICT and Education in Developed Countries.....	15

2.4	Teachers Preparedness for Adoption of ICT in Education in Asia.....	17
2.5	ICT Use in Africa and Teachers Preparedness for Adoption .....	21
2.6	Use of ICT in Education in Kenya.....	26
2.7	Summary.....	31
CHAPTER THREE: RESEARCH METHODOLOGY .....		32
3.1	Introduction.....	32
3.2	Research Design .....	32
3.3	Location of the Study.....	33
3.4	Target Population.....	33
3.5	Sample and Sampling Procedures.....	33
3.6	Research Instruments.....	34
3.6.1	Questionnaires .....	35
3.6.2	Interview Schedules.....	36
3.7	Pilot Study.....	37
3.8	Validity and Reliability of the Instruments.....	37
3.8.1	Validity .....	37
3.8.2	Reliability.....	38
3.9	Data Collection Procedure .....	39
3.10	Data Analysis.....	39
CHAPTER FOUR: FINDINGS AND DISCUSSIONS .....		40
4.1	Introduction.....	40
4.2	Background Information.....	40
4.2.1	Sex of the Respondents.....	40
4.2.2	Education Level .....	41
4.2.3	Teaching Experience.....	42

4.2.4 Subject Taught.....	42
4.2.5 Teaching Workload.....	43
4.3 State of Infrastructure Necessary for Teachers to Successfully Integrate ICT in Schools.....	44
4.3.1 Available Infrastructural Facilities for ICT Integration in the Schools.....	44
4.3.2 Ratio of Students to Computers.....	45
4.4 Attitudes of Teachers towards Use of ICT for Instruction.....	46
4.4.1 Use of Computers by the Respondents.....	46
4.4.2 Attitudes of Teachers Towards Use of ICT for Instruction.....	47
4.5 Teachers' Preparedness to Effectively Integrate ICT for Learning.....	48
4.5.1 Computer Training.....	48
4.5.2 Place of Training.....	49
4.5.3 Level of Training.....	50
4.5.4 Specific Training on Use of Computers for Instruction.....	51
4.5.5 Secondary Schools Preparedness to Integrate Computers for Instruction.....	51
4.5.6 Challenges Faced in Integration of ICT for Instruction.....	52
4.6 Discussions of Findings.....	54
4.6.1 State of Infrastructure Necessary for Teachers to Successfully Integrate ICT in Schools.....	54
4.6.2 The Attitudes of Teachers Towards Use of ICT for Instruction.....	55
4.6.3 Teachers' Preparedness in Terms of ICT Literacy to Effectively Integrate ICT for learning.....	56
4.6.4 Challenges Faced in Integration of ICT for Instruction.....	57
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	59
5.1 Introduction.....	59

5.2	Summary.....	59
5.3	Conclusions.....	61
5.4	Recommendations.....	61
5.5	Recommendations for Further Research.....	62
BIBLIOGRAPHY.....		63
APPENDICES.....		68
APPENDIX A: Principal’s Questionnaire.....		68
APPENDIX B: Teacher’s Questionnaire.....		74
APPENDIX C: Deo’s Interview Schedule.....		79
APPENDIX D: ICT Officer Interview Schedule.....		80
APPENDIX E: Study Permit and Research Authorization Letter.....		81

## LIST OF FIGURES

Figure 1.1: Conceptual Framework .....	10
Figure 4.1: Gender of the Respondents .....	41
Figure 4.2: Education Level of the Respondents.....	41
Figure 4.3: Teaching experience.....	42
Figure 4.4: Subjects Taught by the Respondents.....	43
Figure 4.5: Teaching Workload .....	44
Figure 4.6: Ratios of Students to Computers.....	45
Figure 4.7: Use of Computers by the Respondents .....	46
Figure 4.8: Attitudes of Teachers towards Use of ICT for Instruction.....	47
Figure 4.9: Respondents Computer Training.....	49
Figure 4.10: Place of Training .....	50
Figure 4.11: Level of Training.....	50
Figure 4.12: Respondents Specifically Trained on Use of Computers for Instruction.....	51
Figure 4.13: Views on Secondary Schools Preparedness to Integrate Computers for Instruction.....	52
Figure 4.14: Challenges Faced in Integration of ICT for Instruction .....	53

## LIST OF TABLES

Table 2.1: Percentage of USA Public Schools With Internet Access by 1998.....	15
Table 2.2: Computer Penetration Ratios in Schools in Selected African Countries.....	22
Table 3.1: Distribution of Schools to be Sampled and the Respondents in the Study.....	34
Table 4.1: Available Infrastructural facilities for ICT Integration in the Schools.....	45

## ACRONYMS AND ABBREVIATIONS

<b>DEO</b>	District Education Officer
<b>EFA</b>	Education for All
<b>GoK</b>	Government of Kenya
<b>IAEE</b>	International Association for the Evaluation of Education
<b>ICT</b>	Information Communication Technology
<b>IT</b>	Information Technology
<b>KESSP</b>	Kenya Education Sector Support Program
<b>MDGs</b>	Millennium Development Goals
<b>MoE</b>	Ministry of Education
<b>NEPAD</b>	New Partnership for African Development
<b>NGOs</b>	Non-Governmental Organizations
<b>NSF</b>	National Science Foundation
<b>OECD</b>	Organization of Economic Co-operation and Development
<b>PPP</b>	Public-Private Partnerships
<b>PTC</b>	Primary Teachers colleges
<b>SITES</b>	Second Information Technology in Education Study
<b>SPSS</b>	Statistical Package for Social Sciences
<b>TTA</b>	Teacher Training Agency
<b>UNDP</b>	United Nations Development Programme
<b>UNESCO</b>	United Nation Educational Science and Cultural Organisation
<b>USA</b>	United States of America
<b>USAID</b>	United States Agency for International Development

## ABSTRACT

The purpose of this study was to assess the preparedness of secondary schools teachers in Ruiru Division of Thika District to integrate ICT for instruction. The objectives of the study included, i) determining the state of infrastructure necessary for teachers to successfully integrate ICT in schools, ii) finding out the attitudes of teachers towards use of ICT for instruction, and iii) determining teachers' preparedness in terms of ICT literacy to effectively integrate ICT for learning, iv) to find out the challenges faced by secondary school teachers in the integration of ICT for instruction. The literature reviewed covered the use of ICT in developed countries, strides made by developing countries, and finally status of ICT in education in Kenya was examined. The study was conducted using descriptive survey research design. The target population was 27 head teachers and 300 teachers. Twelve schools which were 44% of the target population were selected using proportionate sampling. Simple random sampling was used to select 5 teachers from each school giving a total of 60 teachers. All the 12 head teachers from the schools selected participated in the study. Two officials from the DEO's office were selected using purposive sampling. Data was collected using questionnaires and key informant interview. Quantitative data was analysed using the statistical package for social sciences and tabulated into frequencies, ratios, tables, and percentages. Qualitative data was analysed by organizing it into themes, and according to the research questions and objectives. Findings indicated that 61% of the schools studied were connected to electricity, while 39% had no electricity. However computer laboratories were only available in 52% of the schools. Only 18% of the schools had computers purposely reserved for teachers' use. A mere nine percent of the respondents have had training on the use of computers for instruction. The remaining 91% had never received such training but were interested in learning how to use computers for instruction. 84% of the respondents reported that they thought schools were not ready to integrate ICT for instruction, citing the major reason as lack of teacher training in ICT. Challenges faced by secondary school teachers in integration of ICT for instruction included insufficient teacher training and lack of teachers' awareness on the need for Integrating ICT in learning. The study concluded that teachers in the district were ill prepared for integration of ICT for instruction and learning. Recommendations were on increasing access to computers and supportive infrastructure, as well as intensifying teachers training on ICT.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the Study

Education is at the core of the knowledge economy and learning society. Improved secondary education is fundamental to the creation of effective human capital in any country. There is a general consensus that modern information and communication technologies are transforming various aspects of human activity, particularly the art of teaching and learning World Bank (2004). Currently, there is an extraordinary interest in ICT throughout the world. Countries are carrying out surveys, policy studies, programmes and projects to help exploit ICT for social and economic benefit and to maintain competitive position to avoid suffering the widening of the digital gap between the electronic “haves” and the electronic “have-nots”.

The global adoption of ICT in education is premised on the belief that the new technological tools will revolutionize an outmoded educational system, better prepare students for the information age, and/or accelerate national development efforts as well as increase cost effectiveness of education programmes, facilitate globalization and above all improve the quality of education Ngare (2007). However, introduction of ICT in teaching and learning requires a well prepared teaching staff and well-developed information infrastructure currently lacking in the developing countries. Cullen (2003) observes that the situation of computer use in education in developed countries is different from that in developing countries and notes that this is due to funds extended to the training institutions by their governments and society. In Britain for instance, Fountain (2001) states that by the school year 1983/84, every secondary school had personal computers for direct use

by the students. In addition, every college and university provided basic education in computer technology not mentioning mathematical and technical faculties teaching professional knowledge.

In developed countries, ICT is now at the centre of education reform efforts that involve its use in coordination with changes in curriculum, teacher training, pedagogy, and assessment. Countries such as Singapore, Chile, the United States, United Kingdom, and Norway have taken the position that the integration of ICT into classrooms and curricula can improve educational systems and prepare students for the 21<sup>st</sup> century learning society. Similarly, multinational organizations, such as the Organization for Economic Cooperation and Development (OECD, 1999) the European Commission (2000), and the G8 nations (2000) have identified the need to prepare students for lifelong learning in the knowledge economy and they assign a central role to ICT in accomplishing this goal.

As the positive effects of ICT have continually been noted in developed countries, it has become critically important for developing countries of Africa to embrace new technology. Butcher (2003) observes that there is a scarcity of data on the state of ICT infrastructure for schools in Africa. However, a number of studies in African countries exist. In a study, Lundell & Howell (2000) found out that South African schools faced a number of challenges that prevent them from using computers for teaching and learning. These are insufficient funds; insufficient numbers of computers; lack of computer literacy among teachers; lack of subject teachers trained to integrate computers into learning areas; and the absence of properly developed curricula for teaching computer skills.

Makau (1988), in a review of literature on ICT notes that Uganda has already adopted and integrated ICT into professional development program for primary school teachers. Through governmental agencies, USAID Uganda has been able to set up multimedia training laboratories in Kampala which enhances the curriculum with ICT by developing, testing and distributing online multimedia training modules for teachers and tutors. These teachers in turn train current and future teachers at the participating Primary Teachers Colleges (PTCs).

In Kenya, the government in May 2007 indicated her commitment to the introduction of ICT in schools. The education minister stated that Kenya was making major strides towards realizing e-learning, adding that the method is cheap and requires less manpower Ngare, (2007). The ministry has embarked on an ambitious programme to connect all primary and secondary schools to the internet in 10 years. Kenya is among 16 countries selected to benefit from the first phase of the e-initiative by the New Partnership for Africa's Development (NEPAD). Six schools have benefited from a pilot programme officially launched on September 2005. Barasa, (2005). The programme is to provide knowledge and experience by implementing information communication technologies (ICT) in schools across Africa that will inform the model for a large-scale rollout. Consequently, the government entered into an agreement with Microsoft to supply computers to the schools.

Teacher training is one essential requirement for successful use of ICT in education (Haddad and Draxler, 2002). In addition, many of those schools that do have computers still do not have access to the Internet. Further, the costs of Internet

access can be prohibitively high for many schools, both in Kenya and elsewhere. Among pertinent aspects which would determine whether teachers are prepared include the existing government's ICT policy which influences the extent to which the government channels resources and support to school and availability of the ICT infrastructure. Others include availability of infrastructural facilities such as computers, electricity, and internet connectivity and teacher's skills and attitudes towards use of computers for instruction.

### **1.2 Statement of the Problem**

Despite the overwhelming emphasis that has been laid towards the importance of ICT in education in the world and in Kenya and subsequent efforts to increase adoption of ICT in secondary schools, it is not clear whether Kenyan secondary schools teachers are prepared to integrate computers for instruction. From the background it is clear that integrating ICT in teaching and learning is very important to improve the quality of learning. It is therefore necessary for teachers to be well prepared for this exercise. This study therefore set out to assess the preparedness of public secondary school teachers in the integration of ICT in learning, in Ruiru Division, Thika District

### **1.3 Purpose of the Study**

The purpose of this study was to assess the preparedness of public secondary schools teachers in Ruiru Division of Thika District to integrate computers for instruction.

#### **1.4 Objectives of the Study**

The objectives of the study were to:

- i) Determine the availability of ICT facilities required by secondary school teachers in Ruiru division to successfully integrate ICT for instruction in schools
- ii) Find out the attitudes of secondary school teachers in Ruiru division towards use of ICT for instruction.
- iii) Find out the status of ICT literacy among the secondary school teachers in Ruiru division
- iv) Find out the challenges faced by secondary school teachers in the integration of ICT for learning in Ruiru division

#### **1.5 Research Questions**

- i) What ICT facilities are available for teaching and learning?
- ii) What is the attitude of secondary school teachers in Ruiru Division towards use of computers for instruction?
- iii) What level of ICT literacy do the secondary school teachers in Ruiru division have?
- iv) What are the challenges experienced by secondary school teachers in Ruiru division in integrating ICT for learning?

#### **1.6 Significance of the Study**

The study is significant in that:

- i. It may yield significant empirical data and information on the preparedness of secondary schools teachers to use computers for teaching and learning.

- ii. The study findings could aid policy makers, especially the Ministry of Education (MoE) and the Kenya Institute of Education, to develop strategies to prepare teachers effectively for integration of computers for instruction in secondary education.
- iii. The study may assist teacher training colleges and Universities with data that could be utilized to offer appropriate teaching for student-teachers and provide strategies relevant to the integration of ICT for instruction in schools.
- iv. In matters of scholarship, the study may add to the body of knowledge in the area of e-learning by contributing literature on teacher's preparedness to use computers in secondary education.

### **1.7 Assumptions of the Study**

The study was based on the following assumptions:

- (i) That the commitment of the government to the introduction of e-learning in secondary schools was well guided by and complemented the national policy as envisioned in vision 2030 of making Kenya a middle income country.
- (ii) That teachers on their own had been making efforts at ICT literacy independent of Government initiatives.
- (iii) That though the study was to be done in Ruiru, its findings would closely mirror other regions in Kenya with similar socio-economic and infrastructure characteristics.

## **1.8 Delimitation of the Study**

The study focused on the preparedness of secondary schools teachers to integrate computers for teaching and learning, in Ruiru Division of Thika District. Its focus was on public secondary schools only. The areas of preparedness looked into included infrastructure, such as computers, electricity and internet connectivity; teacher preparedness in terms of training; and attitude of teachers towards use of computers for instruction. Though ICT covers a wide range of devices the study mainly concentrated on the computers as a tool for teaching and learning.

## **1.9 Limitations of the Study**

It was not possible to include all the stakeholders in the development of ICT in secondary schools as this would have required considerable time, resources and other logistics.

## **1.10 Theoretical Framework**

The study was based on social cognitive theory as advanced by Bandura (1986, 1997). This theory states that behaviour, cognition, and context (or environment) interact with each other to form a reciprocal relationship. The theory argues that the relationship between these three factors provide the best path to understanding behavior. Behaviour in particular is determined by the levels of self-efficacy which is a person's perceptions of her/his competence in a nominated area. Self-efficacy has been defined as a concept relating to a person's self-perceived belief in her/his ability to carry out actions that will achieve designated goals (Bandura 1986, 1997; Pintrich and Schunk 1996). Self-efficacy is based on beliefs about what a person can accomplish with the skills and knowledge she/he already possess. Since self-

efficacy is said to be situation-specific, it is likely that a person will exhibit different levels of self-efficacy in different domains.

Bandura assumes that the acquisition of self efficacy beliefs will be facilitated by four factors: (1) the successful completion of a task (inactive experience or mastery), (2) observation of a successful model (vicarious experience), (3) verbal persuasion and (4) emotional or affective state.

In his study of pre-service teachers Kellenberger (1996) reports that belief about success with computers in the past has some influence on perceived computer self-efficacy. However, the results of his study suggest that past achievement might not influence self-efficacy as much as the level of value a student teacher places on computers in an educational context. Other research has found strong links between self-efficacy and later competence or achievement (Pintrich and Schunk 1996; Bandura 1986).

With the increase of the use of computers at all levels of education, researchers have become interested in links between beliefs about personal ability to perform educational computer tasks and subsequent learning about, and use of, computers. Self-efficacy appears to be an important indicator of whether an individual will teach with computers at a later stage. Ropp (1999) 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. Delcourt and Kinzie (1993) reported that learning about computers is aided by high levels of self-efficacy and a positive attitude.

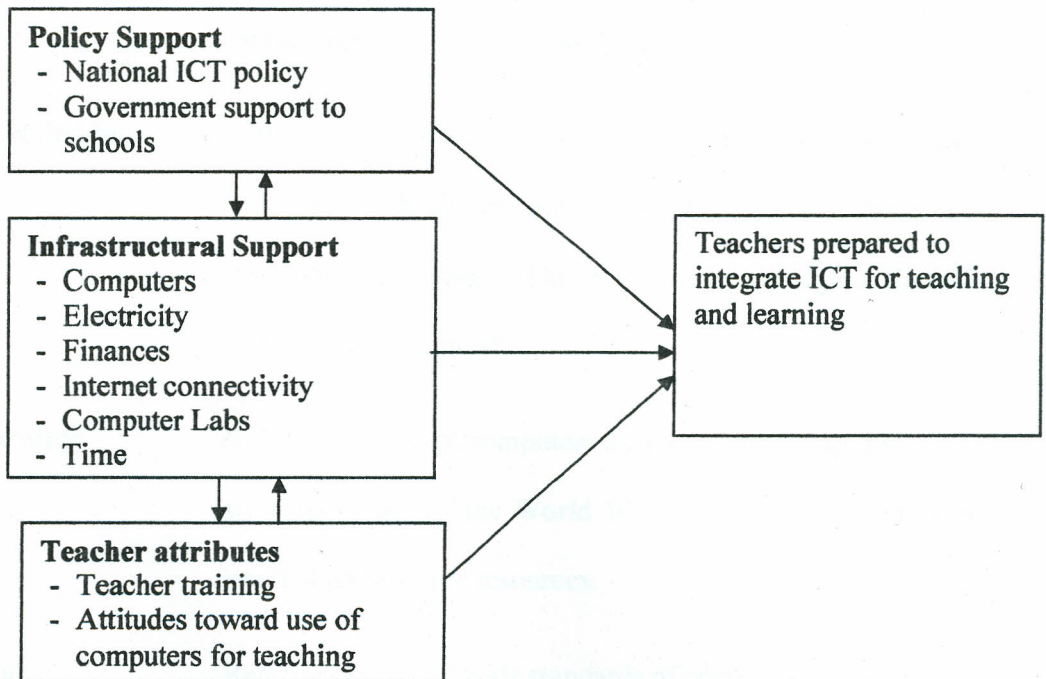
From this theory, it is clear that self-efficacy beliefs are an important, and measurable, component of the beliefs that influence technology integration.

Decisions made by teachers about the use of computers in their classrooms are likely to be influenced by multiple factors including the accessibility of hardware and relevant software, the nature of the curriculum, personal capabilities and constraints such as time. In addition, 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. These determinant factors constitute the variables in conceptual framework and which the study investigated in order to fulfill its objectives.

### **1.11 Conceptual Framework**

The conceptual framework (figure 1) is derived from the theoretical framework discussed earlier and groups the factors determining integration of computers in learning into three categories. These include policy support factors, teacher attributes and infrastructural support. The conceptual framework shows how ICT policy support, computer infrastructure, and personnel work to influence effective integration of computers for teaching and learning in secondary schools. The government's ICT policy influences the extent to which the government channels resources to ICT infrastructure and teacher training. This include a clear and well targeted policy which details intervention measures and government support for school in aspects such as resources and skills.

**Figure 1.1: Conceptual Framework**



**Source: Researcher (2009)**

Availability of infrastructure also determines teachers' preparedness to integrate ICT for learning. This includes facilities such as computers, electricity, internet connectivity and time as a resource which have a direct influence on teacher's preparedness to integrate ICT for instruction. Personnel factors include teacher's skills to use computers for instruction, and their attitudes towards use of computers for instruction. These as observed in the theoretical framework influences teachers self efficacy or believe in their ability to integrate computers for learning.

### **1.12 Operational Definition of Terms**

**Communication:** Refers to the process through which information is relayed from one point to another. E.g. through the internet

**Computer hardware:** Refers to the physical components of a computer system e.g. monitor printer, mouse, and keyboard

**Computer software:** Refers to the programmes that contain data e.g. Microsoft word, excel, access and power point

**Digital divide:** Refers to the uneven access to information through modern processes such as the internet between the developed and developing countries. This has led to the digital “haves” and digital “have nots”.

**E-learning:** Refers to the use of computers in teaching and learning with heavy use of the World Wide Web and other internet enabled gadgets and resources.

**Global:** Refers to the world wide standards of computers use as compared to the local standards

**Globalisation:** The idea that the world is developing a single economy and culture as a result of improved technology and communication

**Information Communication Technologies (ICT):** The use of computer as a tool for instruction and learning in schools. This will also include teachers’ capacity to use the computers and their attitudes towards computers as a mode of instruction in schools.

**Integration:** Incorporation of computers as tool for teaching and learning to the already existing methods of content delivery

**Preparedness:** is defined as being “ready mentally or physically for ICT experience or action”

**Stakeholders:** Refers to individuals, groups or organisations with a common interest in a course e.g. improving computer literacy.

**Technology:** The development of human knowledge and ability to manipulate and invent new devices and adapt it for making life more convenient while saving time and energy.

## **CHAPTER TWO: REVIEW OF RELATED LITERATURE**

### **2.1 Introduction**

This chapter covers a review of literature related to the study. The chapter covers the following:

- a) Use of ICT in education in the developed countries
- b) Recent studies on ICT in Education in developed Countries
- c) Case studies of Teachers preparedness for adoption of ICT in education in the Asian countries
- d) ICT in education in Africa and Teachers Preparedness for Adoption
- e) Status of ICT in education in Kenya

### **2.2 Use of ICT in Education in the Developed Countries**

During the past decade there has been an exponential growth in the use of Information and Communication Technology (ICT) which has made impacts both on society and on our daily lives. It is thus not surprising to find increasing interest, attention and investment being put into the use of ICT in education all over the world. In addition to efforts to employ ICT to improve learning, the emergence of the knowledge economy has also brought about a much greater emphasis on education. A number of master-plans on ICT in education have been produced in many countries (Pelgrum and Anderson, 1999). Such plans reveal that educational innovations in ICT have been increasingly embedded within a broader framework of education reforms that aimed to develop students' capacities for self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn, abilities that figured much less importantly in previous school curricula.

In developed countries, the situation of computer use in education is different from that in developing countries. Cullen (2003) suggests that this is due to funds extended to the training institutions by their governments and society. In Britain for instance, by the school year 1983/84, every secondary school had personal computers for direct use by the students. In addition, every college and university provided basic education in computer technology (not mentioning mathematical and technical faculties teaching professional knowledge) (Fountain, 2001).

According to Malkin (1972), in USA, informatics had taken root in secondary schools by the late 1960s. A survey by the American Institute of Research made for the National Science Foundation (NSF) in 1970 showed that 12.9% of public high schools were using computers in some way in their instructional program and 30% were using computer for administrative purposes. In 1971, the University of Texas Computer Sciences Department offered a special course specifically for teachers entitled 'computer science for teachers' to cope up with the growing population of secondary school and small college users of information technology.

The US Department of Education (1998) reports that by 1996, 91% of secondary schools in USA were using computers, 62% were using advanced telecommunications and 73% had integrated technology into school curriculum. Most schools in USA have internet access and the percentage of public schools with internet access has been on the rise, with secondary schools reporting the highest internet access as depicted in Table 1.

**Table 2.1: Percentage of USA Public Schools With Internet Access by 1998**

<b>School characteristics</b>	<b>1994 (%)</b>	<b>1997 (%)</b>	<b>1998 (%)</b>
Elementary	30	75	88
Secondary	49	89	94

**Source:** US Department of Education (1998)

Fountain (2001), reviewing literature from Guatemala, noted that there is a program for institutional capacity in computer applications for Teachers Training Institutes. The program is training teachers to use the computer laboratories and the education staff to increase their effectiveness in using softwares, electronic mail and the internet. In a study conducted in the U.S., it was shown that subsidies to schools for Internet access (which ranged from 20-90% of costs depending on school characteristics) led to 66% more classrooms with Internet (Goolsbee and Guryan, 2002).

### **2.3 Recent Studies on ICT and Education in Developed Countries**

In the period 1998-99 the Second Information Technology in Education Study (SITES), which is a project of the International Association for the Evaluation of Educational Achievement (IAEEA) conducted a study that involved schools in 26 countries from Europe, North America, and Asia Pacific (Pelgrum and Anderson, 1999). The study was a survey of principals and technology coordinators that addressed ICT issues related to curriculum, infrastructure, staff development, innovative pedagogical practices, and management and organization. The findings document a significant increase between 1995 and 1998 in the number of computers in schools, although there are also significant differences between countries. For

example, Norway moved from approximately 55 students per computer in 1995 to approximately 9 students per computer in 1998. The ratio in China Hong Kong was 39:1 in 1995 and 21:1 in 1998. And Hungary decreased its ratio of 41 students to every computer to a 23:1 ratio.

Similarly, Pelgrum and Anderson (1999) noted that large numbers of schools in many countries had access to the Internet. For example, approximately 85% of the schools in Canada and Denmark had access to the Internet in 1999. About 78% of the schools in Norway did, but only about 30% of the schools in China, Hong Kong and Hungary had Internet access in 1999.

But more important than these findings was a finding about the number of schools engaged in innovative pedagogical practices - what Pelgrum and Anderson (1999) call an emerging new instructional paradigm. An indicator was constructed from questions related to classroom pedagogy that measured the extent to which students were actively involved in their own learning. A number of countries in Europe and North America, such as Norway, Denmark, Hungary, and Canada, scored highly on this indicator. Countries in Asia Pacific often scored low on this indicator and higher on an indicator of traditional pedagogical practices. Also important was the fact that the use of ICT was often involved in these innovative pedagogical practices.

Another set of case studies was reported by Kozma *et al.*, (1999), emphasizing on innovative pedagogical practice using technology. The studies show that there are

instances of these innovative practices in many countries. Examples from these case studies illustrate the kinds of changes that are occurring with the use of ICT. For example in Norway, students in a lower secondary school are using the Internet to collaborate with students in a school in the US to follow two women (one Norwegian and one American) who are going across Antarctica on cross country skis. The students communicate with the women and with weather and research stations in the area to learn about the Antarctic continent. Another example given by Kozma *et al.* (1999) is the Roots Project, which connects five rural primary schools in Catalonia, Spain. Students in each school did a parallel research project about their village: the history, monuments, village square, etc. They used word processing, email, and digital photography to communicate with each other and publish their reports on the Web in Catalan.

Kozma *et al.* (1999) also notes that groups of students in a Chilean primary school were using email and the Internet to collaborate with senior citizens in Belgium on projects related to topics such as tourism and current affairs. Students in each group take on specific roles and responsibilities to produce displays, murals, and monthly presentations to the whole school with the goal of developing their reading, writing, oral expression, and social skills.

#### **2.4 Teachers Preparedness for Adoption of ICT in Education in Asia**

In a study comparing Malaysia's approach to introducing ICT into schools with the approaches taken by eight other countries, researchers found that Malaysia's approach is radically different from the others (Frost and Sullivan, 2006). In Australia, Britain, Canada, Ireland, Japan, New Zealand, Singapore and the USA,

initiatives for incorporating ICT into education have tended to be instigated by schools rather than by the national governments. The schools set the goals themselves, with the governments providing funds. However, a common feature in all cases was that teachers' preparedness to integrate ICT in schools was wanting. The study report recommended further provision of training in teaching methods and recommended that the teacher training curriculum should incorporate competence in the use of specific ICT tools, competence in integrating ICT into subject teaching, and competence in utilizing ICT for planning, preparing, teaching, assessing and evaluating lessons.

Recognizing the need for improvements in the use of ICT in education and training, the Philippines Government has enacted laws to foster the use of ICT for widening access to education, improving the quality of teaching and fostering the development of lifelong learning skills (UNESCO, 2007). A national ICT programme for teachers, the National ICT Competency Standard for Teachers was implemented in all public high schools so that the majority of the teachers were able to satisfy the requirements of the ICT standards by 2010. A major component was capacity building. The objectives of the training programme were to:

- Explore the role of today's teacher and how it relates to use of technology in the classroom.
- Orient the project participants on the project concept – its objectives, scope and coverage, expected outputs and different project components.
- Discuss the pilot project, the roles of the participants, expectations, and support network.

- Explore the lesson plans augmented with video material and review how they were developed.
- Develop participants' competencies and skills in utilizing ICT tools and conducting project activities.
- Plan for successful project integration.

In addition to the training programme, the teachers, school heads and other local education officials were also given suggestions and advice on various aspects of the programme integration during the regular school visits by the project monitors. During the project, communication was encouraged between the teachers, school heads and other stakeholders, through the project help desk, this communication facility served as an avenue for continuing provision of advice and mentoring activities of the project.

In Malaysia training teachers in computer skills and the incorporation of ICT into lessons to improve students' achievement led to the development of an on-line teacher training software which was designed using the United Kingdom's Teacher Training Agency (TTA) specification, to equip teachers with ICT skills and with the knowledge and understanding to make decisions about when and how to use ICT in their teaching and to improve students' learning achievement. The teacher training software incorporates tracking of learning and a self-assessment system, and also maps the learning pathway for each teacher. Teachers are expected to complete the training in nine to 12 months at their own pace. On successful completion, teachers are awarded an internationally recognized certificate of competency.

The overall goal of China's compulsory education programme is to achieve education for all (EFA) throughout China, including in all the rural regions, by the end of 2007 (UNESCO, 2007). The nine-year compulsory education law has provided the catalyst for the introduction of further changes within the Chinese education system, namely the focus on integrating the use of ICT into schools. Compulsory education and increasing enrolment rates across the country have meant that the introduction of ICT into schools has consequently reached more students. In order to change the textbook-based content delivery process, to employ ICT to help students to get access to rich learning content, all classroom teachers, along with school administrators and school technical coordinators received effective training in the use of ICT in education. All classroom teachers were trained in four areas. Each area of training has its own performance indicators:

### **1. Awareness and attitude**

- a) Awareness of technology's value
- b) Self-Assessment
- c) Concepts of lifelong learning

### **2. Knowledge and skills**

- a) Concepts
- b) Skills

### **3. Integration and innovation**

- a) Designing and implementing technology-supported lessons and activities
- b) Using technology to support teaching and management
- c) Using technology to enhance research and professional development
- d) Using technology to mediate collaboration and communication

#### **4. Social responsibilities**

- a) Understanding the social, ethical, legal, and human issues surrounding the use of technology in schools and apply that understanding in practice.

In Thailand an assessment of existing computer skills conducted under School Net indicated that most teachers required intense training (UNESCO, 2007). Throughout School Net, some level of competency has been established, but the study results indicate that teachers were not yet confident in the use of technology for their own productivity or in their teaching. It is important to emphasize, however, that effective and appropriate integration of ICT into teaching and learning requires more than just computer competency. Ultimately, the core competency required of teachers is the ability to make sound informative and pedagogic choices regarding the appropriate tools, social forms, methods, and activities that would enable students to achieve the learning objective of a lesson or unit. Ad hoc training does not meet best practices in education, it requires relevant, self-directed training which integrates learners' immediate experiences and daily work challenges. Similarly to what had been suggested for principals, future initiatives could couple intensive trainings with school-based courses and ongoing support through online training elements, where possible.

#### **2.5 ICT Use in Africa and Teachers Preparedness for Adoption**

Despite the fact that great energies are being expended on ICT infrastructure improvements across the world to bridge the digital divide, a certain measure of economic development has been touted as a fairly good predictor of ICT usage in homes and communities (Dutta, Lanvin, and Paua, 2004). Paliwala (2003) points out that the root cause of the global digital divide is the lack of economic development. Currently, no continent globally epitomizes and characterizes the low level of socio-

economic development more than Africa. This means that any efforts aimed at bridging the digital divide must first and foremost uplift the socio-economic status of the people of Africa. For example, the annual UNDP human development reports have, year after year, documented the fact that on average each individual in sub-Saharan Africa survives on less than US\$1 daily.

The statistics presented below do provide some indication of the technological context within which efforts to use ICT in education take place. Table 2.2 provides an indication of the penetration of computers in selected African countries.

**Table 2.2: Computer Penetration Ratios in Schools in Selected African Countries**

Country	Number of schools	Schools with computers	Percentage schools with computers
<b>Egypt</b>	32,000	10,000	31.25
<b>Ghana</b>	35,000	500	1.43
<b>Mozambique</b>	7,000	20	0.29
<b>Namibia</b>	1,519	60	3.94
<b>South Africa</b>	28,798	5,000	17.36

**Source:** Butcher (2003)

Of the countries depicted, Egypt has the highest percentage of computers in schools, at 31.25%. In Mozambique, only 20 schools currently have access to computers. Across the continent, radio is the most widely available technology. In Ghana and South Africa, the countries in which computers in schools data is available, it is clear that only 1.43% and 17.36% of schools have access to a computer respectively.

Though physical access to computers is a fundamental starting point, this alone will not lead to computer use or enhanced learning outcomes. Teacher training is one essential requirement for successful use of ICT in education (Haddad and Draxler, 2002). Lundell and Howell (2000) note the following factors in the South African context (but relevant generally too) that prevent schools from using computers for teaching and learning:

- Insufficient funds;
- Insufficient numbers of computers;
- Lack of computer literacy among teachers;
- Lack of subject teachers trained to integrate computers into learning areas; and
- The absence of properly developed curricula for teaching computer skills.

In addition, many of those schools that do have computers still do not have access to the Internet, which is an important requirement for supporting networking for learners and teachers, as well as for collaborative learning (Butcher, 2003). The Internet can provide a wealth of learning resources, access to which is, at present, very limited for many African education institutions. In Ethiopia, for example, only nine of the 12,000 primary schools had Internet access at the end of 2001, and ten of the 424 secondary schools (Jensen and Sarroco, 2002). Further, the costs of Internet access can be prohibitively high for many schools, both in Africa and elsewhere.

According to Isaacs (2002), the main obstacles faced by African schools with respect to Internet access specifically are:

- Lack of infrastructure and network infrastructure in particular;
- High telephone and Internet costs;
- Limited expertise and ICT skills levels; and

- Lack of an enabling policy environment.

Given the constraints on widespread computer and Internet access, it is essential that other technologies and resources, such as radio, television, and print media, should not be seen as less important than computers and the Internet. These media will continue to play a fundamental role in provision of educational resources to learners (Butcher, 2003).

Most academic institutions in Africa suffer from financial difficulties which hamper easy procurement of relevant ICT and other support materials and resources for students. For example according to Hadebe (2000), at the University of Zimbabwe in 1999, the government subsidy for students was reduced by 50 per cent.

Farrell and Shafika (2007) conducted a survey on ICT and Education in Africa. The survey was conducted in 53 African countries. The survey concluded that the process of adoption and diffusion of ICT in education in Africa is in transition. Farrell and Shafika (2007) further noted that there appears to be the beginnings of a marked shift from a decade of experimentation in the form of donor-supported, NGO-led, small-scale, pilot projects towards a new phase of systemic integration informed by national government policies and multi-stakeholder-led Integration processes. One of the primary features of this new phase is the priority that governments are giving to policy development. All but a handful of countries surveyed in Farrell and Shafika's (2007) study had a national ICT policy either in place or under development. While some of these national policies define goals and Integration strategies for ICT in the education sector, nearly half the countries had

chosen to develop an ICT policy that is specific to the education sector. Thus the new phase of ICT for education in Africa is occurring within national, and emerging regional, policy frameworks that are providing the basis for partnerships and donor participation.

Although the situation may appear bleak, senior leaders across the continent have recognized many of the education issues highlighted above, and have committed themselves to tackling them. The Sub-Saharan Africa Education for All Framework for Action explicitly states that the participants (Education Ministers, representatives of civil society, and international development agencies) 'recognize the necessity of educational systems to provide all African people with the opportunity to acquire the skills and knowledge essential for access and use of information and communication technology'. However, questions are raised by some about the value of focusing on ICT for education, given the many other and often-times competing needs in African educational systems and societies more generally (Lelliott, Pendlebury, and Enslin, 2001). The importance of ICT for education in Africa therefore justifies further consideration.

The School Net Africa study examined how African teachers are taught about ICT during their teacher training and after, in their teaching practice. Their study revealed that there is evidence of a number of teacher training initiatives involving ICT at both pre-service and in-service levels in Africa. However, these initiatives are mainly on a small scale, regional and fragmented with little sharing of experience across national boundaries. Findings from their research revealed that there were no pre-service teacher training courses in computer integrated education outside South Africa except the Connect-ED programme in Uganda. The study

further revealed that lack of training at pre-service level was closely related to lack of experience and skills among teacher educators; lack of access to technology in pre-service training institutions; lack of access to ICT training content, that is, modules and programmes suitable for teaching teachers to use ICT; and lack of good quality research and good examples documented and available to aid the development of new pre-service training programmes or improve existing ones. School Net Africa emphasized the need for resources and capabilities in ICT training in teacher education in African institutions.

However, as Baartman (2003) observes, training, knowledge and attitude toward ICT use is highly dependent on exposure to these technologies. Comparing the Netherlands and Zimbabwe, he notes that although in the Netherlands basic computer skills are seldom taught in formal classroom situation and computers are considered as a tool to support other subjects and activities, tertiary level students are already skilled and experienced users of computers. In Zimbabwe, however, 60% of first-year students of computer science have no basic computer skills (Baartman, 2003).

The literature provided above shows the challenges and status of ICT Integration in education in African countries like South Africa, Egypt and Mozambique.

## **2.6 Use of ICT in Education in Kenya**

Kenya has placed considerable emphasis on the importance of ICT in its Education Sector Support Programme (KESSP) as evidenced in the recent promulgation of the National ICT Strategy for Education and Training. Kenya promulgated a National ICT Policy in January 2006 that aims to “improve the livelihoods of Kenyans by

ensuring the availability of accessible, efficient, reliable and affordable ICT services” (National ICT Policy, 2006). The national policy has several sections, including information technology, broadcasting, telecommunications, and postal services. However, it is the section on information technology that sets out the objectives and strategies pertaining to ICT and education. The relevant objective in this section states that the government will encourage “... the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning.” The related strategies, under the heading “E-Learning,” are to:

- Promote the development of e-learning resources.
- Facilitate public-private partnerships to mobilize resources in order to support e-learning initiatives
- Promote the development of an integrated e-learning curriculum to support ICT in education.
- Promote distance education and virtual institutions, particularly in higher education and training
- Promote the establishment of a national ICT centre of excellence
- Provide affordable infrastructure to facilitate dissemination of knowledge and skill through e-learning platforms
- Promote the development of content to address the educational needs of primary, secondary, and tertiary institutions
- Create awareness of the opportunities offered by ICT as an educational tool to the education sector
- Facilitate sharing of e-learning resources between institutions

- Exploit e-learning opportunities to offer Kenyan education programmes for export
- Integrate e-learning resources with other existing resources

The Kenya Education Sector Support Program (MOE, 2005) features ICT as one of the priority areas with the aim of mainstreaming ICT into the teaching and learning process. The National ICT Policy embedded this intent as a national priority and provided the impetus for the Ministry to develop its sector policy on ICT in Education. The Ministry moved quickly and, in June 2006, introduced the National ICT Strategy for Education and Training (MOE, 2006). This document, referred to as the ICT Policy for the Education Sector, consists of the following components, each with its own statement of strategic objectives and expected outcomes:

- ICT in education policy
- Digital equipment
- Connectivity and network infrastructure
- Access and equity
- Technical support and maintenance
- Harnessing emerging technologies
- Digital content
- Integration of ICT in education
- Training (capacity-building and professional development)
- Research and development

The Ministry of Education was given the mandate to lead the monitoring and evaluation of the strategy's Integration, guided by overall government policies on

education and ICT, specific education strategic documents for implementing its mandate, and global goals such as Education for All (EFA) and the Millennium Development Goals (MDGs). Another key part of the Integration strategy is the Kenya ICT Trust Fund formed in 2004, with the aim of spearheading ICT initiatives in education. Membership is open to public sector organizations such as ministries and other government institutions, private sector companies, donor partners, civil society, as well as academic and other educational institutions. In general, the objective is to facilitate Public-Private Partnerships (PPPs) that will mobilize and provide ICT resources to Kenyan public schools and community resource and learning centres (Republic of Kenya, 2006).

The ministry's policy framework indicates that there are a number of challenges concerning access to and use of ICT in Kenya, including high levels of poverty, limited rural electrification, and frequent power disruptions (MoE National ICT Strategy for Education and Training, 2006). Most secondary schools have some computer equipment; however, this could consist of one computer in the office of the school head. Very few secondary schools have sufficient ICT tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1 (Farrell, 2007). Most of the schools with ICT infrastructure have acquired it through initiatives supported by parents, the government, NGOs, or other development agencies and the private sector, including the NEPAD e-schools programme. Attempts to set up basic ICT infrastructure in primary schools are almost negligible (Farrell, 2007).

Availability of trained manpower in ICT sector is an important resource. The Kenya government, as observed by the Ministry of Information and Communications (2005), has recognized this by introducing computer education in schools and other learning institutions, while the private sector has responded to the demand of skilled computer operators by setting up commercial computer training colleges in major urban centres all over the country. Estimates by the Export Processing Zones Authority (2005) indicate that in the year 2001, over 150,000 Kenyans passed through basic computer skills training colleges and since 1980s, Kenyans who have undergone computer skills training in the country, stands at an estimated 1.1 million people.

Majority of computer studies teachers in Kenya are computer science graduates with no background in education. Various local authorities have made recommendations to improve computer studies in Kenyan schools. For example, Kandiri (2007) suggested that teacher training colleges should integrate Computer science as a teaching course so as to produce graduate who can deliver the subject better. Introduction of computer studies as one of the teaching subjects for graduates pursuing teaching degrees and diplomas will ensure that the teachers undergo psychology of learning and special methods in teaching computer studies.

Kandiri (2007) further proposes that the government should be involved in the in-service training programs as it rolls out ICT in schools. Currently, the emphasis is on computer hardware which does not make a lot of sense without skilled human resource to extract value from the IT resources.

## 2.7 Summary

The chapter has presented literature on the status of use of ICT in education in the world, status of ICT in education in Africa, status of ICT in education in Kenya, and recent studies on ICT and education. It has emerged from the literature review that the situation of computer use in education in developed countries is different from that in developing countries. This is mainly due to funds extended to the training institutions by their governments and society. From the reviewed literature, it is clear that while the use of ICT in education is becoming popular all over the world, and as Kenya progresses in the Integration of computer-based learning, there is the need for teachers to be prepared for ICT adoption. Before implementing ICT therefore, schools should carry out needs assessment process by creating a high-level requirements document that includes: an e-learning readiness score and a list of advantages and potential obstacles to e-learning adoption. ICT Preparedness should be seen as being ready mentally or physically for ICT experience or action. ICT learning readiness assessment will help the schools to design e-learning strategies comprehensively and to implement its ICT goals effectively.

It is clear from the reviewed literature that existing studies have not addressed the status of the integration of ICT in secondary schools in Kenya. These studies have not documented the challenges facing secondary schools teachers in the integration of ICT. This is therefore the problem which the current study is set to investigate with specific focus on Ruiru Division, Thika District.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter presents the methodology that was used in carrying out the study. Specifically it describes the research design, study location and population, sampling procedures and sample, instruments used, data collection and data analysis procedures.

### **3.2 Research Design**

The study employed a descriptive survey, combining both qualitative and quantitative research strategies. Gay (1992) notes that descriptive survey research method of study is used to investigate educational problems and to determine and report the way things are or were. Similarly, according to Lockesh (1984), descriptive survey studies are designed to obtain pertinent and precise information concerning the current status of phenomenon and wherever possible to draw valid general conclusions from the facts obtained. Bell (1993) on the other hand notes that surveys aim at obtaining information, which is analyzed, patterns extracted and comparisons made. The study employed the survey design since the researcher wanted to get the precise information and make conclusive results regarding integration of ICT in teaching and learning. According to Mugenda and Mugenda (1999) survey design is the best method available to social scientists who are interested in collecting original data for the purposes of describing a population which is too large to observe directly.

### **3.3 Location of the Study**

The study was carried out in Ruiru Division of Thika District, Central Province. Thika District borders Murang'a South, Nairobi, Kiambu and Machakos districts. This area forms an ideal setting for the study since no known study on secondary school teachers' preparedness to integrate ICT for learning in secondary schools has been conducted in the area. In addition, the division has both rural and urban setting each of which would influence in particular way teachers' attitudes towards ICT and thus integration of ICT in learning.

The division also has a variety of school types such as national, provincial and district schools which ensured representation of different school types in the study. This helped the researcher to identify pertinent issues affecting each of the schools type in relation to ICT integration for learning. Singleton (1993), notes that, the ideal setting for any study should permit instant rapport with the informants. The researcher was well versed with the area and thus easily created rapport with the respondents.

### **3.4 Target Population**

The research targeted all the 27 secondary schools in Ruiru Division of Theca District. These schools were four nationals, three provincial and 20 district schools. All the 27 head teachers and 300 teachers were targeted.

### **3.5 Sample and Sampling Procedures**

Twelve schools constituting 44% of the 27 schools in Ruiru Division were sampled. According to Mugenda and Mugenda (1999) at least 10% of target population is

adequate for social science research. Proportionate sampling was used in selection of schools to ensure fair representation within the three strata - national, provincial and district schools. Fair representation within school types (Girls schools, Boys school and mixed schools) was also ensured by selecting respondent teachers and head teachers along school type category. Data was gathered from head teachers and teachers of the 12 secondary schools. From each of the schools, the researcher used simple random sampling to select five teachers giving a total of 65 teachers. All the 12 head teachers from the 12 schools participated in the study. The distribution of the schools sampled and the respondents of the study are summarized in Table 3.1 below.

**Table 3.1: Distribution of Schools to be Sampled and the Respondents in the Study**

School type	National			Provincial schools			District schools			Total
	Boys	Girls	Mixed	Boys	Girls	Mixed	Boys	Girls	Mixed	
Number of Schools	1	1	2	2	1	0	1	2	17	27
Selected schools	1	1	1	1	1	0	1	1	5	12
Selected Teachers	5	5	5	5	5	0	5	5	25	60
Selected Head-Teachers	1	1	1	1	1	0	1	1	5	12

### 3.6 Research Instruments

The following research instruments were used to collect data for this study:

### **3.6.1 Questionnaires**

Questionnaires were used for data collection because as Kiess and Bloomquist (1985) observe, a questionnaire offers considerable advantage in administration; it presents an even stimulus potentiality to large numbers of people simultaneously and provides the investigation with an easy accumulation of data. Gay (1992) maintains that questionnaires give respondents freedom to express their views or opinion and also to make suggestion. According to Kiess and Bloomquist (1985), a questionnaire is a suitable method of data collection because:

- i. Respondent's anonymity ensures they give honest answers.
- ii. Respondents have time for reflection before answering questions hence avoid hasty responses.
- iii. Large populations can be covered with little time and with little personnel thus reducing cost.

#### **a) Head teachers' questionnaire**

The study used questionnaires designed by the researcher to collect information from twelve head teachers from the twelve secondary schools selected. The items in the questionnaire were of two types: closed and open-ended questionnaires. The closed questions provided a good avenue for the researcher to obtain specific responses and clarifications without giving room to the respondents to write their wish. Open-ended questions were used to enrich closed questions by giving respondents an opportunity to give as much information as they wish on given items.

## **b) Teachers' questionnaire**

The questionnaire was used to collect information from the 60 teachers, five from each secondary school selected for study. It had two parts with both closed and open-ended questions. Part one collected their demographic data, while part two collected information on availability of ICT physical resources, teachers' preparedness to use computers for instruction which included their attitude and perception towards integrating ICT for instructions and also elicited information on challenges experienced in integrating ICT, possible solutions as well as recommendations

### **3.6.2 Interview Schedules**

According to Mugenda and Mugenda (1999), interviews are more flexible than questionnaires because the interviewer can adapt to the situation and get as much information as possible. A set of open ended questions were used in interview schedules for both DEO and ICT officer. The interview schedules helped the researcher to clarify issues concerning the research, and as such most respondents gave accurate and honest information.

#### **a) DEO's Interview Schedule**

This Key Informant Interview schedule targeted the DEO in charge of the district. The set of questions in this interview schedule focused on the level of integration of ICT for learning in the district as a whole to give the bigger picture and the challenges encountered in this endeavor. This official was also interviewed to provide insights on the teachers' attitudes and perceptions on integration of ICT for instruction in secondary schools.

## **b) ICT Officer's Interview Schedule**

This interview targeted the officer in charge of ICT in the district. The officer was interviewed on availability of ICT infrastructure in the district in readiness for integration of computers for learning, teachers' preparedness to integrate ICT for learning and availability of facilities such as computers, electricity, and internet connectivity.

### **3.7 Pilot Study**

Prior to visiting the schools for data collection, the researcher pre-tested the questionnaires using two schools in the division, but which were not included in the final sample. The purpose of the pilot study was to enable the researcher to improve the reliability and validity of the instrument, and to familiarize with its administration.

### **3.8 Validity and Reliability of the Instruments**

#### **3.8.1 Validity**

Kombo and Tromp (2006) define validity as a measure of how well a test measures what it is supposed to measure. In other words, validity is the degree to which results obtained from the analysis of the data actually represents the phenomena under study. According to Wilkinson (1991), a pilot study helps to identify those items that could be misunderstood, and such items will be modified accordingly, thus increasing face validity. He continues to say that expert opinions, literature searches, and pre-testing of open-ended questions help to establish content validity. The researcher prepared the instruments in close consultation with her supervisors, whose expert judgment helped improve content validity.

### 3.8.2 Reliability

Reliability is defined as a measure of the degree to which a research instrument yields consistent results or data after repeated trial (Mugenda and Mugenda, 1999).

Piloting enabled the researcher to test the reliability of the instruments. The pilot study also enabled the researcher to familiarize herself with administration of the instrument. Split-Half technique of reliability testing was employed, whereby the pilot questionnaires were divided into two equivalent halves and then a correlation coefficient for the two halves calculated. To compute the correlation co-efficient of the instruments, Spearman's formula was used.

$$R = \frac{\sum XY - \frac{(\sum X)(\sum Y)}{N}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{N}\right)\left(\sum Y^2 - \frac{(\sum Y)^2}{N}\right)}}$$

Where:

R = correlation coefficient

N = total number of scores

$\sum$  = summation of scores

X = scores of the first half

Y = scores of the second half

Through the use of Cronbach's Alpha, a reliability coefficient of at least 0.7 was accepted as recommended by Mugenda and Mugenda (1999). A coefficient of 0.81 was obtained which was high enough to judge the research instruments as reliable.

### **3.9 Data Collection Procedure**

The researcher obtained an introduction letter from Kenyatta University and a research permit from the Ministry of Education (MoE). After which, the researcher booked an appointment with the sample schools through the head teachers to visit the schools and administer the questionnaires. The researcher then visited each of the schools and administered the questionnaires. The respondents were given instructions and assured of confidentiality after which they were given enough time to fill in the questionnaires. The researcher then collected the filled-in questionnaires within stipulated time as agreed upon with the respondents. The interview schedules were pre arranged and an appointments booked. The officers were interviewed as the researcher filled in the details in the interview schedules.

### **3.10 Data Analysis**

After data collection using questionnaires and interview schedules, the obtained information was arranged and grouped according to the relevant research questions. The data was then organised, tabulated and analysed into frequencies tables, ratios, and percentages with the help of statistical package for social sciences. In data analysis, percentages have a considerable advantage over more complex statistics. (Piel. 1995). Qualitative data was analysed by organising it into themes and according to the research questions and objectives. Thereafter inferences were drawn to establish and present the findings.

## **CHAPTER FOUR: FINDINGS AND DISCUSSIONS**

### **4.1 Introduction**

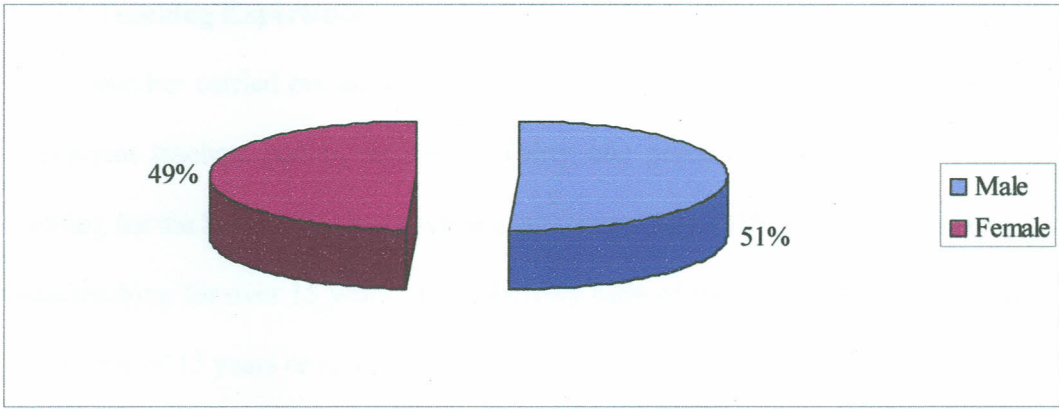
The purpose of this study was to assess the preparedness of public secondary schools teachers in Ruiru Division of Thika District to integrate computers for instruction. The findings of the study are presented in this chapter based on the data collected from the respondents and as per the research objectives. These include, a) determining the state of infrastructure necessary for teachers to successfully integrate ICT in schools, b) finding out the attitudes of teachers towards use of ICT for instruction, and c) determining teachers' preparedness in terms of ICT literacy to effectively integrate the ICT for learning. Sixty five questionnaires were filled out of the seventy two given out, giving a response rate of 90.2 per cent which was adequate for analysis. Discussion of the results was done as per the objectives of the study.

### **4.2 Background Information**

This section covers the sex of the respondents, education level, teaching experience, subjects taught, number of lessons taught, and number of computers available in the schools and students and teachers to computer ratios.

#### **4.2.1 Sex of the Respondents**

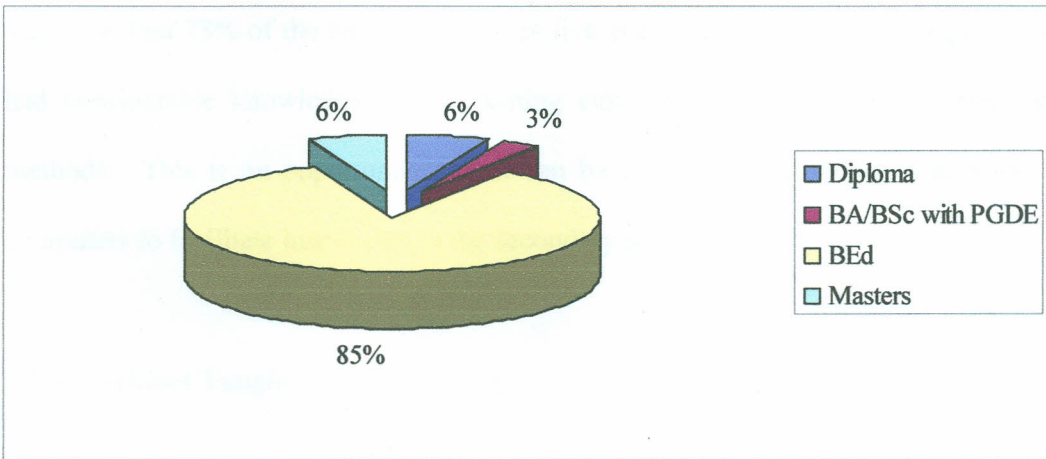
The sample selected for the study constituted 49% female respondents and the rest 51% males as indicated in figure 4.1. In order to assess the preparedness of teachers towards the use of ICT for instruction across both sexes, an almost equal representation of sexes was necessary.



**Figure 4.1: Gender of the Respondents**

#### 4.2.2 Education Level

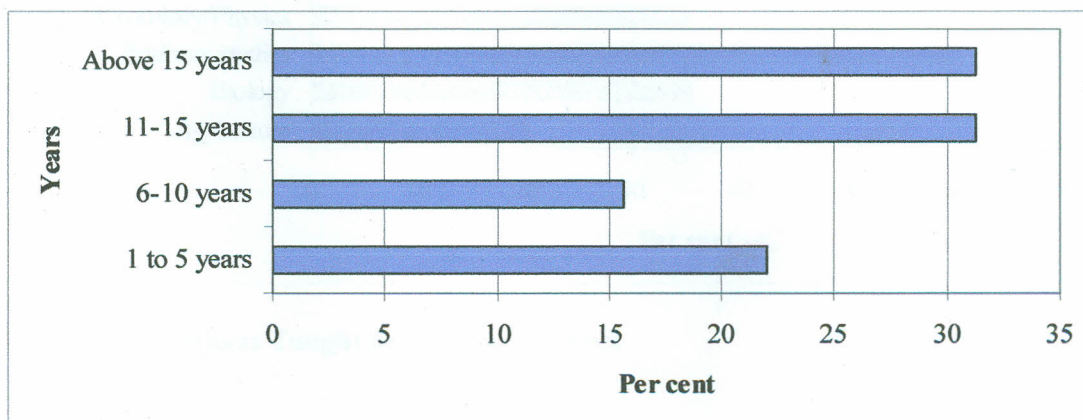
Regarding the level of education of the respondents, the study revealed that the majority of the respondents (85%) had bachelors of education degree while 6% had Post graduate degree and Diplomas in each case (Figure 4.2). Only 3% of the respondents had Bachelor of Arts, Bachelor of Science or Post graduate diploma in education. This means that the group of respondents consisted of individuals with high education achievement who were also professionally trained teachers who could understand the need for adopting ICT for instruction in their schools.



**Figure 4.2: Education Level of the Respondents**

### 4.2.3 Teaching Experience

The researcher carried out an investigation into the number of years of experience the respondent teachers had in teaching. Thirty one percent of the teachers had been teaching for the last fifteen years, while a similar per cent (31%) indicated that they had been teaching for over 15 years. Cumulatively 62% of the respondents had a teaching experience of 15 years or more. (figure 4.3).



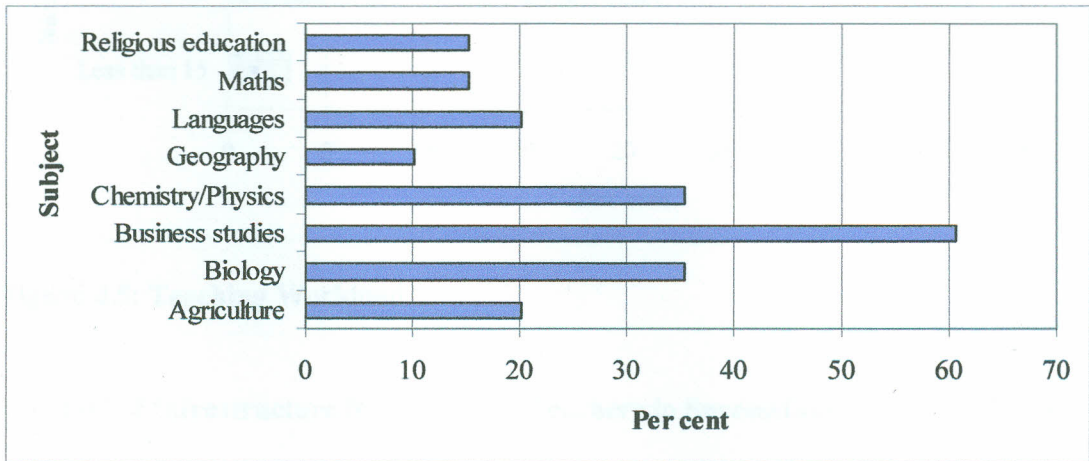
**Figure 4.3: Teaching experience**

Up to 16% of the respondents reported that they had 6 to 10 years of experience while the remaining 22 per cent had a teaching experience of between one to five years. It was clear that 78% of the teachers had over five years experience in teaching and thus had considerable knowledge in the existing curriculum, instructional materials and methods. This is an opportunity which can be utilized in enhancing integration of computers to facilitate instruction in the secondary schools.

### 4.2.4 Subject Taught

The highest number of respondents (61%) was teaching Business studies while those teaching Chemistry and Physics were 35% (Figure 4.4). Respondents teaching Biology classes were 35% while those teaching languages and Agriculture were 20% in each

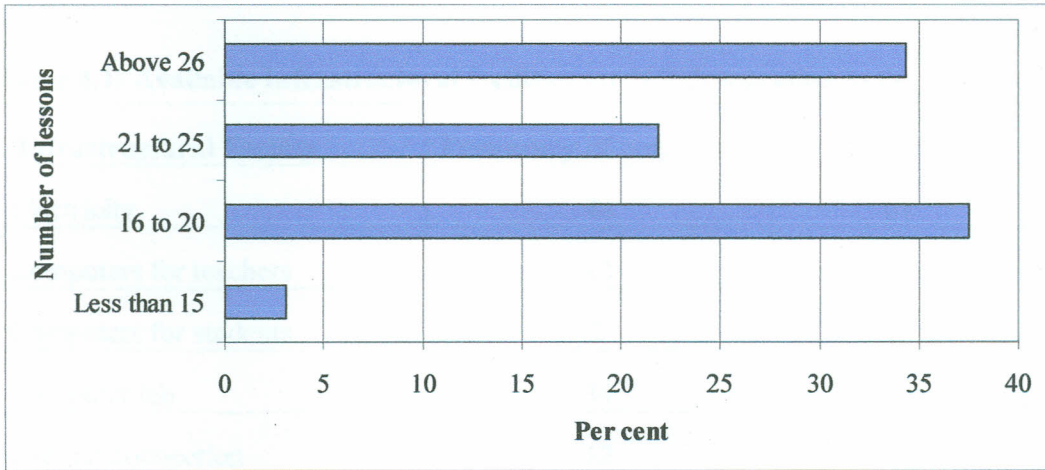
case. It must be noted that adoption of ICT can improve efficiency in the instruction of all subjects which stresses the need for ICT adoption for instruction in secondary schools



**Figure 4.4: Subjects Taught by the Respondents**

#### 4.2.5 Teaching Workload

Teachers who had a workload of 16-20 lessons per week were (38%) as indicated in figure 4.5. Up to 34 % of the respondents had a work load of above 26 hours per week while 22% of the teachers had a workload of 21-25 hours per week. Heavy workload at school was reported to be a major barrier to acquiring computer literacy among Respondents. Those with higher workload reported that they had no time to go and pursue computer training. This means that respondents with lighter workloads such as less than 15 hours could have time to attend computer lessons making them more prepared to adopt ICT for instruction.



**Figure 4.5: Teaching Workload**

### **4.3 State of Infrastructure Necessary for Teachers to Successfully Integrate ICT in Schools**

A basic infrastructure is critical for successful Integration and adoption of ICT for instruction in schools. Aspects like the availability of electricity, computer laboratory, computers, and internet connectivity were thus investigated.

#### **4.3.1 Available Infrastructural Facilities for ICT Integration in the Schools**

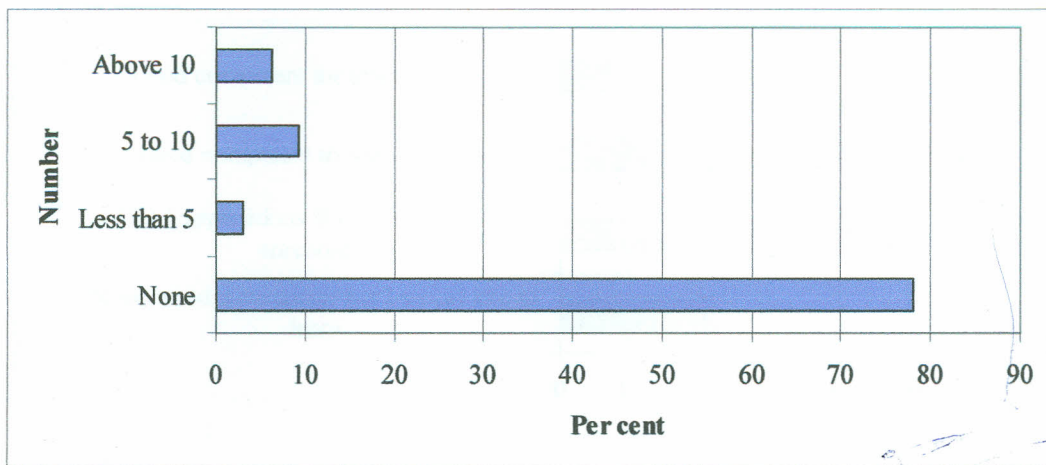
The study revealed that up to 61% of the schools studied had electricity out of which only 18% had computers for teachers. Computers for students were available in three percent of the schools studied while computer labs were in 52% of the schools. Internet connection was only available in 12% of the schools.

**Table 4.1: Available Infrastructural facilities for ICT Integration in the Schools**

Infrastructural Facility	Frequency of responses	Per cent
Electricity	44	61
Computers for teachers	12	18
Computers for students	2	3
Computer lab	34	52
Internet connection	12	18

### 4.3.2 Ratio of Students to Computers

With regard to the ratio of computers to students, the study revealed that eight in every ten students had no access to computers at all (figure 4.6). Only three percent of the schools had less than 5 students to one computer while nine percent had 5 to 10 students per computer. Six percent of the schools had above 10 students per computer.



**Figure 4.6: Ratios of Students to Computers**

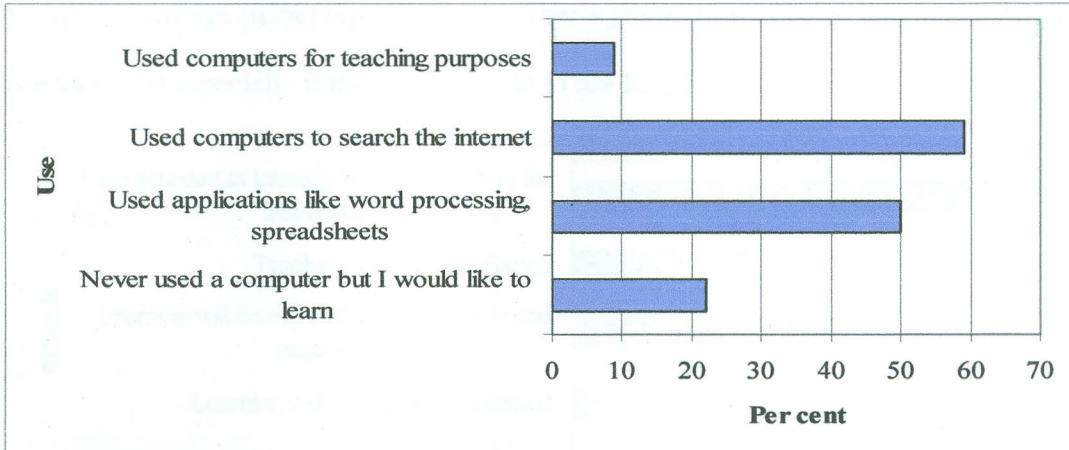
These findings indicate a low level of investments in terms of computers which shows limited preparedness to integrating of computers for learning. This points out to the need to strengthen investments already made and to maximize existing capacity in the

secondary schools that participated in this study. It would be critical to provide these schools with more computers to increase access to technology by teachers and students, so that use of ICT in teaching can take place.

#### 4.4 Attitudes of Teachers towards Use of ICT for Instruction

##### 4.4.1 Use of Computers by the Respondents

With regards to the current use of computers, up to 59% of the respondents used computers to search the internet and reading of emails using private computers while up to 50% used applications like word processing, spreadsheets in their day to day work (Figure 4.7). Up to 22% cited that they never used a computer but would like to learn. Only 9% of the respondents used computers for teaching purposes. It was clear that respondents were using private computers to perform basic personal tasks like surfing, making work plans and sometimes compiling marks with few engaging ICT for instruction where internet connectivity was available.



**Figure 4.7: Use of Computers by the Respondents**

The use of computers as a medium for instruction by teachers remained low. It is clear that additional forms of teacher training in ICT are required in order to integrate the use of ICT into instruction in classrooms.

#### 4.4.2 Attitudes of Teachers Towards Use of ICT for Instruction

The study also sought to understand the attitudes of teachers towards use of ICT for instruction (Figure 4.8). An overwhelming majority (91%) reported that they were interested in learning to use computers for instruction. However most cited a pre condition that such learning programmes should be funded by the government which should also reduce teachers' workloads so that they can be available to attend. Up to 63% of the respondents thought that learning will be affected both positively and negatively while 34% of the respondents thought that learning will be positively affected. Positive effect was cited as the ability to access the materials required through the internet and that students can carry independent research without totally depending on their teachers. Only 3% thought that learning would be negatively affected citing easy access to pornography materials by students as the major reasons. A large percentage (63%) reported that teacher's job will be affected and may as well lose their jobs especially if they were unable to use ICT for instruction.

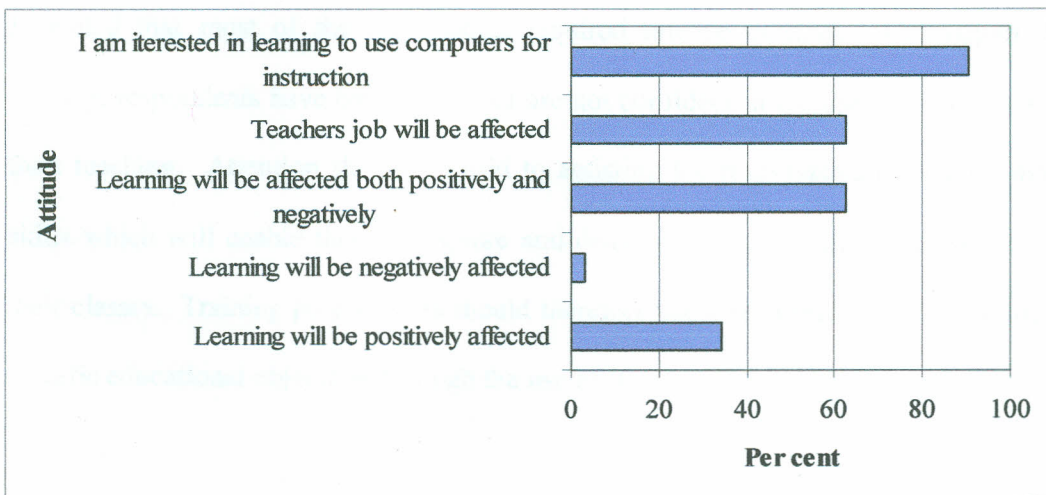


Figure 4.8: Attitudes of Teachers towards Use of ICT for Instruction

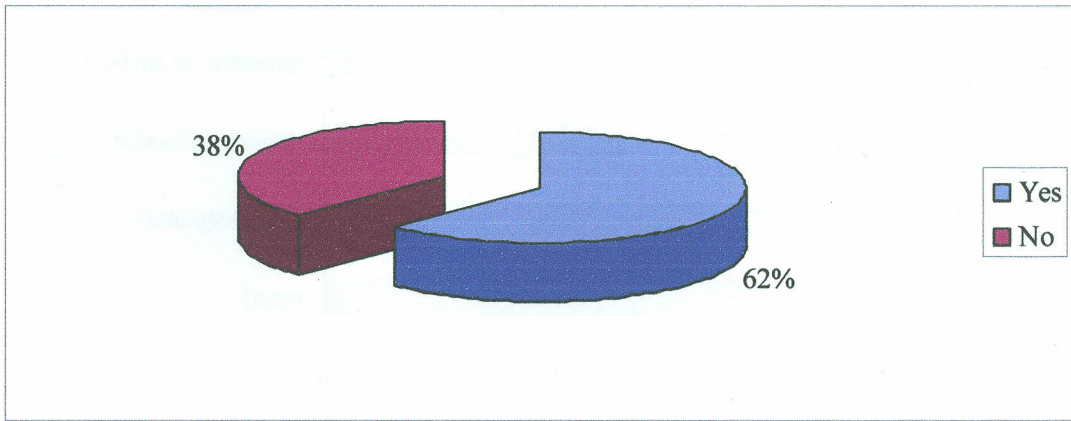
Despite the overwhelming interest among respondents to use computers for instruction, there were also some who were not interested in ICT as a medium for instruction. Reluctance to engage and actively participate in the ICT initiatives was likely to be caused by a number of reasons, which includes lack of awareness of the specific ways in which to use computers for instruction, and some have the fear that technology may replace them, as well as the technology having the negative effects on the students who may be exposed to pornographic materials.

#### **4.5 Teachers' Preparedness to Effectively Integrate ICT for Learning**

The study also investigated aspects like the level of teachers' training in computer knowledge as a measure of preparedness to integrate ICT for instruction and came up with the following findings:

##### **4.5.1 Computer Training**

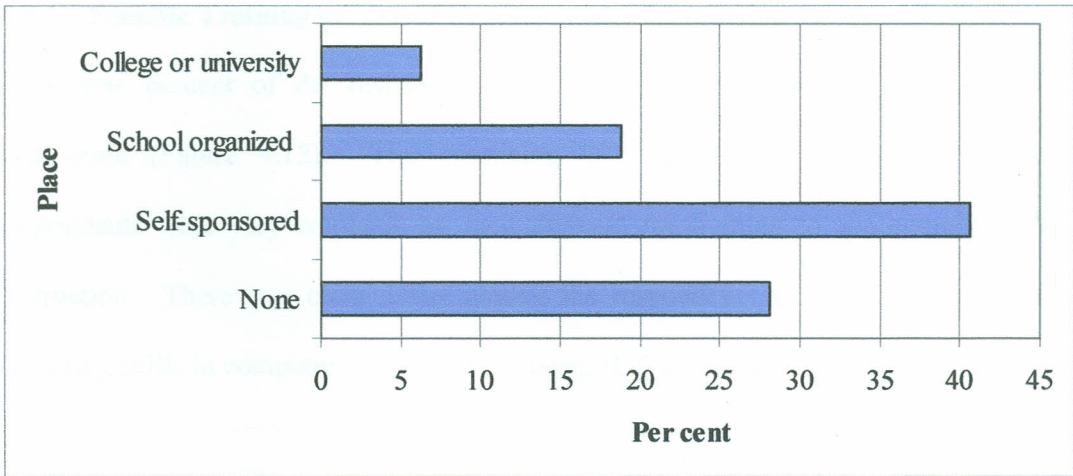
Up to 62% of the respondents had received training on the use of computers while the rest had not (Figure 4.9). An assessment of existing computer skills conducted indicated that most of the respondents required intense training. Throughout the schools, respondents have basic skills but are not confident in the use of technology in their teaching. Attention should be paid to assisting the respondents to acquire more skills which will enable them to explore and discover ways of utilizing computers in their classes. Training programmes should therefore show respondents how to achieve specific educational objectives through the use of ICT.



**Figure 4.9: Respondents Computer Training**

#### 4.5.2 Place of Training

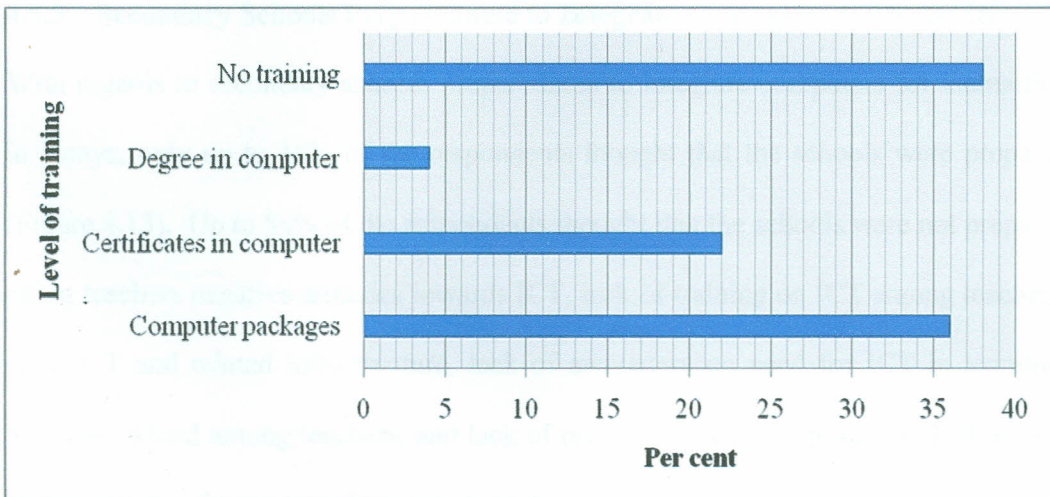
With regards to where respondents received their computer training, up to 40% were self-sponsored, 18% were trained in school organized programmes, 4% were in the university while 38% had not received any training (Figure 4.10). It was reported that those respondents with some training had received basic computer skills and use of software applications and the Internet. Relatively little attention has been paid to enabling respondents couple these skills with their professional capacity as teachers. As a result respondents were not confident in using technology for instruction in their classrooms. Leaving ICT training for teachers at individual level has implications on integrating ICT for instruction. More specific and suitable courses should be made available to train teachers uniformly on how to go about the integration of ICT in teaching and learning.



**Figure 4.10: Place of Training**

### 4.5.3 Level of Training

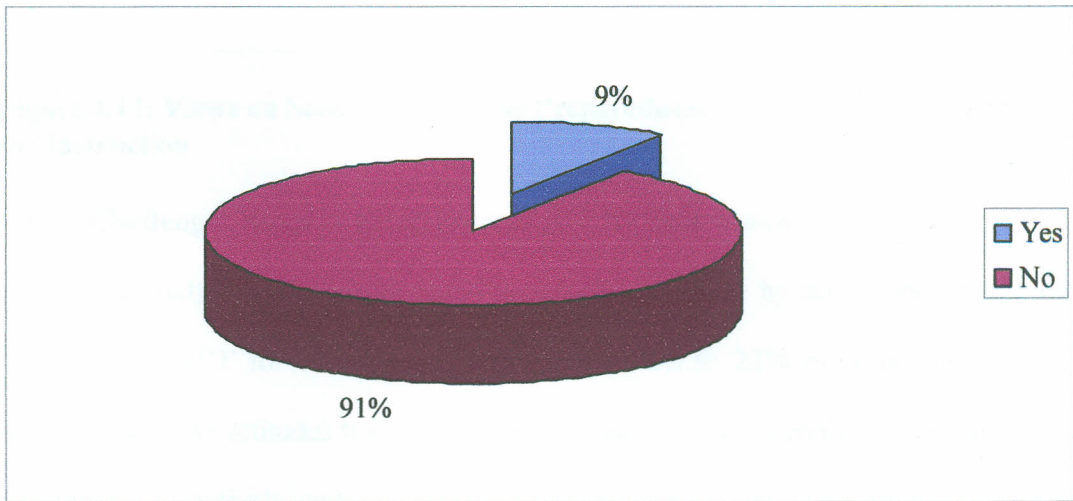
With regards to the level of training in computers attained, up to 36% of the respondents had only received training in computer packages while 22% had only certificates. None of the respondents had a diploma level of training while a mere 4% had degree level training. The rest 38% had no training at all. (figure4.11) It must be noted that regardless of the level of training, teachers need to acquire fundamental ICT skills with emphasis on how these skills can be applied in instruction.



**Figure 4.11: Level of Training**

#### 4.5.4 Specific Training on Use of Computers for Instruction

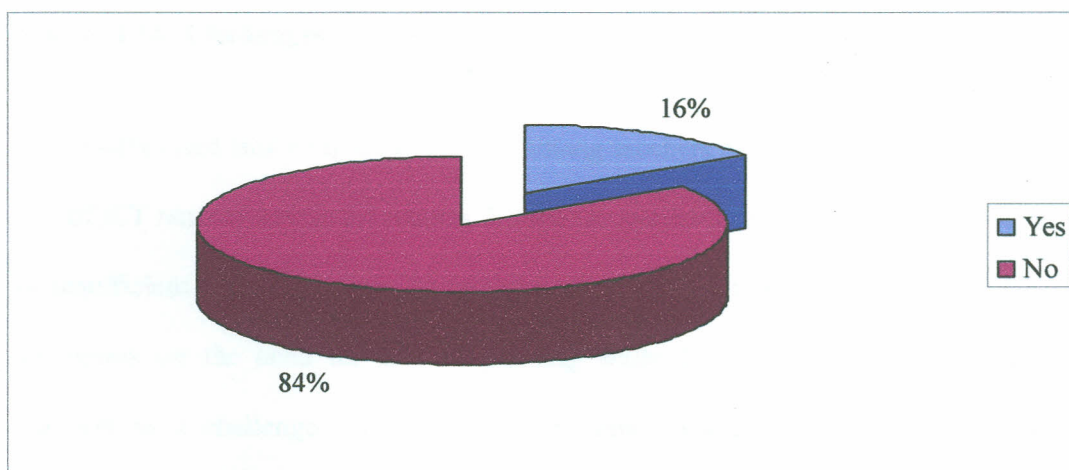
Only nine percent of the respondents had training on the use of computers for instruction (Figure 4.12). The remaining 91% had not. As discussed earlier, respondents were very emphatic on their demand for training to use computers for instruction. There was clear desire among the respondents to improve their skills, including skills in computer operations and using ICT in instruction.



**Figure 4.12: Respondents Specifically Trained on Use of Computers for Instruction**

#### 4.5.5 Secondary Schools Preparedness to Integrate Computers for Instruction

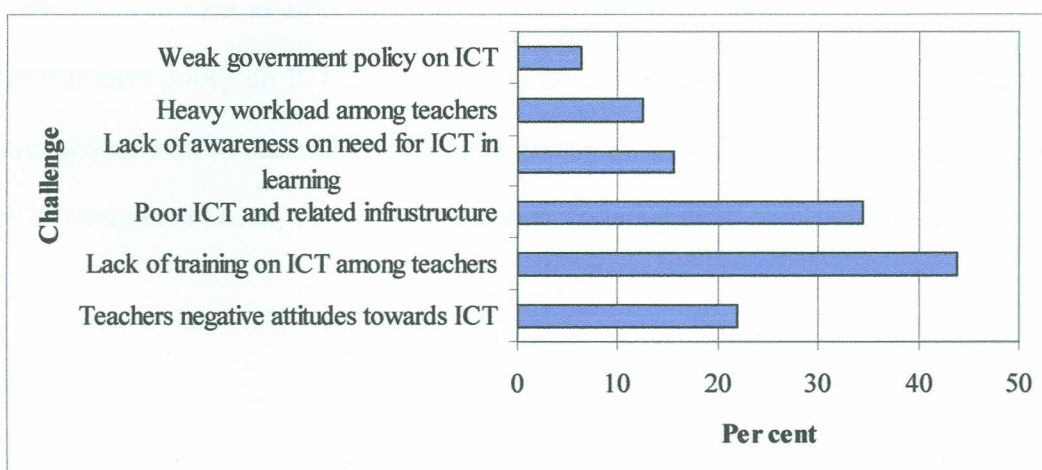
With regards to secondary schools preparedness to integrate computers for instruction in Kenya, only up to 16% of the respondents thought that the schools were prepared (Figure 4.13). Up to 84% of the respondents thought that the schools were not prepared citing teachers negative attitudes towards ICT, lack of training on ICT among teachers, poor ICT and related infrastructure, lack of awareness on need for ICT in learning, heavy workload among teachers, and lack of proper Government policy on ICT as will be discussed in the next section



**Figure 4.13: Views on Secondary Schools Preparedness to Integrate Computers for Instruction**

#### 4.5.6 Challenges Faced in Integration of ICT for Instruction

Finally the study sought to understand the challenges faced by secondary schools in Integration of ICT for instruction (Figure 4.14). Up to 22% of respondents cited teachers' negative attitudes towards ICT Integration as a major challenge. Reluctance to engage and actively participate in the ICT initiatives is likely to be caused by a number of reasons, which may include fear of change; a negative attitude to technology; and negation of the need for professional development to improve teaching practice.



#### **Figure 4.14: Challenges Faced in Integration of ICT for Instruction**

Up to 44% cited lack of training on ICT among teachers as the biggest challenge. The use of ICT remains low in all schools despite the availability of some computer because of insufficient teacher training. In addition, up to 16% of the respondents cited lack of awareness on the need for ICT in learning while 13% faced heavy workload for teachers as a challenge which denies them time to attend ICT classes. Lack of information about tangible benefits of ICT for education could be due to lack of ICT training. It is clear that additional forms of teacher training are required in order to integrate the use of ICT into classrooms. Professional development for teachers and school leaders must be ongoing. This may call for opportunities for seminars for all the stakeholders in education to discuss the emerging issues especially in ICT and hence organize for training of the teachers. This will help teachers to be up to date with the changing technology and its continuous integration.

Further to these, 34% cited poor ICT and related infrastructure as a challenge. These included lack of resources and capabilities in the schools in terms of ICT related infrastructure such as internet, computers and electricity. This was linked to lack of government policy on ICT as cited by 6% of the respondents since it became hard for the government to channel development resources amidst weak ICT policy. Though the government had developed an ICT policy, its integration remained a problem.

## **4.6 Discussions of Findings**

### **4.6.1 State of Infrastructure Necessary for Teachers to Successfully Integrate ICT in Schools**

Adequate provision of infrastructure, particularly electricity to schools in rural communities is crucial in the realization of the fundamental requirement in adoption of ICT for instruction. Infrastructure requirements are costly and their provision may require particularly the government to intervene in providing subsidized rates for schools and especially those in rural areas. Overall, the study found out that teachers are very enthusiastic about integrating computers for instruction and learning. The principals in particular, had taken ownership of the initiative and were very engaged, often investing considerable personal time and school resources. Teachers and schools however faced a range of challenges, including infrastructural issues such as lack of power, and internet access, which hinder the effective use of ICT in teaching and learning. Schools also struggled to optimize use of computers, due to a lack of appropriate professional development.

Secondary schools in Ruiru division of Thika district were ill prepared in terms of infrastructure, to integrate computers for learning and instruction. Findings indicate that nearly half of the schools lacked computer labs and the computer machines available were not adequate. There is hardly any deployment of computer personnel in public schools in Ruiru division of Thika district. Majority of teachers had not been exposed to computer technology in any way and only two schools used computers for teaching. Only a few schools had access to the Internet and there were few teachers trained on use of computers for instruction.

While schools voiced a demand for more computers, schools may not necessarily need many computers to integrate computers for learning in schools. It may be therefore important for schools to find alternative teaching, organization, and access models to optimize the use of the numbers of computer they do currently have, as well as acquiring additional hardware.

#### **4.6.2 The Attitudes of Teachers Towards Use of ICT for Instruction**

Despite the overwhelming willingness of the respondents to adopt new technology, resistance to new technologies was pervasive. Factors contributing to resistance included preconceived ideas about new technology. For example, some teachers tended to be less accepting of new technologies, less willing to move out of their comfort zones and try new things, and less willing to take on extra work. Such obstacles can be overcome by demonstrating how simple it can be to use new technology and assisting teachers to make the transition gradually. The level of awareness of how teachers can integrate ICT for instruction was also low thus teachers should be exposed to seminars that could enlighten them on the options available to integrate ICT for instruction.

The first step to ensuring teachers use computers as teaching and learning tools must be to provide them with educational benefits for doing so. The knowledge of such benefits which include enriching the content as well as making the delivery more learner centred among others, would change their attitude towards integration of computers for learning. Teachers must also be actively involved in any efforts to integrate ICT in the learning process. This should include reflection on current practices, and their shortcomings, and an awareness of what the new technologies can offer to improve both teaching and learning. Only when there is sufficient intrinsic

motivation for teachers will they be willing to fully participate in the integration of ICT. The use of computers must be seen to provide desirable outcomes not readily achievable without them.

#### **4.6.3 Teachers' Preparedness in Terms of ICT Literacy to Effectively Integrate ICT for learning**

The importance of training teachers in integrating ICT into teaching cannot be over-emphasized. It is necessary to recognize teachers require skills and knowledge in a range of areas. Teacher training programmes therefore need to be developed accordingly. For teachers who are just beginning to use ICT in their teaching, attention should be paid to assisting these teachers to acquire skills which enable them to explore and discover new ways of utilizing ICT in their classes. Although these teachers need to acquire certain fundamental ICT skills, the emphasis needs to be placed on how these skills can be applied in teaching. It is necessary to assist teachers to utilize their ICT skills to enhance education. Training programmes should therefore show teachers how to achieve specific educational objectives through the use of ICT.

While many respondents had basic computer skills especially in the packages and surfing the internet, they have not yet become confident in using the technology to improve their own productivity and bring about pedagogical change. At the same time, ICT administrators and principals were requesting more support in technology management and organizational integration of ICT. Such support is needed in order to align the aims of ICT initiatives with overall school development objectives.

Secondly, on professional development teachers must be assisted to become agents of change and risk takers able to adapt to the new teaching paradigms implicit in the use of ICT. Without this they will continue to frame the use of ICT within their current paradigms and not fully maximize its potential. They must be shown how to alter their practices so that constraints on the use of ICT are minimized. It must also provide them with skills needed to enable them to use computers confidently in the classroom context. ICT can transform both the learning and the teaching processes and facilitates autonomous learning. In general, ICT is most useful when its used to support educational goals.

#### **4.6.4 Challenges Faced in Integration of ICT for Instruction**

Major challenges to integration of ICT for instruction in secondary schools included lack of awareness on the need for ICT in learning, heavy workload for teachers, poor ICT and related infrastructure, lack of government policy. Lack of information about tangible benefits of ICT for education could be due to lack of ICT training. To create awareness on the need for ICT in learning among teachers, additional forms of teacher training are required.

For ICT teacher training programme to be successful, it needs to be owned at a national level by the Government as a whole and led by the relevant Ministry of Education. The government needs to commit itself to innovative rural electrification projects to benefit both rural schools and communities. Access to the Internet and the need to bridge the digital divide are the two critical issues to be dealt with before e-learning can be fully and effectively integrated in secondary schools.

Any plan of action designed to increase teachers' use of computers as a tool for instruction needs to focus also on teacher readiness and teacher motivation. It must be noted that more infrastructure may not automatically translate into more use. This study suggests that teachers should be trained comprehensively on the use of ICT, if they have to make use of the same to enrich learning.

## **CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter gives a summary of the study, conclusions and recommendations, which can be made to help in enhancing teachers' preparedness to integrate computers for instruction in the area.

### **5.2 Summary**

The purpose of this study was to assess the preparedness of secondary schools teachers in Ruiru Division of Thika District to integrate computers for instruction. The study was conducted using descriptive survey research design. Data was collected using questionnaires and key informant interview.

Findings indicated that up to 61% of the schools studied were connected with electricity while 18% had computers for teachers. Computers for students were only available in 3% of the schools studied while computer labs were in 52% of the schools. With regard to the ratio of computers to students, the study revealed that up to 78% of the students had no access to computers at all. Only 3% of the schools had less than 3 computers to one student while 9% had 5 to 10 computers per student. With regards to the current use of computers, up to 59% of the respondents used computers to search the internet and reading of emails while up to 50% used applications like word processing, spreadsheets in their day to day work.

Up to 22% cited that they never used a computer but would like to learn. An overwhelming majority (91%) reported that they were interested in learning to use computers for instruction. However most cited a pre condition that such learning programmes should be funded by the government which should also reduce teachers' workloads so that they can be available to attend. Up to 63% of the respondents thought that learning will be affected both positively and negatively while 34% of the respondents thought that learning will be positively affected. Up to 62% of the respondents had received training on the use of computers while the rest had not. An assessment of existing computer skills conducted indicated that most teachers required intense training.

With regards to the level of training in computers received, up to 36% of the respondents had only received computer packages while 22% had only certificates. None of the respondents had a diploma level of training while 4% had degree level training. Only 9% of the respondents have had training on the use of computers for instruction. The remaining 91% had not. With regards to secondary schools preparedness to integrate computers for instruction in Kenya, only up to 16% thought that the schools were ready. Up to 84% thought that the schools were not ready. Finally, the study established that secondary schools faced challenges in integration of ICT for instruction. Up to 22% of respondents cited teachers' negative attitudes towards ICT Integration as a major challenge. Up to 44% cited lack of training on ICT among teachers as the biggest challenge. The use of ICT remained low in all schools despite the availability of some computer because of insufficient teacher training. In addition, up to 16% of the respondents cited lack of awareness on the need for ICT in learning.

### **5.3 Conclusions**

Overall, the study found that teachers were very enthusiastic about being part of an ICT initiative. The principals have taken ownership of the initiative and are very engaged, often investing considerable school resources. Teachers and schools faced a range of challenges, including infrastructural issues such as lack of power, computers and Internet access, which made them ill, prepared in use of ICT in teaching and learning. Schools also lacked appropriate professional development in terms of ICT with some teachers having negative attitude towards use of computers for instruction as well as being computer illiterate. While some teachers have developed basic computer skills, they have not yet become confident in using the technology to improve their teaching. At the same time teachers felt that more support in terms of both financial and personnel resources was required. Such support is needed in order to align the aims of ICT initiatives with overall school development objectives.

### **5.4 Recommendations**

The following recommendations are made from the study:

- i. The study indicated very limited access to computers by teachers. It would be critical for the Government to provide secondary schools in the area with more computers and their supportive infrastructure such as internet connectivity and power to increase access to technology for teachers, so that use of ICT in teaching can take place. In addition benefits of using ICT should be documented by the Ministry of Education and circulars distributed to the schools in order to raise the teachers level of ICT awareness.
- ii. There is need for intensive training in the use of computers for instruction with school-based courses and ongoing support through refresher courses. Although

these teachers need to acquire certain fundamental ICT skills, the emphasis needs to be placed on how these skills can be applied in teaching. It is necessary for the Ministry of Education to assist teachers to utilize their ICT skills to enhance education.

- iii. Existing policies for pre- and in-service training of teachers should be reviewed by the Ministry of Education to better meet the growing needs and demands in ICT field as well as raising the level of awareness of teachers who are in the profession or are joining the profession of teaching. Professional development, in formal pre-service and in-service training programmes, needs to focus more deeply on the relationship between curriculum and technology.

### **5.5 Recommendations for Further Research**

Further research is recommended in the following areas.

- i) The study was carried out in the public schools only. A comparative study should be carried out to assess the status of ICT integration in the private secondary schools and the public secondary schools.
- ii) It is necessary to conduct a needs assessment in full scale before any e-learning program is actually being launched as it is important to know the factors affecting teachers' computer use and its implications to teachers' professional development strategies.
- iii) A study to assess the involvement of private partnerships in the provision of facilities for ICT in secondary schools could also add to this body of knowledge.

## BIBLIOGRAPHY

- Ajzen, I., and Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behaviour*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Baartman, Désiré. (2003). Are we connected? Miscommunication about Internet connectivity between countries in the North and in the South. *TechKnowlogia*, January-March 2003. <http://www.techknowlogia.org/>
- Bandura, A. (1986). *Social foundations of thought and action - a social cognitive theory*. Englewood Cliffs: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy. The Exercise of Control*. New York: Freeman.
- Barasa, L. (2005). *Schools internet team picked*. Daily Nation July 6<sup>th</sup> 2005. Nairobi
- Bell, A. W. (1993). *Education Research*. New York: New York Publishers.
- Betty, C. (1994). *Information Technologies in Teacher Education Issues and Experiences for Countries in Transitions*. Proceedings of a European workshop. University of twente, enschehche, Netherlands: UNESCO
- Butcher, N. (2003). *Technological Infrastructure and Use of ICT in Education in Africa: an overview*; Paris, Working Group on Distance Education and Open learning; available at [http://www.adeanet.org/publications/docs/ICT\\_eng.pdf](http://www.adeanet.org/publications/docs/ICT_eng.pdf)
- China's Ministry of Education, 2007, *ICT in Education: Malaysian Experience* by Dr Masnabhinti Ali Muda, Educational Technology Division, Ministry of Education, Malaysia.
- Cullen, R. (2003). The digital divide: A global and national call to actions. *The Electronic Library*. 21 (3), 247 - 257.
- Delcourt, Marcia A.B. & Kinzie, Mable B. (1993). Computer Technologies in Teacher Education: The Measurement of Attitudes and Self-Efficacy. *Journal of Research and Development in Education*, v27 n1 p35-41 1993. In Jones, Anthony. (2002). Refusing or ignoring? An investigation of student teachers' perceptions and use of computers. <http://www.ascilite.org.au/aset-archive/confs/2002/jones.html>
- Dutta, S., Lanvin, B. and Paua, F. (2004). *The Global Information Technology Report: Towards an Equitable Information Society*, Oxford University Press, Oxford.

- European Commission (2000). *Communication from the commission to the council and the European Parliament: The e-learning action plan – Designing tomorrow's education*. Brussels: Commission of the European Communities.
- Export Processing Zones Authority (2005). Kenya Information and Communications Technology (ICT) sector profile, EPZA, Nairobi
- Farrell, G. (2007). Survey of ICT and Education in Africa: Kenya Country Report, Washington, DC: *infoDev*/World Bank. Available from [www.infodev.org](http://www.infodev.org)
- Farrell, G. and Shafika I. (2007). *Survey of ICT and Education in Africa: A Summary Report, Based on 53 Country Surveys*. Washington, DC: *infoDev*/World Bank. Available at <http://www.infodev.org/en/Publication.353.html>
- Fountain, M. (2001). Teacher training with technology. Notes from the field. [www.aed.org/publications/technologiesforeducation/techedchapter/15/pdf](http://www.aed.org/publications/technologiesforeducation/techedchapter/15/pdf)
- Frost and Sullivan (2006) Impact Assessment Study of the Smart School Integrated Solution and Other ICT Initiatives, Commissioned by MSC Malaysia and the Ministry of Education, Malaysia.
- G8 Nations (2000). Okinawa Charter on the Global Information Society. <http://www.dotforce.org/reports/it1.html>.
- Gay, L. R. (1992). *Educational Research, Competences for Analysis and Application*. Ohio: Charles E. Merrill Publishing Co.
- Goolsbee, A. and Guryan, J. (2002). *The Impact of Internet Subsidies in Public Schools*. US National Bureau of Economic Research, Working Paper 9090
- Haddad, W. D. & Draxler, A. (2002). *Technologies for Education*. Paris: UNESCO and the Academy for Educational Development.
- Hadebe, Z.C. (2000). The Management of Change: an Assessment of the Outcomes of Change Strategies at the University of Zimbabwe Library, MLIS Paper, University of Botswana, Gaborone, pp. 1-12 .
- Hawkrige, D. (1990). *Computer in Third World schools*, London: The Macmillan Press Ltd.

- Isaacs, S. (2002). ICTs in African Schools: A Multi-Media Approach for Enhancing Learning and Teaching. *TechKnowLogia*, January-March, 4 (1), 32-34.
- Jensen, M. & Sarroco, C. (2002). Internet from the Horn of Africa: Ethiopia Case Study. Switzerland: International Telecommunications Union.
- Kandiri, J. M. (2007). Pedagogies to Foster Interest In Computer Programming In Secondary Schools; Paper presented to the International Computer Science and ICT Conference, Strathmore University, Nairobi.
- Kellenberger, D. (1996). Preservice Teachers' Perceived Computer self-efficacy based on Achievement and Value Beliefs within a Motivational Framework. *Journal of Research on Computers in Education*, 29(2), 124-140.
- Kiess, H. O. and Bloomquist, D. W. (1985): *Psychological Research Methods: A Conceptual Approach*. Boston: Allyn and Bacon.
- Kombo, D. K. and Tromp, D. L. A. (2006). *Proposal and Thesis Writing: An Introduction*. Nairobi: Paulines Publications Africa.
- Kozma, R. And McGhee, R., (1999). World Links for Development: Accomplishments and challenges. Monitoring and evaluation annual report, 1998-1999. Menlo Park, CA: SRI International.
- Lelliot, A, Pendlebury, S & Enslin, P (2001). Online Education in Africa: promises and pitfalls. *South African Journal of Information Management*, vol 3 (1). Available online at: <http://general.rau.ac.za/infosci/raujournal/default.asp?to=peer2vol3nr1>
- Lockesh K. (1984). *Methodology of Educational Research*. New Delhi: Vikas Publishing House PVT Ltd.
- Lundell, P., and Howell, C. (2000). *Computers in Schools: A National Survey of Information Communication Technology in South African Schools*. Education Policy Unit. Cape Town: University of the Western Cape, [http://www.school.za/schoolsurveys/suveys\\_index.html](http://www.school.za/schoolsurveys/suveys_index.html)
- Makau, B. M. (1988). *New IT and quality education in Kenya: the potential and problems of computer in schools working paper no. 461*. Nairobi: Institute of Development Studies.

- Malkin, J. G. (1972). Computer science for teacher special interest group on computer science education, SIGCSE. Vol No 1. *The Association for Computing Machinery*.
- Ministry of Education (2005). *Kenya Education Sector Support Programme (KESSP) 2005 – 2010*, Nairobi, Ministry of Education.
- Ministry of Education (2006). National ICT Strategy for Education and Training. Ministry of Education, Science and Technology/Ministry of Information and Communication. [www.education.go.ke](http://www.education.go.ke).
- Ministry of Information and Communications (2004). *National Information and Communications Technology (ICT) Policy*; Ministry of Information & Communications, (October 2004), Nairobi.
- Ministry of Information and Communications. (2006). National ICT Policy. <http://www.information.go.ke>.
- Mugenda, O. M. and Mugenda, A. G. (1999). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.
- Ngare, P. (2007). *Teachers could be out of Jobs: Thousands Face Sack when Planned Computer-Based Learning is Launched*. Daily Nation May 29<sup>th</sup>, 2007. Nairobi.
- Ngome, C. (2003). Country Higher Education Profiles: Kenya, available at: [www.bc.edu/bc\\_org/avp/soe/cihe/inhea/profiles/Kenya.htm](http://www.bc.edu/bc_org/avp/soe/cihe/inhea/profiles/Kenya.htm).
- Organization for Economic Cooperation and Development (1999). *Knowledge management in the learning society*. Paris: OECD/CERI.
- Paliwala, A. (2003). Digital divide globalization and legal regulation, available at: [www.austlii.edu.au/au/other/CompLRes/2003/](http://www.austlii.edu.au/au/other/CompLRes/2003/)
- Pelgrum, W. J. and Anderson, R. E. (1999), ICT and the Emerging Paradigm for Life Long Learning: A Worldwide Educational Assessment of Infrastructure, Goals and Practices, International Association for the Evaluation of Educational Achievement, Amsterdam.
- Piel, M. (1995). *Research methods in Education: A handbook for Africa*. East African publishers, Nairobi.

- Pintrich, and Schunk, D. (1996). *Motivation in education: Theory, research and applications*. Englewood Cliffs: Prentice Hall.
- Republic of Kenya (2006). *Kenya ICT Trust Fund Strategic Plan 2006 – 2011*, Nairobi, Government Printer.
- Ropp, M. (1999). Exploring individual characteristics associated with learning to use computers in preservice teacher preparation. *Journal of Research on Computing in Education*, 31(4), 402-424.
- Singleton, R. A. (1993). *Approaches to Social Research*. New York: Oxford University Press.
- Sub-Saharan Africa, Education for All (1999). *A Framework for Action in Sub-Saharan Africa: Education for African Renaissance in the Twenty-first Century*. Adopted by the Regional Conference on Education for All, Johannesburg, South Africa, 6<sup>th</sup> - 10<sup>th</sup> December.
- UNESCO (2007). *ICT in Teacher Education: Case Studies from the Asia-Pacific region* UNESCO, Bangkok
- United Nations Development Programme (2000). *United Nations Human Development Report 2000: Human Rights and Human Development*. New York: UNDP.
- US Department of Education, national centre for education (1998). *Survey on advanced telecommunication in US public schools, fall 1998 FRSS 61*
- Wilkinson, A. M. (1991). *The Scientist's handbook for writing papers and dissertations*. Englewood Cliffs, NJ: Prentice Hall.
- World Bank (2004). *Contribution of ICTs to Growth*, World Bank, Washington DC, USA.
- Zimbardo, P., Ebbesen, E., & Maslach, C. (1977). *Influencing attitudes and changing behaviour*. Reading, MA: Addison-Wesley Publishing Company.

## APPENDICES

### APPENDIX A: Principal's Questionnaire

#### Introduction

This Questionnaire is designed to gather information about teachers' preparedness in integrating ICT for instruction in secondary schools. Kindly respond by ticking or filling in, the appropriate responses in the spaces provided. All your responses and information in questionnaire will be confidential and will be used by the researcher for the purpose of this study only. Please give as truthful information as possible, and respond to all the items.

#### Part A: General Information

1. Indicate Your Gender:         Male                       Female
2. Indicate your current academic qualification  
Diploma [...]                      S 1[...]  
BA/BSc with PGDE [...]                      Bed [...]  
Masters [...]  
Others [specify] .....
3. Indicate the total number of students in your school?  
Boys.....  
Girls.....  
**Total**.....
4. Indicate the total number of teachers in your school?  
Male.....  
Female.....  
**Total**.....

**Part B:**

**i) Availability of ICT Physical Resources**

1. Is your school connected to electricity? Yes [ ] No [ ]
2. Does your school have a landline telephone? Yes [ ] No [ ]
3. Does your school have internet connection? Yes [ ] No [ ]
- 4 .a) Is there a computer lab in your school? Yes [ ] No [ ]
- b) If yes, how many computers are in the lab?

.....

c) If no please explain  
why?.....

.....

- 5 a) Does the lab have internet connection? Yes [ ] No [ ]
- b) If no please explain why?

- .....
6. Are the computers available adequate to meet the needs of all the students and teachers?
- Yes [ ] No [ ]
7. If no, about how many extra computers are needed?.....

**ii) Attitude of teachers**

1. How would you rate your experience with computers? (Tick all that apply)
- [ ] I have never used a computer and I don't plan to anytime soon.
- [ ] I have never used a computer but I would like to learn.
- [ ] I use applications like word processing, spreadsheets, etc.
- [ ] I use computers for administration purposes
- Others (Specify).....
2. How do you think introduction of e-learning in schools will affect education in the country?
- [ ] Positively
- [ ] Negatively
- [ ] Both positively and negatively

Explain your answer briefly

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

3. I) Do you think that teachers' jobs will be affected by the introduction of E-learning?

Yes [...]

No [...]

ii) Briefly explain your answer.

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

**iii) Level of ICT Literacy**

1. i) Have you received any training on how to use computers?

Yes [...]

No [...]

ii).If yes where did you receive your training? (Tick all that apply).

Self-sponsored     School organized     College or university

Other- please specify .....

iii) What level of training did you receive?

Computer Packages [...] Certificate level [...] Diploma [...] Degree [...]

Others (Specify)

.....  
.....

2 (a) Does your school have computer teachers?    Yes [ ]    No [ ]

(b) If yes, how many? .....

Male.....

Female.....

3. a) Are they qualified to teach computer lessons?    Yes [...]    No [...] b) If

yes, what qualifications do they have

Masters

Degree

Diploma

Certificate

Others (specify) .....

4. a) Are they adequate? Yes [ ] No [ ]  
 (b) If not, how many more are needed? .....

**iii) Training of teachers**

**iv) Teachers Preparedness**

1. The government is in the process of introducing e-learning in schools.  
 Do you think secondary schools teachers in Kenya are ready for this?  
 Yes [ ] No [ ]

Explain your answer briefly

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

2. How many of your teachers are equipped with skills to use ICT as a medium for classroom instruction? .....
- i) Male.....  
 ii) Female.....
3. Are there any courses that the school has organized to train teachers on use of ICT for learning? Yes [...] No [...]
4. i) Are there any courses that have been organized by the ministry of education to train teachers on ICT use? Yes [...] No [...]  
 ii) If yes how many of your teachers have attended such courses?.....
5. i) Has the private sector organized any ICT training for the teachers through the school? Yes [...] No [...]  
 ii) If yes how many of your teachers have participated?.....

**v) Challenges Experienced and Possible Solutions**

1. What challenges does the school face in integration of ICT in relation to the following?
- i). Facilities and Infrastructure  
 .....  
 .....
- ii). Attitudes of teachers in the use of ICT for instruction  
 .....  
 .....

.....  
.....

iii) Training of teachers in use of ICT for instruction

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

iv) Others (Specify)

.....  
.....

2. Suggest measures that can be taken by the following to ensure that teachers are adequately prepared for use of ICT in teaching and learning.

i). The government

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

ii). The school administration

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

iii). Teachers themselves

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

3. What recommendations can you make for effective integration of ICT in schools in regard to the following?

i) Teachers aspects

.....  
.....

ii) Infrastructural aspects

.....  
.....  
**THANK YOU FOR YOUR PARTICIPATION**

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

## APPENDIX B: Teacher's Questionnaire

### Introduction

This Questionnaire is designed to gather information about ICT integration in teaching and learning. Kindly respond by ticking or filling in, the appropriate responses to the questions or information needed. All your responses and information in questionnaire will be confidential and will be used by the researcher for the purpose of this study only. Please give as truthful information as possible, and respond to all the items.

### Part A: General Information

1. Indicate Your Gender:         Male                                 Female
2. Indicate your current academic qualification  
Diploma [...]                                S 1[...]  
BA/BSc with PGDE [...]                                Bed [...]  
Masters [...]  
Others [specify] .....
3. How long have you been teaching?  
1 year and below [...]                                2-5 years [...]  
6-10 years [...]                                11-15 years [...]  
15+ years [...]
4. Which subjects do you teach?  
.....
5. How many lessons do you teach per week?  
.....

**Part B**

**i) Required Facilities**

1. Is your school connected to electricity? Yes [ ] No [ ]  
]

2. Is there a computer lab in your school? Yes [ ] No [ ]  
]

If yes, how many computers are in the lab?

.....

3. Does the lab have internet connection? Yes [ ] No [ ]

4. Are the computers available adequate to meet the needs of all the students  
Yes [ ] No [ ]

5. What is the ratio of computers per each student?  
.....

6. i) Are there computers reserved for teachers use? Yes [...] No [...]

ii) If yes what is the ratio of computers per every teacher?  
.....

**ii) Attitude of teachers**

1 How would you rate your experience with computers? (Tick all that apply)

[ ] I have never used a computer and I don't plan to anytime soon.

[ ] I have never used a computer but I would like to learn.

[ ] I use applications like word processing, spreadsheets, etc.

[ ] I use computers to search the internet

[ ] I use computers for teaching purposes

Others (Specify).....

2 How do you think introduction of e-learning in schools will affect education  
in the country?

[ ] Positively

[ ] Negatively

[ ] Both positively and negatively

Explain your answer briefly

.....

.....

.....

3. I) Do you think that teachers' jobs will be affected by the introduction of E-learning?  
 Yes [...] No [...]

ii) Briefly explain your answer.

.....  
 .....

4. Would you be interested in learning how to use computers for instruction?  
 Yes [...] No [...]

**iii) Level of ICT Literacy**

1. i) Have you received any training in use of computers? Yes [...] No [...]

ii).If yes where did you receive your training? (Tick all that apply).

[ ] Self-sponsored [ ] School organized [ ] College or university

Others- please specify .....

iii) What level of training did you receive?

Computer Packages [...] Certificate level [...] Diploma [...] Degree [...]

Others (Specify)

.....  
 .....

**iv) Teachers' Preparedness**

1. The government is in the process of introducing e-learning in schools. Do you think secondary schools teachers in Kenya are ready for this?

Yes [ ] No [ ]

Explain your answer briefly

.....  
 .....

2. i) Have you attended any courses that has been organized to train teachers on use of ICT for learning? Yes [...] No [...]

ii) If yes who were the facilitators?

KIE [...] MOE [...] The school [...] Private Sector [...]

Others (specify)

.....  
 .....  
 3 a) Are facilities for integrating ICT available in your school?  
 Yes [...] No [...]

b) If yes, which ones?.....  
 .....  
 .....

c) If no, why? explain.....  
 .....  
 .....

**v) Challenges Experienced and Possible Solutions**

1. What challenges does the school face in integration of ICT in relation to the following?
  - i). Facilities and Infrastructure  
 .....
  - ii). Attitudes of teachers in the use of ICT for instruction  
 .....
  - iii) Training of teachers in use of ICT for instruction  
 .....
  - iv) Others (Specify)  
 .....
2. Suggest measures that can be taken by the following to ensure that teachers are adequately prepared for use of ICT in teaching and learning.

i). The government

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

ii). The school administration

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

iii). Teachers themselves

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

3. What recommendations can you make for effective integration of ICT in schools in regard to the following?

i) Teachers aspects

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

ii) Infrastructural aspects

.....  
.....

**THANK YOU FOR YOUR PARTICIPATION**

## **APPENDIX C: Deo's Interview Schedule**

### **i) General Information**

1. How long have you been working in the District?
2. In your opinion, is the government committed to introduce e-learning in schools?
3. Which interventions have been put in place in Thika district in readiness for introduction of e- learning in secondary schools?
4. Are secondary schools in Thika district ready for this? Please explain

#### **a. Required Facilities**

1. How many schools in the division have enough computers for all students?
2. Do they have internet connectivity?

#### **b. Teachers preparedness**

1. Are teachers equipped with skills to use ICT as a medium for classroom instruction?
- 2 Do you have organized seminars or workshops in the district to prepare teachers for ICT integration for instruction?

#### **c. Challenges**

1. In your opinion, what challenges do schools face in integration of ICT in relation to the following?
  - a) Training of teachers in use of ICT for instruction
  - b) Attitudes of teachers in the use of ICT for instruction
  - c) Facilities and Infrastructure
2. Suggest measures that can be taken by the following to ensure that teachers are adequately prepared for use of ICT in teaching and learning by:
  - a) The Government
  - b) The school administration
  - c) Teachers
3. What recommendations can you make for effective integration of ICT in schools with regards to:-
  - a) Teachers aspects
  - b) Infrastructural aspects

**THANK YOU FOR YOUR PARTICIPATION**

## **APPENDIX D: ICT Officer Interview Schedule**

### **i) General information**

1. How long have you been working in the District?
2. Which duties do you perform in the division as an ICT officer?

### **ii) Required facilities**

- 1 In your opinion is Thika District endowed with adequate ICT infrastructure in terms of:-
  - a) Internet connectivity
  - b) Computers
  - c) Fiber optic network
  - d) Cyber cafes
- 2 Does the community make use of the available infrastructures? Please explain
- 3 Are schools in particular equipped with such infrastructure?

### **iii) ICT Preparedness**



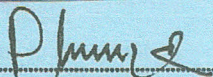
- 1 Do you think secondary school teachers are equipped with skills to use ICT as a medium of instruction?

### **iv) Challenges**

- 1 In your opinion, what challenges do schools face in integration of ICT in relation to the following?
  - a) Training of teachers in use of ICT for instruction
  - b) Facilities and Infrastructure
1. Suggest measures that can be taken by the following to ensure that the area is adequately prepared for use of ICT in teaching and learning:
  - a) The government
  - b) The school administration
2. What recommendations can you make for effective integration of ICT in schools with regards to:
  - a) Teachers aspects
  - b) Infrastructural aspects

**THANK YOU FOR YOUR PARTICIPATION**

**APPENDIX E: Study Permit and Research Authorization Letter**

<b>PAGE 2</b>	<b>PAGE 3</b>
<b>THIS IS TO CERTIFY THAT:</b>	<b>Research Permit No.</b> NCST/5/002/R 251
<b>Prof./Dr./Mr./Mrs./Miss</b> ..... CATHERINE NJERI MIGWI	<b>Date of issue</b> ..... 20.4.2009
<b>of (Address)</b> ..... KENYATTA UNIVERSITY P.O.BOX 43844 NAIROBI	<b>Fee received</b> ..... SHS.1000
<b>has been permitted to conduct research in</b> ..... RUIRU DIVISION.....Location, THIKA.....District, CENTRAL.....Province,	
<b>on the topic</b> ..... AN ASSESSMENT OF SEC. SCHOOL TEACHERS PREPAREDNESS IN INTEGRATING ICT FOR INSTRUCTIONS. A CASE OF RUIRU DIVISION, THIKA DISTRICT	 Applicant's Signature
<b>for a period ending</b> ..... 30TH JULY 09 ....., 20.....	 Secretary National Council for Science and Technology

REPUBLIC OF KENYA



## NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams: "SCIENCETECH", Nairobi  
Telephone: 254-020-241349, 2213102  
254-020-310571, 2213123  
Fax: 254-020-2213215, 318245, 318249  
When replying please quote

P.O. Box 30623-00100  
NAIROBI-KENYA  
Website: [www.ncst.go.ke](http://www.ncst.go.ke)

Our Ref: **NCST/5/002/R/251/5**

Date: **20<sup>th</sup> April 2009**

**Catherine Njeri Migwi**  
Kenyatta University  
P.O. Box 43844  
NAIROBI

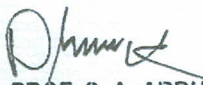
### RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on, *An Assessment of Secondary School Teachers Preparedness in Integrating ICT for Instructions: A Case of Ruiru Division, Thika District*

I am pleased to inform you that you have been authorized to carry out research in Ruiru Division Thika District for a period ending 30th July 2009.

You are advised to report to the District Commissioner and the District Education Officer, Thika District before embarking on your research.

On completion of your research, you are expected to submit two copies of your research report to this office.

  
+ **PROF. S. A. ABDULRAZAK Ph.D, MBS**  
**SECRETARY**

Copy to:

The District Commissioner  
Thika District

The District Education Officer  
Thika District