PUBLIC SECONDARY SCHOOLS’ PREPAREDNESS FOR INTEGRATION OF
COMPUTER TECHNOLOGY FOR INSTRUCTION IN NKUENE DIVISION, MERU
COUNTY, KENYA

BY

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DECLARATION

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DEDICATION

This work is dedicated to my loving husband, Samson and my dear sons Clinton and Kelvin for their total support, inspiration and encouragement during my study. Thank you for being there for me and sacrificing so much to make sure that I succeed and obtain masters of education degree.
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LIST OF ABBREVIATIONS AND ACRONYMS

CFSK  Computer for schools in Kenya
DEO   District Education Officer
ICT   Information and Communication Technology
IT    Information Technology
KESSP Kenya Education Sector Support Programme
KIE   Kenya Institute of Education
MDG   Millennium Development Goals
MoE   Ministry of Education
NEPAD New Partnership for Africa’s Development
NCST  National Council for Science and Technology
PTC   Primary Teachers College
TTC   Teachers Training Colleges
UNESCO United Nation Educational Science and Cultural Organization
USA   United States of America
USAID United States Agency for International Development
ABSTRACT

Effective implementation of computer technology for teaching and learning requires preparedness in areas such as availability of government ICT policy, infrastructural facilities and teachers’ skills and attitudes. In Kenya, computer education was first introduced in public secondary schools in 1996 so that students could learn computer literacy skills. The purpose of this study was to assess the preparedness of secondary schools teachers in Nkune Division to integrate Computer technology in Education for instruction. The objectives of the study were, (i) finding out the availability of computer facilities required in public secondary schools for successful integration of computers for instruction in schools, (ii) finding out the availability of computer technologies required by public secondary schools for successful integration of computers for instruction in schools, (iii) investigating teachers’ preparedness for integration of computer technology for instruction in public secondary schools, (iv) investigating learners’ preparedness in use of computers for learning in public secondary schools. The literature reviewed covered the use of ICT in developed countries, strides made by developing countries, and finally status of ICT in education in Kenya was examined. The study was conducted using descriptive survey research design. The target population was 10 principals and 20 teachers and 80 students. Ten schools were selected using proportionate sampling. All the 10 principals from the schools selected participated in the study. Two officials from the DEO’s office were selected using purposive sampling. Data was collected using questionnaires and key informant interview. Quantitative data was analyzed using the Statistical Package for Social Sciences and tabulated into frequency tables, percentages, Pie-charts and Histograms. Qualitative data was analyzed by organizing it into themes, and according to the research questions and objectives. Findings indicated that 100% of the schools studied were connected to electricity. However computer laboratories were only available in 30% of the schools. Sixty percent of the principals and 80% of teachers have had training on the use of computers for instruction. The researcher noted that generally all the categories of the respondents were ready for integration of computers in teaching and learning. This is because though many respondents ascertained that they were computer illiterate, they also cited that they were ready to learn on computers applications. A number of the respondents also said that they currently use more computers for basic operations. The study concluded that there weren’t adequate facilities and resources necessary for the integration of computers in teaching and learning in schools. Amongst the facilities lacking were the computer laboratories. The study recommends for the launching of an in-service training for secondary teachers on the integration of computer technology in their lessons and in particular on the application of available instructional software. Universities and teacher training colleges should launch a course on programming so that both pre-service teachers will gain skills on developing and applying instructional programs. There should be an increased investment strategy to improve and equip the secondary schools with computer-literacy training facilities and resources for both teachers and students in Nkune Division. This will ensure technical skill readiness, and leverage teachers’ skills so as to reverse the slow rate of computer technology adoption trend and improve the pace of diffusion in the secondary schools. The researcher suggests that a quasi-experimental study needs to be carried out where teachers are trained on the use of computer technology in their classes so as to establish their effectiveness in teaching compared to those who apply conventional approach to teaching. The study will have practical significance because the findings may aid policy makers especially Ministry of Education (MoE) and Kenya Institute of Education (KIE) in developing strategies to prepare teachers effectively for integration of computers for instruction in secondary schools.
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CHAPTER ONE
INTRODUCTION

1.0 Introduction
This chapter presents background of the study, statement of the problem, purpose of the study, objectives and research questions. It also highlights the study's significance, assumptions, limitations and delimitations, theoretical and conceptual framework. Operational terms were defined as well.

1.1 Background to the study
Education, in its broadest sense, is the means through which the aims and habits of a group of people live on from one generation to the next. Generally, it occurs through any experience that has a formative effect on the way one thinks, feels, or acts. In its narrow, technical sense, education is the formal process by which society deliberately transmits its accumulated knowledge, skills, customs and values from one generation to another e.g. instruction in schools (en.wikipedia.org/wiki/Education).

The World Bank concurs with Wikipedia by noting that education is universally recognized as one of the most fundamental building blocks for human development and poverty reduction. It is Key to attaining the Millennium Development Goals (MDG) (www.worldbank.org). Education also empowers the mind to achieve its full potential which consequently contributes to a better quality of life. The world needs education as it is the basis of a civilized and cultured society. Advancement in all fields, including Science and Technology are made possible through education (www.thebenefits.com/benefits).
The incorporation of Information Technology (IT) in the education sector is important to meet the challenges presented by the global communication of knowledge. It is essential that the students become familiar with the concept and use of information technology in order to equip themselves for the future job market. Similarly the education sector can achieve better quality in teaching computer applications in secondary schools (http://www.blurtit.com/q 222489.html).

The global adoption of Information and Communication Technology (ICT) in Education is premised on the belief that the new technological tools will revolutionize an out-molded Educational System, better prepared students for the information age, and/or accelerate national cost effectiveness of education programmes, facilitate globalization and above all improve the quality of education (Ngare, 2007).

In recent times, the world has witnessed a rapid increase in technological innovations. Electronic computer system has been ushered in among other modern technologies. At present computer technology has permeated nearly all aspects of human organizational roles and education. Computer encompasses almost all facets of human endeavors. Today, computer technology in schools is one of the most far-reaching and fast growing development in education. The incursion of the electronic computer system into the educational parlance, according to McCarney, J. (2004) provides the wherewithal to solve teaching and learning problems even more rapidly and accurately than hitherto conceived. Improved secondary education is fundamental to the creation of effective human capital in any country. There is a general consensus that Modern Information and Communication Technology (ICT) are transforming various aspects of human activity, particularly the art of teaching and learning (World Bank, 2004).
According to Jung, I. (2005) computer has become the ‘nowlogy’ in our society and possibly futuristic years ahead in schools, computers are widely used and the need for computer technology and literacy in the educational system has become more relevant. A Computer has been found to be an effective device for presenting an instructional programme. However, introduction of ICT in teaching and learning requires a well prepared teaching staff and well-developed information infrastructure currently lacking in developing countries. Culten (2003) concurs by observing that the situation of computer use in Education in developed countries is different from that in developing countries and notes that this is due to funds extended to the training institutions by their governments and society. In Britain for instance, by the school year 1983/1984, every secondary school had personal computers for direct use by the students. In addition, every college and university provided basic education in computer technology not mentioning mathematical and technical faculties teaching professional knowledge. Research from developed countries indicates that the introduction of computers into school system came about as a result of government policy pronouncement. Most of the policy statements were written documents and others were not documented for circulation to schools but were contained in the existing educational policies (esjournals.org/).

In developed countries, ICT is now at the centre of education reform efforts that involve its use in co-ordination with changes in curriculum, teacher training, pedagogy and assessment. Countries such as Singapore, Chile, the United States, United Kingdom and Norway have taken the position that integration of ICT into classrooms and curricula can improve educational systems and prepare students for the 21st century learning society.
In developing nations such as Nigeria various Information and Communication Technologies (ICTs) are being introduced in schools to facilitate effective teaching and learning. For instance despite the fact that English is the official language of instruction in schools, EKPO, et al note that one of the pedagogical issues facing the teaching of English as a second language in most Nigerian primary schools is little or no interaction among the learners and between the teacher and the learners. Mojgan, et al (2009) argue that every teacher is expected to use ICT to enhance teaching and learning of all subjects because they keep learners engaged during the lesson and make them active participants of instructional process. Pynoo, et al (2011) are of the opinion that in modern day of technology advancement in order to promote knowledge co-construction and improved interaction in the classroom, teachers need to update their knowledge and skills so as to integrate technological innovations such as personal response system in teaching and learning process.

In a review of literature on ICT, Makau (1988) asserts that Uganda has already adopted and integrated ICT into professional development program for primary school teachers. Through government agencies, USAID Uganda has been able to set up multimedia training laboratories in Kampala which enhances the curriculum with ICT by developing, testing and distributing online multimedia training modules for teachers and tutors. These teachers in turn train current and future teachers at the participating Primary Teachers Colleges (PTCs). In Uganda, an interconnectivity programme known as “Uganda School Net” is dedicated to extending educational technology throughout Uganda (Carlson & Firpo, 2001). In Senegal, teachers and students are using computers extensively as information tools. These programs in African countries mentioned are supported by their government through training the Ministry of Education (MoE).
Kenya has made remarkable progress by putting in place an ICT Policy Framework which the government came up with the Sessional Paper No.1 of 2005 and the implementation strategy, complete with measurable outcomes and time frames (www.inforder.org). The process has had the benefit of sound advice from officials and stakeholders and perhaps more importantly strong leadership from the office of the Permanent Secretary of the Ministry of Education. However, universal implementation is challenging given the lack of resources, national ICT infrastructure, and even electrical supply particularly in the rural areas (www.infordev.org). The government in May 2007, indicated her commitment to the introduction of computers in schools. The Education Minister stated that Kenya was making major strides towards realizing e-learning, adding that the method is cheap and requires less manpower (Ngare, 2007).

In a bid to set the pace for young people’s initiation into the digital world, the Kenyan Government allocated Sh.680 million in the 2011 budget for the purchase of computers for schools. The Ministry of Education has embarked on an ambitious programme to connect all primary and secondary school to the internet in 10 years. The Ministry of Education (MoE) developed a Kenya Education Sector Support Programe (KESSP) as one of the priority areas with the aim of mainstreaming ICT into teaching and learning process. The national priority and provided impetus for the ministry to develop its sector policy on ICT in education (www.infodev.org).

Kenya is among 16 countries selected to benefit from the first phase of the e-initiative by the New Partnership for Africa’s Development (NEPAD). Six schools have benefited from pilot programme officially launched on September, 2005 (Barasa, 2005). The programme is to provide knowledge and experience by implementing information and communication technology (ICT) in schools across Africa that will inform the model for a large scale rollout.
Whereas results indicate that computer technology has penetrated many sectors including banking, transportation, communication and medical services, the Kenyan educational system seems to lag behind. Further, recent report by the National Council for Science and Technology (NCST) (2010) indicate that computer use in Kenyan classrooms is still in its early phases and concluded that the perceptions and experiences of teachers and administrators do play an important role in the use of computers in Kenyan classroom (www.pctechmagazine.com).

Haddad & Draxler (2002) asserts that teachers' training is one essential requirement for successful use of computers in education. In addition, many of those schools that do have computers still do not have access to the Internet. Further, the costs of internet access can be prohibitively high for many schools, both in Kenya and elsewhere.

Johnson (1998) indicates that all educators and students should have access to effective and engaging resources and all teachers should have the skills and knowledge needed to use computer technology as an effective tool to deliver education and knowledge. Computer-technology events cannot be created without teachers who are well trained and experienced in the use of the technology as a tool for promoting critical thinking. Among pertinent aspects which would determine whether schools are prepared include the existing government ICT policy which includes the extent to which the government channels resources and support to schools and availability of computer technology infrastructure such as computers, electricity and internet connectivity and teachers skills and attitudes towards use of computers for instruction.

Following this background, this study sought to assess the public secondary schools' preparedness in integrating computer technology for instruction in Nkuene Division, Meru County.
1.2 Statement of the Problem

Computer technology has become more prevalent in the society and schools where it is used in teaching and learning. It is viewed as a tool that can make teaching and learning more effective. Cuban (1993) notes that using computer technology makes it possible to utilize activities, which may promote students’ thinking in new and different ways, not available before the invention of computer technology.

In Kenya, computer education was first introduced in public secondary schools in 1996 so that students could learn computer literacy skills. The Ministry of Education (MoE) approached UNESCO to fund the project and train secondary schools teachers to teach computer skills. The MoE also published a policy and curriculum guidelines in 1997 approving the teaching of computer education in secondary schools and announced that the subject would be examined in 1998.

Effective implementation of computer technology for teaching and learning requires preparedness in areas such as availability of government ICT policy, infrastructural facilities and teachers’ skills and attitudes. It is not clear whether Kenyan public secondary schools were well prepared to integrate computer technology for instruction. This study therefore sought to assess the preparedness of public secondary schools for integration of computers in teaching and learning in Nkuene Division, Meru County.

1.2.1. Purpose of the Study

This study was designed to assess the public secondary schools’ preparedness in integrating computers for instruction in Nkuene Division, Meru County. The study was done with a view to generating policies that can aid, fully integration of computers in teaching and learning in order...
to exploit computer technology for social and economic benefit and to maintain competitive position to avoid suffering the widening of the digital gap between the electronic “haves” and the electronic “have nots”.

1.3 Objectives of the Study

The objectives of the study were:

1. To find out the availability of computer facilities required in public secondary schools in Nkuene Division for successful integration of computers for instruction in schools;
2. To find out the availability of computer technologies required by public secondary schools in Nkuene Division for successful integration of computers for instruction in schools;
3. To investigate teachers’ preparedness for integration of computer technology for instruction in public secondary schools of Nkuene Division, Meru County; and
4. To investigate learners preparedness in use of computers for learning in public secondary schools of Nkuene Division, Meru County.

1.3.1. Research Questions

1. What computer facilities are available in public secondary schools of Nkuene Division, Meru County?
2. What computer technologies for use in institutions are available in public secondary schools of Nkuene Division, Meru County
3. To what extent are the teachers prepared for integration of computers for instruction in public secondary schools of Nkuene Division, Meru County?
4. To what extent are the learners prepared to use computers for learning in public secondary schools of Nkuene Division, Meru County?

1.4 Significance of the Study
The findings of the study have both theoretical and practical implications for the future integration of computer technology for instruction in schools. Theoretically, the study contributed to the advancement of knowledge and skills about Computer and brings to awareness the importance of Computer technology integration for instruction in schools in Kenya. It also highlighted the challenges that hinder Computer technology integration for instruction. The study has also practical significance because the study findings may aid policy makers especially Ministry of Education (MoE) and Kenya Institute of Education (KIE) in developing strategies to prepare teachers effectively for integration of computers for instruction in secondary schools. In a similar vein, the results of the study will assist Teachers Training Colleges (TTC) and Universities with data that could be utilized to offer appropriate teaching for student – teachers and provide strategies relevant to the integration of Computer technology for instruction in Public Secondary Schools.

1.5 Delimitations and Limitations of the study
There are several challenges that threaded the success of this study as illustrated in the following subsections.
1.5.1. Delimitations

The study confined itself to the students, teachers and the administrators of the public secondary schools who are directly beneficiaries of Computer technology for Instruction. Secondly, the study was carried out in Nkuene Division only and it was confined to a period of three months only. It was not possible to cover the opinions of stakeholders because tracing them would have required considerable time, resources and other logistics. Finally, although there are many factors contributing to secondary schools’ preparedness in the use of computers for instruction, this study only focused on government support, in terms of infrastructure support such as computer laboratories, computers, electricity and teachers attributes as major factors to schools’ preparedness.

1.5.2. Limitation of the Study

The study was based on the following limitations:

First, for more conclusive result, the whole District should have been covered. However, this was not possible due to financial and other logistic constraints such as time.

There is a dearth of literature on the use of computers in Imenti South District and therefore, the review was basically drawn from within and outside Kenya. The study also limited itself within the timeframe given to the researcher in order to present the findings for assessment.

1.6 Assumptions of the Study

In carrying out the study the researcher made a number of assumptions. First, the researcher assumed that the respondents would be co-operative and would provide reliable responses. Secondly, the researcher did not know the level to which teachers in public secondary schools
were prepared in the use of computers for instruction. Thirdly, the commitment of the government to the introduction of e-learning in secondary schools was well guided by and complemented the National Policy as envisioned in Vision 2030 to make Kenya a middle income country. Lastly, teachers on their own had been making efforts at computer literacy independent of government initiative.

1.7 Theoretical and Conceptual Frameworks

1.7.1 Theoretical Framework

Wiersma (1985) asserts that theories help to provide a framework by serving as the spring board for the pursuit of a research problem and they help to identify the crucial factors and provide a guide for systemizing and inter-relating the various facts of the research. In carrying out the study, the theory of social cognitive theory was adopted as advanced by Bandura (1986, 1997). Albert Bandura argued that individuals especially children learn aggressive responses from observing others, either personally or through the media and environment. Bandura stated that many individuals believed that aggression would produce reinforcements. These reinforcements can formulate its reduction of tension, gaining financial rewards or gaining the praise of others or building self esteem (Siegel, 1992:171).

Social cognitive theory revolves around the notion that learning correlates to the observation of role models. In education for example, teachers play the role of a model in a child’s learning acquisition in everyday life, the Model could be medial sources or those with whom you interact. Effective modeling teaches general rules and strategies for dealing with different situations (www 2 careers.gvt nz). This theory is based on the ideas that people learn by watching what others do and that human through processes are central to understanding personality. This theory
provides a framework for understanding, predicating and changing human behavior. The theory identifies human behavior as an interaction of personal factors, behavior and the environment. (Bandura, 1977: 1986).

In the model, the interaction between the person and behavior involves the influences of a person’s thoughts and actions. The interaction between the person and the environment involves human beliefs and cognitive competencies that are developed and modified by social influences and structures within the environment. The third interaction, between the environment and behavior, involves a person’s behavior determining the aspects of their environment and in turn their behavior is modified by the environment.

According to Jones (1989) “the fact that behavior varies from situation to situation may not necessarily mean that behavior is controlled by situations but rather that the person is construing the situation differently and thus the same set of stimuli may provoke different responses from different people or from the same person at different times”. Behavior in particular is determined by the level of self-efficacy which is a person’s perceptions or his/her competence in a nominated area.

Self-efficacy can be defined as the beliefs a person has about their capabilities to successfully perform a particular behavior or task. Bandura (1986) postulated that “behaviors were best understood in terms of triadic reciprocal determinism” which defines a belief that cognition, behavior and the environment operate interactively as determinants of one another.

Bandura (1977, 1986, 1997) stated that the acquisition of different levels of self-efficacy was determined by the following four major sources:-

i) Performance accomplishments

ii) Vicarious experiences (observing other people’s success and failures)
iii) Verbal persuasion (from teachers, relatives, colleagues)

iv) Emotional arousal (effective state)

Therefore, strong feelings of self-efficacy in students can help them to create a better academic or occupational environment. Pre service teachers with lower self-efficacy are more likely to have problems with technology integration and likely to have problems integrating technology into their own classrooms when they complete teacher education programs and start teaching (Wall, 2004).

With the increase of the use of computers at all levels of education researchers have become interested in links between beliefs about personal ability to perform educational computer tasks and subsequent learning about, and use of computers. Self-efficacy appears to be an important indication of whether an individual will teach with computers at a later stage. While many teachers have positive attitudes to the use of educational technologies, they do not necessarily believe in their own ability to use technology in a classroom with students. (Ropp, 1999).

Delcourt and Kinzie (1993) asserts that learning about computers is aided by high levels of self-efficacy and a positive attitude.

Bandura’s theory brings out clearly that self-efficacy beliefs are important and measurable components of the beliefs that influence technology integration. Decisions made by teachers about the use of computers in their classrooms are likely to be influenced by multiple factors including the accessibility of hard-ware and relevant software, the nature of the curriculum, personal capabilities and constraints such as time. In addition, there is substantial evidence to suggest that teachers’ beliefs in their capacity to work effectively with technology is a significant factor in determining patterns of classroom computer use. These determinant factors constitute
the variables in conceptual framework and in which the study will be investigated in order to fulfill its objectives.

1.7.2. Conceptual Framework

Conceptual frameworks, according to educational researcher Smyth (2004) are structured from a set of broad ideas and theories that help a researcher to properly identify the problem they are looking at, frame their questions and find suitable literature (www.ehow.com).

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

**Policy Support**
- Government ICT policy/school curriculum
- Government support to schools in term of finances

**Infrastructure Support**
- Computers
- Electricity
- Finances

**Teacher Attributes**
- Teacher training
- Teachers' attitudes towards teaching and learning.

**Schools' preparedness to integrate computers for teaching and learning in a classroom situation**

*(Independent variables)*

**Source: Researcher (2013)**

The availability of infrastructure also determines school’s preparedness to integrate computers for teaching and learning. This includes computers, electricity, finances, computer laboratories and time as a resource which have a direct influence to schools’ preparedness to integrate computers for instruction. Teachers attributes include teachers skills gained after training to use computer for instruction and their attitude towards use of computers for instruction. These as observed in the theoretical framework influence, teachers' self-efficacy or believe in their ability to integrate computers for teaching and learning.
1.8. Operational Definitions of key terms

Communication: Refers to the process through which information is relayed from one point to
the other e.g. through internet.

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

Computer software: Refers to the programs that contain data e.g. Microsoft ward, excel access
and power point.

Digital divide: Refers to the uneven access to information through modern process such as the
internet between the developed and developing countries.

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

Information and Communication Technology (ICT): Refers to a range of technology tools
and resources used to communicate, and to create to disseminate, to store and manage
information.

Integration: Refers to the incorporation of computers as tools for teaching and learning to the
already existing methods of content delivery.

Preparedness: Refers to being ready mentally and physically for computer experience or
action.

Technology: This refers to the development of human knowledge and ability to manipulate and
invent new devices and adopt it for making life more convenient while saving time and energy
CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

A literature review is an account of what has been published on a topic by accredited scholars and researchers (Kombo and Tromp, 2006). It is a critical look at the existing research that is significant to the work that the researcher will be carrying out. This Chapter therefore, covers literature review related to the study. The Chapter covers the following:-

(a) Use of computer technology in education in developed countries.

(b) Case studies of teachers’ preparedness for adoption of computer technology in education in various developed countries.

(c) Computer technology in Africa and teachers preparedness for adoption in classroom teaching.

(d) Status of computer technology in education in Kenya up-to-date.

2.1. Use of Computer Technology in Education in Developed Countries

In education there are efforts both at national and regional levels to harness the use of ICT in education. European member states meeting in Lisbon identified ICT as a core component of the knowledge society and a necessary instrument for adopting education to it. As a result e-learning initiatives and programs were adopted with specific funding and strong support of stakeholders (Commission of European Communities, 2008). All member states have programs and actions to integrate ICT in Education. This translated into intensive effort to provide equipment and train teachers in ICT skills. This has led to wider use of ICT in schools in Europe. ICT in Europe is widespread in higher Education nearly all universities have web sites and nine out of ten have
intranets. Siddiqui, (2004) states that nearly 90% of Americans support the introduction of educational technology into American schools and libraries and most (83%) see the internet as a way to improve educational opportunities for all Americans’ especially for disadvantaged children. He further states that, in United States, virtually everyone under the age of 60 (92%) has used a computer, and 75 % have used the internet.

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

### Table 2.1: Percentage of USA public schools with internet Access by 1998

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<thead>
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<tbody>
<tr>
<td>Elementary</td>
<td>30%</td>
<td>75%</td>
<td>88%</td>
</tr>
<tr>
<td>Secondary</td>
<td>49%</td>
<td>89%</td>
<td>94%</td>
</tr>
</tbody>
</table>


Pelgrum and Anderson (1999) noted that large numbers of schools in many countries had access to the internet. For example, approximately 85% of the schools in Canada and Denmark had access to the internet in 1999. About 78% of the schools in China, Hongkong and Hungary had internet access in 1999. Education and Energy Ministries in conjunction with the government of Finland have also embarked on a program to supply rural public secondary schools with power and internet connection (International Conference on ICT development, education and training e-learning in Africa, 2007).
The Australian Government had a computer policy document on the use of computers that was entitled “learning Technologies in Victorian schools” and computers were available in schools to the students’ ratio of one computer to each twelve students (1:12) and that “all teachers were to have a minimum level of skills in the use of computers for learning”. In Great Britain, Pearson (2001) reports about availability of the British government policy document titled “connecting the learning society. National Grid for learning in 1997” Opie and Katsu (2000) noted that the British government policy on the use of computers in schools was to ensure that each school had computers. So, teachers were trained in their use and funds provided for teacher training.

Wazlowick, (2002) report on the Brazilian Government Information Communication Technology (ICT) policies and implementation published in 1981. The Ministry of Education (MoE) and the secretary of information created the first National ICT project in 1983 to introduce computers in schools. According to Wazlowick (2002) the project was to be implemented in two phases. The first stage aimed to introduce students and teachers to computers and in the second stage the computer was to be incorporated in teaching and learning process and in school administration.

Barron, et al (1999) report that a total of 4.8 billion was spent to integrate technology in K-12 schools in Florida State in USA. The issue of funding technology in education in developed and developing countries is a big problem because budgetary data are often inadequate for a detailed study of costs that sometimes could be immense (ejournal of science.org). Given the pivotal role now played by the new Information and Communication Technologies (ICT) in productivity and competitiveness of societies, education systems in the Caribbean have paid increasing attention to the introduction and integration of the new technologies into their education systems (Commonwealth 2004).
2.2 Case studies of Schools' Preparedness for Adoption of Computer Technology in Education in various Developed Countries

The importance of technology in the educational process is quite evident. Thomas (1981) and Shavinina, (1997) share the view that the computer as educational technology provides productive teaching and learning in order to increase people's creative and intellectual resources especially in today's information society. Consequently there is emphasis on the intensive use of ICT for teaching and learning in the developed world as a potent means of equipping students for successful and productive living in a technologically developed world (Thomas, 1981).

Extolling the importance of technology in the instructional process, Chapin and Messick (1992) and Imogie, (1998) asserted that the role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy. To this extent, developed countries of Europe and America have made legislative provisions on the imperative use of technology in the instructional process (Britain, 1998). Consequently, there has been a staggering amount of research and publication related to the use of technology for educational purposes in these advanced industrialized nations. Today, nearly everyone in these countries gains access to Information and Communication Technology (ICT), and the purchases of computers for school use in such countries as the United States of America has been increasing in such a phase that is difficult to keep track of how many computer machines are now in American schools (Harper, 1987). US Department of Education, (2000) notes that in rich industrialized nations, like the U.S.A., computers and internet are abundant in schools and classrooms; According to the 'Teachers' tools for the 21st century, survey, in 1999 almost all public school teachers (99%) reported having computers available somewhere in the schools and 84% of them reported having computers available in their classrooms.
Furthermore, there is a rapid increase in the proportion of schools that are connected to the internet. In 1994, 35% of US schools were online, compared to 95% in 1999. (US Department of Education, 2006). A survey report by Becker, (1986) on the instructional uses of computers in United States public and private schools suggested that over one million computers were in American elementary and secondary schools and those more than fifteen million students used them during 1985. The report also says that more than a half a million teachers used computers for instructional purposes during the same period and half of American secondary schools owned at least 15 computers each. Considering the fast pace of ICT in the last 20 years in Europe and America, the figures reported by Becker, (1986) must have risen astronomically by now.

According to Thomas, (2003) the story in Britain is basically the same as that of the USA. This country has been able to keep such pace as a result of government funding through the local Education Authorities and the Education Reforms Act of 1988 that compelled the central government to make budgetary provision for education technology. In a study comparing Malaysia’s approach to introducing ICT into schools with the approaches taken by eight other countries, researchers found that Malaysia’s approach is radically different from the others (Frost and Sullivan, 2006).

In Australia, Britain, Canada, Ireland, Japan, New Zealand, Singapore and the USA, initiatives for incorporating ICT into education have tended to be instigated by schools rather than by the national government. The schools set the goals themselves, with the governments providing funds. However, a common feature in all cases was that teachers’ preparedness to integrate ICT in schools was wanting. The study report recommended further provision of training in teaching methods and recommended that the teacher training curriculum should incorporate competence in the use of specific ICT tools, competence in integrating ICT into subject teaching and
competence in utilizing ICT for planning, preparing, teaching, assessing and evaluating lessons. In Thailand an assessment of existing computer skills conducted under school Net indicated that most teachers required intense training (UNESCO, 2007).

Throughout school Net, some level of competency has been established, but the study results indicate that teachers were not yet confident in the use of technology for their own productivity or in their teaching. It is important to emphasize, however, that effective and appropriate integration of ICT into teaching and learning requires more than just computer competency. Ultimately, the core competency required the appropriate tools, social forms, methods and activities that would enable students to achieve the learning objectives of a lesson or units.

A study by Macro and Erler (1998) in England found that gaining experience and confidence particularly in the use of computers and software was seen as the main deficit in the use of computers in schools. Chiero (1997) found that lack of training was a problem frequently mentioned by teachers as the second highest obstacle to the integration of computers into teaching. Scheffler and Logan, (1998) also noted ‘teachers’ lack of confident in their computer skills and their ability to integrate computers into classroom hampers effective computer implementation. Similarly, Abbot and Faris (2000:150) argued that the amount of computer experience provided to students during their training might affect the extent to which they will implement computers in their teaching.

According to many proponents, increasing the educational uses of computers and the internet may provide an opportunity to transform teaching, predicting a move toward more student-centre instruction based on content-rich, real-world applications, what some have called the transformation of classroom teacher from “the stage on the stage” to ”the guide on the side”. For example, in America between 1994 and 2000, the proportion of public schools connected to the
internet increased from 35% to 98%, eliminating prior differences by school poverty, grade level and Urban location. At classroom level, where technology can be integrated into daily instruction, 77% of all public school classrooms had internet access in 2000, representing a dramatic increase from only 3% in 1994, (Siddiqui, 2004).

In Romania a study carried out between August 2007 and May, 2008 to investigate ICT use in education revealed that seven out of ten teachers preferred to teach using computers. The teachers observed a positive performance in their disciplines as a result of using ICT (Elina, 2008). This study indicated that students considered most important effect of using ICT for school lessons is a simplified learning process followed closely by easier understanding of the content. Another study by Lim & Khine (2006) reported that educators believed that the more use of computers in their lessons excited and motivated their students to learn.

2.3. Computer Technology in Africa and Schools’ Preparedness for Adoption in Classroom Teaching.

Information and Communication Technologies (ICT) have become key tools and had a revolution impact on how we see the world and how we live. Today, the place of ICTs in Education and the world in general cannot be undermined. African countries have realized the role of ICT in education. Education Ministers meeting at first African Ministerial round table on ICT for education, training and development in Nairobi June 2007 emphasized the role of ICT in promoting development especially in rural areas (Farrel, et al 2007). Aduwa and Iyamu (2004) reported on the progress made in Uganda, Senegal and Nigeria to institutionalize educational technology. Efforts are gradually being made to provide educational institutions with computers and to encourage ICT as integral component of the educational process so as to meet the
demands and challenges of globalization. Carlson and Firpo (2001) notes that in Uganda an interconnectivity programme known as “Uganda School net” is dedicated to extending educational technology throughout Uganda.

In Senegal, teachers and students are using computers extensively as information tools. These programs in African countries mentioned are supported by their government through Ministry of Education (Carlson and Firpo, 2001). However, while ICT continues to advance in western and Asian countries, African countries still experience a lag in its implementation, and that continues to widen the digital and knowledge divides. In a recent study by Kiptalam, et al (2010), observed that access to ICT facilities is a major challenge facing most African countries. Farrel (2007) argue that state of infrastructure in Africa regarding to access to ICT infrastructure as too little, too expensive and poorly managed. The survey revealed that access to ICT in schools is poor; computer laboratories are ill equipped with an average of computer to student ration as 1:40 and low internet connectivity. In particular Sub-Saharan Africa is missing out on better education (Shafika et al, 2006). Ertmer (2002) also identified widespread barriers to technology integration within teaching and these are: lack of computers, lack of quality software, lack of time, technical problems, teacher attitudes towards computers, poor funding, lack of teacher confidence, resistance to change, poor administrative support, lack of computer skills, poor fit with the curriculum, lack of incentives, scheduling difficulties, poor training opportunities and lack of vision as to how to integrate technology. Lundell and Howell (2000) also note the following factors in the South African context (but relevant generally too) that prevent schools from using computer for teaching and learning:

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

Butcher (2003) adds that many of those schools that do have computers still do not have access to the internet, which is an important requirement for supporting networking for learners and teachers, as well as collaborative learning. The internet can provide a wealth of learning resources, access to which is at present, very limited for many African education institutions. Most academic institutions in Africa suffer from financial difficulties which hamper easy procurement of relevant ICT and other support materials and resources for students. For example, Hadebe (2000) notes that at the University of Zimbabwe in 1999, the government subsidy for students were reduced by 50%.

It appears that some of the facilities are not sufficiently provided for teaching-learning process in secondary schools. It must however be stressed that the effective use of the various methods of the ICT in teaching and learning depends on the availability of these facilities and teachers' competence in using them. Observation has shown that there are no functional internet facilities in most of the secondary schools; (Ajayi, 2008).

It has also been observed that most secondary schools in Ondo and Ekiti states lack computer literate teachers; irregular power supply appears to thrive in the schools. Moreover, it seems the schools could not purchase computers for use because of inadequate fund, (Ajayi, 2008). Teaching and learning materials required to enable technology innovation to work should be easily available. In order to integrate computers into the school curriculum there is need for all schools to have adequate supply of computers and software, it is impossible to implement changes that require such support and other teaching and learning materials. A study by Ertmer
et al (1999) confirmed that lack of computers was a barrier to the integration and use of computers in the classroom. Struddler (1996) also found out that lack of access to computers and software was a major impediment to computer integration.

The school Net Africa study examined how African teachers are taught about ICT during their teacher training and after, in their teaching practice. Their study revealed that there is evidence of a number of teacher training initiative involving ICT at both pre-service and in-service levels in Africa. However, these initiatives are mainly on a small scale, regional and fragmented with little sharing of experience, across national boundaries. Findings from their research revealed that there were no pre-service teacher training courses in computer integrated education outside South Africa except the connect-ED programme in Uganda. Kay, et al (1999) indentified the inadequacy of pre-service course program of education technology in the classroom such as time, expertise, accessibility to equipment resources and support materials. These scholars were convinced that if properly trained the power of technology lies in the teacher’s ability to appropriately select, integrate and evaluate computer tools to support learning.

The inadequate training of teachers in the use of computers has been claimed to be a major factor affecting the integration and effective utilization of computers in teaching and learning. Many scholars have therefore argued that in order to integrate and use computers in the classroom, all teachers should be trained in their use (Cameroon, 1999, Rannae and Troy, 1999: Clark 2000 ;). Adams, (1985) notes that critical ingredient to successful teaching with computers is the teacher’s own frame of reference- the manner in which the teacher perceives himself or herself. Vital is the teacher’s feeling that what he or she is doing is right.
2.4. Status of Computer Technology in Education in Kenya up-to-date

African nations have begun designing new policies and investing large sums of capital aimed at integrating computers into the classrooms. In Kenya, the effort is to develop human resources capable of promoting industrialization by 2030 through the use of Information and Communications Technology (ICT) in education and training (National ICT policy, 2006). This initiative was published in sessional paper No. I of 2005 where ICT in education is given prominence. A specific target was to equip secondary schools and other learning institutions with ICT and adopt their curriculum to meet challenges of information society. Kenya promulgated a National ICT policy in January, 2006 that aim to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (National ICT Policy, 2006). To achieve these, every educational institution, teacher, learner and respective community should be equipped with appropriate ICT infrastructure and skills needed to benefit from ICT knowledge-based economy by 2015. Teaching and learning should be transformed to incorporate new pedagogies that embrace ICT and that are appropriate for 21st century.

Achievements so far include: equipping of over 450 secondary schools with computers and provision of Kenya shillings 213 million by the government 142 secondary schools to purchase computers. The Minister for education in a recent forum on ICT (International Conference on ICT Development, Education and Training e-learning in Africa, 2007) noted that 288 rural public secondary schools will be supplied with electricity. This will be a first step towards integration of computers in the Education Sector. In regard to the 2011 budget, all was not lost since the budgetary allocation for energy and computers for schools was a boost for the growth of ICT. The rural electrification programme has in its kitty Sh.5.6 billion to facilitate supply of
power to 460 trading centres and 110 secondary schools among other public facilities. Powering of rural areas and schools will create an enabling environment for installing ICT equipment crucial in bringing the digital divide. In a bid to set the pace for young people’s initiation into the digital world, the government also allocated Sh. 680 million in the 2011 budget for the purchase of computers for schools. Finance minister’s allocation of Sh. 680 million for schools is a good start in scaling the needs for ICT in primary and secondary schools (http://allafrica.com).

Kenya has become the third African country to launch e-learning facilities in secondary schools after South Africa and Nigeria (Checkpoint, 2008). The program sponsored by Intel, aims at equipping schools to use computers and wireless connectivity for all types of class work. The new program aims to replace the blackboard with a touch screen and students to send their work to teachers through wireless connectivity. However, rolling of this program may not be effective in rural areas since they lack the basic infrastructure to enhance this type of learning.

According to Kenya ICT 4E situational analysis, (2009) the following achievements have also been realized: MoE again disbursed 1.5 million to 213 schools evenly distributed across the country to be used to acquire 25 new computers per school, 1 printer per school, educational software and sensitize ICT teacher on technical maintenance. Computers for Schools Kenya (CFSK) reported to have installed 18,000 computers in over 600 schools with 20 computers per school. The ICT Trust Fund has provided 200 schools with 20 computers each. NEPAD e-school project provided 6 schools with 20 computers each. It has also been noted that the infrastructure and systems provided to NEPAD e-schools were donations that are not localized. Some parts have also become non-functional because spare parts or components are not available locally (East African Standard, May 21, 2008).
The Rural School Project has provided 4,500 computers to a number of unidentified schools. Overall the analysis indicated that 15,450 computers have been disbursed to 1300 secondary schools out of over 4000 schools. Although the project improved teacher’s ability to use basic computer programmes and their confidence in doing so, further training, more in school support and more access to digital content were still needed (Kinyanjui, 2004) (ejournal of science.org/achieve).

Kenya was also among 16 other countries in Africa that had been identified by the e-Africa commission to host a demonstration project under an ambitious programme that was mooted by NEPAD Heads of state and governments as one of the ways of fixing Africa’s many problems, including poverty, illiteracy, hunger and diseases. It is expected that African schools, 600,000, will be ICT-compliant by 2015. (East African standard, May, 21, 2008). The Kenya Education Sector Support Program (KESSP) features ICT as one of the priority areas with the aim of mainstreaming ICT into the teaching and learning process (MoE, 2005).

The ministry’s Policy Framework indicates that there are a number of challenges concerning access to and use of ICT in Kenya, including high levels of poverty, limited rural electrification and frequent power disruptions (MoE, 2006; National ICT strategy for Education and Training, 2006). Most secondary schools have some computer equipments; however, this could consist of one computer in the office of the school head. Very few secondary schools have sufficient ICT tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1 (Farrell, 2007, Kiptalam et al, 2010). A study by Nduku (2003) on problems encountered in implementation of educational ICT projects found that insufficient number of computers and peripherals devices, teachers’ lack of knowledge and inadequate soft wares for instructions as impediments to integration of ICT in Kenya.
Ford (2007) reports that Kenya has approximately 19,890 primary schools, many of which are in rural areas, of these schools only 15% have electricity and only 500 have computers albeit with limited internet access. He further, observes that in Teacher Training colleges (TTC) ICT curriculum is taught but internet connectivity is limited and most available through dial up. Kenya School Net (2003) found that although schools are aware of benefits of computers, few had them and only one school had a website.

It's apparent that majority of computer studies teachers in Kenya are computer science graduates with no background in education. Various local authorities have made recommendations to improve computer studies in Kenyan schools. Kandiri (2007) suggests that Teacher Training Colleges (TTCs) should integrate computer science as a teaching course so as to produce graduates who can deliver the subject better.

While acknowledging the government effort simply deploying computers in schools will not automatically lead to computer integration into teaching and learning. Effective integration will depend on a larger extent trained and supported teachers (UNESCO, Bangkok, 2003). The greatest challenge of the schools therefore has been the provision of adequate support to teachers in as far as acquisition of appropriate technical skills important for integrating computers in the classroom instruction is concerned. Kandiri (2007) argue that the government should be involved in the in-service training programs as it rolls out ICT in schools.

2.5 Summary

This chapter has presented literature review on the use of computer technology in education in developed countries citing various states and showing the extent to which computer technology has been used in education, case studies of schools’ preparedness for adoption of computer
technology in education in various developed countries citing the successes and shortcomings of computer technology integration for instruction. The literature also reviews computer technology in Africa and schools’ preparedness for adoption in classroom teaching and status of computer technology in education in Kenya up to date.

It has emerged from the literature review that the situation of computer use in education in developed countries like USA is different from that in developing countries like Africa. As quoted by (National ICT strategy for Education, Training and research, 2006) that the developed countries have reported up to 41% of integration of computers in instruction while the proportion remains substantially low in Africa. This is mainly due to government policy pronouncement and funds extended to the schools and training institutions by their government and the societies.

It is clear that while the use of computer technology in education is becoming popular all over the world, and as Kenya progresses in the integration of computer-based learning, there is the need for school preparedness for computer technology adoption for instruction. Computer preparedness should be seen as being ready mentally and physically for computer experience or action.

The reviewed literature has expressed clearly that the existing studies have not addressed the status of the integration of computer in teaching and learning in Public Secondary Schools particularly in Kenya. These studies have not documented the issues and challenges facing Public Secondary Schools in integration of computer technology for instruction. This study, therefore sought to fill this gap by finding out the extent to which schools are prepared in adopting computers for instruction with specific focus on Nkuene Division, in Meru County.
3.0 Introduction

This chapter describes the procedure that was followed in conducting the study. It focuses on the research design, locale, target population, sample size and sampling procedures. The research instruments used for data collection are identified and described in detail and how they were administered. Finally, the methods of data analysis that were employed in the study are given.

3.1 Research Design

The study employed an exploratory approach using a descriptive survey design to investigate schools’ preparedness for integration of computer technology for instruction. Orodho (2005) notes that descriptive survey designs are used in preliminary and exploratory studies to allow the researcher to gather information, summarize, present and interpret for the purpose of clarification. Descriptive survey research is intended to produce statistical information about aspects of the population that interest policy makers without manipulating any variable. The choice of the design was made based on the fact that in the study, the researcher was interested on the schools’ preparedness for integration of computer technology for instruction in Nkuene Division, Meru County and no variable would be manipulated.

3.2 Location of the Study

The study was carried out in the Public secondary schools in Nkuene Division, Meru County. Singleton (1993) noted that the ideal setting for the study should be easily accessible to the researcher and should be that which permits instant rapport with the informants. Public
Secondary schools were chosen because they face a major challenge in financing their programs and no similar research to the best knowledge of the researcher has been done in Nkuene Division, Meru County. As such, Nkuene Division is an ideal setting for the study; the findings would be of benefit to the policy makers, teachers, students, community and other education stakeholders.

3.3 Target Population

There are 21 Secondary schools in Nkuene Division of Meru county of which 20 are public secondary schools. The target population of the study was all secondary schools comprising of 20 head teachers; 322 teachers and 4961 students (District Education Office – Imenti South).

3.4 Sample size and sampling techniques

Sample is a small portion of a target population, while sampling is selecting a given number of subjects from a defined population as a representative of that population (Orodho 2002). There were a total of 20 public secondary schools in Nkuene Division. From this a sample of 10 Public secondary schools constituting 50% of the 20 public secondary schools were selected. The schools involved in this study were selected using stratified random sampling. Stratified random sampling ensures that stratified sub groups of the population are represented in the sample required by the researcher. The schools were stratified in terms of categories i.e. provincial secondary schools, District boarding secondary schools and District day secondary schools.
Table 3.1: Category of schools in Nkuene Division and sample selection.

<table>
<thead>
<tr>
<th>School Category</th>
<th>No. of Schools</th>
<th>Sample Selection</th>
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<tbody>
<tr>
<td>Provincial Secondary schools</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>District Boarding Secondary schools</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>District Day Secondary schools</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20</strong></td>
<td><strong>10</strong></td>
</tr>
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From this, sample of 10 schools were obtained through purposive sampling. Purposive sampling techniques allow the researcher to use cases that have the required information with respect to the objectives of his or her study (Mugenda and Mugenda, 2003).

Ten head teachers (10) from the ten public secondary schools, participated in the study since every school is headed by one head teacher, twenty teachers (20) two from each public secondary school sampled, eighty students (80) eight students per school comprising of two students from each level, the District Education Officer (1) and ICT officer from Imenti South District, Meru County, were selected for the study through purposive sampling. The entire sampling matrix yielded a total sample size of 112 respondents for proposed study. These respondents were best placed to furnish the researcher with relevant information regarding all the requirements of school preparedness in integrating computer technology for instruction, in Nkuene Division, Meru County.

3.5. Research Instruments

The data for the study was collected using questionnaires and interview schedule. There were interview schedules for the District Education officer and ICT officer. This enabled the
researcher to probe further in depth the public schools' preparedness for integration of computer technology for instruction. Questionnaires were designed for the head teachers, teachers and the students. Gall and Berg (1996) pointed out that questionnaires are appropriate because they collect information that is not directly observable as they inquire about feelings, motivations, attitudes, accomplishments as well as the experiences of individuals. Orodho (2005) adds that anonymity is also possible through use of questionnaires and therefore respondents are likely to be free to express their views.

3.5.1 The Questionnaires
The questionnaires had both open and closed ended questions. Open ended questions helped the respondents complete with freedom of response and closed ended questions helped the respondents select the answers that best describe their situation. The two sets of questionnaires had two sections (A and B). Section A sought for demographic information while section B had statements that sought information on school preparedness in integrating computer technology for instruction in classroom.

3.5.2 Interview Schedule
Interview schedule was used to collect information from the District Education Officer and the ICT officer on general state of computer technology in the District and schools.

3.6 Piloting of the Instruments
The research instruments were piloted at Upper Mikumbune Day secondary school. Wiersma (1985) observes that piloting is important for it helps to identify misunderstanding, ambiguities
and useless or inadequate items. After piloting, items found to be ambiguous were revised. Piloting acquainted the researcher on how best she would collect data on teacher computer literacy information of which most respondents are seldom willing to share with public.

3.6.1 Validity of the Instruments
Validity, according to Mugenda and Mugenda (2003) is the degree to which results obtained from the analysis of the data actually represent the phenomenon under study. The content validity of the research instrument was ensured through expert judgment of the supervisor and other academic staff in the department. Content experts help determine content validity by defining in precise terms the domain of the specific content that the test is assumed to represent and then determine how well that content universe is sampled by the test items (Gall et. al 1996).

3.6.2 Reliability of the Instruments
Reliability is a measure of the degree to which a particular measuring procedure gives/yields consistent results or data after repeated trial (Mugenda and Mugenda, 2003; Orodho,2005). The reliability of the instrument was tested during piloting. The open ended questions responses were categorized and assigned values depending on the relevance of response given. All questions were then divided into two equal halves taking the odd numbered items against the even numbered items and split half correlation coefficient was calculated using the formula:

\[ r = (\text{split half}) = \frac{N\Sigma(xy) - \Sigma(x)\Sigma(y)}{\sqrt{[N\Sigma(x^2) - \Sigma(x^2)][N\Sigma(y^2) - \Sigma(y^2)]}} \]
A split half coefficient was obtained. Then to get the coefficients of the total test, the spearman Brown Prophesy formula was used i.e.

\[
\frac{2(\text{split half})}{1 + \text{split half}}
\]

If the coefficient of reliability is 0.70 or above, it is considered reasonable and the item is considered reliable. Slavin (1984) noted that reliabilities of 0.70 are usually considered reasonable minimum in education.

### 3.7 Data Collection Procedure

A research permit was obtained from the Ministry of Education (MoE). Thereafter the office of the District Education Officer (DEO) Imenti South District was contacted by the researcher for a written authority to conduct the research. Then the selected schools were visited and the researcher introduced herself to the head teachers and the staff and established a rapport by explaining her intentions and the importance of the study. In the second visit the researcher personally administered the questionnaires to the respondents. The respondents were assured of confidentiality that would be maintained in dealing with the responses. The filled questionnaires were collected after a week. The researcher also used interview schedule to collect further data for analysis.

### 3.8 Data Analysis

All completed instruments were assembled and information organized according to the research questions and objectives. This study generated both qualitative and quantitative data. Therefore both qualitative and quantitative techniques were used to analyze the data obtained. Quantitative
data was analyzed using Statistical Package for Social Sciences and tabulated into frequencies, ratios, tables and percentages. Qualitative data was analyzed by organizing it into themes and according to questions and objectives. The analysis also involved theoretical descriptions. Descriptive statistics involved the use of frequencies and percentages. Bell (1993) maintains that when making the results known to a variety of readers percentages have a considerable advantage over more complex statistics. The percentage is the most widely used and understood standard proportion (Borg and Gall, 1989). In addition, the researcher evaluated the usefulness of the information in answering the research questions.
CHAPTER FOUR
DATA ANALYSIS, RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents results of the analyzed data obtained from the respondents in the survey carried out in 10 secondary schools in Nkuene Division of Meru County. The survey's objective was to assess the public secondary schools' preparedness in integrating computers for instruction in Nkuene Division, Meru County. Descriptive statistics that includes percentages, bar-graphs pie-charts and frequency tables were used with the Microsoft excel 2007 package to analyze data. Guided by the research objectives, the researcher presented the results in this order:

I. A brief background of the respondents

II. Analysis of the principals, teachers, students, D.E.O and ICT officer in the District views from the questionnaires on the preparedness in integrating computers for instruction in Nkuene Division, Meru County.

III. Discussion of the findings on the topic under study.

4.1 Background Information of the Respondents

This section focuses on the background information of the respondents in the area of study. Such information is important in understanding the respondents to the study. The analysis was done based on the respondents' gender, class (for students only), and academic qualifications (for the principals and teachers).

A total of 10 principal and 20 other teachers responded to the questionnaires and their distribution by gender was 60% males and 40% female principals. A total of 20 class teachers
responded to the class teachers questionnaires. For the teachers, there were 70% females and 30% males.

The finding on the academic qualifications of the teachers and the principals showed a major effort towards pursuing of studies. This is because the study found that most of the principals (60%) possess masters and (40%) degrees. No principal was of the diploma level. Also a big percentage of the teachers, 15 teachers, (75%) had at least a bachelor’s degree. 3, 15% had diplomas and only 1, 5% had masters.

According to the findings, most of the principals have been in the profession as teachers for more than 5 years as given by 80%. This indicates that the teachers who were interviewed had been in the career for a long time which shows that they have experience on their preparedness and the preparedness of the students on the introduction of computer teaching and learning.

The number of the females 60% was higher than the number of the males 40%.

4.2 Data Analysis and Findings

4.2.1 Availability of Computer Facilities

Table 4.1: Availability of computer laboratories

<table>
<thead>
<tr>
<th>Availability</th>
<th>No. of schools</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Not Available</td>
<td>7</td>
<td>70%</td>
</tr>
<tr>
<td>Totals</td>
<td>10</td>
<td>100%</td>
</tr>
</tbody>
</table>
The first research question was responded to by the principals, teachers and the students. Out of 10 schools, only 3 had the computer laboratories, this represents 30% of all the schools that were under study and 7 never had computer laboratories and this represents 70%.

Continued adoption and use of emerging technologies is vital in any education system committed at bridging a digital gap or at realizing a knowledge economy in a nation. Perceived fear of support sustenance has led slow adoption rate, discontinuance and even rejection which is argued by Rogers model of innovation as consequence that contribute to lags in adoption (Rogers 1995).

4.2.2 Availability of Electricity

Availability of connectivity to electricity as source of power for running the computers is of essence. According to the researcher, all the secondary schools under the study had connectivity to electricity. Therefore, it begs the question since only 30% of schools under the study had computer laboratories.

From the findings, it is clear that as much as the issue of electricity is not a problem in the area, the schools’ management ought to work towards the establishment of computer laboratories for better integration of computer technologies in the schools under study. According to the interview schedule conducted on the ICT officer in the district and the D.E.O South Imenti, both the D.E.O and the ICT officers said that all schools in the district were connected to electricity. However, having served in the district for 6 years, the ICT officer asserted that the facilities that would enhance ICT progress were not adequate and clearly cited that there no cyber cafes in the schools. All these responses then show that as per the current situation, the facilities for the integration of computers in learning and teaching are not adequate in the public secondary schools in the area under study.
Electricity failure has been a persistent problem militating against ICT application and use in Kenya (Adomi, 2005). This makes the few schools with ICT facilities unable to use them regularly.

4.2.3 Availability of computer technologies

This section’s main purpose was to investigate on the computer technologies in the area under study for the integration of Computers in teaching and learning. The computer technologies studied were computers, and internet.

a. Presence of computer

Table 4.2: The Number of Computers in the Schools

<table>
<thead>
<tr>
<th>Places with computers in the schools</th>
<th>No. of computers</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Laboratories</td>
<td>16</td>
<td>30%</td>
</tr>
<tr>
<td>Principal’s Offices</td>
<td>6</td>
<td>60%</td>
</tr>
<tr>
<td>Secretary’s Offices</td>
<td>10</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.2 shows distribution of the computers in the secondary schools under the study. The table shows that in 100% of the school had each a computer in the secretary’s offices while 40% of the schools didn’t have computers in the principals’ office whereas the rest six schools each had a computer in the principals office. The school which the researcher found to have established computer laboratories gave the number of the computers in the laboratories as follows; In School A had 3 computers, C had 6 computers and school D had 7 computers. This represents 30% of the schools with the computer as compared to the total number of the schools
under the area of study. This finding is corroborated by Ndiku (2003) cited by Wims and Lawler (2007) who discovered that insufficient numbers of computers and peripheral devices inhibit deployment of ICT by teachers and by Plante and Beattie (2004) who observed that inadequate ICTs was a challenge to integration of technologies in Canadian schools. Similarly, Okwudishu (2005) discovered that unavailability of some ICT components in the schools hampered teachers' use of ICTs. This problem may be due to underfunding (Enakrire and Onyenienia, 2007). Researchers have contended that access to reliable and functional computer resources is a key factor in the use of computers for instructional activities (Gilmore, 1995; Jaber & Moore, 1999).

b. Internet Connection

Table 4.3: Internet Connection

<table>
<thead>
<tr>
<th>Internet connectivity</th>
<th>No. of schools</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>Not connected</td>
<td>6</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.3 shows that the schools which were connected to internet were few. From the findings of the study only 4 schools were connected to the internet. The schools that were connected to the internet were 40%. Though 70% of the schools had no computer laboratories, there was internet connection in the offices of the principal and the secretary. Responding to the issues of the internet in the schools under study, the ICT officer in the area under study also ascertained that there were no cyber cafes in the schools under study and this further is a confirmation that
the issue of internet as a technology was not up to the level that is required for the integration of
the computers in learning and teaching in the secondary schools in Nkuene Division.

From the above findings, it is therefore clear that the issue of computer technologies was not
well catered for. This then mean that for the integration of the computers in learning and
teaching, all the school stake holders have put their efforts in purchasing of new computers and
also in doing internet networking in the schools. Integration of computers in learning and
teaching cannot proceed without presence of computers. As a matter of fact, computers are the
most important in the integration of the computers in teaching and learning hence there is a great
need for the government, the parents and the teachers to do a lot of effort geared towards the
establishment of the computers in all the schools and for this case, the computer should be
adequate. Internet connection is also very important because learning and teaching of computers
involves both using the computers in the basic applications and also in other operations that
involve internet browsing. Following the above findings, then it is clear that a lot need to be
streamlined as far as the internet connectivity is concerned. The school stake holders should
consult with the various internet providers such as the Safaricom, Airtel amongst others so as get
access to the internet in the schools.

High Cost of ICT internet connectivity has been reported as one of the factors which influence
provision and use of ICT services (Adomi, 2006). The cost of computers internet is too high for
many to afford. Monthly Internet rates are exorbitant and the charges for satellite television are
unaffordable for most people in Africa (Brakel and Chiseuga, 2003). This has made it difficult
for Kenyan secondary schools to acquire and install ICT facilities for the use of teachers and
students.
4.2.4 Principals' preparedness to Computer Technology for Instructions.

In this section the main aim of the researcher was to find out how the participants were prepared for the integration of the computers in learning and teaching in schools under study. Thus researcher got responses from the various sections with a main aim of establishing this fact. This was investigated through various questions as explained below;

a. Experience of Principals with Computers

Table 4.4: Experience of Principals with Computers

<table>
<thead>
<tr>
<th>Experience with computers</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest to learn the computer</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>Never used computers but would like to learn</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>Apply the computer skill</td>
<td>5</td>
<td>50%</td>
</tr>
<tr>
<td>Use the computer in the administration</td>
<td>3</td>
<td>30%</td>
</tr>
</tbody>
</table>

Table 4.4 shows clearly that all the principals at least had interest to learn the computer since 0% of the principals' respondents said that they were not interested in getting training on computer operation. Two (2) of the principals which represents 20% of the principals' respondents, said that they had never used computers but would like to learn, 5 principals that is 50% said that they apply the computer skills on the word processor, spread sheets and other Microsoft services, 3 principals which is 30% said that they used the computer in the administration activity and the same percentage said that they used computers for the instruction purposes.
Figure 2: The Experience of the Principals with Computers

Figure 2 gives a clear insight that the principals are prepared for the integration of the computers in teaching and learning. This is because most of them at least do one thing or other using computers. This is also an insight that if the use of computers in the schools is introduced, it will pick very fast since the heads of the schools are informed on computer use and that they will work to attain this implementation.

Secondary school principals who have changed their mind-set and perceptions will endeavour to support the use of technology in their broad and balanced planning process, despite the challenges. Computer technology-support/diffusion demands visionary leadership and effective management from school administrators. LeBaron and Collier (2001) observe that; until the arrival of the information age, the attitude of school administrators was, ‘if it isn’t broke, don’t fix it’. Little attention was given to ICT implementation. Afshari, Bakar, and Wong (2010) assert that principals need to be cognizant of the benefits of the new technologies. If principals
understand the value of ICT and its benefits, they are able to implement innovations in school.

(p.121).

b. Computer Training

Table 4.5: Computer Trained Principals.

<table>
<thead>
<tr>
<th>Are you trained on computer use?</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6</td>
<td>60%</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.5 shows that 60% of the total respondents are trained on computer use. On the other hand 40% of the principals are not trained on the use of computer at all. This is a clear indication of the level of computer use in the said secondary schools since the principal’s interest on computer use is a determinant on its implementation in his/her school.

Table 4.6: Means in which Principals Acquired Computer Training.

<table>
<thead>
<tr>
<th>How were you sponsored for computer training?</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self sponsored</td>
<td>4</td>
<td>67%</td>
</tr>
<tr>
<td>School arrangement</td>
<td>2</td>
<td>33%</td>
</tr>
<tr>
<td>College or University training</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Table 4.6 shows that 4 of the computer trained principals got their training through self-sponsored means. This presents 67% of all the principals’ respondents who said that they have trained on computer operation. Two principals were trained through the school arrangement, which represents 33%, while none of the trained principals on computer acquired training through either collage education or university training.

Table 4.7: Computer Qualification of the Trained Principals.

<table>
<thead>
<tr>
<th>Level of computer training</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Packages</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td>Diploma</td>
<td>1</td>
<td>17%</td>
</tr>
<tr>
<td>Certificate</td>
<td>2</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

On the question of the level of computer training, table 4.7 shows that 50% of the principals who had trained on computers said that they have trained on the same up to computer packages, 33% of the remaining respondents said that they have trained up to certificate level and the rest 17% said that they trained up to the level of diploma.

A survey by Lusike (2006) on teachers’ and administrators’ perception and experiences on computers in Kenya revealed that both teachers and administrators viewed the use of computers in Kenyan classrooms as worthwhile, but of less importance in administration. Teachers who used computers were enthusiastic and spoke positively about computer use, whereas non-computer users felt left behind technologically. Teachers reported feeling unprepared after attending teacher training colleges to use computers in the classrooms. The situation is more
difficult for an administrator who is expected to manage or supervise computer technology in schools. The study suggests that teachers’ and administrators’ perceptions and attitudes play a significant role in the use of computers. Hence the need to provide pre-service and in-service training to enable teachers to successfully teach using computers in the classroom, and professional development opportunities for administrators in technology use in administration.

c. Experience of Teachers with Computers

Table 4.8: Computer Trained Teachers.

<table>
<thead>
<tr>
<th>Are you trained on computer use?</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>16</td>
<td>80%</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.8 shows that 80% of the total teachers respondents were trained on computer use. On the other hand 40% of the teachers were not trained on the use of computer at all.
According to the findings shown by Figure 4, various teachers in the area of study can do basic operations on computers. This is because 75% of the teachers said that they can use computers on word processor, spread sheets etc. 60% of the teachers said that they use computers to search internet, 65% use computer for instructional purposes. This shows that the teachers who were interviewed had just basic computer techniques. However, it was clear that most of the teachers had a positive mind about the integration of the computers in teaching and learning because most of the teachers who said that they are not familiar with the computer operations said that they would like to learn.
d. Use of Computers in Class Teaching

Table 4.9: Use of Computers by Teachers in Class for Teaching.

<table>
<thead>
<tr>
<th>Use of computers for teaching</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.9 shows that 18 teachers, which is 90%, had never used computers in teaching and the rest of the 10 percentage were of the contrary opinion. According to the teachers the major reason as to why they don’t use computers for teaching in classes is basically because of the absence of computers in the schools and also due to the reason that management is not assertive on introducing some computers for teaching and learning.

Table 4.10: Means in which Teachers Acquired Computer Training.

<table>
<thead>
<tr>
<th>How were you sponsored for computer training?</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self sponsored</td>
<td>9</td>
<td>56%</td>
</tr>
<tr>
<td>School arrangement</td>
<td>2</td>
<td>13%</td>
</tr>
<tr>
<td>College or University training</td>
<td>5</td>
<td>31%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.10 shows that 56% of the trained teachers in computer applications had got training through self sponsored means, 13% through school arrangement and 31% through college and Universities.
Table 4.11: Computer Qualification of the Trained Teachers.

<table>
<thead>
<tr>
<th>Level of computer training</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packages</td>
<td>13</td>
<td>81%</td>
</tr>
<tr>
<td>Diploma</td>
<td>2</td>
<td>13%</td>
</tr>
<tr>
<td>Certificate</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

On the question of the level of computer training, table 4.11 shows that 81% of the teachers who had been trained on computers were qualified up to computer packages, 13% of the were trained up to certificate level and 6% were trained up to the level of diploma. This shows basic computer training for the teachers. Figures 4 below illustrate this information.

Figure 4: Computer Qualification of the Trained Teachers.
f. In-service Courses Organized to Trained Teachers

Table 4.12: In-service courses organized to trained teachers.

<table>
<thead>
<tr>
<th>In-service courses attended</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10</td>
<td>62%</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>38%</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.12 shows that 62% of the teachers with computer training had never attended any in-service computer course. The rest 38% had never attended any in-service computer course.

A study by Sadik (2006) in South Valley University in Egypt showed that there was a provision for pre-service and in-service teacher preparation in Egypt. New evidence from a developing nation which examined 443 teachers suggested that computer attitude is multidimensional when examining the relationship between genders, years of teaching experience, computer use, computer experience, and computer attitudes.

White (2008) observes that the use of ICT in education is still a relatively new phenomenon. Educators, researchers and thinkers have taken up the challenges of using ICT since the 1980s with varied success. The advent of the internet and the World Wide Web has raised expectations for new productivity and service demands, although research to guide best practice remains scant and elusive.

Figure 5 shows that 63% of the computer trained teachers had attended in-service courses which were organized by the Ministry of education, 13% said that they attended training organized by British council while the rest 25% said that the courses were organized by the SMASSE.
Figure 5: Organizations that Prepared In-service Courses.

This shows the teachers preparedness of integrating computer technology into teaching and learning in secondary schools is affected by the ministry of education to some extent since the ministry does not pay much attention as far as the training of teachers is concerned.

4.2.5 Students preparedness

This section presents the findings of the study on how prepared the students were for the integration of the computers in learning. All the students' participants answered the questions that regarded to this area and as such the findings of the researcher were sufficient to give a conclusion on the research question. The various sections that assisted the researcher to answer this question are;
a. Experience of Students with Computers

Table 4.13: Experience of Students with Computers

<table>
<thead>
<tr>
<th>Experience with computers</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledgeable on computer applications</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td>Never used computers</td>
<td>60</td>
<td>75%</td>
</tr>
<tr>
<td>Use computers for internet browsing</td>
<td>14</td>
<td>18%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.13 shows that 14 out of the total students' respondents which represented 18% use computers only in browsing the internet, while 60 students equivalent to 75% of all the students had never interacted with computers and that they would like to learn. It is only 7% of the students who said that they are knowledgeable on the operation of computer on word processor, spread sheets amongst others.

NEPAD has scored the level of African continent students' experience with ICTs and their proficiency in using them very low. Fifty-five percent of students within the continent, including Nigeria, Algeria, Burkina Faso, Cameroon, Republic of Congo, Egypt, Gabon, Lesotho, Mali, Mauritius, Mozambique, Rwanda, Senegal, South Africa, Kenya and Uganda (who are participating in the first phase of the NEPAD e-Schools initiative), stated they had no experience at all in using computers. Other findings included that the typical African school environment provides neither opportunity nor training in using ICTS, and that 75 percent of responding teachers have no or very limited experience and expertise regarding ICT educational applications.
b. Students’ Competence in Computer Operations

Table 4.14: Students’ Competence in Computer Operations

<table>
<thead>
<tr>
<th>Competence in Computer Operations</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possess e-mail address</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td>Do not have training on computer operations</td>
<td>60</td>
<td>75%</td>
</tr>
<tr>
<td>Never used computer in school</td>
<td>65</td>
<td>81%</td>
</tr>
</tbody>
</table>

Table 4.14 shows that of all the participants in this question, 7% of the respondents do not possess email address, 75% do not have training on computer operations and 81% had never used computer in school. To the understanding of the researcher, the general overview of this is that most of the students do not have access to the operations of the computers however the earlier section puts a positive attitude of the students since most of them though not computer literate, said that they would be very willing to learn computer operations.

Table 4.15: Students’ Trained on Computer Operations

<table>
<thead>
<tr>
<th>Are you trained on computer operations</th>
<th>Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15</td>
<td>19%</td>
</tr>
<tr>
<td>No</td>
<td>65</td>
<td>81%</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.15 shows that 19% of the respondents among the students are trained in their schools on computer application while 81% of the respondents are not at all trained on computer applications in their secondary schools within Nkuene Division. Even though most students
do not access computers in their schools, some do have access of the computers at their home. According to the above responses from the students, it is then clear that the students in the schools under study are not competent in the computer operations. However the findings also show that with the little resources, the students try as much as possible to familiarize themselves with the issues of computer operations and due this some go to cyber to access their face books, twitter and other social media. The findings show that the students are very ready for the integration of computers in learning and teaching but the biggest limitation is the issue of computer facilities and technologies.

Improved secondary education is essential to the creation of effective human capital in any country (Evoh, 2007). The need for ICT in Kenyan secondary schools cannot be overemphasized. In this technology-driven age, everyone requires ICT competence to survive. Organizations are finding it very necessary to train and re-train their employees to establish or increase their knowledge of computers and other ICT facilities (Adomi and Anie, 2006; Tyler, 1998). This calls for early acquisition of ICT skills by students.
CHAPTER FIVE
SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction
This chapter summarizes the researcher's findings and the conclusions drawn from the study. The chapter also makes recommendations based on the study findings and suggestions for further study.

5.1 Summary of the Findings
The purpose of this study was to assess the Public Secondary Schools' preparedness in integrating computers for instruction in Nkuene Division, Meru County. In search for the information on this topic, the researcher was guided by the objectives such as; to investigate the facilities for enabling computer integration, to find out the technologies for computer integration in teaching and learning training, to establish the extent of teachers' preparedness and also to establish students' preparedness.

From the findings, the researcher got a general overview that the facilities and resources for propelling the introduction of computers for teaching and learning in schools were not sufficient. The technologies for the purpose of computer integration were also not satisfactory as only few schools had purchased computers and established internet connections. The study also found that the computers existing in the mentioned schools are not adequate. The researcher noted that generally all the categories of the respondents were ready for integration of computers in teaching and learning. This is because though many respondents ascertained that they were computer illiterate, they also cited that they were ready to learn on the applications of computers.
A number of the respondents also said that they currently use computers on basic operations. In the first objective, the researcher sought to know availability of computer facilities required by public secondary schools in Nkuene Division for successful integration of computers for instruction in schools. According to the responses that were given by all the categories of respondents, it came out clearly that as it stands; the facilities required for the learning of the computer skills in schools are minimal.

The issue of insufficient computer facilities was witnessed by the teachers, after 70% of them confirmed that there were no computer laboratories in their schools. Adding to the suggestions of the teachers, the principals confirmed on the insufficient computers by 70% of them stating that there are no computer laboratories currently put up for learning of the students. Though electricity connection was found to be sufficient in the area under study, still computer facilities for the students learning are limited since even with electricity computer teaching and learning cannot proceed without computer laboratories. The problem of this according to deduction of the researcher may be due to insufficient funds for establishment of the structures or it could also be a result of lack of concern by the management to commence on computer teaching and learning in the schools.

This implies intangible and un-observable support of computer technology integration in secondary schools has influenced its diffusion rate where users and managers have a dilemma on actual implications. Despite computer technology relative advantage, compatibility and tolerance, its implementation in secondary schools is merely on trial as managers wait to observe trends unfold due to the perceived fear.
From the illustration of table 4.5, it is obvious that the principal participants with high skill in the use of computer technology in teaching and learning are far more than those with low skill. It could therefore be concluded that majority of principals in the schools included in this study have high skill in use of computer technology.

Table 4.7 shows the percentage of the responses of principals on the qualification of computer skills as well as table 4.8 shows the same on teachers. On average 3-4 teachers have acquired package skills, though observation on both indicates that more teachers on average have diploma on computer applications than that of principals.

The respondents rated the ease of use of computer applications in class for content delivery as complex. According to teachers, and administrators' of secondary schools in Nkuene Division, the use of computer applications in class for content delivery is complex as accounted by the percentage of 10% of teachers who use computer for classroom instructions and 30% of the principals as shown in figure 2 respectively.

The high response rate of complexity in use of computer applications shows lack of use due to poor access and inadequate technical skill readiness which hinders computer technology usage. In addition ease of use of computer applications cross tabulations shows that computer technology adoption perceptions are independent of experience of teachers, while partly depends on level of education of respondents as shown in Tables 4.7 and 4.8. This shows that complexity issues in use of computer technology for curricular delivery cuts across all teacher. Implying the manual instruction experience attained does not enhance technology uptake.
In her study, the researcher also sought to find out the availability of computer technologies required by public secondary schools in Nkuene Division for successful integration of computers for instruction in schools. The findings of the researcher established that the computer technologies in the area under study were limited. This is because factors such as presence of computers and internet which are major indicators of computer technologies were not adequate.

The researcher found out that the preparedness for integration of computer technology for instruction in public secondary schools of Nkuene Division, Meru County as it pertained to teachers, was in progress though not adequate as the situation stands. This is because 10% of the teachers said that they had never used computers and that they would like to learn. This shows that computer illiteracy still exists amongst the teachers. For integration of the computers in teaching to be possible, the teachers should be well versed with the computer so that they would act as role models to the students and also train them. Also the same case was found amongst the principals whereby 10% of the principals responded that they have never interacted with the computers.

A very positive indication of the preparedness amongst the teachers is the way they responded to the issue of the effect of e-learning. 55% of the teachers looked at the issue on the positivity, 40% thought that the issue may be positive or negative while the rest of the respondents said that e-learning would have negative effects. However the latter was suggested only by 5% which shows that the majority were positive on introduction of computer training in schools. The principals also had a positive consideration on this issue since 80% said that the effect would
bear both positive and negative fruits while the rest percentage said that the effect would be all positive. None of the principals had a negative opinion towards integration of computers in schools. This shows that the teachers are prepared for introduction of computer training in schools and also are ready for e-learning.

Learners also portrayed their preparedness for the matters of computer training in schools. The responses of the students showed that they were not well acquainted with computer skills but the encouraging point about their preparedness is that those who did not have computer training were very much willing to learn. The students also suggested a lot of effort towards understanding the concepts of computer training as some of them said that they use computer to search internet and mostly on the social network. This shows that the students are very ready for introduction of the computer teaching but they lack motivation due to insufficient facilities and technologies.

5.2 Conclusion of the Study

The study concludes that:

As per the current situation, there weren’t enough facilities and resources necessary for the integration of computers in teaching and learning in schools. Amongst the facilities lacking are the computer laboratories. However, the researcher also concludes that there is one necessity that is currently in place in all the schools that were sampled and that is, electricity.

The researcher also concludes that the technologies needed for the e-learning and other computer services for the students, are not enough. This is because the findings showed that only a few schools have internet connections and only a few computers existed in the schools under study.
Another conclusion of the study is that both teachers and students are prepared for the integration of the computers in teaching and learning though lots need to be put into place before the actualization of it such; establishment of computer laboratories, purchasing of computers and internet connections in the schools.

5.3 Recommendations of the Study

From the findings of this study it is clear there is a statistically significant difference in teachers’ computer skill competence of their preparedness to apply computer technology in secondary school classroom instruction by availability of computers and computer laboratories however there was no difference by computer in-service courses and competence in computer operations. Based on the findings of the study, the following recommendations are made for education policy makers and researchers:

1) There is need to launch an in-service training for secondary teachers on the integration of computer technology in their lessons in particular on the application of available instructional software.

2) There is need for Universities and teacher training colleges to launch a course on programming so that both pre-service and in-service teachers will gain skills on developing and applying instructional programs.

3) There should be an increased investment strategy for improving and equipping the secondary schools with computer-literacy training facilities and resources for both teachers and students in Nkuene Division to address technical skill readiness. This will leverage teachers’ skills so as to reverse the slow rate of computer technology adoption trend and improve the pace of diffusion in the secondary schools.
4) Functional computer facilities should also be provided in all secondary schools and be made accessible for both teachers' and students' use.

5.4 Suggestions for Further Study

The researcher suggests that:

1) A quasi-experimental study needs to be carried out where teachers are trained on the use of computer technology in their classes and establish their effectiveness in teaching compared to those who apply conventional approach to teaching.

2) A study should be conducted on the strategies being employed by school administrators to cope with the challenges faced in implementation of integrating computer technology in secondary education.

3) A study should be conducted on the effects of integrating computer technology in secondary education on academic performance of students in Nkuene Division and the rest of the country.
REFERENCES

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APPENDICES
APPENDIX I

PRINCIPAL’S QUESTIONNAIRE

Introduction
This questionnaire is designed to gather information about the school’s preparedness for integration of Computers for instruction in public secondary schools. Kindly respond by ticking or filling in the blank spaces the appropriate responses in the spaces provided. All the information within the questionnaire framework will be treated with utmost confidentiality and will be used by the researcher for the purpose of the study only. Please give the truthful information as possible and respond to all the items. Do not write your name or anything that will identify you.

PART A: Demographic information.

(i) What is your Gender? [ ] Male [ ] Female

(ii) What is your current academic qualification? Diploma [ ] S1 [ ] BA/BSC with PGDE [ ] Bed [ ] Masters [ ] Others (specify)

(iii) What is the total number of students in your school?

Boys................. Girls............... Total..............

(iv) What is the total number of teachers in your school?

Male ...................... Female.................. Total .................

PART B:

1. Availability of computers and computer technology resources

(a) (i) Is there a computer lab in your school? Yes [ ] No[ ]
(ii) If yes, how many computers are in the lab? ............................................

(iii) If no, please explain why..............................................................................

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

(b) (i) Are there computers in the classrooms? Yes [ ] No. [ ]

(ii) If yes, how many per class? .................................................................

(iii) Please indicate any other area with a computer in your school if any.

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

(c) Is your school connected to electricity? Yes [ ] No. [ ]

(d) Does your School have internet connection? Yes [ ] No.

2. Teachers’ preparedness

(a) What is your experience with computers (Tick all that apply)

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

[ ] I have never used a computer and I would never

[ ] I apply computers in word processing spreadsheets etc.

[ ] I use computers for administration purposes only

[ ] I use computers for instruction purposes.

(b) Introduction of e-learning in schools may affect education in the country

Positively [ ]

Negatively [ ]

Both positive and Negative [ ]

Explain your answer ...............................................................................................
(c) Do you think introduction of e-learning in schools will affect teachers' job?

Yes [ ]
No. [ ]

Explain your answer briefly .................................................................

(d) (i) Have you ever been trained on the use of computers? Yes [ ]
No. [ ]

(ii) If yes, how did you receive your training?

[ ] Self sponsored
[ ] Arrangement of the school

[ ] College or University
[ ] Others (specify) .................................................................

(iii) To what level did you train?

[ ] Computer packages
[ ] Certificate
[ ] Diploma
[ ] Degree

[ ] Others (specify) .................................................................

(e) (i) Do you have computer teachers in your school? Yes [ ]
No. [ ]

(ii) If yes, how many? Male ....... Female........... Total ............

(f) (i) Are the computer teachers adequate? Yes [ ]
No. [ ]

(ii) If not, how many more are needed? ...........................................

(g) How many teachers in your school are equipped with skills to use computers in classroom instruction?

Male .............. Female................................. Total..................

(h) Are there any courses organized by the school to train teachers on use of computers for teaching and learning? Yes [ ]
No. [ ]
(i) a. Are there any courses organized by the Ministry of Education to train teachers on Computer use? Yes [ ] No. [ ]

b. If yes, how many of your teachers have attended such courses? .........................

(j) a. Are there any courses organized by private sectors to train teachers on computer use through the school? Yes [ ] No. [ ]

b. If yes, how many of your teachers have attended those courses? .........................

3. Students’ preparedness

(a) (i) Are there students in your school who can operate computers by their own? Yes [ ] No. [ ]

(ii) If yes, please give a rough estimate of the number of students. .........................

(iii) How do the students use the computers available in the school?

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

(b) (i) Are there any computer lessons in your school? Yes [ ] No. [ ]

(ii) If not, please suggest ways in which you think the students got the knowledge and Skills for handling the computers.

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

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

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

4. Challenges faced and possible solutions.

(a) What are the challenges faced by your school in integration of computers in relation to the following:-

(i) Facilities and infrastructure. .................................................................
(ii) Teachers’ attitudes in the use of computers. ........................................

(iii) Teachers’ training in use of computers for instruction. ............................

(iv) Students experience of computers? ......................................................

(v) Others (specify) ..............................................................................

(b) Outline the measures that can be taken by the following bodies in ensuring adequate
preparation of teachers in the use of computers for teaching and learning:-

(i) The government ...........................................................................

(ii) The School administration ..............................................................

(iii) Private sectors ...............................................................................

(iv) Teachers’ themselves ......................................................................

(c) For effective integration of computers in teaching and learning in your school, what
Recommendation can you give in regard to:

(i) Teachers aspect ...........................................................................

(ii) Students aspect ............................................................................

(iii) Infrastructural aspect ...................................................................

THANK YOU FOR YOUR CO-OPERATION
APPENDIX II

TEACHERS’ QUESTIONNAIRE

Introduction

This questionnaire is designed to gather information about integration of computers for instruction. Kindly respond by ticking or filling in the blank spaces the appropriate responses.

All the information within the questionnaire framework will be treated with utmost confidentiality and will be used by the researcher for the purpose of this study only.

Please respond to all the items. Do not write your name or anything that will identify you.

PART A: Demographic information

1. What is your gender? Male [ ] Female [ ]

2. What is your current academic qualification? Diploma [ ] S1 [ ]

   BA/BSC with PGDE [ ] Bed [ ] Masters [ ] Others specify . . . . . . . . . .

3. How long have you been in teaching profession?

   1 year and below [ ] 2-5 years [ ]

   6-10 years [ ] 11-15 years [ ]

   15 and above [ ]

4. Which subjects do you teach? .................................................................

5. How many lessons do you teach per week? ...........................................

6. Which co-curricula activity do you participate in? .................................
PART B:

1. Facilities and resources

(a) (i) Is there a computer lab in your school? Yes [ ] No. [ ]

(ii) If yes, how many computers are there in the lab? ..........................................

(b) Is your school connected to electricity? Yes [ ] No. [ ]

(c) Does your school have internet connection? Yes [ ] No. [ ]

(d) (i) Are there computers in the classrooms? Yes [ ] No. [ ]

(ii) If yes, how many per class? ..........................................................

(iii) Please indicate any other area with a computer in your school if any. ...........

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

(ii) If yes, what is the ratio of computers to teachers? ..........................................

2. Teachers’ preparedness

(a) What is your experience with computers? (Tick all that apply)

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

[ ] I have never used a computer and I would never

[ ] I apply computers in word processing, spreadsheets etc.

[ ] I use computers to search the internet

[ ] I use computers for instruction purposes

(b) Introduction of e-learning in schools many affect education in the country

Positively [ ]

Negatively [ ]

Both positively and Negative [ ]

Explain your answer briefly .................................................................
(c) Do you think introduction of e-learning in schools will affect teachers’ job?

Yes [ ] No. [ ]

Explain your answer briefly ………………………………………………………………………………………………

(d) (i) Have you ever been trained on the use of computers? Yes [ ] No. [ ]

(ii) If yes, how did you receive your training?

Self sponsored [ ]
Arrangement of the School [ ]
College or University [ ]
Others (specify) [ ]

(iii) To what level did you train?

Computer packages [ ] Certificate level [ ]
Diploma [ ] Degree [ ]
Others (specify) ………………………………………………………………………………………………

(e) (i) Have you attended any courses which have been organized to train teacher on use of
Computers for learning?

Yes [ ] No. [ ]

(ii) If yes, who were the organizers?

KIE [ ] MoE [ ]
The school [ ] Private Sector [ ]
Others (specify) [ ]
(f) (i) Do you use computer for teaching and learning in the classroom? Yes [ ] No. [ ]

(ii) If not, explain briefly why? ..........................................................................................

3. Challenges faced and possible solutions

(a) What are the challenges faced by your school in integration of computers in relation to the following:

(i) Facilities and infrastructure .................................................................

(ii) Teachers’ attitudes in the use of computers ........................................

(iii) Teachers’ training in use of computers for instruction ......................

(iv) Others (specify) ...............................................................................

(b) Outline the measures that can be taken by the following bodies in ensuring adequate preparation of teachers in the use of computers for teaching and learning:-

(i) The government ..............................................................................

(ii) The school administration .................................................................

(iii) Teachers’ themselves ......................................................................

(c) For effective integration of computers in teaching and learning in your school, what recommendation can you give in regard to:-

(i) Teachers’ aspect ..............................................................................

(ii) Infrastructural aspect ......................................................................

THANK YOU FOR YOUR CO-OPERATION
APPENDIX III

STUDENTS’ QUESTIONNAIRE

Introduction

This questionnaire is designed to gather information about computer integration for learning. Kindly respond by ticking or filling in blank spaces the responses or the appropriate information needed. All the information within the questionnaire framework will be treated with confidentiality and will be used by the researcher for the purpose of this study only. Please respond to all the items. Do not write your name or anything that will identify you.

PART A: Demographic information

(1) What is your gender? Boy [ ] Girl [ ]

(2) Indicate your class.
   Form One [ ] Form Two [ ]
   Form Three [ ] Form Four [ ]

(3) What is your age? .................................................................................................

(4) How many students are there in your class? ......................................................

(5) How many subject do you take ..........................................................................

PART B:

1. Facilities and resources

(a) (i) Is there a computer lab in your school? Yes [ ] No. [ ]

   (ii) If yes, how many computers are there in the lab? .........................................

(b) Is your school connected to electricity? Yes [ ] No. [ ]

(c) Does your school have internet connection? Yes [ ] No. [ ]

(d) (i) Are there computers in the classrooms? Yes [ ] No. [ ]
(ii) If yes, how many per class? ..............................................................

(iii) What is the ratio of computers to students ........................................

(iv) Please indicate any other area with a computer in your school if any ....

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

2. Students’ preparedness

(a) What is your experience with computers (Tick all that apply)
   [ ] I have never used a computer but I would like to learn
   [ ] I have never used a computer and I would never
   [ ] I apply computers in word processing, spreadsheets etc.
   [ ] I use computers to search the internet

(b) (i) Is there a computer at home  Yes [ ]  No. [ ]

(ii) If yes, have you ever used it?  Yes [ ]  No. [ ]

(iii) If yes, explain briefly how? ..............................................................

(c) (i) Do you have e-mail address?  Yes [ ]  No. [ ]

(ii) If yes, how often do you use it? ..........................................................

(d) (i) Have you ever received any training on the use of computers?
     Yes [ ]  No. [ ]

(ii) If yes, explain briefly where and how? ..............................................
     .................................................................................................

(e) (i) Have you ever used computers in school?  Yes [ ]  No. [ ]

(ii) If yes, explain briefly how .............................................................
3. (a) Outline the measures that can be taken by the following bodies in ensuring adequate preparation of students in the use of computers for learning.

(i) The government ..............................................................................................................
(ii) The school administration ..............................................................................................
(iii) The parents .....................................................................................................................
(iv) The teachers ...................................................................................................................
(v) The students themselves .................................................................................................

(b) For effective integration of computers in learning in your school, what recommendation can you give in regard to:-

(i) Parent aspects ..................................................................................................................
(ii) Students aspects ..............................................................................................................
(iii) Infrastructural aspects ...................................................................................................

THANK YOU FOR YOUR CO-OPERATION
APPENDIX IV
DEO'S INTERVIEW SCHEDULE

1. General information

(i) How long have you been working in Imenti South District? .................

(ii) According to your assessment, is the government committed to introducing e-learning in schools?

(iii) What measures have been put in place in Imenti South District in readiness for introduction of e-learning in secondary schools?

(iv) Are the public secondary schools in Nkuene Division ready for this?

Please explain briefly.................................................................

2. Facilities and resources

(i) How many schools with computer lab and computers adequate for teachers and learners use?

(ii) Are schools in Nkuene Division connected to electricity?

(iii) Do the schools in Nkuene Division have internet connectivity?

3. Teachers preparedness

(i) Do you organize computer training for the teachers in partnership with the Ministry of Education?

(ii) Do you organize seminars or workshops in the District to prepare teachers for computer integration for instructions?

(iii) In your opinion, do you think teachers in Nkuene Division are well equipped with knowledge and skills in use of computers as a medium for classroom instructions?
4. Challenges faced and possible solutions

(a) In your opinion, what challenges do schools face in integration of computers for instruction in relation to the following:

(i) Facilities and infrastructure .................................................................

(ii) Training of teachers in the use of computers ...........................................

(b) What measures can you suggest that can be taken by the following bodies to ensure that schools are adequately prepared for use of computers in teaching and learning:

(i) The government ..................................................................................

(ii) The school administration ...................................................................

(iii) The District Office .............................................................................

(iv) The teachers ......................................................................................

(c) For effective integration of computers in teaching and learning in schools, what recommendations can you give in regard to:

(i) Teachers' aspects ..............................................................................

(ii) Infrastructural aspects .....................................................................

THANK YOU FOR YOUR CO-OPERATION
APPENDIX V

ICT OFFICER INTERVIEW SCHEDULE

(1) General information

(i) How long have you been in Imenti South District?
(ii) Which are the duties of an ICT Officer in the District?
(iii) What is the general state of ICT in the District?

(2) Facilities and Resources

(i) Is Imenti South District endowed with adequate computer technology in terms of:
   (a) Electricity connections
   (b) Internet connectivity
   (c) Cyber cafes
   (d) Computers etc

(ii) Does the community make use of the available infrastructure?

   Please explain briefly.

(iii) What is the general state of the computer technology infrastructure in the public
     secondary schools in the District?

(iv) What steps are taken to ensure that the teachers acquire the required knowledge and
     skills in use of computers for instruction?

(3) Challenges faced and possible solutions

(a) In your opinion, what challenges do schools face in integration of computers for
    Instruction in relation to the following:
(i) Facilities and infrastructure

(ii) Training of teachers in use of computers

(b) What measures can you suggest that can be taken by the following bodies to ensure that the schools in the area are adequately prepared for use of computers in teaching and learning:-

(i) The government

(ii) The school administration

(c) For effective integration of computers in teaching and learning in schools, what Recommendation can you give in regard to:

(i) Teachers aspect

(ii) Infrastructural aspect

THANK YOU FOR YOUR CO-OPERATION