FACTORS INFLUENCING TEACHERS' ADOPTION OF COMPUTER ASSISTED LEARNING IN SECONDARY SCHOOLS: A CASE OF RARIEDA DISTRICT- KENYA

BY

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DECLARATION

This Project is my original work and has not been presented for any award in any University.

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This Research Project is dedicated to my late mother Judith Auma Onyango for shedding the light for my education. May her soul rest in peace.

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ABSTRACT

This study is an investigation into the factors influencing teachers' adoption of computer assisted learning in secondary schools, a case of Rarieda District, Kenya. The Study was guided by the following objectives: to determine teachers' attitudes towards adoption of computer assisted learning; to explore the infrastructure in schools in relation to adoption of computer assisted learning; to assess implementation of the Ministry of Education policy on the adoption of computer assisted learning and to establish the extent to which availability of in service training influence adoption of computer assisted learning in secondary schools. The target population was 261 which included secondary school teachers, Ministry of education officials and secondary school Principals. The study employed descriptive survey design and the sample size was collected using a formula by Fisher *et al* (1998), this gave a sample size of 155. The literature was reviewed based on the themes established from the objectives of the study. The instruments used for collecting data were questionnaire and interview schedule. Descriptive statistics used frequencies and percentages to present data. The study established that younger teachers were more positive to adoption of computer assisted learning than older teachers while majority of teachers were willing to adopt the use of computers to enhance learning. Inadequate infrastructure emerged as a major hindrance to adoption of computer assisted learning with majority of schools lacking electricity and computers and those with computers acquired most of them as donations from other education stakeholders, some of which were too old to be used for proper learning. However, a few schools which offered computer as an examinable subject had adequate infrastructure. It was also noted that lack of proper assessment on the implementation of the Information and Communication Technology Policy also contributed to low adoption of computer assisted learning in secondary schools. While in-service training is a prerequisite to successful adoption, only a few teachers had acquired training on basic computer certificate and no programme was put in place by the Ministry of Education to empower all teachers for the same apart for teachers who took self initiative. The study recommends a review of the Information and Communication Technology policy especially on its implementation in public secondary school. There is also a need to have a programme for training all secondary school teachers on Information and Communication Technology pedagogical skills by the government and proper provision of adequate resources for secondary schools by all educational stakeholders. Further research is needed to investigate other factors which influence adoption of computer assisted learning among teachers of secondary schools in urban areas.

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LIST OF ABBREVIATIONS/ ACRONYMS

A.C	-	Air Conditioner
CBI	-	Computer Based Instruction
CEPAK	-	Computer in Education Project in Kenya
DEO	-	District Education Office
D.C	-	District commissioner
DQUASO	-	District Quality Assurance and Standards Officer
ICT	-	Information and Communication Technology
IDRC	-	International Development Research Centre
KESSP	-	Kenya Education Sector Support Programme
EFA	-	Education for All
MDGs	-	Millennium Development Goals
MOE	-	Ministry of Education
PDE	-	Provincial Director of Education
TSC	-	Teachers Service Commission
KIE	-	Kenya Institute of Education
KCSE	-	Kenya Certificate of Secondary Education
UPS	-	Uninterrupted Power Supply

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Globally, computer technology occupies a central place in education reform and economic progress of a nation. To achieve the desired educational reforms, governments, mainly in the industrialized countries, are spending billions of dollars annually on the implementation of computer technology-based-curricula (Bebell *et al*, 2004; Roblyer, 2004).

Computers did not occupy a relatively secure place in education until the late 1970s and early 1980s (Thomas, 1987). This period marks the mass production of microcomputers and their subsequent infiltration into American schools (Alessi & Trollip, 2001). These developments concurred with calls for educational reform (Besser, 1993). The common wisdom of the time was that education needed to resolve a previously unknown deficiency called "computer literacy" (Besser, 1993). More importantly, computers were perceived to have the potential to revolutionize teaching and learning just as they revolutionized many other aspects of modern life (Maddux, Johnson, & Willis, 1997).

In China, the government and educational organizations have been paying more attention to improving teachers' Information and Technology literacy and skills (Ministry of Education of China, 2006). However, relatively few teachers' use computers regularly in their teaching and the impact of Information and communication technology on curriculum are still very limited (Li, 2003). The same situation is witnessed in Syria.

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According to a study conducted by Abdukafi (2004) on 'Exploration of factors associated with the attitudes of high school EFL teachers in Syria towards Information and communication technology, it was reported that there was low levels of computer use among the teachers. The Ministry of Education then adopted a national plan to introduce computers and informatics into pre-college education. . In addition, the Ministry inaugurated computer-equipped laboratories within secondary schools for general, vocational and technical education. It also connected many schools to the Internet and created a new specialization in computer technologies in an effort to increase the number of computer experts in society. Educational theorists and researchers have realized that an important factor in the implementation of computers is users' acceptance, which is in turn influenced by their attitudes towards these media (Koohang, 1989). Teachers' attitudes have been found to be major predictors of the use of new technologies in instructional settings (Abas, 1995; Isleem, 2003; Almusalam, 2001; Blankenship, 1998).

African countries are slowly integrating technology in schools. In South Africa for example, the use of computers in education is increasing slowly and the government has mandated that schools create computer media centers in their schools so that teachers can learn to use technology and teach their skills to their students. (Van der Wal & Pienaar, 1996-97). According to a study conducted on technology use in secondary schools in Botswana by Batne (2002), public secondary schools in both rural and urban areas are using computers and this has changed the way teachers teach and even the way students learn and the teachers role has changed from one who disseminate information to one who facilitates student learning activities. In Tanzania on the other hand, only a

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few private secondary schools around urban settings especially in Dar es Salaam have access to Information and Communication Technology.

Kenya like other African countries is making efforts to harness the potential of Information and Communication Technologies especially in the education sector. This is evident in the country's introduction of Computers in the Secondary Schools curriculum in 1998 and hence the development of the computer syllabus. The Ministry of Education developed a Kenya Education Sector Support Programme (KESSP) in 2005 that featured Information and Communication Technology(ICT) as one of the priority areas with the aim of mainstreaming ICTs into the teaching and learning process (Ministry of Information & Communication, 2006). In 2006, after several years of trying to put the policy in place, the Kenya National ICT Policy was adopted with an aim of improving the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (Kenya. MoEST, 2005). In order to achieve the objective of this policy, the Kenya Institute of Education (KIE) was singled out as the sole government body charged with the responsibility of developing the ICT curriculum as well as distributing the educational material. KIE was also charged with overseeing other institutions that develop appropriate e-content (Farrell, 2007).

According to Creemers (1994), teachers who are bent on improving their competence are likely to contribute, directly or indirectly to the growth of student's achievement. Similarly, studies concerning staff training and education clearly demonstrated the need to offer teachers better opportunity to educate and develop themselves in order to create understanding between their job and their effectiveness (Javis, 1983; Keen, 1991; Kautto-Koivula, 1996). To make this work, teachers need

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effective techniques, tools and assistance that can help them develop ICT based projects and activities especially designed to raise the level of teaching in required subjects to be able to improve student learning and academic achievement (Aduwa *et al*, 2005). However, as much as computer knowledge and skills are important in today's technological age, computer use in Kenyan classrooms is still at its initial stage. In fact studies indicate that most of the new technological innovations including computers have found significant place in only a small percentage of the nation's schools (Kibos, 2000; Makau and Wray, 1987).

1.2 The Statement of the Problem

Education is central to the long-term well-being of our society and individuals, teachers and students need all the support they can get to make it worthwhile hence the need to consider the potential of all available technologies. The rationale for the use of a technology to support learning should arise from dissatisfaction with the educational opportunities offered to learners and a strive to do better.

Lack of information on what is happening in the information technology in education sector has made it difficult to use lessons learnt from such projects in planning and strategy formulation (Farrell *et al*. 2007). Studies conducted by Wabuyele, (2003) indicated that the use of computers in the classroom depends on the ability of the teachers to integrate it. The same view is held by Bitner and Bitner, (2000) who reiterated that the success or failure in the implementation of computer education policy in schools depends more on the effectiveness of the preparation of teachers, their willingness to use computers in classroom instruction than the nature of software and hardware.

A survey conducted by Oloo (2009) in 56 secodary schools in 7 provinces in Kenya between June and November, 2008 indicated that majority of teachers were not properly equipped to effectively integrate computers in classroom. This contradicts the National Information and Communication Technology Policy which strongly recognizes the potentials of ICT in education by emphasizing its integration in teaching curriculum at all levels of education.

In Oloo's survey three schools were interviewed in Rarieda: Ramba Boys High School, Rarieda Mixed secondary school and Raliew secondary school. From his survey he did not dig deeper to look at the factors that might have influenced the adoption of computer use in secondary schools. The question to ask is, since 2008 when the survey was conducted to date what has changed in terms of integrating computer use in teaching in Rarieda district and what has been the role of the teachers? What is the state of information technology infrastructure in secondary schools in Rarieda District? It is therefore important to investigate the factors influencing secondary school teachers adoption of computer assisted learning in teaching with a view to identify the challenges hindering computer use in teaching secondary schools.

1.3 The Purpose of the Study

The purpose of this study was to investigate the factors that influence teachers' adoption of computer assisted learning in secondary schools in Rarieda District.

1.4 The Objective of the Study

The study's objectives were to:

1. Determine teachers' attitudes towards adoption of computer assisted learning in secondary schools.

2. Explore infrastructure in schools in relation to adoption of Computer assisted learning in Secondary schools.

3. Assess the implementation of the Ministry of Education policy on the adoption of computer assisted learning in secondary schools.

4. Establish the extent to which availability of in service training for teachers influence adoption of computer assisted learning.

1.5 The Research Questions

The study tried to answer the following research questions:

1. What are the teachers' attitudes towards adoption of computer assisted learning in Secondary schools?

2. Is there adequate infrastructure for the adoption of computer assisted learning in secondary schools?

3. What is the implementation of the Ministry of education policy on adoption of computer assisted learning in secondary schools in Kenya?

4. To what extent does the availability of in service training influence teacher' adoption of computer assisted learning in secondary schools in Kenya?

1.6 The Significance of the Study

The Ministry of Education has been charged with the task of overseeing educational activities in this country. It is hoped that the findings of this study would be found useful by the Ministry of Education since the study has come at a time when several schools are receiving computers as donations from stakeholders in education. It is hoped that the findings should motivate more teachers to use computers to assist in learning. Other researchers would also use the study as appoint of reference in future research.

1.7 Basic Assumptions of the Study

The study was guided by the basic assumption that the respondents for the study will give truthful and accurate information required to make the study successful.

1.8 Limitation of the Study

This study should have been conducted in all secondary schools in Kenya to improve its external validity. However, time and financial constraints made the researcher to conduct the research in only Rarieda District. Therefore the findings might not allow generalization. By the time the research was being done there was heavy rainfall in the region hence the researcher administered the questionnaires and collected them on the same day.

1.9 De-limitation of the Study

The study was conducted in only Rarieda District hence generalization of the result is not a full representation of the national situation. The study was de-limited to teachers of secondary schools since they are believed to be the agents of change and did not involve students but informal interview with principals of secondary schools and ministry of education officials in the D.E.O's office were conducted where further clarification was needed as these are the officials who supervise curriculum implementation.

1.10 Definition of significant Terms as used in the Study

Adoption: Is the acceptance to use.

Computer assisted learning: This is the use of computers to aid in learning.

Computer literacy: Basic Computer knowledge skills which include keyboarding, Microsoft office, spreadsheets, e-mail and internet use.

Influence: To affect positively or negatively.

Policy: Refers to adequacy or inadequacy of a system. Its management structure in relation to goals and objectives which can be harmful or beneficial to the system.

Technology Integration: The use of computers to support and enhance the curriculum goals and objectives in all content areas, it involve use of computers as a tool to enhance learning.

Learner / Student centered: Approach to learning with more of the learner under the control of the learner.

Uninterrupted Power Supply Is a device which saves power while computer is shutting down and prevents power surge

Infrastructure: Refers to facilities used to provide one or more Information technology services they include Computer laboratory, Air conditioner, solar panels Uninterrupted power supply.

Information and Communication Technologies: Is a diverse set of technologies, tools and resources used to communicate, and to create, disseminate, store and manage information. In this study it would be used to refer to computer use.

e-learning- It encompasses learning at all levels, formal and non- formal, that uses an information network. It can also be referred to as online learning

1.11 Organization of the Study

The study is organized into five chapters. Chapter one basically gives the introduction, and describes the background of the study, Statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, basic assumptions, the limitation, de-limitation , definition of significant terms as used in the study as well as the organization of the study.

Chapter two provides a review of literature regarding the study, the theoretical framework as well as the conceptual framework whereas Chapter three focuses on the

research methodology discussed under the following subheadings: research design, target population, sample size and sample selection, research instrument, validity of research instruments, reliability of research instruments, data collection procedures, data analysis technique and ethical considerations.

Chapter four entails data analysis, presentation, discussion and interpretation. This has the following; the respondents return rate, demographic characteristics of respondents, analysis of collected data, interpretation and discussion based on the themes from the objectives. Chapter five consists of the summary of findings, conclusions, recommendations, suggestion for further research and the contribution to the body of knowledge in terms of objectives.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter discusses the survey of available literature related to the study from contribution of various scholars based on the following themes: Teachers attitudes on computer assisted learning; Exploration of infrastructure in relation to Computer assisted learning in secondary schools; Influence of in-service training on adoption of computer assisted learning; ICT policy; Theoretical framework guiding the study; Conceptual framework; Literature gap and a summary of literature review.

2.1 Teachers' attitudes on computer assisted learning

The success of any initiatives to implement technology in an educational program depends strongly upon the support and attitudes of teachers involved. It has been suggested that if teachers believed or perceived proposed computer programs as fulfilling neither their own or their students' needs, they are not likely to attempt to introduce technology into their teaching and learning. Among the factors that affect the successful use of computers in the classroom are teachers' attitudes towards computers (Huang & Liaw, 2005).

Educational theorists and researchers have realized that an important factor in the implementation of computers is users' acceptance, which is in turn influenced by their attitudes towards these media (Koohang, 1989). Teachers' attitudes have been found to be major predictors of the use of new technologies in instructional settings (Abas, 1995;

Isleem, 2003; Almusalam, 2001; Blankenship, 1998). The successful use of technology in the classroom depends to a large extent on the teachers' attitudes toward these tools (Lawton & Gerschner, 1982). Christensen (1998) states that teachers' attitudes toward computers affect not only their own computer experiences, but also the experiences of the students they teach. Positive attitudes often encourage less technologically capable teachers to learn the skills necessary for the implementation of technology-based activities in the classroom. Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. They concluded that changing individuals' negative attitudes is essential for increasing their computer skills. In a study by Jennings and Onwuegbuzie (2001), teachers of younger age were found to be associated with more positive attitudes towards ICT. Thus, it was hypothesized that teachers of younger age make more use of ICT in schools, compared to the elderly counterparts.

Positive teacher attitudes towards computing are critical if computers are to be effectively integrated into the school curriculum. A major reason for studying teachers' attitude towards computer use is that it is a major predictor for future computer use in the classroom (Myers & Halpin, 2002). Khine (2001) studied 184 pre-service teachers and found a significant relationship between computer attitude and its use in the institution. This finding was corroborated by Yuen and Ma (2001) who, using the Chinese Computer Attitude Scale for Teachers (CAST), found that 216 secondary school teachers in Hong Kong had reported the instructional use of computers and their results revealed that affective attitudes, general usefulness, behavioral control, and pedagogical use to be

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significant in determining the use of ICT. Kumar and Kumar (2003) reported that most teachers believe that the amount of computer experience has a positive effect on attitude towards computers. Jackson *et al,* (2001) indicated that female users, compared with males, are more inclined to hold negative reactions to computers and such differences may have resulted in the different ways of using computers.

2.2 Exploration of infrastructure in relation to adoption of computer assisted learning in secondary schools

Introduction of computer technology into the U.S.A school curriculum was in order to improve teaching practices and learning (Smerdon *et al,* 2000). This was in an effort to produce a well-educated and technologically skilled workforce responsible for sustaining America's economic superiority in the information-driven global economy (Culp *et al,* 2003). United States schools have made great strides in improving access to computer technology as indicated by the average national student-to-instructional computer ratio and student-to-instructional-multimedia computer ratio of the 5:1 and 10:1, respectively (CEO Forum, 2000).

By the year 2000, there was an estimated 10 million computers in American schools with annual school expenditures for technology of about 6 billion dollars (Fouts, 2000). There was one instructional computer for every 5.7 students and more than half of America's classrooms were connected to the Internet (Fouts, 2000). By the time computer technology have permeated American education, technology manufacturers began looking for new markets in the international arena (Holloway & Ohler, 1995; Thomas, 1987). In the educational setting of China, some of the schools have acquired sufficient ICT hardware and software which can benefit not only teachers but also

students. In order to develop ICT abilities of teachers, the Chinese government and educational organizations have been paying more attention to improving teachers' ICT literacy and skills (Ministry of Education of China, 2006). However, relatively few teachers' use ICT regularly in their teaching and the impact of ICT on curriculum is still very limited (Li, 2003). A serious contradiction exists between the attempt to integrate ICT into education and real ICT integration. Part of the tension was explained by analyzing relationships between teachers' beliefs and ICT use (Loveless, 2004). In Syria, Recognizing the challenge of the "information age", the Ministry of Education has recently adopted a national plan to introduce computers and informatics into pre-college education. To this end, the Ministry inaugurated computer-equipped labs within secondary schools for general, vocational and technical education. It also connected many schools to the Internet. In addition, the Ministry created a new specialization in computer technologies in an effort to increase the number of computer experts in society.

According to the National Center for Educational Statistics (NCES), by the fall of 2003, nearly 100 percent of public schools in the United States had access to the Internet (NCES, 2005). As computers have become more prevalent in schools, educators are increasingly encouraged to integrate technology into all aspects of learning. Research has indicated that the use of technology in the classroom can aid and improve the delivery of curriculum content while also providing training in the skills students need to enter the workforce (O'Dwyer, Russell, & Damain, 2004). Technology has also been found to play a key role in non-instructional activities, which include data management, lesson preparation, and communication (Holcomb, 2005; O'Dwyer, Russell, & Damain, 2004).

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In a multi-national study, Pelgrum (2001) examined what educational practitioners in 26 countries perceived as major impediments to technology implementations in their respective schools. Pelgrum (2001) found that the main obstacles were shortage of computers and lack of computer knowledge among teachers. In her study of technology implementation in Malaysian schools, Abas (1995) reported that the main hindrance to successful technology implementation was the scarcity of resources. The Malaysian ministry of education supplied software packages, but no funds to purchase additional resource material. A study in South Korea by Na (1993) revealed that computer resources available for teachers were very limited. Even when such resources existed, they were housed in computer rooms or business offices. Similarly, Modum   UNIVERSITY OF NAIROBI

(1998) reported the lack of hardware and software in Nigerian schools. Focusing on the Tanzanian scenario, use of ICT in education is hampered by the cost of bandwidth which is unaffordable for many schools. Rural schools that are located outside the national telecommunications network have to use expensive satellite technologies. The national electricity grid is limited to commercially viable areas missing out most of the schools in the rural areas. This, together with frequent breakdowns and load shedding, has increased the cost of owning ICT infrastructure (Farrell, 2007) and made it almost impossible for schools in rural areas to access and use ICT in education.

According to a research conducted by Kenya School Net (2003) based on the findings of a questionnaire to which 69 secondary schools responded, coming from 8 provinces and 46 districts, it was reported that only 46.4% of the sampled schools. The research also reported that Internet and fax were rare in the schools. It was suggested that

E-mail was yet to be recognized as a tool for collaboration among teachers as only one school had a website and only two schools networked all their computers to the Internet (p.20). It went on to assert that in those schools, access to the Internet was severely limited and when available, was only for administrative use.

The Kenya School Net research also found out that almost 40% of schools had less than 10 computers, and therefore inadequate numbers for teaching and learning. More than 20% had less than 5 computers, indicating that the computers were largely for administrative purposes (p.10). Only one third of schools surveyed had dedicated computer laboratories. The research also found that some schools were making use of very old equipment and that heavy reliance on the donation of computers as opposed to sourcing locally reduced the capacity of the school to determine the make of computer they used (p.13).

2.3 Influence of in-service training on adoption of computer assisted learning

Teacher education and training is a means for professional updating, which deals with all developmental functions, directed at the maintenance and enhancement of one's professional competence and literacy. Teacher's professional growth supports the idea that ICT in teacher education and training is an important factor in teachers' job effectiveness and development. This is so because teachers' education and training is generally considered to be essential for school effectiveness and improvement (Larose *et al*, 1999). Creemers (1994) also argued that teachers who are bent on improving their competence are likely to contribute, directly or indirectly to the growth of student's achievement. Similarly, studies concerning staff training and education clearly demonstrated the need to offer teachers better opportunity to educate and develop

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themselves in order to create understanding between their job and their effectiveness (Javis, 1983; Keen, 1991; Kautto-Koivula, 1996). To make this work, teachers need effective techniques, tools and assistance that can help them develop ICT based projects and activities especially designed to raise the level of teaching in required subjects to be able to improve student learning and academic achievement (Aduwa-Ogiegbaen & Iyamu, 2005). Realistically, the inclusion of ICT materials in secondary schools is not valuable if first of all inservice and pre-service teachers are not conversant with the traditional teachings necessary for adequate and effective teaching involvement. It then follows that teachers should initially be trained and developed professionally to be able to assist students in their ICT material utilization competencies (Ololube, 2006).

According to Gumbo (1998), a major problem associated with the integration of technology into the educational systems of developing countries has been the lack of trained teachers and trainers. Generally, the skills and technical background necessary for effectively utilizing the new technology are absent or in short supply (Soolnanan, 2002). This view is shared by Ruohonen & Adelakun (1998) who noted that, insufficient and inadequate human-resource development for Information technology(IT) implementations works against the effective IT adoption and integration in most developing countries. In line with this view, Abas (1995) pointed to the shortage of well trained teachers as a main barrier to effective technology integration into Malaysian schools. She concluded that effective in-service training is a key for technological integration. She further suggested that teacher "training" is not enough; what is needed is "effective" teacher training. Based on his study in South Korea, Na (1993) recommended teachers' participation in computer training programs to increase their skills and

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knowledge about computer use. He suggested that teachers should be trained, not simply to use the computer but also to use it in the classroom.

According to a study conducted by Wabuyele (2003) on understanding teachers and administrators perception towards computer use in Kenyan classroom, of all the obstacles identified by the participants in her study, lack of training was found to be the most critical hindrance to the effective use of computers in Kenyan classrooms. Teachers and administrators, the key people who are supposed to equip the students with knowledge and skills in computers are themselves not trained in computers according to participants in the study. This finding was consistent with other studies that have pointed to lack of professional development for technology use as one of the most serious obstacles to fully integrating technology into the curriculum (Fatemi, 1999; Chiero, 1997; Office of Technology Assessment, 1995; Panel on Educational Technology, 1997) as cited in Wabuyele (2003:153), for instance Chiero's study revealed that 78.1% of the respondents in the study rated "Not enough training" as either a significant or a moderate obstacle to use of computers in classroom. They further expressed lack of training as the most immediate need. Due to lack of qualified teachers to teach computer science, most schools depend on computer experts and/ or in some cases schools have taken teachers for training in computer packages in commercial colleges and then assigned them to teach the subject.

2.3.1 Computer Competence

While the infusion of technology into schools required new competencies on the part of the teachers, teachers' preparation does not always afford these competencies (Francis *et al*, 1996). Research suggests that teachers often struggle with the integration

of technology in the school curriculum on daily basis (Spiegel, 2001). In fact, computer competence includes not only the knowledge of computers but also the skills and experience necessary for putting them into use. Previous research suggests that the success of educational innovations depends largely on providing teachers with the competencies required to make them function (Pelgrum, 2001). In a multinational study that involved teachers from 26 countries, Pelgrum (2001) found that teachers' lack of knowledge and skills was the second most inhibiting obstacle to the use of computers in schools. In their analysis of several major cross-cultural studies completed during the 1990s and related to information technology and education, Knezek and Christensen (2002) found that teachers' competence with computer technology is the principal determinant of effective classroom use by students. Isleem (2003) found that computers expertise (competence) was the strongest predictor of computer use by Ohioan technology education teachers. A number of studies showed that teachers' computer competence team up with attitudes in determining both the initial acceptance of computer technology as well as future behavior regarding computer usage (Francis-Pelton & Pelton, 1996; Harrison & Rainer, 1992)

Providing teachers with access to technology resources within the school post training is one motivational strategy. Having them work with colleagues in technology-supported instructional design projects is another (UNESCO Bangkok 2004). Giving teachers time and recognition for innovation is essential. Teachers need to be given time to participate in training activities and they need to be given time to try out what they have learned in the classroom. The latter means that school administrators should take care not to overload teachers particularly with extra-curricular assignments — although

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perhaps this is easier said than done in the majority of public schools in developing countries where there is a shortage of teachers. Teachers who successfully complete professional development programs and implement technology-supported teaching and learning innovations should be given public recognition to give them a sense of achievement and encourage them to continue, as well as to encourage others to participate in such programs (Carlson and Gadio 2002). An important incentive for teachers to upgrade their knowledge of and skills in ICT integration is formal certification of in-service professional development leading to a degree (UNESCO Bangkok 2004).

2.4 Information and Communication Technology (ICT) Policy

This is the framework governing the implementation of computer use in schools. This section covers an overview of the ICT policy in Kenya, ICT as discrete subject, as well as Monitoring and evaluation of ICT in Kenya.

2.4.1 Overview of the ICT Policy in Kenya

The Kenya National ICT policy was adopted in 2006 after several years of effort in trying to put it in place. The aim of the policy was to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services as reported in the ICT in Education options paper (Kenya. MoEST, 2005). Although the national ICT policy has several sections, objectives and strategies regarding ICT in education are spelt out in the information technology section. In this section, the objective regarding the use of ICT in schools, colleges, universities and other educational institutions to improve the quality of teaching and learning is spelt out as documented by

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Farrell in the Survey of ICT in Africa Report (2007). One important strategy outlined in this report is the promotion and development of specific e-learning resources that would address the educational needs of primary, secondary and tertiary institutions. A significant step in this direction is the digitization of the curriculum which is ongoing at the Kenya Institute of Education (Ratemo, 2009). Also, the development of the curriculum and training of teachers both at in-service and pre-service level may be central to the government's efforts of achieving the policy objectives.

In an effort to promote the development of content that will address the educational needs of primary, secondary, and tertiary institutions, the government came up with two ways in which the curriculum will be developed (Kenya. MoEST ICT in Education options paper, 2005). One, by adapting existing educational materials and distributing them to the schools; and the second, by beginning the process of having schools create their own e-content. Besides, building capacity in Kenya to create instructional material for an increasing digital world is noted as an important aspect of the curriculum that is expected to pay dividends in improving the quality of education (ibid). In order to achieve this policy objective, the Kenya Institute of Education (KIE) has been singled out as the sole government body charged with the responsibility of developing the ICT curriculum as well as distributing the educational material. KIE would also be in charge of overseeing other institutions that develop appropriate e-content (Farrell, 2007). Objective number 10 of the MoEST strategic plan (running from 2006 to 2011) targets strengthening the capacity of KIE to execute this mandate among others (Kenya. MoEST, 2006). This is a strong commitment in support of the National ICT policy.

Farrell (2007) asserts that while technicians can be employed to fix and maintain computers, teachers and educators must know how to exploit ICT for what it does best – opening learners up to the world of knowledge. The author also noted that investment into upgrading computer labs and building ICT capacity at the Teacher Training Colleges (TTCs) is an intervention which can quickly yield high returns. By providing adequate access to ICT, the TTCs can use it to achieve learning objectives at various levels. This point is also noted in the ICT in Education Options Paper (Kenya. MoEST, 2005) in which large-scale capacity building workshops for teachers have been suggested. The paper observes that teacher training should be built on existing structures that support quality ongoing professional development for teachers. The programme should be consistent with the workshops for lecturers and pre-service teachers at teacher training colleges. The paper further notes that the training of teachers should focus on increasing efficiency in the teachers' workload and integrating ICT to improve teaching and learning objectives.

2.4.2 ICT as a discrete subject

In Kenya Computer Studies (CS) is offered as an optional subject in secondary schools. The subject is aimed at enabling the learners to; "appreciate the computer system and the development of computers, safely use computers, understand the role of ICTs, interact with the global society, and acquire basic knowledge, skills and attitudes to help them live in a fast changing technological world" (Kenya. MoEST, 2002, p. 30).

Topics covered in the four years of secondary education include Introduction to computers, Computer systems, Operating systems, Application packages: word processing, spreadsheets, databases, desktop publishing, internet and Email. Data security

and controls, Elementary programming principles, Application areas of ICTs, Impact of ICT on society and Career opportunities in ICT (MoEST, 2002, p. 31-44, Kenya).

2.4.3 Monitoring and Evaluation of ICT in Kenya

Based on local experience and international research, it is clear that a comprehensive set of indicators must be developed to discretely reflect the goals articulated in the ICT in Education strategy documents. This document articulates key areas for measurement to support the development and delivery of ICT throughout the education sector. The three key areas identified are (1) Infrastructure and Access, (2) Training and Usage, and (3) Impacts. It should be made very clear that many countries are attempting to include qualitative and quantitative indicators, with varying degrees of success. "Quantitative data can be collected from indicators that will

provide an overall view of infrastructure support and ICT presentation in schools. However, it is equally important to examine indicators that will show how ICTs have been used not only as a basic operational tool, but also as a communications tool, which promotes the development of creativity, interactivity, collaborative learning, critical thinking, and problem-solving" (UNESCO 2003: 8). This is the most difficult task but one which should not be avoided if the MOEST and development partners are to provide valuable, consistent data in regards to the integration of ICT in education in Kenya. Towards this end, the areas for measurement presented below are intended to provide guidance for the later development of indicators and data collection. We envision data for the first two areas, (1) Infrastructure and Access and (2) Training and Usage, can be collected nationally. Data for the (3) Impacts section will likely be collected through highly focused case studies. If data is collected for the areas below, the MOEST will be

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able to determine what ICTs are available in the education sector; where these are; from where these came; who uses these resources, and for what these are used. The MOEST will also be able to establish the number of schools achieving policy development levels. Note that all data should be disaggregated for gender and community characteristics.

2.5 Technology and Gender

Until recently, vast amounts of research indicated that a technology gender gap exists between males and females, with males using technology more frequently than females (AAUW, 1992; Crombie & Armstrong, 1999; Fiore, 1999; Kadijevich, 2000). In addition to using technology more frequently than females, research has also found that males have a higher exposure to technology, both in school and at home (Kirkpatrick & Cuban, 1998). Further, research has found that as new technologies emerge, initial users tend to be young, male, educated, affluent, urban, and not members of a racial or ethnic minority group (Norris, 2001; Rogers, 1995). Furthermore, according to Van Braak, Tondeur, and Valcke (2004), male teachers reported that they integrate computers in their classrooms more often than female teachers self-reported.

2.6 Theoretical framework

The study was guided by Rodgers' diffusion and innovation theory. For Rogers, "a technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome" (p. 13). It is composed of two parts: hardware and software. While hardware is "the tool that embodies the technology in the form of a material or physical object," software is "the information

base for the tool" (Rogers, 2003, p. 259). Since software (as a technological innovation) has a low level of observability, its rate of adoption is quite slow.

For Rogers (2003), adoption is a decision of "full use of an innovation as the best course of action available" and rejection is a decision "not to adopt an innovation" (p. 177). Rogers defines diffusion as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). As expressed in this definition, innovation, communication channels, time, and social system are the four key components of the diffusion of innovations. These four components explain the process of change as determined by individuals, decision-makers, or whole organizations. In the field of education, teachers are undeniably a key agent of change on the classroom floor (Pelgrum, 2001).

Rogers (1995) describes an Innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11). Rogers focuses on technological innovations in particular. A technology is a means of uncertainty reduction insofar as it helps to solve the individual's perceived problem (p.14). However, it may create uncertainty when little is known about its consequences. A Communication Channel is "the means by which messages get from one individual to another" (p. 18). The channel can be a mass medium or an interpersonal medium. Diffusion studies show that most individuals rely on the subjective accounts of other individuals who may have experienced or came in contact with the new media (Rogers, 1995). This means that diffusion is a social practice. The Time element refers to the innovation decision process by which an individual passes from knowledge about the innovation to its adoption or rejection. Time also refers to the innovativeness of the individual in terms of how early or

late he/she adopts the innovation compared to other members of the social system. Lastly, the Social System denotes the social context in which the innovation diffuses.

Research using Rogers' Diffusion of Innovations has often been guided by the assumption that the theory incorporates several sub-theories, each focusing on different elements of the diffusion process. Because of the comprehensiveness of Rogers' theory, researchers often test or investigate some aspects of this unified theory of diffusion. In the field of education, researchers have often examined three major sub-theories related to the sphere of educational change: Innovation Attributes, Individual Innovativeness, and Innovation Decision Process.

The sub-theory of Innovation Attributes states that potential adopter's evaluate an innovation based on their perceptions of five characteristics of the innovation. These include: Relative Advantage, Compatibility, Complexity, Observability, and Trialability. The theory holds that an innovation will be increasingly diffused if potential adopters perceive that the innovation: (1) has an advantage over previous innovations, (2) is compatible with existing practices, (3) is not complex to understand and use, (4) shows observable results, and (5) can be experimented with on a limited basis before adoption. The Individual Innovativeness sub-theory stipulates that individuals who are inclined to being innovative will adopt an innovation earlier than those with less innovative inclination. According to this hypothesis, individuals can be grouped into Innovators, Early Adopters, Early Majority, Late Majority and Laggards. Innovativeness is highly determined by socioeconomic status. Thus, "it is assumed that individuals adopt innovations in direct proportion to their economic status; with each added unit of income,

education, and other socioeconomic status variables, an individual is expected to become more innovative by an equivalent amount" (1995, p. 270).

Many researchers have derived relevant teachers' characteristics, such as income, education and so forth, from this sub theory. The last amongst these three sub-theories, namely the Innovation Decision Process, holds a special significance for many researchers in the field of education, and it has been by far the most frequently researched component of Rogers' theory. Rogers' Innovation Decision Process theory states that diffusion is a process that occurs over time through five stages: Knowledge, Persuasion, Decision, Implementation and Confirmation (Figure 2.1). Accordingly, "the innovation-decision process is the process through which an individual (or other decision-making unit) passes (1) from first knowledge of an innovation, (2) to forming an attitude toward the innovation, (3) to a decision to adopt or reject, (4) to implementation of the new idea, and (5) to confirmation of this decision" (Rogers, 1995, 161). Due to the novelty of computers and their related technologies, studies concerning technology diffusion in education have often focused on the first three phases of the innovation decision process. This is also because the status of computers in education is, to a great extent, still precarious. In cases where technology is very recently introduced into the educational system, as is the case of most developing countries, studies have mainly focused on the first two stages, that is, on knowledge of an innovation and attitudes about it. Rarely do we find studies dealing with the "adoption/rejection" phase.

Figure 2.1: Stages of Innovation-Decision Process, Based on Rogers (1995, p. 163)
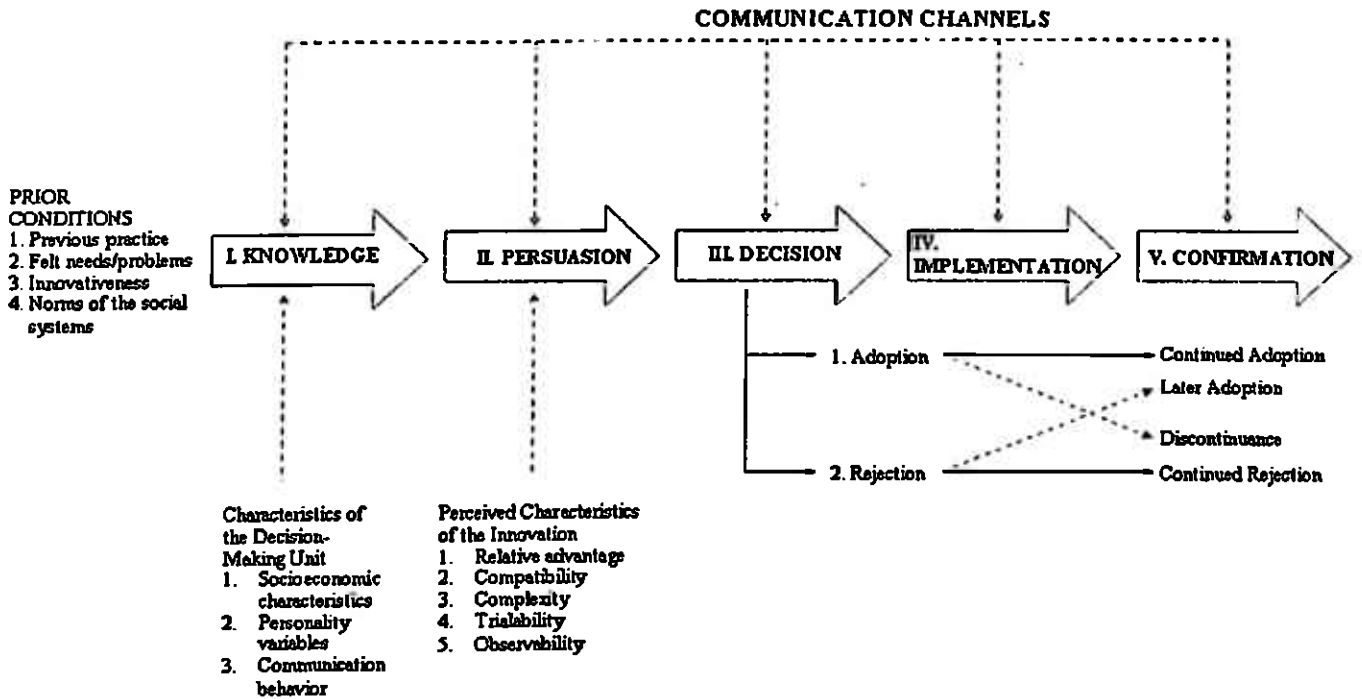
As noted above, people's attitudes toward a new technology are a key element in its diffusion (Rogers, 1995). According to Lawton & Gerschner (1982), the successful use of technology in the classroom depends to a large extent on the teachers' attitudes toward these tools. Positive attitudes often encourage less technologically capable teachers to learn the skills necessary for the implementation of technology-based activities in the classroom. Harrison and Rainer (1992) found that participants with negative computer attitudes were less skilled in computer use and were therefore less likely to accept and adapt to technology than those with positive attitudes. The theoretical simulation is significant in this study as it underscore the importance of decision of whether to adopt or reject a technology. Teachers with adequate knowledge are likely to

make decisions which enhance adoption while those computer illiterate are likely to reject an innovation. Likewise teachers in schools with adequate infrastructure are likely to adopt an innovation those without electricity and even computers. Finally if the Ministry of education has a workable policy which makes computer use compulsory then secondary school teachers are likely to decide on the adoption of a given technology.

2.7 Conceptual framework for the relationship between of computer assisted learning and factors influencing its adoption.

Fig 2.2 The study was guided by the following conceptual framework:

```
┌─────────────────────────────────────┐
│ Perception and attitude of teachers  │──────────►
│ Beliefs                              │
└─────────────────────────────────────┘
              ↕
┌─────────────────────────────────────┐
│ ICT Infrastructure- Hardware, Software│          ┌──────────────┐
│                                      │          │ Computer use │
└─────────────────────────────────────┘          │ teaching     │
              ↕                                    └──────────────┘
┌─────────────────────────────────────┐
│ In-service training on ICT           │          (Dependent variable)
│                                      │
└─────────────────────────────────────┘
              ↕                          ┌─────────────┐
┌─────────────────────────────────────┐ │ School      │
│ Implementation Ministry of Education │ │ location    │
│ policy on ICT in schools             │ └─────────────┘
└─────────────────────────────────────┘
```

(Intervening Variable)
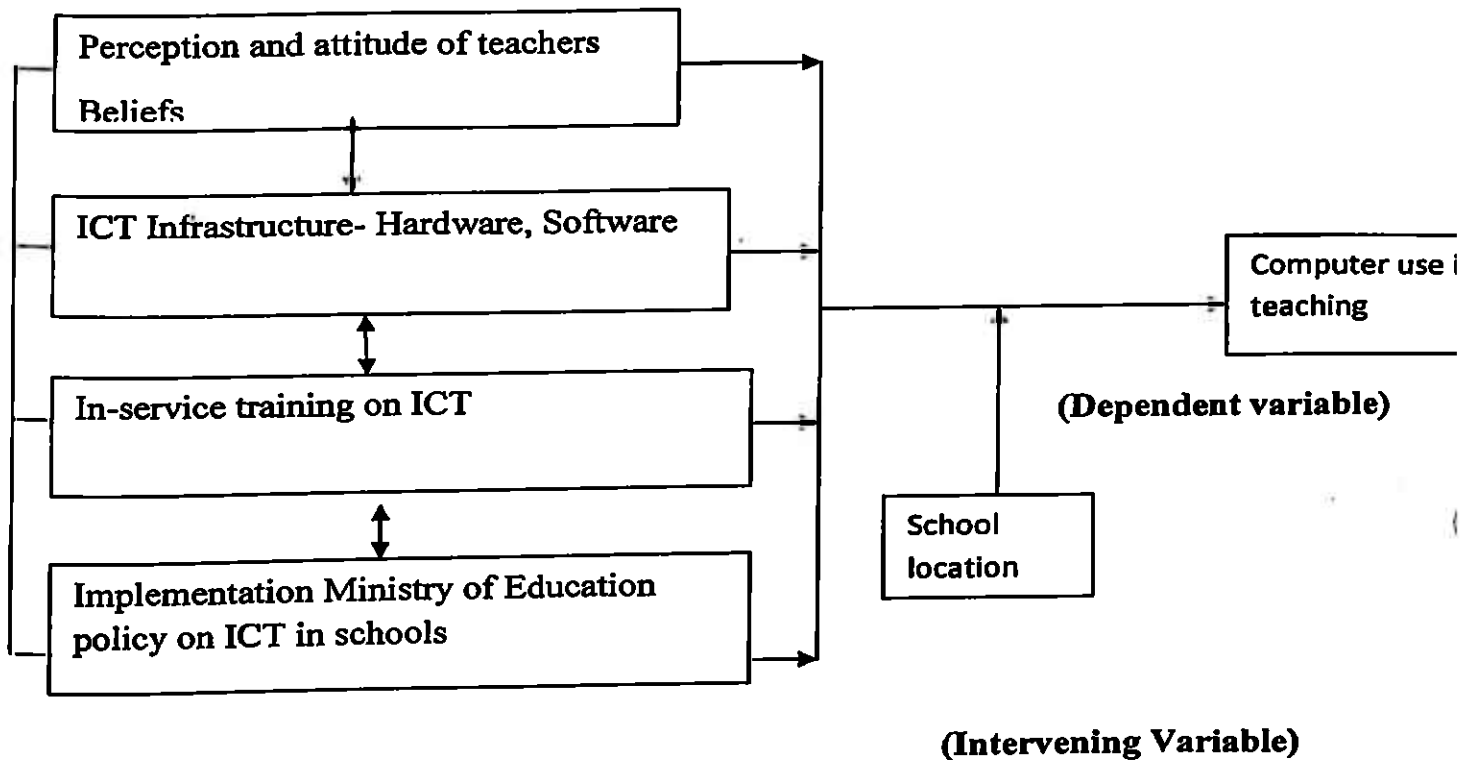
(Independent Variable)

Source: Researcher (2010).

The conceptual framework provides tools to be used to critically analyze the given variables in this case; the dependent variable is computer use in classroom while the independent variables are policy factors, ICT infrastructure, ICT literacy skills, and beliefs and the intervening variable is the school location.

Attitudes towards computer may influence teachers acceptance of the usefulness of technology and also influence whether teachers integrate ICT or not. Positive computer attitudes are expected to foster computer use in the classroom while teachers with negative attitudes towards computer use are less likely to use computer to assist in teaching. In addition government policy can also influence teachers' integration of computers in classroom teaching. If the policy demands integration of computer use in teaching then more teachers will tend to use computer for teaching in addition, if there is a proper ICT implementation policy by the Ministry of Education and computer use is made compulsory in schools then more teachers will use computers to assist in teaching. Teachers in schools with electricity, computer labs, internet connectivity and projectors are likely to use computers to assist in learning than teachers without appropriate and adequate infrastructure. While training is important for imparting of skills, knowledge and abilities, teachers with training in ICT are more likely to use computer to assist in learning than those without any training in computer. Schools situated in urban and peri-urban areas are likely to integrate computer use in classroom than those situated in rural areas.

2.8 Literature Gap

Studies on adoption of computer use for teaching in secondary schools by teachers have mainly been conducted outside Rarieda District and even the ones

conducted outside the district have not focused on factors influencing adoption of computer assisted learning by teachers in secondary schools. The survey conducted by Oloo (2009) in Rarieda district explored the nature of ICT integration in primary and secondary school in the district and this was done in Raliew secondary school and Ramba boys. Of these two schools only Ramba Boys High school had computers. The survey highlighted that most schools lacked adequate funding to purchase ICT equipment.

Despite focus on the use of computers in most school especially in private schools very little has been done in Secondary schools. In addition, focus has not been on the Ministry of Education officials especially the quality assurance and standards officers who monitor curriculum implementation in terms of their computer competence and ability to monitor and evaluate the use of computer to assist in learning by teachers. This study seeks to address an area which has never been addressed before, that is what might enhance adoption of computer use or what might hinder use of computer for classroom teaching in secondary schools in Rarieda District. The study will also analyse the monitoring and evaluation framework on ICT adoption in secondary schools.

2.9 Summary of Literature Review

The literature review covered the introduction; the exploration of the variables in the objectives which include; teachers attitudes on computer assisted learning; exploration of infrastructure in relation to adoption of computer assisted learning in schools; in-service training on adoption of computer assisted learning; ICT policy; theoretical framework; conceptual framework; literature gap and a summary of literature.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the overall methodology that was employed in the study. It provides an explicit description of the research design, target population, sample size and sampling procedures, research instruments, validity and reliability of instruments, data collection procedures, data analysis techniques and ethical considerations.

3.2 Research Design

A descriptive survey design was used in the study. This design was appropriate for the study as it enables the collection and analysis of both qualitative and quantitative data. Descriptive survey is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals (Orodho, 2003). According to Orodho and Kombo (2002), the design can be used when collecting information about people's attitudes, opinions, habits or any of the variety of education or social issues. This survey design was appropriate since it generated information about teacher's attitudes and adoption of computer assisted learning by teachers for teaching in secondary schools. It also gathered information on influence of in-service training on adoption of computer assisted learning in secondary schools.

3.3 Target Population

Arasian (2000) defined a target population as the population that the researcher would ideally like to generalize to. The study was conducted in Rarieda District, in Nyanza Province, Western part of Kenya. Rarieda District has two administrative

divisions namely Madiany and Rarieda divisions. The target population consisted of secondary school teachers, ministry of education officials and Principals of secondary schools in Rarieda District. The record received from the D.E.O's office gave a total target population of 261teachers and administrators as shown in table 3.1.

Table 3.1: Target population

Category	Male	Female	Total
Secondary school teachers	176	49	225
Ministry of education officials	5	1	6
Secondary school Principals	22	8	30
Total Population	203	58	2

3.4 Sample Size and Sample Selection

Mugenda and Mugenda (1999) defined sampling as the process of selecting a number of individuals for a study in such a way that the individuals selected represent a large group from which they are selected. The sampling technique used was random sampling. This was the most appropriate to target secondary school teachers, purposive sampling was used for secondary school principals and Ministry of education officials. The respondents were informed of the purpose and objectives of the study well in advance by the researcher. The respondents were both male and female sex.

3.4.1 Sample size

Te sample size was drawn from a target population of 263 teachers and Ministry of Education officials. Using a formular by Fisher *et al.* as cited in Mugenda and Mugenda (2003, p43) a sample size of 155 respondents was obtained.

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3.4.2 Sample selection

The sample size was selected at 95% level of certainty and a sample formulae by Fisher *et al.* (1998) presented below was used.

$$n_0 = \frac{Z^2 pq}{d^2}$$

Where n   =desired sample size

Z   =standard normal deviation at required confidence interval of 95%

P   =Proportion in target population with characteristic being used

Q   =1- p

D   =the level of statistical significance set

P   =0.5 as recommended by Fisher et al which assumes 50% of characteristic of interest.

Q   =   1- p = 0.5

Z   =   1.96 at 95% Confidence level. The sample size is therefore:

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{(0.5)^2} = 384$$

Since the target population was less than 10,000, a final sample size (nf) using the following formula of Mugenda and Mugenda, (2003, p44)

$$nf = \frac{n}{1+n/N}$$

Where nf   =   the desired sample size (When the population is less than 10,000).

n   =   the desired sample size (when the population is more than 10,000)

N   =   Total population of teachers and Ministry of education officials

Therefore, Sample size $= \dfrac{384}{1+384/261} = 155$

3.5 Research Instruments

Questionnaires and interview schedules were used as tools for collecting data. The selection of tools was guided by the nature of data that was to be collected, time available as well as the objective of the study. Questionnaire and interview schedule were employed as the main tools for collecting data.

a) The Interview Schedule

Structured Interviews involves subjecting every informant in a sample to the same stimuli (Kombo and Tromp, 2006). This is important to the study because the reliability of information gathered is high. In addition it provides in-depth information about particular case of interest to the study (Ibid). There were two sets of interview schedules one set was used to gather information from the Ministry of education administrators on the education policy on the implementation of Computer- based integrated instruction in Kenya. Another set of interview schedule was administered to Head teachers/Principals of secondary schools. This was used to gather data on attitudes of Principals, ICT infrastructure in schools and the implementation of ICT policy in schools.

b) The Questionnaire

According to Kombo and Tromp (2006), questionnaires are research instruments that gather data over a large sample. A questionnaire based on the objectives of the study or research questions of the study related to adoption of computers was administered to Secondary school teachers. The questionnaires consisted of four sections. The first section (I) consisted of demographic information which could not be observed directly. The advantage was that the target population was literate and had no difficulty in responding to the items in the questionnaire was anticipated.

The second section (II) consisted of the information about the facilities/ infrastructure related to ICT. The third section (III) gathered data on level of training in ICT for teachers while the last section (IV) gathered data on the attitude of teachers' towards adoption of computer assisted learning in secondary schools.

3.5.1 Pilot Testing

Pilot testing was conducted at Mirando Secondary school to 12 respondents after the permit had been obtained but before the actual research began. It was done to ensure that the items in the instrument are clearly stated and have the same meaning to all respondents. The respondents were not part of the selected sample.

3.5.2 Validity of Research Instruments

Validity is defined as the degree to which an instrument measures what it purports to measure (Mugenda, 2008). It can therefore be taken that validity is accuracy, truthfulness and meaningfulness of inferences that are based on the data obtained from use of a tool. To enhance validity of the instruments, they were given to two experts (my supervisors) for scrutiny and objective comments were used for amendment. In addition, pre-testing was done to determine whether the questions were acceptable, answerable and well understood by the respondents.

3.5.3 Reliability of Research instrument

Reliability is the degree to which a test consistently measures whatever it is measuring (Gay and Airasian, 2000:169). A reliability coefficient indicates the consistency of the score produced (Ibid). The test retest method was used to assess the reliability of data. This involved administering the same questionnaire twice to teachers and correlated the answers. The questionnaires were administered to a group of 10

teachers at two separate times of three weeks interval, these teachers were not involved in the actual research. After which a correlation coefficient was calculated to indicate the relationship between the two set of scores. To obtain correlation (r_{xx}^1) the formula used was;

$$r_{xx}^1 = \frac{S_1^2}{S_x^2}$$

Where x = result on the first score

x^1 = result on the second score

r_{xx}^1 = correlation coefficient between x and x^1

S_1^2 = estimate of the true scores

S_x^2 = calculated variance of observed scores

A correlation coefficient (r_{xx}^1) of 0.72 was obtained which indicated that the two sets of scores were correlated.

3.6 Data Collection Procedures

The researcher administered the questionnaire for both pilot (pre-test) and the main research. This was done after a permit was obtained from the ministry of education science and technology. The primary data was collected through a survey using well structured questionnaire and interview schedule designed for the study. The researcher collected data in two stages; in the first stage, the researcher briefed the principals of schools of the detail of the questionnaire and the need of the study. The principals in turn distributed the questionnaires to the teachers who filled them and handed them over to the researcher on the same day through the principal.

In the next stage the interviews were conducted for purposefully selected principals and the ministry of education officials.

3.7 Data Analysis Techniques

According to, Kombo and Tromp (2006) data analysis involves scrutinizing the acquired information and making inferences. The data was analyzed both qualitatively and quantitatively. Qualitatively the researcher used interview schedule, questionnaires and observation method. This aimed at understanding the teachers and administrators perception towards use of computers for teaching. All the data from the study were coded in the computer continuously during the course of the study. The researcher then used (SPSS 12.0) Student version. Finally charts and tables were then used for quantitative analysis of data.

3.8 Ethical Considerations

As a first steps the researcher sought clearances by obtaining an introduction letter from the University of Nairobi. The researcher then sought a permit and letter of research authorization to conduct research from the National Council for Science and Technology. These were taken to Rarieda District Commissioner and the DEO officer who further gave clearance. By use of a letter of transmittal the researcher reached the teachers through their respective principals. Other measures that were taken included: Ensuring that all the respondents were treated with respect and personal information was treated with confidentiality.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTEPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents findings of the research study. It contains the respondents return rate, the demographic characteristics of respondents, teachers attitudes towards adoption of computer assisted learning, ICT infrastructure in schools, In-service training for ICT, and the implementation Ministry of education policy on adoption of computer assisted learning in secondary schools these are presented in order to fulfill the study's objectives and research questions.

4.2 Respondents Return rate

The respondent return rate was 100%. All the questionnaires administered were returned. The researcher ensured that the respondents had been sensitized prior to the administration of the questionnaires. The questionnaires were then administered and collected on the same date from the institutions by the researcher.

4.3 Demographic Characteristics of Respondents

Three categories of respondents were identified, namely, teachers, heads of institutions and Ministry of education officials. The demographic characteristics that were considered in this section included age, gender, and the level of education of the

participants. This gave a deeper insight on understanding the relationship between the variables under study.

4.3.1Age distribution of Teachers

The study sought to know the ages of the participants in the study because it is believed that younger teachers may adopt new technology faster than older ones. Based on this the respondents were asked to state their ages. Out of 155 who participated in the study 45 (29.0 %) were between 20-29 years, 54 (34.8%) were between30-39 years, 44(28.4%) were between 40-49% and 12(7.7%) were between 50-59 years. This was illustrated in Table 4.1:

Table 4.1 Teachers disaggregated by age

		Frequency	Percent
Valid	20-29 years	45	29.0
	30-39 years	54	34.8
	40-49 years	44	28.4
	50-59 years	12	7.7
	Total	**155**	**100.0**

Analysis of demographic attributes of the sample of survey teachers reveal that majority of the teachers fall in the age group of 30-39 (54 or 34.8%) and there is a decline in the number of teachers with age 50-59 (12 or 7.7%), meaning that most teachers leave the profession with age. A deputy principal from one of the schools pointed out that most

of the teachers aged 40 years and above are reluctant about using computers even when it comes to entering of examination marks in the computer they would rather send younger teachers to do the task after they have done it manually while younger teachers are enthusiastic about using computers and especially the internet. This view is held by Norris (2001) and Rogers (1995). Who in their research found out that as new technologies emerge, initial users tend to be young, male, educated, affluent, urban, and not members of a racial or ethnic minority group.

4.3.2 Distribution of Teachers by Gender

The under-representation of females in information and communication technology (ICT) fields of study and careers continues to attract considerable attention. Gender balance is one of the challenges facing many countries especially in employment situation. The Kenya government has taken a step ahead to ensure that 30% of total employees in an organization be women to remove gender disparities at all sectors. Based on this, the study sought to know the gender of respondents to assist in knowing the level of adoption by gender. For this reason, the respondents were asked to state their gender. Out of the 155 respondents, 122 (78.7%) teachers were male while 33 (21.3%) were female. This was depicted in table 4.2 as follows:

Table 4.2 Teachers disaggregated by Gender

		Frequency	Percent
Valid	20-29years	45	29.0
	30-39 years	54	34.8
	40-49 years	44	28.4
	50-59 years	12	7.7
	Total	**155**	**100.0**

Further analysis along gender lines revealed that more male teachers 22.0 % had applied the skills of ICT for classroom teaching than the female teachers 15.2 %.This was attributed to the reason that most male teachers had acquired ICT training than the female teachers. This is in line with other researchers view. According to Van Braak *et al*, (2004), male teachers reported that they integrate computers in their classrooms more often than female teachers self-reported. In addition to using technology more frequently than females, research has also found that males have a higher exposure to technology, both in school and at home (Kirkpatrick & Cuban, 1998).

Table 4.3 designated gender of respondents and application of ICT for classroom teaching.

Have respondents applied ICT skills For classroom teaching	Males		Females	
	Frequency	Percent	Frequency	Percent
Yes	22	22	5	15.2
No	100	78	28	84.8
Total	**122**	**100**	**33**	**100**

4.3.3 Professional Training

This section provides an analysis of professional training of respondents. Table 4.3 represents the highest professional qualification of the respondents.

Table 4.4 Highest professional Qualification

Qualification	Frequency	Percent
Diploma	40	25.8
Bachelor's	111	71.6
Master's	4	2.6
Total	155	100.0

Complexity of instructing learners is based on the development of skills, knowledge and abilities in the teaching profession. Out of the 155 respondents, 4(2.6%) keyed in the highest qualification as Masters, 111(71.6%) Bachelor's degree while 40(25.8%) had Diploma. This shows that most teachers are equipped with the necessary skills, Knowledge and abilities to impart knowledge to the learners. Further analysis reveal that 85(54.8%) of the respondents affirmed there training was related to ICT while 70(45.2%) said there training was not related to ICT. Training therefore needs to be modified to equip teachers with skills necessary for the implementation of inclusive philosophy that provide quality teaching that meet the needs of each individual learner and also meet the national goals of education.

4.4 Teachers Attitudes towards Computer Assisted Learning for Teaching

This section provides an analysis of the teachers' attitudes towards use of computer assisted learning for classroom teaching. According to Harmon and Jones (1993), the teachers' status, skills, knowledge and attitude are important factors in educational innovations In this study, one of the objectives was to determine teachers' attitudes towards adoption of computer assisted learning in secondary schools and the respondents were asked to give their perception concerning computer use in schools by use of a Likert scale, respondents attitudes were analyzed. Teachers and administrators viewed the use of computers differently. However most teachers interviewed had a positive perception concerning the use of computers in schools with a strong statement that the computers are with us and the future depends on computer use. Table 4.4 shows the views of teachers concerning making computer assisted learning as compulsory

subject in secondary schools. Majority of teachers feel that computer assisted learning should be made compulsory in schools 110(70.9%) while only 32(20.6%) disagree while 13(12.5%) did not commit.

Table 4.5 Computer assisted Learning should be made compulsory in Secondary Schools

Response	Frequency	Percent
Strongly agree	56	36.1
Agree	54	34.8
Neutral	13	8.4
Disagree	20	12.9
Strongly disagree	12	7.7
Total	**155**	**100.0**

Further research showed that most teachers especially the young teachers had a positive attitude towards computer use for classroom teaching with (90%) interviewed affirming computer being necessary for the students. This view was reinforced by the respondents, 103(72.9%) desiring to use computer frequently for teaching if there could be enough computers in the schools and a further 132 (87.1%) of the respondents said they would buy computers if money was available. According to 152(98%) of the respondents there is a strong desire to learn more about computers and there reason for not applying ICT skills for classroom teaching is majorly on lack of training and lack of

computers in schools. This is in contrast to a paltry 12(7.7%) who said they would rather do things by hand than by use of computers with some affirming that computers will be useful when they shall had retired from the teaching profession. One principal from a school confessed that although most teachers are positive about computer use in classroom teaching, those falling in the age bracket of 50-59 are 'technophobic'. He further reiterated that his deputy principal removed a computer he was allocated from his office because it made him uncomfortable and would rather do his work manually.

4.5 In-service Training for Information and Communication Technology

Training of respondents in ICT is very important for effective adoption of ICT for classroom teaching. It is believed that those who have training are likely to integrate ICT than those who have not acquired any training on ICT. This section provides an analysis of respondents who had undergone training in ICT, the level and the duration of training. Table 4.4 represents the percentage of respondents who have been trained on ICT and the level at which they were trained.

Table 4.6 Teachers Level of ICT training

Training	Frequency	Percent
Literacy course	8	5.2
Certificate	22	14.2
Diploma	5	3.2
Not trained	120	77.4
Total	155	100.0

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Out of the 155 teachers interviewed only 35(22.6%) had some training on ICT compared to 120(77.4%) teachers. Of the teachers trained 8(5.2%) underwent basic literacy course which lasted for less than one month, 22(14.2%) were trained at certificate level while 5(3.2%) had Diploma in information technology. This is a major hindrance in adoption of computer assisted learning in secondary schools since it is not possible to deliver what one has no idea about. Wabuyele (2003) also found out that lack of quality training was a commonly expressed obstacle. Teachers had reported that lack of expertise with using computers strongly impacted their use of computers. The same view was expressed in a study conducted by Delton(1989) as cited in Kalkowski(2000) who found out that teachers are likely to ignore an innovation when they lack confidence to integrate it.

4.5.1 Sponsorship of Secondary school teachers' ICT training.

For proper adoption of ICT in schools it is important to explore who sponsors the training for teachers and for this reason teachers gave their response the mode of sponsorship they attained and this is reflected in the table 4.7;

Table 4.7. Sponsorship of respondent's ICT training.

		Frequency	Percent
Valid	Self	21	13.5
	School	4	2.6
	MoE	4	2.6
	Training in Campus	6	3.9
	Not trained	120	77.4
		155	100.0

Out of the 155 respondents, 120(77.4%) of teachers had not been trained while only 35(22.6%) teachers had been trained on ICT. Of the teachers who had been trained majority 21(60%) sponsored their own training while 6(17%) had been trained in Campus. However the ministry of education and schools had only sponsored 4teachers (11%) each respectively. This shows that teachers are willing to learn and if other stakeholders support them then all teachers could be computer literate and adoption of computer use could be a notch higher. In addition those who had acquired diploma training in ICT applied the skill for classroom teaching more frequently while those who had certificate level of training applied the skill for classroom teaching frequently and those who had a literacy course only applied the skill for classroom teaching rarely. It therefore follows that lack of training is a contributing factor to ICT adoption. This confirms earlier research conducted by Moursand (1999) as cited in Wabuyele (2003) who reiterated that teachers were willing to learn, and eventually become learners when they start to use computers in their classroom. From the above research it is evident that there is no proper in-service programme for teachers on ICT training in secondary school by the ministry of education and by the various schools and this has influenced adoption of computer assisted learning negatively. This also confirms another study which was conducted by OTA (1995) which indicated that lack of appropriate training for teachers is one of the barriers hindering implementation of technology in schools.

4.6 ICT infrastructure in schools

This section provides an analysis of the infrastructure in schools in relation to the adoption of computer assisted learning in secondary schools. It explores the availability

of computers in school, computer laboratory, computer models available and the source of power.

Table 4.8 represents the percentage of the number of computers in the respondents' school. The study found out 98 (63.2%) of the respondent affirmed there schools lack computers while 57(36.8%) of the respondents had computers in their schools. For the schools which had computers in schools 66% had them stored and used for administrative duties and for the analysis of examination while a smaller percentage of the respondents used them for teaching computer studies as a subject and some used them to assist in classroom teaching. In terms of internet access, only 19(33.3%) of the respondents had internet connection in their schools.

In his study, Pelgrum (2001) examined what educational practitioners in 26 countries perceived as major impediments to technology implementations in their relative schools. He found out that the main obstacles were shortage of computers and lack of computer knowledge among teachers.

Table 4.8 The Number of Computers in Schools

Number	Frequency	Percent
None	98	63.2
1-5	38	24.5
6-15	10	6.5
16-25	6	3.9
>26	3	1.9
Total	155	100.0

Of the computers available in schools 2(1.3%) of the respondents acquired the computers from the ministry of education, 33(57%) were acquired through NGO's, 30(52.6%) were purchased by various schools and 27(47%) were acquired through the PTA. This study reveals that most computers were sourced by schools with the ability to purchase and from other well wishers. This meant the ministry was not doing much in terms of provision of infrastructure in schools. According to another Head teacher "Computer are only available to 'big' schools and not 'decimal' schools who depend heavily on the funds from the Subsidized free secondary education funds as a result most decimal schools do not get to enjoy the benefit of using computers. In order to alleviate this problem the same head teacher felt that the government should address this disparity immediately because all the children have a right to information technology and all teachers should be literate at no cost and be accessible to the internet."

4.6.1 Storage of computers

This section explores the availability of computers. Table 4.8 represents the storage facilities or where the computers are used.

Table 4.8 Storage of computers

Facility	Frequency	Percent
Exams office	3	1.9
Computer Lab	14	9.0
Secretary's office	29	18.7
Bursar's office	5	3.2
Stores	6	3.9
No comp in school	98	63.2
Total	**155**	**100.0**

From the above data most of the computers are stored in the secretary's office meaning they were being used for typing and administrative purposes. Other computers were being used and stored in the computer laboratory. An observation further revealed that the computers being used in the lab were kept under in better condition, there were covered to prevent dust in some schools there were A.C facilities this was appropriate since computers require a cool condition. The computers in the Lab were also connected to a U.P.S system which was important to protect the computers a against power surge.

According to a District quality and standards officer in Rarieda, infrastructure poses a great challenge to the integration of Computer education since most schools in the district are single streamed schools without electricity, he further commented of two schools in the Districts which received computers from a local NGO but could not use them due to lack of electricity.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter comprises of summary of findings, conclusion and recommendations as per the research findings and also suggestions for further studies.

5.2 Summary of findings

The first objective of the research was to determine the teachers' attitude towards computer assisted learning in secondary schools. Data analysis and interpretation of the responses achieved revealed that the teachers viewed the use of computers differently. The teachers and head teacher who had some basic knowledge about ICT were enthusiastic about computer use and expressed positive feelings while those without the knowledge did not feel the same. Younger teachers were more positive to adopt the use of computers than the older teachers. One Principal said 'Computers does not affect my teaching but could be used as a teaching aid, I know this will occur after I shall have retired'. In spite of this, most teachers interviewed had a positive perception concerning the use of computers in schools with a strong statement that the computers are with us and the future depends on computer use. This confirms that attitude is not a major drawback especially among the young teachers in the implementation of computer

assisted learning as majority affirmed they desire to use computers if they could be adequate in schools and if they could get adequate training.

The second objective of the research was to explore the infrastructure in relation to the adoption of computer assisted learning in Secondary schools. Data analysis and interpretation of interview and questionnaire responses revealed that there were inadequate facilities for the full implementation of the ICT integration into the curriculum in the District and most of the schools lacked computers and for those who had, a greater percentage were Pentium 1and 2 which were mostly received as donations from other stakeholders of education and some bought by the schools. According to a computer studies teacher from one of the schools, some computers were very old and very slow especially when one had to use the internet. Most schools lacked computer labs and computers were stored and used in the offices and classrooms turned into computer labs some schools also lacked electricity. The schools which offered Computer studies as examinable subject had appropriate facilities with the laboratory having A.C system and computers connected to the U.P.S devices which prevent the computers against power surge. This suggests that ICT infrastructure is one of the main factors affecting adoption of computer assisted learning in Secondary schools.

The third objective of the study was to assess the implementation of the Ministry of education policy on the adoption of computer assisted learning in Secondary schools in Kenya. Despite computer studies being made an examinable subject in 1998 in Kenya and the Ministry developing a policy framework on ICT as stipulated in the KESSP draft all this remain on paper in the District. There is no proper programme on the assessment

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of the implementation of computer integration in education in the District and this according to a human resource officer is attributed to the fact that Computer studies is not a compulsory subject in the curriculum and very little has been done by the Ministry in terms of capacity building of the teachers and provision of ICT advisory services to educational institutions and to develop a strategy, standards and a quality control system for e-learning still remain a dream to be realized. In addition the quality and standards officer in the district are not trained to assess the implementation of computer use in schools. All this negates the adoption of computer assisted learning in secondary schools.

The fourth objective was to establish the extent at which availability of in-service training for teachers influence adoption of computer assisted learning in secondary schools. Although the findings of this study suggest the need for schools to integrate computers in to the curriculum and use them as a tool instead of offering Computer studies as an isolated discipline. There is no proper programme for in-service training in various schools. Only 22.6% of the respondents had undergone some training on ICT and majority sponsored themselves for a certificate in computer basic skills. For the schools which offered computer studies as a subject their instructors are highered by the BOG and are not qualified teachers and have no background in pedagogy. The unanswered question is how can teachers handle the subject when they themselves were not trained and a few were only exposed to it as a sub- unit of other discipline in the university and the teacher training colleges.

5.3 Conclusions

The main purpose of this study was to investigate what factors influence teachers' adoption of computer assisted learning in secondary schools in Rarieda District. In terms of the stated research objectives, the following findings emerged from the investigation: The infrastructure and policy framework on ICT have a significant influence on the implementation of computer integration in education. This was evident from the findings especially from respondents about the availability of electricity in schools, availability of computers, the model of the computers, appropriate computer laboratory. The policy framework does not put a lot of emphasy on computer integration in education hence there is no strong motivation in adoption of computer assisted learning in schools. The findings from the study indicated that adequate infrastructure and policy framework are directly proportional to the adoption and use computers to assist in learning. The findings of this study also suggest that most teachers had appositive perception towards adoption of computer integrated learning and they were willing to adopt the innovation and to acquire pedagogical skills in computer to assist them in the integration.

5.4 Recommendations.

From the findings of this study, the following recommendations can be made. First, the Ministry of Education should create awareness on the importance of integrating computer based instruction in secondary schools and the teachers who have stayed in service for a very long period should be motivated and to change their perception and attitude on use of computers for teaching. The use of computer for teaching should be

demystified and assurance given to teachers on the benefits of reduced workload and faster coverage of the syllabus when computer assist in teaching.

Secondly, since ICT resources are grossly inadequate, the government put strategy in place to ensure that all Secondary schools have electricity. The Ministry of Education should subsidize acquisition of ICT infrastructure and there should be funds set aside by the government for development of ICT infrastructure and employ computer technicians for maintenance of the computers and other periferals. In addition, Non Governmental organizations, civil societies, Parents Teachers Association (PTA) should play a role in assisting schools to get these facilities. Secondary schools should also invest in infrastructure and not rely heavily on donations from other stakeholders which result in old computers that may not accept some software before being upgraded.

Thirdly, the Ministry of Education should review the implementation on policy of education on ICT to ensure a well planned curriculum for the integration of computer use in teaching, a comprehensive set of indicators should be developed by the Kenya Institute of Education to reflect the goals in the ICT documents this should address the infrastructure and access. Moreover, the government should provide in service training to all the quality assurance and standard officers on computer use assessment in Secondary schools and redesign the assessment tool used for monitoring of the curriculum implementation which features ICT.

Lastly, the Ministry of Education together with key educational stakeholders should design a programme for professional development of teachers that is tied to computer use for teaching, and sustained by adequate financial and staff support if

teachers are to use technology appropriately to promote learning for students in the classroom. Against a backdrop that the training received in colleges inadequately prepare teachers to effectively teach using computers in the classroom, teachers training colleges and Universities should review teaching methodologies to integrate computer based instruction at all levels of learning to empower teachers with manipulative skills. Moreover, in my opinion the government should as a matter of priority provide in-service training to all secondary teachers in the country on pedagogical skills on ICT since those who had received literacy course on ICT only got the basics and not how to use computers for classroom teaching therefore could not fully integrate it in classroom due to lack of confidence.

5.5 Areas for Further Research

This research was only conducted using secondary school teachers who are employed by the Teachers Service Commission and did not involve those who are employed by the BOG. The research did not involve students in the study. I propose therefore, that for a better understanding of factors influencing adoption of computer assisted learning the views of students should also be considered. The study should also be conducted in schools in urban areas where it is assumed that the infrastructure is not a major challenge and teachers are more exposed than in rural areas. In addition, the research should be conducted in teacher training institutions on factors influencing teachers' adoption of computer assisted teaching in colleges and Diploma teachers colleges on the view to assess pedagogical skills imparted on teachers.

5.6 Contribution to Body of Knowledge.

Research Questions	Contribution to body of Knowledge
1. What are the teachers attitudes towards adoption of computer assisted learning in secondary schools?	Teachers' attitude is a contributing factor to the successful adoj of computers use. The respondents reflected a sense of optimisn Support for the role of computers to transform learning process
2. Are there adequate infrastructure for the adoption of computer assisted learning in secondary schools	The success or failure of curriculum implementation may well depend on the availability of infrastructure. This is a main factor affecting use of computers. The government and other education stakeholders should support the schools to acquire equipment and materials for computer use adoption.
3. What is the Ministry of education policy on implementation of computer assisted leaning in secondary schools in Kenya?	This study points out the weaknesses existing in the policy Framework. For adoption of computers to take place the policy should be reviewed and planning should involve making compι integration in Schools compulsory and putting programmes in p for training and monitoring and evaluation framework.
4. To what extent do availability of in-service training influence teachers adoption of CAL in Secondary schools?	The respondents in this study learned computers on their own without support from schools or the government. There is need for proper planning with regard to staff development. Teacher training institutions should put emphasy on integration Computer in the curriculum during pre-service training.

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APPENDICES

APPENDIX I

LETTER OF TRANSMITTAL

PHILIP OMONDI ABIERO,

P.O BOX 3646,

KISUMU.

Dear Sir/Madam

RE: PERMISSION TO CONDUCT A STUDY IN YOUR SCHOOL.

My name is Philip Omondi Abiero, a second year Master of Arts student in Project Planning and Management at the University of Nairobi. My main reason for writing this letter is to request permission to conduct a study in your school. I am interested in finding out the *factors influencing teachers' adoption of computer assisted learning in secondary school in Rarieda* District. The result of this study will provide much needed insight into the desires of teachers and administrators in terms of use of computers to assist in learning in secondary schools.

I hereby submit my questionnaire/ interview meant for the purpose of this research. The information provided to me will be treated with utmost confidentiality and will be used for the purpose of this study only. Thank you for your co- operation.

Yours faithfully

Philip Omondi Abiero

APPENDIX II

TITLE: ASSESSMENT OF FACTORS INFLUENCING TEACHERS ADOPTION OF COMPUTER ASSISTED LEARNING IN SECONDARY SCHOOLS. A CASE OF RARIEDA DISTRICT

QUESTIONNAIRE FOR SECONDARY SCHOOL TEACHERS

Answer the questions independently to the best of your knowledge where possible tick or cross the choice to your answer.

I. DEMOGRAPHIC INFORMATION.

1. What is your gender? ☐ Male ☐ Female

2. What is your age? ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59

3. How many years have you been teaching? ☐ 1-5 ☐ 6- ☐ 11 ☐ 16 ☐ over 20

4. What is your highest academic qualification? Diploma ☐ Bachelor's ☐ Master's ☐

5. Is your academic qualification related to ICT? Yes/ No

II. FACILITIES

1a) Do you have computers in your school? Yes/No

b) If yes, how many computers are there in your school? _____

2a) Do you have a computer laboratory in your school? Yes/ No.

b) If No, where are the computers stored or used? _____

3) What is the source of power in your school?

4) Does the school have Internet access? Yes/No

5) How were the computers in your school acquired? ☐ P.T.A ☐ Other donations

☐ Purchased by school ☐ Ministry of Education ☐ NGO's

6) What model of P.C's is there in your school? P4? P3? P2? P1?

III. IN SERVICE COURSE FOR TEACHERS

1).Have you been trained in ICT? Yes/No

b) If yes, at what level were you trained?

☐ Literacy course   ☐ Certificate   ☐ Diploma ☐ Bachelor's

c) If yes how long was the training?

☐ 1-2 weeks ☐ 2-4 weeks ☐ 1 month   ☐ over one month

d) Who sponsored the training?

☐ Self ☐ school   ☐ KIE   ☐ Ministry of Education ☐ Any other

specify_____

2. Have you ever applied the skill of ICT for classroom teaching? Yes/ No

b) If yes, rate the frequency of use

☐ Rarely ☐ Frequently ☐ Very frequently

c) If no, what is the reason?

☐ Lack of confidence

☐ Inadequate time to use computers

☐ Large classroom

☐ School lack computers

☐ Others specify ────────────────────

IV. ATTITUDES TOWARDS COMPUTER TECHNOLOGY

Please indicate your reaction to each of the following statements by ticking the box that represents your level of agreement or disagreement with it. Make sure you respond to every statement.

Strongly Agree- SA; Agree- A; Neutral- N; Disagree- D; Strongly disagree- SD;

NO.		SA	A	N	D	SD
1.	Computers make me uncomfortable					
2.	I would like to learn more about computers					
3.	Using computers is enjoyable					
4.	Computers is not important in teaching					
5.	Computers save time and effort					
6.	Schools would be a better place without computers					
7.	I do not think computers are necessary for students					
8.	I desire to use computer frequently for teaching					
9.	I would never need a computer in my classroom					
10.	I would rather do things by my hand than with a computer					
11.	If I had the money, I would buy a computer					
12.	I have no intention to use computers in the near future					

NO.		SA	A	N	D	SD
13.	Future depends on computer use					
14.	Learning about computers is a waste of time					
15.	Computers can enhance students' learning					
16.	I do not like talking about computers					
17.	I must use computers for teaching like other teachers					
18.	Computers will be very useful when I shall have retired					
19.	Students need computer knowledge as a priority					
20.	Computer assisted learning should be made compulsory in secondary schools					

APPENDIX III

TITLE: FACTORS INFLUENCING TEACHERS' ADOPTION OF COMPUTER ASSISTED LEARNING IN SECONDARY SCHOOLS IN KENYA. A CASE OF RARIEDA DISTRICT

SAMPLE OF THE MINISTRY OF EDUCATION ADMINISTRATOR'S INTERVIEW GUIDE

1. What role do you play in the Ministry of education?

☐ AEO ☐ QUASO ☐ DEO ☐ Others specify _____

2. How long have you worked in your position as a Ministry of education administrator?

_____

3. How many public secondary schools are using computers in the District?

_____

4. As per your own evaluation, do teachers use computers for instruction? Yes / No

b) If No, what do you think is the problem?

c) What have you done about the problem?

5. Are there any policy on use of computers by teachers for classroom teaching? Yes/ No

b) If yes are the teachers aware?

6. Are you trained to assess teachers in utilizing computers? Yes/ No

(Other questions will depend on the role of the administrator).

APPENDIX IV

TITLE: FACTORS INFLUENCING TEACHERS' ADOPTION OF COMPUTER ASSISTED LEARNING IN SECONDARY SCHOOLS IN KENYA: A CASE OF RARIEDA DISTRICT, NYANZA PROVINCE.

SAMPLE OF HEADTEACHER/ PRINCIPAL INTERVIEW GUIDE

1. Do teachers in your school use computers? If so, for how long have they been using computers?

2. Is computer studies offered as an examinable subject in your school?

3. What percentage of teachers uses computers in their teaching?

4. What impact does technology have on the learning and teaching process?

5. Overall how do you perceive the use of computers by teachers in your school?

6. What form of training do teachers using computers in your school receive to help improve their use of computers in the classroom?

7. Are there any steps being taken to help teachers in your school integrate technology in their teaching?

8. What are the major obstacles hindering effective use of computers in your schools?

9. What suggestions do you have to help advance technology or computer use in schools?

10. What is the school e-mail address

11. Do you have internet access in your school?

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

Our Ref: NCST/RR1/12/1/SS/295/5

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke
Date: 3rd May 2010

Mr. Philip Omondi Abiero
University of Nairobi
P. O. Box 30197
NAIROBI

Dear Sir,

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Factors influencing teachers' adoption of computer assisted learning in secondary schools in Kenya: A case of Rarieda District"* I am pleased to inform you that you have been authorized to undertake research in Rarieda District for a period ending *31st December, 2010.*

You are advised to report to the **District Commissioner and the District Education Officer, Rarieda District** before embarking on the research project.

On completion of the research, you are expected to submit two copies of the research report/thesis to our office.

P. N. NYAKUNDI
FOR: SECRETARY/CEO

Copy to:

District Commissioner
Rarieda District

THIS IS TO CERTIFY THAT:

Prof./Dr./Mr./Mrs./Miss............PHILIP..........................

............OMONDI ABIERO.................................

of (Address)........UNIVERSITY...OF...NAIROBI

P.O. BOX 30197 NBI..........................

has been permitted to conduct research in.....................

....Location,

............................RARIEDA............District,

............................NYANZA............Province,

on the topic...Factors influencing Teachers'

adoption of Computer assisted learning

in Secondary Schools in Kenya:....

A case of Rarieda District.............

....

for a period ending..........31ST DECEMBER, 20..10..

Research Permit No....NCST/RRI/12/1/SS/29!

Date of issue.....30/04/2010..........................

Fee received.....SHS 1,000..........................

Applicant's
Signature

Secretary
National Council for
Science and Technology

REPUBLIC OF KENYA

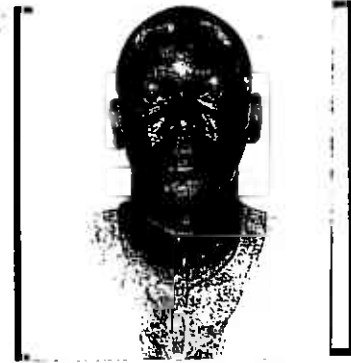**RESEARCH CLEARANCE
PERMIT**

CONDITIONS

1. You must report to the District Commissioner and the District Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit

2. Government Officers will not be interviewed with-out prior appointment.

3. No questionnaire will be used unless it has been approved.

4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.

5. You are required to submit at least two(2)/four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.

6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

(CONDITIONS— see back page)

GPK6055(3m(10/2009