PREPAREDNESS OF TEACHERS IN INTEGRATING INFORMATION COMMUNICATION TECHNOLOGY IN PUBLIC PRIMARY SCHOOLS IN THIKA WEST DISTRICT, KIAMBU COUNTY, KENYA

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JUNE, 2015
DECLARATION

I declare that this research project is my original work and has not been presented for a degree in any other university.

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DEDICATION

To my family for their encouragement and unwavering support during the study.

This gave me the zeal to soldier on.
ACKNOWLEDGMENT

My sincere thanks go to my supervisors, Dr. Florence Itegi and Dr. Nobert Ogeta for their dedication, enthusiasm and patience in working with me from the inception of this project to the end. Their guidance has been invaluable. I am grateful to all the headteachers of the participating schools for giving me access to their schools and to all the teachers who willingly accepted to participate in the research. Special appreciation goes to Mr. Benson Karanga for the support extended to me. My thanks are extended to all friends and colleagues who provided great support throughout the study. To my classmates; Masai, Damaris, Linet, Diana and Muhere, I am greatly indebted to you.
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<tbody>
<tr>
<td>CCK</td>
<td>Communications Commission of Kenya</td>
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<tr>
<td>EFA</td>
<td>Education for All</td>
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<tr>
<td>GoK</td>
<td>Government of Kenya</td>
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<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>ITU</td>
<td>International Telecommunication Union</td>
</tr>
<tr>
<td>KICD</td>
<td>Kenya Institute of Curriculum Development</td>
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<tr>
<td>MDGS</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MoEST</td>
<td>Ministry of Education, Science and Technology</td>
</tr>
<tr>
<td>PTA</td>
<td>Parents Teachers Association</td>
</tr>
<tr>
<td>SMC</td>
<td>School Management Committee</td>
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<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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ABSTRACT

This study sought to investigate the preparedness of teachers in integrating Information and Communication Technologies (ICTs) in public primary schools in Thika West District, Kiambu County. The study was guided by the following objectives: to establish the ICT infrastructure that is there in public primary schools, to determine the attitudes and perceptions of the teachers towards the use of ICTs in public primary schools, to assess the levels of training of the teachers in the use of ICTs in public primary schools and to find out the initiatives the schools have taken towards integrating ICTs in teaching and learning. The study adopted a descriptive survey design. There were 17 headteachers and 250 teachers that made up the target population. Stratified sampling technique was used to group the participants by categories of headteachers and teachers while simple random sampling was used to select the study respondents from the sampled schools. The study sample was made up of 9 headteachers and 45 teachers. Questionnaires, interview guides and observation checklist enabled the researcher to collect data. Piloting was done in two schools, which were not included in the actual study, to test the reliability and validity of the research instruments. The quantitative data was analyzed using descriptive statistics with the help of Statistical Package for Social Sciences-version 21 (SPSS v.21). The qualitative data was analyzed using content analysis where ideas were grouped into themes. Tables and other graphs were used as appropriate to present the data findings. The study findings indicated that the schools are barely equipped with ICT infrastructure though majority are connected to the national power grid, that both the teachers and the headteachers are very positive towards the use of ICT in schools, majority of the teachers had acquired basic computing skills without being formally trained in ICT with the majority of those who had formal training in ICT being trained at computer Packages level and at school level, the schools are taking little initiatives towards integrating ICTs in teaching and learning. The study recommended that the government needs to equip the public primary schools with the necessary ICT infrastructure, intensive and sustained training in the use of computers for instruction need to be offered to both the pre-service and in-service teachers and that seminars/workshops need to be organized to sensitise as well as train the headteachers on the benefits of using ICTs in education.
CHAPTER ONE

INTRODUCTION AND CONTEXT OF THE STUDY

1.1 Introduction

This chapter gives details on the background to the study, statement of the problem, purpose of the study, objectives of the study, research questions and significance of the study, limitations and delimitations of the study, assumptions of the study, theoretical and conceptual frameworks and operational definition of significant terms.

1.2 Background of the Study

The United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Telecommunication Union (ITU) have been at the forefront advocating the harnessing of the power of the internet and other Information and Communication Technologies (ICTs) in efforts to reach the 2015 internationally agreed Millennium Development Goals (MDGs). This is in recognition that, ICTs will be critical in providing solutions to the challenges facing the world in regard to poverty eradication, advocacy of gender equality, better health standards, and promotion of quality Education for All (EFA) (UNESCO, 2008).

The use of technology is prevalent in some form or the other in all institutions of learning whether at the universities, middle level colleges, teacher training colleges, secondary and primary schools or in distant education (ITU, 2009). Computers and technological advances notably the internet are revolutionizing the way teaching and learning has been known for decades, according to Komal (2009). The many advantages of technology supporting teaching and learning including fostering
positive changes in learning institutions are well documented. However, public education is yet to be revolutionized. Mere installation of technological tools such as the computers, hubs, routers, and the accompanying peripherals is not sufficient for educational reforms. To successfully integrate ICT in our schools, the school leadership must play a critical role. It is the school leadership that initiates the formulation of the school ICT Policy not to mention the key part the leadership will play in mobilizing resources and support for the school ICT plan. If the ICT project is to take off in a school, the school leader should be aware of the obstacles that limit Information and Communication Technology (ICT) integration and translate the knowledge into effective approaches of leadership (Brannigan, 2010).

In India, the government has come up with the policy framework based on the use of ICTs and focused initiatives such as the scheme geared towards making opportunities available to students and school administrators for developing their ICT skills at the school level. Technology is increasingly being used in secondary and primary schools where school administrators use ICTs to facilitate the teaching and learning process and for general school administrative functions such as the monitoring of pupil attendance, performance tracking, online registration of candidates for national exams, communication with education officials and parents among others. The availability of computers in Manipur, one of the poorest states in India, has made the work of school administrators’ progress at a faster rate, more accurate and easier than before (Chuttur, 2009).

In e-Government initiatives, Africa is not on the first lane of the digital divide (UN, 2012). The African governments have woken up to the reality that they won’t be
total participants in an increasingly competitive global world where the economy is knowledge based and have therefore started to invest heavily in technology targeting to integrate ICT in the education systems (Kara, 2008).

In developing countries, almost all teachers and head teachers using computers in public schools never had any pre-service training and might have only had a brief in-service course relating to computers (Law & Chow, 2010; Komal, 2009). It is in light of this, that the Rwanda government launched vision 2020 to strengthen teacher development in Information and Communication Technology (ICT) for the achievement of National Social economic development goals. The government aimed to achieve this through the in-servicing of teachers via the institutional programmes such as Kigali Institute of Education that has launched ICT programmes to upgrade the skills on computer use of the under-qualified teachers (Workman, 2007).

The Kenya government is aware of the critical role that an ICT enlightened citizenry will play in catapulting the country to a developed economy status. Teachers will play a vital part for they are at the centre of any intended educational reforms (Bikos & Tzifopoulos, 2011). Through Sessional paper No 14 of 2012, the government recognizes the pivotal role that teachers will play in integrating technology in the education system by requiring all teachers and education managers to be ICT literate by the year 2015 (RoK, 2014). Teachers who have acquired some ICT skills feel more confident and are more likely to incorporate technology in their classroom work than those teachers who are totally unaware as far as ICT use is concerned. According to Agbatogun (2010), teachers who have not received any training in
computer are likely to suffer from technophobia and this is likely to curtail the range of the ICT teaching and learning resources at their disposal. Therefore, it is important that teachers be well grounded in how to use technology and also how to integrate technology in their pedagogy (Dogan, 2010). According to Nyakowa (2014), teachers will feel comfortable with technology only if they are trained in basic ICT skills and ICT based teaching methods. Integrating new technologies into educational settings requires change. According to Watson cited in Bingimlas (2009), different teachers respond differently to the change and as such taking into account the teachers’ beliefs and attitudes towards the ICT innovation is important, for what teachers do in the classroom will be influenced by their beliefs. If teachers are to become positive and be receptive to technology, they have to be made to understand that ICT will be beneficial to their pedagogy and that it will add value to their pupils learning. However, Schoepf’s, (2005) study as cited in Bingimlas (2009), revealed that teachers felt they were not being given guidance, no rewards were forthcoming and neither were they being supported as they incorporated ICT in their teaching despite the abundance and availability of technology. Those teachers who are hesitant to integrate ICT in their classroom work have stuck to the belief that the usage of ICTs will add no value to their teaching and consequently it is of no benefit (Bingimlas, 2009; Sang et al., 2010).

On February 14, 2013, the government launched a National ICT master plan ‘connected Kenya 2017’. One of the four strategic goals in this plan is that, Kenya will have a knowledge-based economy by the year 2017 (Kenya ICT Board, 2013). The country intends to achieve the four goals in the Master Plan by developing Konza Technology City which is a planned high-tech hub inspired by Silicon
Valley, and by continual strengthening of education in ICT (RoK, 2013). The launch of the ambitious Ksh.257 billion national broadband strategy on 23, July, 2013 would see schools connected into high-speed and affordable internet (Sunday, 2013). This according to Matiangi, Information and Communication Cabinet Secretary, demonstrates the governments’ commitment to making broadband access universal and accessible. The launch of the National broadband strategy coincided with a time when the government was preparing to roll out a project that would see all primary school children in class one get access to a laptop (Jubilee Government Manifesto, 2013) and one of the immediate challenges to be addressed was the need for internet access. Kiptalam et al. (2010) observes that in many African countries, Kenya included, it is a major challenge to access ICT facilities where a ratio of one hundred and fifty students to one computer prevails.

The then prevailing situation as per the views of the headteachers in Thika West District was that the preparedness of schools to integrate ICT was on-going though at a very slow and un-coordinated pace. In 2013, the government collected data on schools which were not connected to the national electricity grid and on the availability of safe and secure storage rooms for the ICT equipment. Schools were asked to forward names of teachers who have ICT knowledge to go and be trained to be Teachers Trainers while the headteachers were yet to be trained on ICT use. The government has provided a radio to every school but this ICT equipment was rarely used for various reasons ranging from lack of power, un-availability of radio broadcast timetable from the KICD to inadequacy of the gadget due to large and overcrowded classrooms. The number of schools known to have computers was very
few. It is against this backdrop that the study was set to establish the preparedness of teachers to integrate ICT in public primary schools in Thika West District.

1.3 Statement of the Problem

ICT plays a prominent role in such sectors like banking, construction, transport and communication, but despite this increasingly essential and critical role, ICT has not been fully adopted in the teaching and learning environment in most developing countries, Kenya among them. According to the Ministry of Education and the National Council of Science and Technology (2010), the failure to capitalize on the opportunities offered by technological advances to education for massive expansion represent a drastic lag in skilled innovative manpower, thus narrowing the possibilities for individual activities in areas of business, research, learning, health and welfare among other aspects of daily life. According to Laaria (2013), the ICT strategy adopted by the Kenya government, did not factor in the reactions and attitudes of the teachers when it was adopted. Little had been done on the preparedness of schools particularly in the readiness to use computers in teaching and administration in public primary schools. It is against this backdrop that the study would identify and indicate the level of preparedness of primary school teachers in integrating ICT in Thika West District.

1.3.1 Purpose of the Study

The study sought to investigate teacher preparedness in ICT for teaching and learning in public primary schools in Thika West District of Kenya. The focus was on the integration of ICT for teaching in the district and whether lack of computer technical skills, provision of infrastructure and the teachers’ attitude play a part in
the process. The objectives of the study were to establish the ICT infrastructural availability, to determine the attitudes teachers’ have towards the use of computers in teaching and learning, to assess teachers’ level of training in the use of ICT and finding out the initiatives adopted by schools to integrate ICT in teaching and learning.

1.4 Objectives of the Study

This study was guided by the following objectives

i) To establish the ICT infrastructure that has been put in place in public primary schools in Thika West District.

ii) To determine the attitudes and perceptions of primary school teachers towards the use of ICT in public primary schools in Thika West District.

iii) To assess the level of training of teachers in the use of ICT in public primary schools in Thika West District.

iv) To find out the initiatives public primary schools in Thika West District have taken to integrate ICTs in teaching and learning.

1.5 Research Questions

The study was guided by the following questions:-

i) What ICT infrastructure has been put in place in public primary schools in Thika West District?

ii) What are the attitudes and perceptions of primary school teachers towards the use of ICT in public primary schools in Thika West District?

iii) What is the level of training of teachers in the use of ICT in public primary schools in Thika West District?
iv) What initiatives have been taken to integrate ICTs in teaching and learning in public primary schools in Thika West District?

1.6 Significance of the Study

The findings of this study would provide useful data and information to key stakeholders in the education sector both in the National and County levels by revealing the available ICT resources, teachers’ skills in ICT and initiatives being taken by schools to integrate ICT in teaching and learning. This would be useful in initiating and formulating policies to offer professional development programs to both pre-service and in-service teachers.

At the school level, the findings would help expose the perceptions, beliefs and altitudes that hinder the uptake of ICTs by the teachers, reveal the support the school administrators give to the teachers and the challenges they face. These revelations would help increase the integration of ICTs in schools.

The findings of this study would also benefit the learners as schools would be better equipped and their teachers would be better placed to embrace ICTs having changed their negative perceptions, beliefs and altitudes through training and thus encouraging constructivist learning.

1.6.1 Limitations of the Study

The study was carried out in selected public primary schools in the district due to financial and time constraints. Further, private primary schools were not part of the study and as such the findings of this study may not be generalizable to all primary
schools in the district. In addition, the schools in Thika West District in Kiambu County comprise only a small percentage of public primary schools in Kenya. Therefore, the findings of this study would only be generalized to the area of study but not to the whole country.

It was also not possible to cover the opinion of all the headteachers and teachers all over the district. Therefore, the study was limited to the sampled nine headteachers and forty five teachers from the sampled public primary schools in the district.

The study was limited in that the ICT aspects are highly dynamic and tend to change within a short span of time. Therefore, the study findings are likely to be relevant only within a specific time range/scope. Further, apart from the variables singled out for investigation, there may be other factors affecting teachers’ preparedness in ICT integration in public primary schools that this study did not explore.

1.6.2 Delimitations of the Study

This study confined itself to public day primary schools in Thika West District, Kiambu County. The special schools for the handicapped and the private primary schools were not taken into consideration because they are in different levels of computer use in their schools.

1.7 Assumptions of the Study

The study was based on the following assumptions:

i) ICT integration in the Kenyan Education system would enhance learning.

ii) Teachers are using ICT in the teaching and learning process in schools.

iii) The basic ICT infrastructure and equipment is available in schools.
1.8 Theoretical Framework

The study was guided by the Technology Acceptance Theory. The theory was developed by Davis (1989) and it is an adaptation of the Theory of Reasoned Action by Ajzen and Fishbein (1980) developed to describe the use of technology. The Technology Acceptance Theory posits that technology users’ attitude is determined by their behavioural beliefs about the consequences of the behaviour on the part of the individuals.

The theory also explains the extent to which the perceived ease of use and perceived usefulness predict the attitude towards the use of a technology while attitude towards use indicates users’ intention to use, which then indicates the actual use of the technology. The model shows how users come to accept and use technology and goes on to suggest that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, i.e. preparedness, and notably:

Perceived usefulness (PU) defined by Fred Davis (1989) as the degree to which a person believes that using a particular system would enhance his or her job performance and perceived ease of use defined also by Davis (1989) as the degree to which a person believes that using a particular system would be free from effort.

For this study, the teachers’ preparedness in the use of ICT in public primary schools would be enhanced by improved job performance and would use little effort when using IT in their teaching/learning and administrative tasks.

The Technology Acceptance Model has however, been criticized for limited explanatory and predictive power, triviality, lack of any practical value and its questionable heuristic values (Chuttur, 2009).
1.9 Conceptual Framework

The study employed the conceptual framework below to help focus on variables that include: perceptions, beliefs and attitudes, teachers’ training, infrastructure and resources among others to indicate the preparedness of the teachers for the use of computers in public primary schools. The conceptual framework postulates that attitudes, training and acquisition of relevant ICT skills, the presence of ICT infrastructure and a supportive ICT environment are the indicators of the preparedness of the schools to use computers.

The conceptual framework shows how different variables indicate the preparedness of teachers to use computers in public primary schools. The attitude of teachers towards the use of computers is a very important indicator in that positive attitudinal change towards computers will propel them towards acquiring skills and training in computer application on teaching-learning activities and school administration while negative attitude will discourage ambitions to use computers in public primary schools.

The outcome of effective use of ICT in schools is likely to enhance teaching and learning but this is only possible if there is an enabling policy both at national and school level, there is a supportive and visionary school leadership, the security and safe storage of ICT gadgets and equipment is guaranteed.
Figure 1.1: Preparedness in the integration of ICT in Public Primary Schools

ICT infrastructure and Resources
- Cost and financing
- Hardware and software availability
- Power and internet connectivity
- Technical support

Teachers’ perceptions, beliefs and attitudes
- Positive attitudes
- Negative attitudes
- Resistance to change

Teachers’ training on ICT use
- Professional development
- Teachers’ ICT knowledge and skills

ICT Integration in teaching and learning
- Access to e-content resource materials
- Learner centric pedagogy practices
- Electronic portfolio assessment
- Easy storage and retrieval of records
- Use of models, simulations and virtual laboratories
- Quality instructional design
- ICT role modeling

Independent variables

Dependent variable

Output

Source: Researcher (2014)
1.10 Operational Definition of Central Terms

**Attitude:** Refers to teachers’ perception towards the use of information communication technology in public primary schools.

**Constructivist learning:** Learning where the pupils are allowed to observe, question, critique, explore, as well as being innovative on their own with the teacher facilitating.

**E-learning:** Learning that is supported by use of electronic technology aided by computers.

**Information Communication Technology (ICT):** It refers to the tools and accompanying technologies such as the computers, broadcasting technologies (audio and visual), smart boards, interactive boards, television and digital cameras, mobile telephony which aid in synthesizing, dissemination, storage and management of processed data that eventually goes to support the pupils and teachers in their school and classroom work.

**ICT integration:** The process of introducing technological tools (both hardware and software) into the instructional process with an aim of improving content delivery or provoking the creativity and innovativeness among the learners.

**ICT infrastructure:** This refers to all the necessary software as well as the hardware that is required for effective integration of ICT in teaching and learning.
**Preparedness:** It refers to readiness to use the skills, knowledge and attitude one has acquired during training or studies and the competency to use computers.

**Public Primary School:** Refers to the lowest level of education from standard 1 to standard 8, funded and staffed by the government of Kenya in accordance with the Basic Education Act of 2013.

**School leadership:** This refers to the head teachers’ ability at offering technological leadership in planning, acquisition of ICT tools and in making arrangements for the training of the teaching staff.

**Traditional Teaching Methods:** Instructional methods involving mainly text book, chalkboard and talking by the teacher.

**Teacher Training:** The preparation a teacher undergoes to acquire, skills, competencies and knowledge by using computers.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents a review of literature under the following headings: ICT Infrastructure in Education, Attitudes and Beliefs towards ICT Integration in Education, Teacher Professional Development in ICT, Initiatives to Integrate ICT in Teaching and Learning and ends with a summary of literature review.

2.2 ICT Infrastructure in Education

Successive integration and implementation of ICT in education demands that appropriate infrastructure be in place. Before the ICTs can become operational in an institution, infrastructural related challenges need to be dealt with (Mikre, 2011). For countries in Africa, the main challenge is to install systems that will prove to be dependable and at the same time efficient. The countries in the region need to sort out a range of issues ranging from network connectivity, different tax regimes, access to technologies and expertise, to interoperability across and within the individual countries (Nwuke, 2003). Kenya has shown remarkable growth in the ICT sector, but this growth has not spread to all parts of the country with some of the interior rural areas and far flung parts of the country yet to be covered by the Internet Service Providers.

To successfully implement ICTs in schools, access to good quality electricity is a basic provision (Laaria, 2013). Many parts of Kenya, especially the rural schools are not connected to the national electricity grid and even for the parts where there is electricity; the supply is marked by frequent power blackouts. The availability of a
dependable electricity supply greatly determines the development of the ICT infrastructure in a country (Watson, 1999). This is not to rule out such other resources like the computers, digital cameras, printers, DVDS, multimedia projectors and scanners, which need to be provided. This is not all, ICT needs the updated software and hardware, donated, old and obsolete computers are found in some of our schools. These computers keep breaking down and this lowers the morale of both the teacher and the student (Mungai, 2011). A critical feature in the diffusion of technology is the usage of up-to-date software and hardware (Gulbahar, 2007).

Another prerequisite for integrating ICT in the teaching learning environment is High speed internet connection, but as noted by Ombui (2011), the high costs involved in the connectivity are unaffordable to most schools meaning that schools cannot access educational materials from the web, (Mungai, 2011). There is sharing of ICT tools and too many pupils are sharing a computer. In many African countries the ratio is one computer to one hundred and fifty students (1:150) while in the developed countries the ratio is 1:15 (Kiptalam et al., 2010).

Another infrastructural challenge the Kenyan schools have to contend with is the availability of safe and secure rooms. Not many schools in the country have got permanent structures, and where permanent structures are erected, majorities are left open without doors and windows.

Effective implementation of ICT in education requires a proper plan, policies execution and monitoring (Khan et al., 2012). There is a need for a government policy that will clearly define the boundaries of the initiatives taken by having in
place the required legislation to guide and bring on board all the stakeholders and guide also on how the resources would be fairly shared (Uys et al., 2004).

The Kenya government recognizes the role that ICTs will play in transforming the country into a modern economy. By publishing Sessional paper No 1 of 2005; the government gave a clear indicator that it was committed to implementing ICT in schools. This was highlighted when it further went on to state that, students, teachers and communities around the school were required to participate in acquiring desirable ICT skills by the year 2015 to enable them thrive in a knowledge based economy. Sessional paper No 14 of 2012 underscores the government’s commitment to competency based teaching and learning that promotes acquisition of 21st century skills and attitudes such as, creativity, critical thinking, communication, collaboration and innovation. The governments’ initiative on ICT integration in primary education (Laptop programme) where every pupil in class one would get a laptop is further prove that the government is serious in creating a techno-savvy generation to drive the information economy in the 21st century (MoEST, 2010).

Since the adoption of a national ICT policy in 2006 by the government, some achievements have been realized. According to (Laaria, 2013), in March 2010, KICD launched e-content for schools, there has been partnership with several organizations including the private sector in provision of computers to schools,, over five hundred secondary schools have been equipped with computers, more than three hundred schools in the rural areas have been connected to electricity and a unit has been established at KICD to provide leadership in implementation of ICT in schools.
Many schools, according to (Manduku et al., 2012) have failed to effectively use ICT to support teaching and learning, including management. Laaria (2013) goes on to add that though efforts have been put by various stakeholders, the national ICT policy of 2006 on education was not effectively implemented as was intended. This may be due to the fact that the attitudes of the teachers, the skills of the teachers and their reactions towards the new tools were never considered when the government put this strategy in place.

School heads need to have a vision of how ICT will integrate in the school curriculum and how it is going to be used in supporting all the other essential services to the school. It is this ICT vision that will translate into the school ICT plan, thereafter all the resources needed to support the school ICT plan can be mobilized (Tondeur, Van Keer et al., 2008). To champion the use of ICT in their schools, the school heads must be seen to be providing encouragement and support to their teachers (Anderson & Dexter, 2005). School heads who wish to model technology use in their schools participate in professional training, read books and journals about computers, attend technology conferences, join technology organizations, use the internet, visit innovative schools, form technology committees, look for experts to help them and develop technology plans among others (Stegall, 1998) If the school leaders want to elevate the levels of technology use in their schools, they have to be seen to be personally using it in their day to day school activities (Becta, 2007).

Teachers cannot implement ICT in their teaching and learning activities unless they have mustered enough confidence to try it out in class. It is therefore important that they be provided with enough time to learn and experiment with the new technology
outside the scheduled class time by participating in seminars, conferences and workshops, this calls for support from the school administration who should also encourage the teachers to use technology in the classroom by availing the required resources (Bingimlas, 2009). The school leadership should initiate the formulation of the school ICT policy that is economically sustainable and which ensures equal access to ICT by all learners and teachers (Kairo, 2013). This policy should also address storage and safe keeping of ICT resources as well as the moral and ethical issues such as copyrights, unauthorized system access, regulating access to computers, and preventing access to adult-only sites, including health risks for pupils.

In most Kenyan primary schools, school heads go about their administrative tasks for instance, registering of pupils, maintenance of pupils’ records, keeping of inventory lists of supplies, among others, manually. According to Mue (2014), public secondary schools in Nairobi are using ICT to track teachers and students performance, monitor class attendance in addition to monitoring the registration of the students. There is need for the heads to embrace and spearhead the implementation and use of ICT in their schools.

Financing of the ICT sector poses a problem to many countries in Africa; Kenya included (Zinyeka, 2005). Scarce financial resources mean that not enough proportion of funds is allocated for repairs and maintenance let alone for the purchase of new gadgets. Even where the importance of ICTs is recognized, allocation of resources for ICT development is often inadequate (Mugenda & Mugenda, 2006). This scarcity of resources manifests itself in frequent power blackouts, huge unsettled electricity and telephone bills, and internet connectivity
that is slow and unsteady. High interest subscription cost has been a big hindrance to wide internet connectivity in Kenya, despite the governments’ effort to zero rate duty on ICT equipment and making immense investment in undersea cable (GoK, 2010). Afshari et al. (2009) assert that for effective and efficient use of technology, teachers must be provided with hardware and software. The costs of these resources are unaffordable to many African economies, Kenya among them; this is a major contributing factor to the scarcity of the ICT infrastructure in many public schools in the country.

The power of technology ceases to be felt when it fails to communicate. Much of the e-content available is in foreign language such as French, English and Portuguese which are not the first language to many Africans. This may limit access to education which is likely to be amplified by the ICT (Nwuke, 2003). The limited amount of relevant local educational content leads to dependency on imported material that may not be the best at addressing the needs of the recipients. Software that is appropriate and tailor made to meet the needs of the locals is in short supply. This situation is aggravated by a shortage of qualified manpower and high production costs. Goko (2012) asserts that the high cost of the hardware and the software is a major barrier to the integration of ICT in education. Attempts to develop educational software that is globally applicable have not borne much fruit for different countries have got their own requirements (Kinuthia, 2009; Syombua, 2013).
2.3 Attitudes and Beliefs towards ICT Integration in Education

The beliefs that teachers bring to the workplace are established by the experiences that they underwent through during their own school going days as pupils and which later concretized during their teacher preparation in colleges and universities (Varol, 2013). It is the teachers’ attitude or belief that has a significant role in determining the adoption and implementation of technology in the classroom. The pupils learning experiences will be curtailed by the incompetency and the reluctance of the teachers to integrate ICT in the teaching and learning environment (Fook et al., 2011). According to Uslu and Bumen (2012), studies conducted in Israel (Klieger, Benttor & Bar-yossef, 2010) and Australia (Pierce & Ball, 2009), go on to show that the Attitudes of the educators are crucial in determining whether the implementation of technology in education succeeds or fails. Those teachers, who have a positive disposition towards technology and regularly use it, will be at ease while using technology and the chances are high that they will plan to incorporate it in their day to day classroom activities (Kidombo, 2010). Those educators who still hold the belief that pupils can only learn better when exposed to the traditional ‘chalk and talk’ method do not see the need of pupils venturing and experimenting with computer based technologies for learning (Chai et al., 2008). Mere observations of the instructional practices of teachers are not enough to make one understand teacher beliefs, the underlying belief system can only be brought to the open by certain activities. Kagan (1992) as cited in Faulder (2011) asserts that the secondary and tertiary beliefs that are as a result of the core beliefs often have multiple connections to other beliefs and this poses a barrier to understanding beliefs systems. It is often a challenge when teachers find it difficult to bring to the open what their submerged beliefs are (Hixon & Buckenmeyer, 2009). According to (Keengwe & Onchwari,
it is not enough to just provide the ICT equipment to the teachers, it is how the teacher considers it to be beneficial and how easy it is to use that dictates the speed at which the teacher adopts and integrates the new technology. All over the world, the computer has been slowly accepted as a basic tool of learning. This slow acceptance can find explanation from an ecosystem’s perspective of a deemed intrusion of the classroom by ‘alien’ bodies. The new bodies pose a threat to the classroom ecosystem and more so the teacher who feels the territory where he or she reigns supreme as the sole authority is being encroached, which leads to the teacher rejecting it. Research has shown that capable teachers with a positive disposition towards ICT but are however not advanced technologically do need less effort and encouragement to acquire the skills required for the implementation of ICT than their colleague teachers who posses negative computer attitudes (Harrison & Rainer, 1992, Ertmer & Ottenbreit-Leftwich, 2010). For teachers to Change the negative attitudes towards ICT and start integrating technology in the curriculum, they have to perceive technology as fulfilling both the needs of their pupils and their own (Nyambane & Nzuki, 2014). Educators need to have a positive disposition to use of technology. Afshari et al., (2009) cited in Khan et al., (2012) assert, positive attitudes can only be developed when the teacher is sufficiently comfortable and accepts the technology as well as being knowledgeable about how it is used.

2.4 Teacher Professional Development in ICT

Many scholars concur that a continued professional development of teachers can help to successfully implement ICTs in schools (Higgin et al., 2011). Since teachers cannot offer what they don’t have, it is important that the quantity and quality of professional development that they undergo commensurate with the ICT use in the
classroom (Becker et al., 1999). Little professional development in ICT limits the teachers’ competence and confidence in using ICT (Wanga, 2014). The teaching and learning process may be hugely influenced by the teachers who tend to lean towards using ICT equipment, but for the teachers to use the ICT tools they must have the competency and the confidence (Fook et al., 2011). According to Obonyo (2013), lack of training is a huge barrier to the integration of ICT in the school curriculum. Failure to provide in service training denies the teachers a chance to acquire knowledge, skills and competencies, and also the attitudes necessary to incorporate ICT in the curriculum (Kinuthia, 2012).

This has been cited as the reason as to why many of the teachers in primary schools do not champion and use ICT in the day to day classroom activities as asserted by Fletcher (2006). More uptake of ICT in lower primary schools could come about as a result of offering the teachers a chance to develop professionally and getting the necessary certification. The preparedness of a teacher to incorporate technology in the classroom is influenced by the training the teacher has received Chege (2014). To implement change, teachers require professional development so as to empower, equip, and encourage them. The designed teacher development programs must target at empowering teachers to move beyond the borders of the traditional teacher centered instructional methods and encourage pupil centered methods, if integration in ICT is to be effective. According to Laaria (2013) the pre-service teacher training should concentrate on: changes in the curriculum and in ICT use, integration of ICT into existing curricula, skills and application of ICT, management of ICT in schools, and educational and learning theories. Before conducting an in-service course for the teachers in the field, there is a need to carry
out a needs assessment to determine the gap to be filled by the intended course. This way the reluctant teachers would feel encouraged to attend these specific and tailor made courses which would motivate them to embrace ICT integration in their classroom work Buckenmeyer (2010). Thorough teacher preparation is necessary in equipping teachers as they embark in integrating ICTs in their teaching and learning work. This is necessary as teachers are normally under pressure to incorporate ICT into their class work (Murphy & Gunter, 1997). Teo (2008) cited in Laaria (2013) asserts that it is the inability of teachers to understand why they should use ICTs and how exactly they should use them that proves to be a barrier to implementation of ICT in schools. Teachers, therefore, need to know where to use ICT, when is most appropriate to use it and more importantly how do they integrate technology in the curriculum (Groff & Mouze, 2008).

Duplessis (2010) identifies three types of ICT integration, the first being learning about computers without any link to classroom practice. The second is full integration with traditional goals whereby computer is just used as transmitter of knowledge resulting to just learning from the computer and the third is full integration with constructivist learning space and context, implying that computers are taken as meditational or transformational tools resulting to learning with or through using computers. Poole (1998) as cited in Muchiri (2008) asserts that, teachers in the United States are using computers to prepare teaching and learning materials. They are able to produce syllabi, Schedules and classroom materials in a more professional and efficient manner using computers.
In Kenya, ICT usage has not gone beyond computer literacy training (GoK, 2005; Mutuma, 2005). Karsenti et al. (2011) asserts that the ICT curriculum in force today does not deal with how computers can be utilized to bring transformation in the teaching and learning in Kenyan schools but just concentrates in teaching about computers. The inclusion of ICT in the teacher education curriculum is a big step forward in ensuring that the primary school teachers are equipped with ICT knowledge and skills that will go on to improve their pedagogy of teaching. The teacher Training colleges (TTCS) are under great pressure to adopt innovative methodologies and to integrate New Information and Communication Technologies (NICTS) in the teaching and learning process to prepare students with the knowledge and skills they need in the 21st century (MoEST, 2014). As the teaching profession evolves from the traditional teaching methods to embrace constructivist learning, the role of a teacher educator needs to be redefined. This changing scenario generates demands on the teacher who goes on to shoulder additional responsibilities. Those responsibilities, according to the cabinet secretary, Ministry of education, science and Technology include; acting as a role model for pre-service trainees and in service teachers, demonstrate the use of technology across the curriculum, encourage technology integration among the trainees, colleagues, teachers and parents, interact through e-mail and blogging forum with trainees, communities, participating schools and parents, planning, designing and demonstrating the use of multimedia applications for instructional use through multimedia projects, examining a variety of evaluation and assessment tools including electronic portfolio assessment, becoming active, competent online users of telecommunication services, acting as models in the use of internet as an
instructional tool and directing trainees and teachers to digital resources that will be able to answer their questions (MoEST, 2014).

2.5 Initiatives to Integrate ICT in Teaching and Learning

The potential of the ICTs is yet to be exploited in Kenyan primary schools. Teaching and learning will be transformed by the implementation of ICT where research has shown that the pupil’s understanding, motivation, retention and collaboration among others are enhanced by the use of ICT in the classroom. However, the provision of computers alone won’t work magic, other factors among them effective teacher preparation in ICT, teacher attitudes, strategy and a vision of how the curriculum and instruction will evolve in a world where technology is rapidly changing need to be taken into account so as to educate the Kenyan child for the 21st century. The Kenya Institute of Curriculum Development (KICD) has taken a significant step in promoting and developing specific e-learning resources that would address the educational needs of schools. According to Kairo (2013), the digitization of the curriculum is on-going and an ICT curriculum has been introduced at teacher training level. KICD has partnered with the private sector to promote ICT use in education. In her study, Kairo (2013) says KICD through the Tafakari Mindset project has already digitized the curriculum for Mathematics and Science. Through the Kenya ICT Trust Fund, the Kenya e-schools program is helping to develop the teacher capacity by integrating ICT into the curriculum with the conviction that pupil activities that would prove to be difficult or impossible would be supported by technology. The Kenya e-schools initiative has already provided schools with complete suites that contain digital content with clear pupil learning objectives, evaluation strategies and interactive packages which offer presentation and
dissemination of content in different multimedia such as video, graphic, virtual reality, simulations, animations, music, audio, including interactive and gaming elements among others (Kenya ICT Board, 2013).

The British Council has partnered with Microsoft in establishing 18 digital hubs in schools to soar up support for the government’s commitment to improving access and training for teachers and pupils in the country. The digital hubs will serve as ICT centers for teachers, pupils and the wider communities around them. In order to provide a wider broadband connectivity, the British council has also partnered with Bharti Airtel to upgrade the infrastructure in all the digital hubs. Kalimoni primary school, one of the schools in British Council network of schools on a project called ‘connecting classrooms’ has a digital hub which serves 4 more nearby schools and the communities around Nairobi County (British Council, Kenya, 2014). It was launched in September, 2013 and was used as a model hub. Under the Spark a Child Digital Future Project (SCDF), 14 digital hubs were installed in 14 schools in Matete in Western Kenya in January, 2014. All the schools in Matete received laptops and desktops for use in learning. In addition, a printer, scanner and a project were also installed.

Through Sessional paper number 14 of 2012; the government reiterates its commitment to integrate ICT across all levels of subjects and education by recognizing that ICT is a major vehicle for teaching and learning. Subsection 79(i) of the Sessional paper goes on to state that the government will require all teachers and education managers to be ICT literate by 2015 and that e-curriculum should be in place by then. There has been a re-launch of the revised 2013/2014 ICT master plan that has been tweaked to include the Jubilee governments’ digital manifesto.
The revised plan banks on increased access to cheaper ICT solutions to propel Kenya towards being the regional ICT hub by the year 2018. This plan expects stronger participation from the education sector by the year 2017 by turning the spotlight on ICT academics and is anchored on three major foundations: ICT human capital and workforce development, integrated ICT infrastructure and integrated information infrastructure (Standard Newspaper, April, 21st 2014). According to the Energy Cabinet Secretary (2014), 5,000 primary schools out of the targeted 11,000 primary schools have already been connected to the national power grid and the remaining 6,000 schools would be connected by the year 2015. Twenty nine counties are connected to the fibre-optic network, according to the Information and Technology Cabinet Secretary; the remaining eighteen counties were to be connected by the year 2015. This would also see 10,000 primary schools connected to the internet as part of e-learning (Gitonga, 2014).

2.6 Summary and Identification of Gaps

ICTs are set to become an integral part of primary education and in order to move with the 21st century demands; there is a need to incorporate technology in the school curriculum. Kenya’s ICT Policy on education articulates the use of ICT in educational institutions, so as to improve the quality of teaching and learning, promote distance and virtual education as well as integrate e-learning resources. But despite the strong emphasis given to e-learning in education, little has been done to evaluate how prepared the primary schools are to roll out e-learning. This study, therefore seeks to fill this gap. Negligible effort has been made to finding out the beliefs and attitudes of primary school teachers in incorporating technology in the curriculum. Since teachers play a critical role in any curriculum innovation, their
beliefs, attitudes and skills level among other factors will influence the decisions they make when integrating technology in their class work. Very few studies are known to have attempted to determine these factors in public primary schools. Currently, majority of the available studies focus on ICT integration in education at the post primary level. To fill the knowledge gap that exists in literature, this study set out to establish the preparedness of teachers in integrating ICT in teaching and learning in public primary schools in Kenya.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction
This chapter focuses on research design, target population, location of the study, sample and sampling procedure, research instruments, data collection procedure and data analysis.

3.2 Research Design
The study adopted a descriptive survey design. In descriptive survey, structured questionnaires are used to collect data from a representative sample of the study population and the study findings are generalized to the target population (Orodho, 2005).

Creswell (2003) notes that, a descriptive survey design helps to gather information about the present and existing condition of a phenomena under study. Descriptive survey is suitable since the study sought to determine the preparedness of public primary schools in integrating ICT in the school curriculum.

3.3 Study Locale
The study was carried out in Thika West District in Kiambu County. The justification for picking on this locale was that the government of Kenya is in the process of integrating ICTs in all public primary schools and therefore it was important to investigate how prepared teachers are. The location forms an ideal setting for the study because Kiambu County has relatively good infrastructure developments such as good roads, there is connection to the national power grid and
the major internet service providers (ISPs) have covered the region well. Indeed 98% of the county is well covered by mobile network (RoK, 2013). The researcher was well versed with the area and easily created rapport with the respondents.

3.4 Target Population

Specifying the population that is targeted for study is important as it helps the researcher to make decisions on sampling and resources to use (Orodho, 2010). The target population for this study comprised of the teachers and headteachers of all the public primary schools in Thika West District. In Thika West District, there are 17 public primary schools with 17 headteachers and 250 teachers. All the teachers and the headteachers in these schools formed the study’s target population.

3.5 Sample and Sampling Procedure

Orodho (2010) defines a sample as a small part of a large population which is thought to be a representative of the larger population. According to Mugenda and Mugenda (2008), 10% of accessible population is enough for a descriptive study. The study employed stratified sampling and simple random sampling techniques to select the sample. Stratified sampling technique was used to select the participants by categories of headteachers and teachers. Stratified sampling technique was used to ensure that the target population was divided into the two homogeneous strata, and that each strata was represented in the final sample in a population equivalent to its size in the target population. Simple random sampling was used to select the teachers and headteachers who participated in the study from the sampled schools. Simple random sampling method ensured that each member of the target population had an equal and independent chance of being included in the sample. A total of 9
headteachers and 45 teachers representing 52.9% and 18% of the total headteacher and teacher population respectively were picked to form the sample.

Table 3.1: Sample and population

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Sample</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headteachers</td>
<td>17</td>
<td>9</td>
<td>52.9%</td>
</tr>
<tr>
<td>Teachers</td>
<td>250</td>
<td>45</td>
<td>18%</td>
</tr>
</tbody>
</table>

3.6 Research instruments

The study employed a self-administered questionnaire, interview guide and an observation checklist as the research instruments. The self-administered questionnaire contained both close ended and open ended questions based on the research objectives. It was administered to the teachers. This tool was used because it can capture a large amount of data. An interview guide was used for the headteachers. The interview guide helped to gather more detailed information and offered the researcher the chance to be flexible and restructure the question if need be. An observation checklist helped the researcher to gather crucial information that was not captured by the interview guide and the questionnaire.

3.7 Piloting of Research Instruments

According to Orodho (2008) piloting is mainly done to determine the suitability of the research instruments to be used in the study. Piloting helps to detect deficiencies in research instruments. The piloting was done in two schools which were not included in the actual study.
3.7.1 Validity

This is the degree to which results obtained actually represents the phenomenon under study. This was established through close consultation and expert judgment of the supervisors who appraised the research instruments. The content of the questionnaire were then corrected appropriately according to the supervisors guidance.

3.7.2 Reliability

This is the measure to which a research instrument yields consistent results after a repeated trial (Orodho, 2009). Test re-test method which involved administering the same instruments twice to the same respondents within a period of two weeks was used. The two sets of scores from each group were then correlated using Pearson’s products moments correlation coefficient (r).

\[ r = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{n \sum x^2 - (\sum x)^2} \sqrt{n \sum y^2 - (\sum y)^2}} \]

Where

\( x \) = Score of the first test for each respondent, \( y \) = Score of the second test for each respondent, \( r \) = Correlation coefficient of the scores in the two sets and \( n \) = number of respondents.

A coefficient of correlation (r) of 0.8 was obtained. This is higher than 0.75 as recommended by researchers (Orodho, 2009), and as such the instrument was judged to be reliable.
3.8 Data Collection Procedure

Authority to conduct research was sought from Kenyatta University and from the National Council for Science and Technology (NCST) where a research permit was obtained. Consent to carry out the research in Thika West District was obtained from the Sub County Director of Education.

3.9 Data Analysis and Presentation

Data analysis refers to examining the data collected in the survey and making deductions and inferences. The study made use of primary data consisting of both quantitative and qualitative data. In analyzing the quantitative data, the study employed descriptive statistics such as mean, frequency and percentages. This was with the help of Statistical Package for Social Sciences-version 21 (SPSS v.21). Tables and other graphs were used as appropriate to present the data findings. Qualitative data was analysed using content analysis, through developing a thematic framework from the key issues, concepts and themes emanating from the open ended questions (Nsubuga, 2006).

3.10 Logistical and Ethical Issues

Prior arrangements were made with the schools to confirm the dates for data collection. An informed consent was sought from all the respondents so that the respondents participated voluntarily. The information collected was treated confidentially and used for the purpose of the study only.
CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the result of the findings of the study guided by the set objectives. These include; establishing the ICT infrastructure that has been put in place in public primary schools in Thika West District, determining the attitudes and perceptions of primary school teachers towards the use of ICT in public primary school, assessing the level of training of teachers in use of ICT in public primary schools and finding out the initiatives schools have taken to integrate ICT in teaching and learning. This chapter has five sections. The first section presents the bio data of the sampled 45 teachers and the 9 Head teachers, the successive second; third, fourth and fifth sections are the findings of the set objectives.

4.2 Bio Data of the Respondents

The bio data that was sought from the respondents in this study included; gender, age, professional qualifications, teaching experience, website present, classes taught and teachers trained in ICT in the schools. The findings were as presented in tables 4.1(a) and 4.1(b).
Table 4.1a: Demographic information of the respondents

<table>
<thead>
<tr>
<th>Demographic information</th>
<th>Teachers (n = 45)</th>
<th>Head teachers (n = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>37.8</td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>62.2</td>
</tr>
<tr>
<td><strong>Ages (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 - 30</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>31 - 35</td>
<td>3</td>
<td>6.7</td>
</tr>
<tr>
<td>36 - 40</td>
<td>10</td>
<td>22.2</td>
</tr>
<tr>
<td>Over 40</td>
<td>31</td>
<td>68.9</td>
</tr>
</tbody>
</table>

From table 4.1(a) majority, 88.9% of the headteachers were aged over 40 with most, 55.6% being female. The same trend is observed with the teachers where majority, 68.9% were aged over 40 years with most, 62.2%, being female. The long teaching experiences of the respondents as shown in table 4.1(b) mirror their ages. Majority, 53.3% of the teachers have got a teaching experience of over 20 years. These findings show that the teacher population of public primary schools in Thika West District is composed mainly of the female gender who also constitute the majority in the headship positions of the schools and given their long teaching experiences, they are teachers who have mastery on their subject contents and would know when and how to incorporate technology in their pedagogy. But their long teaching experiences can also work against them, given that many left their teacher training institutions before ICTs had been introduced and that they were taught by tutors and lecturers that could themselves have been ignorant on ICTs. Majority of the headteachers, 66.7% have only served for a period of 1-5 years in the headship.
positions of these schools implying they may not have had enough time to implement their ICT school policies.

Table 4.1b: Qualifications of the respondents

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Teachers (n = 45)</th>
<th>Head teachers (n = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Professional qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undertaking PhD</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>MA</td>
<td>4</td>
<td>8.9</td>
</tr>
<tr>
<td>B.Ed.</td>
<td>10</td>
<td>22.2</td>
</tr>
<tr>
<td>DIP</td>
<td>16</td>
<td>35.6</td>
</tr>
<tr>
<td>P1</td>
<td>12</td>
<td>26.7</td>
</tr>
<tr>
<td>ATS IV</td>
<td>2</td>
<td>4.4</td>
</tr>
<tr>
<td>None committal</td>
<td>2</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Teaching experience

<table>
<thead>
<tr>
<th>Experience</th>
<th>Teachers (n = 45)</th>
<th>Head teachers (n = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>1 – 5 years</td>
<td>2</td>
<td>4.4</td>
</tr>
<tr>
<td>6 – 10 years</td>
<td>3</td>
<td>6.7</td>
</tr>
<tr>
<td>11 – 15 years</td>
<td>10</td>
<td>22.2</td>
</tr>
<tr>
<td>16 – 20 years</td>
<td>6</td>
<td>13.3</td>
</tr>
<tr>
<td>Over 20 years</td>
<td>24</td>
<td>53.3</td>
</tr>
</tbody>
</table>

On their professional qualifications, majority, 55.6% of the headteachers have had exposure to University education while 35.6% of the teachers are trained at Diploma level. This implies that both the headteachers and teachers are knowledgeable and hence can be trained on the use of ICT. These findings agree with Kairo (2013) who found that majority of the teachers in Gatanga public primary schools were females.
but differ in the revelation that the headship positions were dominated by males. Chege (2014) had found majority of the respondents in his study favored the male teachers as the gender most likely to use ICTs in teaching and learning over the female teachers whom they cited as showing little interest in technology. The findings of the current study will be informed mainly by the opinions of the female gender given they are the majority.

**Website Present at the Schools**

The study sought to establish whether the public primary schools in Thika West District had a school website. The findings are as shown in Figure 4.1 below.

![Figure 4.1: Website Present at the Schools](image)

In majority, 88.9% of the schools, the study established there was no website, however, one school, 11.1% had a website. A school website offers a school the means to communicate with the world and in particular the parents and pupils of the school on a range of issues. Through a school website teachers and pupils can display some of the classrooms activities they have achieved when the work is published on the internet which can be done in text, video or sound format. Through
a school website pupils and teachers can interact, for instance, teachers can leave the pupils’ assignments while the pupils keep the completed assignments there for the teachers to mark. To host a website means the school must have invested in such infrastructure such as computers, internet connectivity power connection, and digital cameras among others. According to Chege (2014) majority, 62.5% of the respondents in his study agreed that inability to consistently access computer affected teachers’ readiness to use ICT in teaching while more than half, 54.2% of the respondents cited poor internet connectivity as a main ICT infrastructure challenge faced by the schools. This study found majority of the schools in Thika West district are lacking in ICT equipments which has the implication the schools are far from being prepared to integrate e-learning in the curriculum.

**Classes Taught by the Teachers**

The study sought to establish whether the teachers taught in upper classes or in lower classes. The findings are as shown in Figure 4.2 below.

![Figure 4.2: Classes taught by the teachers](image)

Figure 4.2: Classes taught by the teachers
Most of the teachers, 60.0% are teaching upper primary classes while 40.0% were teaching lower primary classes. For the five teachers that were sampled per school, three came from the upper primary and two from the lower primary. The study wanted to include the views and perceptions of the teachers in upper primary, who form the majority in the schools. The expectation among the general public was that the governments’ initiative on ICT integration in primary education (Laptop programme) would start in upper primary and it was therefore worthwhile to find how prepared teachers in upper primary were to incorporate technology in the curriculum.

Trained ICT Teachers in the Schools As reported by the Head teachers

The study sought to establish the total number of teachers in each of the sampled schools and the number of those who had trained in computer skills. The findings are as presented in table 4.2 below.

Table 4.2: Trained ICT Teachers in the schools as reported by the head teachers

<table>
<thead>
<tr>
<th>School</th>
<th>No. of teachers in school</th>
<th>No. of teachers trained in computer skills</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>5</td>
<td>31.2</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>3</td>
<td>34</td>
<td>26</td>
<td>76.4</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>3</td>
<td>25.0</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
<td>20</td>
<td>87.0</td>
</tr>
<tr>
<td>6</td>
<td>31</td>
<td>5</td>
<td>16.1</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
<td>5</td>
<td>31.3</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td>4</td>
<td>40.0</td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
In these schools, the average number of teachers was 18.9 teachers with a standard deviation of 8.8. The school having the lowest number of teachers was found to have 10 teachers while the school with the highest number had 34 teachers. Among these schools, the highest number of trained ICT teachers in a single school was 26. This represented 76.4% of the teachers in the school. The highest percentage of trained teachers was recorded in a school which had 23 teachers and 20 were trained in ICT, this accounted for 87.0% of the trained teachers in the school.

From table 4.2, majority of the schools have got less than 40% of their teaching workforce who are trained in ICT with even two out of the nine sampled schools having none of the teachers on their staff being trained in ICT. This shows that majority of the schools are lacking in teachers who are skilled in ICT and as such, they are not prepared to implement e-learning. These findings echo those of Nyakowa (2014) who found that all the respondents, 100% had not undertaken a course on multimedia such as using digital video while three quarters had no professional development opportunity related to ICT.

4.3 ICT Infrastructure in public primary schools in Thika West District

4.3.1 Availability of the ICT Equipment in the Schools

Teachers stated the available ICT equipment in their schools as stated in Figure 4.3 below.
Majority of the teachers, 93.3% indicated they had calculators, 88.9% had mobile phones, 48.9% stated they had radios, only 11.1% of the teachers mentioned they had computers while 8.9% indicated there was a digital camera and the same number of teacher reported there was a photocopier. Equipment such as printers was reported by 6.7% of the teachers and the same number of teachers indicated there were flash disks while only 4.4% reported there was a tape recorder. On their part, the headteachers of the nine sampled schools reported the available ICT equipment in their schools as calculators, 88.9%, mobile phones, 88.9%, radio, 88.9% computers, 22.2%, monitors 22.2%, digital camera 11.1%, photocopier 11.1% and printer 11.1%. When asked to indicate how regular they used some of the ICT equipment in the teaching and learning process the teachers responded as indicated in Table 4.3 below.
Table 4.3: Teachers use of ICT equipment

<table>
<thead>
<tr>
<th>Equip</th>
<th>Usage (N = 45)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very often</td>
</tr>
<tr>
<td>Radio</td>
<td>1 (2.2%)</td>
</tr>
<tr>
<td>Television</td>
<td>-</td>
</tr>
<tr>
<td>Computer</td>
<td>-</td>
</tr>
<tr>
<td>Internet</td>
<td>-</td>
</tr>
<tr>
<td>Overhead projector</td>
<td>-</td>
</tr>
<tr>
<td>Digital camera</td>
<td>-</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>11 (24.4%)</td>
</tr>
</tbody>
</table>

On a Likert Scale of ranks 1-4 (1 - very often, 2- often, 3- Occasionally, 4 – Never ) the findings show that the mobile phone was the most regularly used ICT equipment (Mean rank 2.58). This was followed by the radio which recorded a mean ranking of 3.38. The least frequently used ICT equipment was the computer which had a mean rank of 4.00 showing it was never used. The respondents revealed how the ICT equipment were used in teaching and learning:

**Calculators**

This equipment is reported to be readily available in majority of the sampled schools largely due to its affordable price and given that little technical skills are needed to operate a calculator. This equipment was reported to be mainly used during exam analysis where teachers use it to compute the pupils’ scores. A few of the teachers, those teaching mathematics reported using the calculator in working out solutions to
maths homework assignments since it is faster than when doing it manually. However, only 4.8% reported the calculator is adequate in schools.

**Mobile Phones**

It is worth noting that these ICT equipment though widely available in schools, were owned individually. No school had purchased mobile phones for school work use by the teachers or the headteachers. Given that the present day mobile phones can multitask, for instance, they can be used to access the internet, send SMS, can be used as a camera, it can be used as a calculator, it is not a surprise that majority of the teachers own one. However, when asked how frequently they used this equipment, only 40% of the teachers were reported to very often and often use it in their teaching and learning work with 37.8% reporting to occasionally use it. Almost a quarter said they have never used the mobile phone in their teaching and learning work. As to how exactly they were using it in teaching and learning, majority reported using it to search for reference material with the language teachers mentioning they use it to find the meaning of difficult words. The other use that was widely mentioned is when the mobile doubled as a calculator. These findings agree with Gatama (2013) that mobile phones have become useful tools to access internet and download information by teachers.

**Radio**

The radio was reported to be available by 88.9% of the headteachers and 48.9% of the teachers. This disparity in reporting is due to the fact that in many schools, the radio had been shelved in the headteachers office when it broke down and as such, some teaches never knew that a radio existed in the school. But even in schools where the radio was functional, cumulatively, it was only 15.5% of the teachers who
very oftenly and oftenly used it, with 26.7% reporting to occasionally use the radio while majority, 57.8%, reported to never use it, as indicated in table 4.4. When asked why many of the teachers were not using it, some headteachers reported the unavailability of the radio broadcast lesson timetable from KICD with others reporting that the lessons broadcasted were either behind or ahead of what the schools had covered or not covered in their schemes of work. The other reason advanced was that the radio was inadequate to serve a combination of two classes where the schools had more than one stream given that the classes were overcrowded and there is only one radio that was available. These findings align with the study by Obonyo (2013) who found that the radio was available and adequate in only 37.5% of the schools sampled. In the current study, the respondents reported the radio was not adequate.

**Computers**

The computers were reported to be available by only five teachers, representing 11.1% of the teacher population, however, 22.2% of the headteachers which represents two schools said they had computers in their schools, but it is only in one school where the only one computer was functional. When asked how regular they used the computer for teaching and learning work, all the teachers reported never to have used it citing the inaccessibility of the computer given it was placed in the office of the school clerk where it was used for office work. This was confirmed by the headteacher of the school who reported the computer was meant for administrative purposes such as storing pupils’ records on enrolment and typing and printing of end of term newsletters to parents. A number of reasons among them lack of computers could be an impediment to teachers not using the computers in the
teaching and learning process. These findings align with Nyakowa (2014) who had found that there was a serious shortage of ICT equipment in her sampled schools in Webuye where only 4.2% of the schools had a desktop computer, 1.1% had a desktop computer that had internet connectivity and none of the schools had a laptop or notebook computer.

**Digital Camera**

This was reported to be present in one school, 11.1% and it was mainly limited for use in the special units class where it is used in conjunction with a personal computer to perform various tasks like taking photos of various objects to make a class photobook, geometrical shapes of various figures among others. However, majority of the teachers, 91.7% reported to never have used it in teaching and learning as indicated in table 4.4.

**Flash Disks**

These are necessary equipment for storing school and classwork in digitized form, and given the voluminous paperwork, especially in lesson planning and during the setting and typing of continuous assessments tests and end of term exams, flash disks would help in curbing the costs involved but it is only 6.7% of the teachers who reported using them. In Wanga (2014) study, 37% of the respondents were reported not to have flash disks while only 18.5% stated the equipment was adequate. The low level of use of this equipment implies teachers are not well prepared for e-learning.
Photocopier and the Printer

These equipment were reported to be available in only one school, 11.1%, which also had connection to the national power grid. However, the one photocopier and one printer machine were small in size and not meant to cater for high numbers of pupils especially in public primary schools in Thika West district that were reporting an average of 50 and above pupils in a class. These equipment were also slow in speed and could only be used in light work, like making copies of memos to teachers, school management committee members, County Director of education and other education officials. Karsenti (2011) had established the lack of modern teaching equipment in institutions of learning which run on nearly obsolete systems.

Monitors

The monitors were reported to be available in only two, representing 22.2% of the sampled schools. These equipment are meant to be used together with the computer. But as this study observed, these equipment had been donated to the two schools and they did not have computers. The functionality of the equipment was in doubt as they were old models and in one of the schools, there was no connection to the national power grid which meant the equipment could not be immediately used. These findings agree with Mungai (2011) who noted that donated, old and obsolete computers are found in some of our schools.

Equipment not available

Other ICT equipment such as the television, overhead projectors, microphone for audio recording and DVD players were not available in any of the sampled schools. These findings echo those of Kairo (2013) who in her study revealed that none of the primary schools in Gatanga had a T.V. set, microphone for audio-recording, video
cassette, film projector and overhead projector. A parallel study by Wanga (2014) conducted in Nakuru County revealed that majority of the schools, 54% didn’t have ICT equipment that included; projectors, DVDs, flash disks and monitors with only 8.69% of the schools under study indicating the ICT equipment was available and adequate.

Various factors could be contributing to the lack of these equipment in schools for instance the cost of these equipment could be beyond the budgets of the schools which rely only on the government for funding. The free primary money is never enough for the intended purposes in the first place let alone for other procurements. Though nearly two out of three schools have got electricity, as this study has revealed, power connection is limited to the administrative and the staffroom offices. Electricity has not been extended to the classrooms where the prerequisite infrastructure of wiring, cabling and fixing the sockets and switches has not been done. Another possible reason could be that most of these equipment have to be used in conjunction with another equipment, for example, the DVD player needs CD-ROMs and a monitor to show the output, the microphone would have to be used with another tool like a laptop, overhead projector would require extra cabling and transparencies and a screen, these call for extra costs that could have been overlooked. Another factor that should not be overlooked is that some of the teachers may not be conversant with these equipment as they were not exposed to them and therefore shy off from using them. Where to store these equipment is a challenge to the schools, and as this study has revealed, three quarters of the teachers indicated the schools do not have safe and secure storage of the ICT equipment. Some equipment is heavy and fragile while others are delicate and sensitive to dust;
a specially built room is needed to store them. Rampant theft and break-ins have been reported in many schools, reinforced doors and burglary proofed windows are needed in these specially built rooms but this was not the case as has been revealed by this study where staffrooms were being used as the storage rooms for the little ICT equipment available.

The preparedness of schools in integrating ICTs in teaching and learning in Thika West District is far off the mark judged from the infrastructure available and this is confirmed from the respondents who all agreed that none of the ICTs equipment that was available was adequate in meeting the needs of both the pupils and the teachers. Wanga (2014) had established that availability of ICT infrastructure influences the level of integration in the curriculum and that it is those teachers in schools that have been provided with more infrastructure that are more likely to incorporate ICT in the curriculum.

4.3.2 Schools connection to National Electricity Power grid

In Thika West Public Primary Schools, 33.3% of the teachers stated that their schools were not connected to the national electricity power grid. This implies that they do not have electric power in the schools. This study however, observed that though 66.7% of the schools that had been sampled had been connected to the mains electricity, the supply of electricity was limited to the administration and the staffroom offices. It is only in 11.1% of the schools which translates to one school where power had been transmitted to the classrooms. In the other schools which had electricity, little evidence was there to show that work was going on to do the wiring, cabling, fixing the sockets and the switches among the other basic prerequisite infrastructure that has to be put in place. Lack of electricity in the
classrooms has implications on how prepared the schools are in integrating ICTs in teaching and learning for even if the ICT tools are available, they may not be of any use in the classroom if the teacher cannot connect them to the power supply. The government has done a commendable job by connecting majority of the schools to the national power grid but it should not stop there, it should avail funds so that schools can get the power transmission extended to the classrooms. Access to good quality electricity is a basic prerequisite if schools are to successfully integrate ICTs in the curriculum (Laaria, 2013). In the schools which had electricity, 26.7% had internet connectivity while 73.3% had no internet connectivity. This result showed that there was a significant association in having electricity in schools and having internet connection ($\chi^2 = 4.865$, P-value = 0.027). This indicated that having electricity influenced having internet connectivity in the schools. For the computers and mobile phones to access the internet, they need electricity to drive them. In the current study, only one school, 11.1% had internet connectivity which it was accessing via a prepaid modem. As noted in the observation checklist, this connected computer was meant to serve administrative purposes, it was located in the school clerk’s office adjacent to the headteacher’s office and as such it could not be fully accessible to the teachers. In her study, Goko (2012) found that majority of the schools that had internet connection were relying on prepaid modems. This connection is unstable, as it is erratic and incurs high bills. Ombui (2011) in his study had observed that none of the schools in his sample had internet connection though the schools had acquired some modems but could not connect due to high internet costs. High internet cost could be among the factors that are contributing to low internet use in schools in Thika West District as indicated by a low, 13.3% of
the teachers who reported to occasionally use the internet with the implication that schools are far from being ready in integrating ICTs in teaching and learning.

4.3.3 Maintenance of ICT equipment in the schools

Three quarters of the teachers stated that their ICT equipment is maintained by a hired consultant while only a quarter stated that they are maintained by the teacher who has been appointed the ICT coordinator.

These findings agree with the conclusion made in Goko (2012) study, that there is little technical support in schools and three quarters of the teachers in her study agreeing that high costs of computer maintenance and upgrading was limiting the teachers access to ICTs. As noted during the interview with the headteachers, there were schools which had shelved their radios when they broke down and in one of the schools which reported to have computers, the only one computer they had could not function for it had broken down and was shelved due to the high costs demanded for repairs. This concurs with Laaria (2013) who asserts that maintenance and repairs of ICT equipment in many developing nations is unaffordable.

4.4 The attitudes and perceptions of primary school teachers towards use of ICT

The teachers’ attitude and perception were gathered by their views on the tested statements to establish their levels of agreement. The findings are as illustrated in table 4.4 below.
Table 4.4: Teachers’ attitude and perception towards ICT

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers are difficult to use</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>19</td>
<td>19</td>
<td>4.09</td>
</tr>
<tr>
<td></td>
<td>(4.4%)</td>
<td>(8.9%)</td>
<td>(2.2%)</td>
<td>(42.2%)</td>
<td>(42.2%)</td>
<td></td>
</tr>
<tr>
<td>Computers need to be used only in Maths and science</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>13</td>
<td>25</td>
<td>4.23</td>
</tr>
<tr>
<td>subjects</td>
<td>(6.7%)</td>
<td>(6.7%)</td>
<td>(2.2%)</td>
<td>(28.9%)</td>
<td>(55.6%)</td>
<td></td>
</tr>
<tr>
<td>Use of ICT can help make difficult topics easy to</td>
<td>26</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1.49</td>
</tr>
<tr>
<td>understand</td>
<td>(57.8%)</td>
<td>(40.0%)</td>
<td>(2.2%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male teachers are better than female teachers in</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>11</td>
<td>29</td>
<td>4.40</td>
</tr>
<tr>
<td>computers</td>
<td>(4.4%)</td>
<td>(4.4%)</td>
<td>(2.2%)</td>
<td>(24.4%)</td>
<td>(64.4%)</td>
<td></td>
</tr>
<tr>
<td>ICT makes it easier to respond to the needs of the</td>
<td>22</td>
<td>19</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>1.62</td>
</tr>
<tr>
<td>pupils</td>
<td>(48.9%)</td>
<td>(42.2%)</td>
<td>(6.7%)</td>
<td>(2.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT motivates pupils to learn more</td>
<td>34</td>
<td>11</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>(75.6%)</td>
<td>(24.4%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT will make the work of teacher easier</td>
<td>30</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>(66.7%)</td>
<td>(26.7%)</td>
<td>(4.4%)</td>
<td>(2.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT makes learning pupils centered with the</td>
<td>28</td>
<td>17</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.38</td>
</tr>
<tr>
<td>teacher being the facilitator</td>
<td>(62.2%)</td>
<td>(37.8%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT makes the lessons more interactive</td>
<td>26</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
<td>(57.8%)</td>
<td>(28.9%)</td>
<td>(6.7%)</td>
<td>(4.4%)</td>
<td>(2.2%)</td>
<td></td>
</tr>
<tr>
<td>ICT needs to be used by newly graduated teachers</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>7</td>
<td>35</td>
<td>4.62</td>
</tr>
<tr>
<td>only</td>
<td>(4.4%)</td>
<td></td>
<td>(2.2%)</td>
<td>(15.6%)</td>
<td>(77.8%)</td>
<td></td>
</tr>
<tr>
<td>The use of ICTs makes me a more effective teacher</td>
<td>19</td>
<td>18</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1.91</td>
</tr>
<tr>
<td></td>
<td>(42.2%)</td>
<td>(40.0%)</td>
<td>(6.7%)</td>
<td>(6.7%)</td>
<td>(4.4%)</td>
<td></td>
</tr>
<tr>
<td>Anything that a computer can be used for, I can do</td>
<td>7</td>
<td>11</td>
<td>2</td>
<td>19</td>
<td>6</td>
<td>3.13</td>
</tr>
<tr>
<td>just as well in another way</td>
<td>(15.6%)</td>
<td>(24.4%)</td>
<td>(4.4%)</td>
<td>(42.2%)</td>
<td>(13.3%)</td>
<td></td>
</tr>
</tbody>
</table>

Majority of the teachers in this district strongly agreed that use of ICT motivates pupils to learn more (75.6%) and use of ICT will make the work of teachers easier (66.7%). Most of the teachers strongly disagreed that ICT needs to be used by newly graduated teachers only (77.8%) and strongly disagreed that male teachers are better than female teachers in computers (64.4%).
When using a likert scale of 1 – 5 (1-Strongly agree, 2-Agree, 3-Undecided, 4-Disagree, 5-Strongly disagree) for ranking the teachers respondent, the result showed that, the teachers use of ICT motivates pupils to learn more, a mean rank of 1.24 and they feel that use of ICT will make the work of teachers easier, mean rank of 1.24. They also believe that use of ICT makes learning pupils centered with the teacher being the facilitator, mean rank 1.34. Teachers also feel that use of ICT can help make difficult topics easy to understand, mean rank of 1.49.

In addition, the headteachers’ attitude and perception were gathered by their views on the tested statements to establish their levels of agreement. The findings are as presented in table 4.5 below.
<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers are difficult to use</td>
<td>1(11.1%)</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>3</td>
<td>4.00</td>
</tr>
<tr>
<td>Computers need to be used only in Maths and science subjects</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>6</td>
<td>4.70</td>
</tr>
<tr>
<td>Use of ICT can help make difficult topics easy to understand</td>
<td>6(66.7%)</td>
<td>3(33.3%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.30</td>
</tr>
<tr>
<td>Male teachers are better than female teachers in computers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>5</td>
<td>4.60</td>
</tr>
<tr>
<td>ICT makes it easier to respond to the needs of the pupils</td>
<td>6(66.7%)</td>
<td>3(33.3%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.30</td>
</tr>
<tr>
<td>Use of ICT motivates pupils to learn more</td>
<td>9(100%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>Use of ICT will make the work of teacher easier</td>
<td>8(88.9%)</td>
<td>1(11.1%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.10</td>
</tr>
<tr>
<td>Use of ICT makes learning pupils centered with the teacher being the facilitator</td>
<td>6(66.7%)</td>
<td>3(33.3%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.30</td>
</tr>
<tr>
<td>Use of ICT makes the lessons more interactive</td>
<td>8(88.9%)</td>
<td>1(11.1%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.10</td>
</tr>
<tr>
<td>ICT needs to be used by newly graduated teachers only</td>
<td>1(11.1%)</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>6</td>
<td>4.30</td>
</tr>
</tbody>
</table>

SA-Likely agree, A-Like, U-Undecided, D-Disagree, SD-Strongly disagree
From tables 4.4 and 4.5 above, it can be seen that there are respondents who strongly agreed and strongly disagreed with the stated statements.

4.4.1 Respondents strongly agreeing:

ICTs motivate pupils to learn more

All the headteachers and three quarters of the teachers were in agreement that the use of ICTs motivates pupils to learn more. The respondents felt that ICTs would enhance pupils learning by arousing and maintaining pupil’s interest in their learning. While traditional teaching and learning methods have put emphasize on content gathered from textbooks, through tutorials and lectures, they have been viewed as rather dull and boring to the pupils because of being too much teacher-centred and lack of flexibility in giving the learner a choice as to when, where and when to do their learning. The integration of ICTs in teaching and learning, on the other hand has been seen as providing information in differentiated multimedia such as graphics, text, video and simulations that are able to capture the learners interest. This in turn enhances the learner’s concentration span on the educational task at hand. ICTs are also seen to support and encourage independent learning where the learner is able to explore and express their imaginations which all go to make the pupils learning to be fun and enjoyable. These finding agree with Kinuthia (2012) who found majority of the teachers in his study were in agreement that ICTs motivate pupils.

Use of ICT will make the work of teacher easier

Majority, 88.9% of the headteachers and 66.7% of the teachers had the perceptions that the work of the teacher would be simplified by use of the ICTs. The respondents mentioned areas such as time table making, exam analysis and ranking of the pupils
in zonal and internal school exams, downloading of reference material, use of computer dictionary to find the meaning of words, easy access of revision material for all it required is to download digitally stored questions, print and photocopy just at the click of a button. Kinuthia (2012) had made similar findings where all the teachers had agreed that the work of the teachers is simplified by use of ICT.

**Use of ICT makes learning pupil centered**

Majority of the respondents 66.7% of the headteachers and 62.2% of the teachers strongly agreed with the stated statement. The respondents opined that with the ICTs at their disposal, the pupils would be driven by their own interest and be able to learn at their own pace, choosing on the method they feel best suits them. The pupils are able to gather as much learning material as they can without having to be spoon-fed by the teacher. The pupil is let to make the decision on what and how they want to do their learning.

**Use of ICT can make difficult topics easy to understand**

Majority of the headteachers, 66.7% and 57.8% of the teachers strongly agreed with the stated statement. Difficult and abstract concepts that pupils find hard to grasp and understand can be demystified with the help of ICTs. The technological capability of a computer to offer a three-dimensional visual display has made the work of the teacher easy who no longer has to worry the manually drawn charts and the two-dimensional diagrams on the chalk-board are not really effective in communicating the learning objective due to poor and inaccurate display. This high quality display enhances the pupils’ conceptualization capability. Through simulations, ICTs can help bring into the classroom the real world experiences which the pupil can quickly and easily connect with. These findings concur with
Kinuthia (2012) who established the use of ICT made abstract concepts more concrete.

4.4.2 Respondents Strongly Disagreeing:

ICTs need to be used by newly graduated teachers only

Majority, 77.8 of the teachers and 66.7% of the head teachers were reported to have strongly disagreed with the stated statement. Newly graduated teachers are relatively young in age and have received their teacher education during the era of IT proliferation when computers, the internet, email, face book among other innovations have become available in homes and in learning institutions (Kidombo, 2010). Newly graduated teachers feel comfortable and at ease when experimenting with the latest technology while the older teachers feel their teaching experience gained over the years put them at a better position as to how they can make pedagogy and technology work best in the classroom environment. This implies they are positive towards ICTs and they are prepared to integrate them in the teaching and learning process.

Male teachers are better than female teachers in computers

Majority of the teachers, 64.4% and 55.6% of the headteachers strongly disagreed with the statement. Some of the respondents who gave reasons for their response opined that, it is the same old myths and stereotypes since their school going days when in primary and secondary school that mathematics and science subjects are meant for boys and not for girls, that are now finding their way in the ICT field. Though some studies have been cited depicting female teachers as having low levels of computer use for reasons varying from limited technology access, lack of interest and skills, the male teachers have been reported as having used ICT in the classroom
more often. The study by Yulselturk and Brulut (2009) as cited in Nyambane & Nzuki (2014) reported that there has been a shift over the past years which have seen more female teachers than their male counterparts use technology.

The findings of this study reveal that more female respondents, 20 female teachers and 4 female headteachers, representing 70.6% of the female respondents are trained in ICT than their male counterparts where 9 male teachers and 2 male headteachers, representing 55% of the male gender population are trained in ICT. This implies that more female teachers are likely to be using ICTs in their classroom work than the male teachers.

Computers need to be used only in Maths and Science Subjects

Majority of the respondents 66.7% headteachers and 55.6% of the teachers strongly disagreed with the statement. They cited examples where application programs such as word processors, for instance Microsoft word are being used in language subjects to improve on the reading and writing skills of the pupils. Drawing programs such as Microsoft paint are helping the pupils discover and exploit their potentials in arts. When connected to a peripheral device such as a microphone or a digital camera, the versatility of the computer is even increased enabling it to record and play back such activities as plays, songs, speeches, dances, dramas and skits for teaching in any subject where the content is relevant. Digital photographs of landscapes such as mountains, rivers, urban and rural dwellings are being used in geography lessons to enhance the pupils’ understanding while simulations and virtual archives allow pupils to visit museums giving access to a wide range of historical material. According to Becta (2007) research, ICT is getting embedded in many of the subjects in the school curriculum.
4.5 Level of training of teachers in the use of ICTs

The study sought to establish whether the respondents were trained in ICT. The findings are as shown in table 4.6 below.

Table 4.6: Where the teachers and the Head teachers received their ICT training

<table>
<thead>
<tr>
<th>Whether trained in ICT</th>
<th>Teachers</th>
<th></th>
<th>Head teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f(n = 45)</td>
<td>%</td>
<td>f(n = 9)</td>
</tr>
<tr>
<td>Yes</td>
<td>29</td>
<td>64.4</td>
<td>6</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>35.6</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training on ICT</th>
<th>Teachers</th>
<th>%</th>
<th>Head teachers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial college</td>
<td>9</td>
<td>31.0</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>School organized training</td>
<td>1</td>
<td>3.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TTC/University</td>
<td>4</td>
<td>13.8</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>Self taught</td>
<td>15</td>
<td>51.7</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

When asked to state whether they were trained in ICT, 66.7% of the headteachers and 64.4% of the teachers stated they were trained in ICT. As shown in table 4.6 above, majority (51.7%) of the teachers and 33.3% of head teachers indicated that they were self taught in computers which meant that they had acquired basic computing skills without being formally trained in ICT. When asked to indicate from where they received their training, 31% of the teachers indicated they were trained from commercial colleges, 13.8% from TTCs/Universities with only 3.4% getting their training from school organized training. The headteachers indicated that, 33.3% were trained in commercial colleges, and 33.3% from TTCs/Universities with none getting training in the school organized training.
These findings show that more teachers are getting their training in ICT from commercial colleges with very few respondents benefiting from school based training. This could be a result of various factors among them, very few seminars/workshops being organized by the ministry of education, lack of equipment and facilities such as computer labs and not to rule out lack of awareness on the benefits of integrating ICT in education on the part of the headteachers. These finding echo those of Wanga (2014) who found that only 21.7% of the teachers had received their ICT training from seminars/workshops and even fewer than this, 5.8% receiving their ICT training during their teacher training in TTCs/Universities.

4.5.1 Certification of the teachers trained in ICT

Those teachers with some formal training in ICT indicated that 27.6% were trained at common packages level, 10.3% at certificate level and 6.9% at degree level. The headteachers stated 33.3% were trained at common packages level, 16.7% at certificate level and 16.7% at degree level. However, those who had their training at degree level indicated they did it as course unit in their undergraduate studies.

Figure 4.4: Qualifications of the respondents in ICT
This shows that most teachers and headteachers are trained at common packages level. These finding concur with Kairo (2013) who established that majority of the teachers in public primary schools in Gatanga are trained in common packages.

4.5.2 Respondents rating of the relevancy of the training on ICT

The respondents were asked to rate the trainings they had received in ICT in terms of equipping them with skills on lesson planning, lesson delivery and presentation. Majority of the teachers 70.4% stated the training was relevant with 66.7% of the headteachers agreeing that the training were relevant. However, a minority 7.4% of the headteachers indicated they found the training to be not relevant. In Gatama (2013), majority of the respondents reported their training to be slightly relevant.

<table>
<thead>
<tr>
<th></th>
<th>Teachers (n = 27)</th>
<th>Head teachers (n = 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Very relevant</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>Relevant</td>
<td>19</td>
<td>70.4</td>
</tr>
<tr>
<td>Slightly relevant</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>Not relevant</td>
<td>2</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Those indicating it were relevant reported they could type and save their class notes in a computer and that they could use spreadsheets to rank their pupils in the end of term exams. These findings reveal that, though majority of the teachers stated to be ICT trained, they may be far from being well prepared to integrate ICTs in the teaching and learning environment for they were not inducted on the pedagogy of integrating ICTs in the curriculum and as such it is a case of chancing on which method will do in the class. The number of teachers getting trained through school
based training is dismally low at 3.4%. This shows that the Ministry of education is not conducting enough ICT in service programs to prepare its teachers for the role of implementing ICTs in the school curriculum. Failure to provide in service training denies the teachers a chance to acquire knowledge, skills and competencies and also the attitudes necessary to incorporate ICT in the curriculum (Kinuthia, 2012).

4.6 Respondents Competency in Use of ICT

On their own rating of competency, majority, 88.9% of the headteachers and 86.4% of the teachers stated they can connect computer cables to electricity and switch ON and OFF a computer, 68.9% of the teachers and 66.7% of the headteachers indicated they can open, close, save and rename a file while 68.9% of the teachers and 55.6% of the head teachers stated they can search the internet for educational reference materials.

However, only a small number of the respondents, 31.1% of the teachers and 33.3% of the headteachers indicated they have confidence in using spreadsheets to perform arithmetical calculations and graph drawing with only 28.9% of the teachers stating they can use digital camera and computer to produce video for class presentation while only 17.8% of the teachers and none of the headteachers could scan for viruses nor fix basic faults in a computer.
Table 4.8: Teachers’ and Head teachers rating of their competency in use of ICT

<table>
<thead>
<tr>
<th>Competency</th>
<th>Teachers (n = 45)</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can connect computer cables to electricity and switch ON and OFF</td>
<td>38</td>
<td></td>
<td>86.4</td>
</tr>
<tr>
<td>Can open, close, save and rename a file</td>
<td>31</td>
<td></td>
<td>68.9</td>
</tr>
<tr>
<td>Can search the internet for educational reference materials</td>
<td>31</td>
<td></td>
<td>68.9</td>
</tr>
<tr>
<td>Can use the internet for emailing other teachers, parents and pupils on issues related to teaching and learning</td>
<td>22</td>
<td></td>
<td>48.9</td>
</tr>
<tr>
<td>Can scan for viruses and fix basic faults (trouble shoot)</td>
<td>8</td>
<td></td>
<td>17.8</td>
</tr>
<tr>
<td>Can use word processor e.g MS Word to type lesson notes, exam etc.</td>
<td>21</td>
<td></td>
<td>46.7</td>
</tr>
<tr>
<td>Can use spread sheets e.g MS Excel to perform arithmetical calculations and plot graphs</td>
<td>14</td>
<td></td>
<td>31.1</td>
</tr>
<tr>
<td>Can use presentation software e.g PowerPoint for class presentation</td>
<td>14</td>
<td></td>
<td>31.1</td>
</tr>
<tr>
<td>Can use database e.g access to store pupils personal and performance records</td>
<td>16</td>
<td></td>
<td>35.6</td>
</tr>
<tr>
<td>Can use digital camera and computer to produce a video for classroom presentation</td>
<td>13</td>
<td></td>
<td>28.9</td>
</tr>
<tr>
<td>Head teachers (n = 9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can connect computer cables to electricity and switch ON and OFF a computer</td>
<td>8</td>
<td></td>
<td>88.9</td>
</tr>
<tr>
<td>Can open, close, save and rename a file</td>
<td>6</td>
<td></td>
<td>66.7</td>
</tr>
<tr>
<td>Can use the internet for e-mailing other teachers, parents and pupils on issues related to teaching and learning</td>
<td>4</td>
<td></td>
<td>44.4</td>
</tr>
<tr>
<td>Can scan for viruses and fix basic faults (trouble shoot)</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Can search the internet for educational related issues</td>
<td>5</td>
<td></td>
<td>55.6</td>
</tr>
<tr>
<td>Confident using MS Word and MS Excel application programs</td>
<td>3</td>
<td></td>
<td>33.3</td>
</tr>
</tbody>
</table>
4.6.1 Competencies found with majority of the respondents:

Switching ON and OFF a computer

That over 80% of the respondents have this competency is not a surprise. Many of them could relate it to the switching On and Off of such home gadgets like TVs and radios which majorities have in their houses. However, the few who could not, expressed such sentiments like they fear damaging the computer and thus the computer technophobia prevailed. According to Agbatogun (2010), teachers who have not received any training in computer are likely to suffer from technophobia and this is likely to curtail the range of the ICT teaching and learning resources at their disposal.

Opening, Closing and saving a file

Many, 68.9% of the teachers and 66.7% of the headteachers reported to have this competency. While a good number reported to have acquired this skill during their computer trainings, a sizeable number reported to have acquired it through observation when they visited cyber cafes or watched their colleagues, friends and relatives working on their personal computers and then trying it on their own. All were quick to add that they didn’t find it difficult to learn. This competency is necessary if teachers are to be able to store the voluminous school work and in particular the teaching and learning content digitally.

Searching the Internet for educational Material

Majority, 68.9% of the teachers and 55.6% of the headteachers reported it is easy to learn to use the internet given that the modern day mobile phones have got internet connectivity. However, some lamented it takes a long duration of time surfing the internet to get relevant material that they can use in the class. They therefore call for
training on how to quickly surf and access credible sites and skills on how to filter the, unrelated and at times morally unsuitable material. According to Nyakowa (2014), teachers will feel comfortable with technology only if they are trained in basic ICT skills and ICT based teaching methods. It is noteworthy that more teachers than headteachers can search the internet for educational reference materials implying that they are making use of this technology to prepare for their lessons. On the other hand, the headteachers are mainly doing administrative work than teaching hence the disparity.

4.6.2 Competencies lacking in many of the respondents:

Scanning for Viruses and troubleshooting

All the headteachers and 82.2% of the teachers could not scan for viruses and fix basic faults (troubleshoot). Many of the respondents felt this is a skill better left to people with specialized knowledge in computers such as technicians. Some even admitted they didn’t know what a computer virus is and how it attacks a computer. This indicates a knowledge vacuum and thus the need of training the teachers so that they can accelerate their preparation of incorporating technology in the curriculum.

Using digital Camera and Computer to Produce Video for class Presentation

It is only 28.9 % of the teachers who reported they have the skills of combining a digital Camera and a computer to make a video for classroom presentation. Some of the 71.1% teachers who were lacking in this competency admitted they have often seen a digital camera and a computer (laptop) being used in such social functions like weddings and funerals and being operated by hired people but they have never contemplated of how they can incorporate them in their teaching and learning work. This is an indicator that the teachers require training not only on how to operate the
equipment but also on how to integrate them in the teaching and learning environment. According to Dogan (2010), teachers need not only to be well grounded in how to use technology but also how to integrate it in their pedagogy.

**Using Spreadsheets to perform arithmetical calculations and plot graphs**

Only a third of the respondents indicated they were confident in using this application software implying that majority of the respondents do not have the skill and hence not competent to use it. This low level of competency implies the teachers are not integrating the software in the curriculum where it could be of great help in drawing charts, graphs, analysis of examination results, finding trends and also assist in making predictions. This hints, to the need of training the teachers so as to sensitize them on the benefits of using it, how to use the application and how to incorporate it in the curriculum.

These findings concur with Gatama (2013) who established that teachers were good in basic computer functions like file opening, saving and renaming but expressed low confidence in such skills like troubleshooting. Nyakowa (2014) had found that no training on pedagogical use of ICT had been offered with majority 73.7% of the teachers confirming that they had not been involved in any professional development opportunities to update their knowledge and skills on such basic competencies like word, spreadsheets, presentation and databases.

### 4.7 Initiatives taken by schools to integrate ICTs in teaching and learning

Head teachers stated the initiatives taken by schools to integrate ICTs in teaching and learning in their respective schools as shown in table 4.9. In all the schools, the headteachers encouraged the teachers to use their mobile phones to search for
educational materials from the internet, in 88.9% of the schools, the teachers were encouraged to attend ICT seminars and workshops while in 77.8%, the teachers were encouraged to own personal computers. However, in majority of the schools, 88.9%, there is no ICT policy, no provision for ICT budget and the schools have never sought for donors to fund the ICT budget. These findings agree with Abdul & Zohora (2012) cited in Mue (2014) who established that 80 % of the schools in Malaysia did not have a school ICT policy.

Table 4.9: Initiatives taken by the schools to integrate ICT

<table>
<thead>
<tr>
<th>Statement</th>
<th>No. of schools</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encourage teachers to own personal computers to aid in the teaching/learning process</td>
<td>7</td>
<td>77.8</td>
</tr>
<tr>
<td>Encourage teachers to store their class work in soft copy form</td>
<td>7</td>
<td>77.8</td>
</tr>
<tr>
<td>Encourage teachers to use their mobile phones to search for the educational materials from the internet</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>The school has an ICT policy</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>The school has a provision for ICT budget</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>The school has sought for donors to fund the ICT budget</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>The school encourages teachers to attend ICT seminars/workshops</td>
<td>8</td>
<td>88.9</td>
</tr>
<tr>
<td>The school has sought for technical support from the government, ICT suppliers, consultants etc.</td>
<td>3</td>
<td>33.3</td>
</tr>
</tbody>
</table>
When asked to state their agreements to the statements concerning the schools’ initiatives majority, 62.2% of the teachers indicated that the schools encouraged them to use mobile phones to access educational reference material from the internet while 44.4% stated the schools encouraged them to own personal computers with only 33.3% of the teachers indicating the schools encouraged them to store their class work in digital form.

Table 4.10: Teachers who agreed to the statements on school initiatives

<table>
<thead>
<tr>
<th>Statement</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>The school encourages teachers to acquire personal computers to aid in the teaching/learning process</td>
<td>20</td>
<td>44.4</td>
</tr>
<tr>
<td>The school encourage teachers to store their class work and exams in soft copy form e.g. flash disks for easy and quick retrieval and to cut on cost</td>
<td>15</td>
<td>33.3</td>
</tr>
<tr>
<td>The school encourages teachers to use their mobile phones to access the current research and educational reference material from the internet</td>
<td>28</td>
<td>62.2</td>
</tr>
</tbody>
</table>

4.7.1 School encourages teachers to use their mobile phones to access educational reference material

Some of the reasons advanced for the headteachers strong advocacy for the use of mobile phone include; majority of the teachers, as revealed in this study own a
mobile phone and thus the equipment is readily available. Majority of the teachers, as established by this study, stated they can access the internet and get educational reference material and thus they are computer literate as per this skill. As long as there is internet connectivity, the teachers can access and download the material anytime and anywhere. The headteachers find this flexibility very convenient for it means teachers won’t miss their lessons with the excuse they have gone to the library to search for reference material. The e-content leaning material accessed through the mobile phone can be digitally forwarded to other teachers thus allowing sharing and collaboration among the teachers and given that e-content material does not require such big physical storage space like in textbooks, the headteachers were relieved of the burden of having to look for storage space.

4.7.2 Schools encourage teachers to own personal computers and store their work in Soft Copy Form

Though majority, 77.8% of the schools had indicated that they encourage their teachers to own personal computers and store their class work in digital form, only 44.4% of the teachers agreed they are encouraged to own personal computers and an even lower number 33.3% agreed that they are encouraged to store their class work in digital format. Teachers felt that the first step towards these initiatives should be to improve the staffroom conditions where infrastructure such as suitable work stations, that is teacher working desks, reinforced and burglar proofed windows and doors and extension of power to the various teacher work stations which are lacking in many schools. However, teachers were of the opinion that these were more of individual teacher initiatives rather than the schools’ which they claimed offered little support, for instances, no school had made any arrangement to have its
teachers acquire laptops at cheaper prices, the schools were not willing to subsidize or refund the teachers who used their money to pay for internet charges or replace the flash disks that got damaged due to virus attacks when they took them to the cyber cafes to print the stored class work. However, teachers questioned how serious the headteachers were in encouraging them to acquire personal computers as they noted that the headteachers didn’t have them. According to Laaria (2013), headteachers must champion the use of ICT in their schools for it is only then, that teachers can rate them highly if they perceive them to be role models.

4.7.3 The school has an ICT Policy

Majority, 88.9% of the schools didn’t have an ICT policy, 88.9% didn’t have an ICT budget and the same number of schools had not sought for donors to fund the ICT budget. A school ICT policy provides a framework for action and interventions the school would take in implementing technology in the curriculum in the future. The school headteacher who is expected to spearhead the formulation of the school ICT policy needs to have a vision of how ICT will integrate in the school curriculum and how it is going to support all the other non essential services to the school. Almost all the schools that were sampled didn’t have an ICT policy, no ICT budget and none had sought for donors to fund the ICT budget. This is an indicator to the reality that little preparation is going on towards embracing ICTs in schools. A number of factors could be contributing to this, among them lack of awareness of the benefits technology will bring to education. According to Afshari et al (2010), it is only after the school principals have understood the benefits of ICT that they will implement innovations in schools. This shows there is a need of offering training to the
headteachers in Thika west public primary schools to sensitize them on the benefits of integrating ICTs in education.

4.7.4 The school encourages teachers to attend ICT Seminars

Majority 88.9% of the schools indicated they encourage their teachers to attend seminars, workshops and conferences on ICT. The headteachers reported they were always punctual to communicate and bring to the attention of all the teachers the circulars from the education officials requiring the teachers to attend. However, a half, 48.9% of the teachers disagreed with this.

![Teachers views on attendance of seminars / workshops](image)

**Figure 4.5: Teachers views on attendance of seminars / workshops**

Some teachers claimed the headteachers were reluctant to facilitate the teachers travel and up-keep, some headteachers were worried pupils would be left unattended given too many schools are suffering from teacher shortages with some teachers claiming the headteachers pick on the same individual teachers always. According to (Kinuthia, 2012) failure to provide in service training denies the teachers a chance to acquire knowledge, skills and competencies and also the attitudes necessary to
incorporate ICT in the curriculum. Other initiatives the schools had taken included, organizing in-house training of the teachers on ICT where an individual school made arrangements with external trainers who brought their computers to the school and other schools reported providing toy computers to pre-primary children in their schools to make the children familiarize with computers.

4.8 Teachers’ Recommendations

The teachers’ recommendations towards increasing preparedness of schools in integrating ICTs in teaching and learning in Public Primary Schools in Thika West district included, the government should offer in-service training in ICT to all the serving primary teachers, all the public primary schools should be equipped, sensitize the pupils, teachers and parents on the benefits of integrating ICTs in education and the government should address the issue of security to safeguard the ICT equipment in schools.

In-Service Training

Majority of the teachers, 73.3% strongly felt that proper logistics should be put in place so that the ICT in-service programs target and benefit all the serving primary school teachers as opposed to the current arrangements where it is only the class one teachers who are being in-serviced.

Equipping the Schools

Slightly more than a third, 35.6% of the teachers recommended the equipping of all the schools in Thika West District with the necessary basic ICT infrastructure ranging from electricity and internet connectivity to provision of computers. To store these equipments safely, the teachers recommended the government should
build computer labs and logistics be worked out on the maintenance of the ICT facilities.

**Sensitization of the Stakeholders**

In order for the ICT innovations to be successfully implemented and adopted in schools, 6.7% of the teachers felt this needed the support of all the concerned, pupils, teachers and parents who can only do so after getting enlightened on the benefits of embracing and integrating ICT in education.

**Safety of the ICT Equipment**

The teachers who expressed strong concerns over the increasing break-ins and theft of school property comprised of 2.2% of the teacher population. They pointed out that, the culprits came from the school neighbourhoods and as such there is need for the school authorities to liaise with the government to provide enough security to schools.
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations. The chapter also presents the suggestions for further research.

5.2 Summary of the Study Findings

The purpose of this study was to investigate the preparedness of teachers in integrating ICTs in public primary schools in Thika West District. Four research objectives guided the study. These included; to establish the ICT infrastructure in public primary schools, to determine the attitudes and perceptions of primary school teachers towards the use of ICT in public primary schools, to assess the level of training of teachers in the use of ICT in public primary schools and to find out the initiatives schools have taken to integrate ICTs in teaching and learning. The study sampled 9 headteachers and 45 teachers out of a population of 17 headteachers and 250 teachers respectively.

5.2.1 ICT Infrastructure in Public Primary Schools

This study established that most schools in Thika West district are connected to the national power grid as indicated by the majority of the teachers, 66%, but internet connectivity is not available even in most of the schools which have electricity as indicated by 73.3% of the teachers who stated they have electricity but no internet connectivity. Mobile phones, though individually owned, and calculators were the most available ICT equipment as reported by over 80% of the teachers followed by the radio, as reported by nearly a half of the teachers. Computers were reported to be
available by only 11.1 % of the teachers and these were used for administrative purposes only as confirmed by the headteachers. Other ICT equipments were reported to be available by less than 10 % of the teachers with none of the schools sampled reporting to have a television, overhead projector, microphone and neither a DVD player. Three quarters of the teachers indicated storage and security of the ICT equipment is a challenge while the same number of teachers indicated that the maintenance of the ICT equipment was done by hired consultants.

5.2.2 Attitudes and Perceptions of Primary School teachers

The study established that an overwhelming majority of the sampled respondents were very positive as indicated by all the teachers who agreed that ICT motivates pupils to learn more, cumulatively, 84.4 % of the teachers disagreed with the statement that computers are difficult to use. This implies that the teachers are eager and willing to adopt ICTs in teaching and learning, all the teachers agreed that the use of ICT makes learning pupil centred with the teacher being the facilitator with 93.4 % agreeing with the statement that the use of ICT will make the work of the teacher easier. This is very encouraging given that attitudes towards ICT are important if its potential is to be realized.

5.2.3 Level of Training of Teachers in ICT

On teacher’s level of training, nearly two thirds of the teachers stated they were trained in ICT. However, majority, 51.7%, of the teachers were self trained. Majority, 57.1% of the teachers who had attended some formal training in ICT i.e. at TTC/University, commercial college or in a seminar/workshop were trained at the level of computer packages. Majority, 86.4%, of the teachers possessed only three competencies i.e. connecting cables to electricity and switching
ON and OFF a computer, files opening, saving and renaming, 68.9%, and searching the internet for educational reference material, 68.9%, of the ten competencies the study asked. These findings imply that the level of training offered is not intensive. Teachers need to be well prepared in ICT not only to navigate round technical barriers e.g. trouble shooting but more importantly on how to integrate ICT in the curriculum.

5.2.4 Initiatives Taken by Schools to Integrate ICTs in Teaching and Learning

On initiatives taken by schools to integrate ICTs in teaching and learning, all the headteachers were reported to encourage their teachers to use their mobile phones to access current research materials where majority, 77.8% of the headteachers were reported to encourage their teachers to own personal computers and store their work in soft copy form. The study also revealed that majority, 88.9%, of the schools did not have an ICT policy, no provision for an ICT budget and the same number of schools had not sought for donors. If ICT ‘culture’ is to take root in our schools, the school leadership should set the pace by showing interest, commitment, as well as modeling the use of ICT in the school. Therefore, it is paramount that school heads should be aggressive in acquiring the ICT skills as well as seeking for the ICT infrastructure not to mention the initiating of the formulation of the school ICT policy in their schools.
5.3 Conclusions

Based on the findings of this research, the study came to these conclusions:

Many of the public primary schools in Thika West district are connected to the national electricity power grid but nearly three quarters have got no internet connectivity. None of the schools has computers devoted for teaching and learning while some of the traditional form of ICT equipment like the television is not available in any of the schools.

Both the teachers and the head teachers were found to be very positive and optimistic about integrating ICTs in teaching and learning. All the teachers agreed that ICT motivates pupils to learn more and that the use of ICT makes learning pupil centered.

This study also concluded that, though nearly two out of three teachers have got some form of computer training, majority of the teachers are self taught. The majority of the teachers who are trained only posses the basic competencies such as connecting cables to electricity and switching on and off a computer, file opening, saving, renaming and searching the internet.

The study came to the last conclusion that, at school level, the schools are not taking many initiatives towards integrating ICTs in teaching and learning as indicated by a majority of the headteachers who stated that there is no ICT policy, no ICT budget and none of the schools has sought for ICT donors for their schools.
5.4 Recommendations

Based on the findings of this research, the study makes the following recommendations:

i. There is need by the government to organize seminars/workshop to sensitize the headteachers on the benefits of using ICTs in education as well as training them on using ICT in education including offering intensive and sustained training in the use of computers for instruction starting at the TTCs/universities to the practicing teachers in the field.

ii. There is need for the school management to liaise with all the relevant stakeholders i.e. the government, school community and parents to see to it that safe and secure storage of the ICT equipment is provided.

iii. The teachers need to be provided with an enabling environment where the necessary ICT infrastructure is provided in all the schools so that they can incorporate technology in the curriculum.

5.5 Suggestions for Further Research

Further research is recommended in the following areas:

i. A study to find out how prepared parents with children in public primary schools are to support e-learning in their schools

ii. A study to explore to what level the private sector is ready to partnership with the government in the provision of ICTs in public primary schools

iii. A study to investigate the relationship between the level of the teachers’ professional training and ICT usage in the classroom
REFERENCES


British Council (2014). *SPARK a child’s digital future Matete launch*.


Dogan, M. (2010). ‘*Primary Trainee Teachers’ Attitudes to and use of computer and technology in mathematics:* The case of Turkey,’ Educational Research.


Ministry of Education Science and Technology (2014). Cabinet Secretary’s Speech During the Kenya Teacher’s College’s Annual Conference on 29th November, 2013 at Milele Beach Hotel Mombasa.


RoK, (2014). The presidency, Republic of Kenya, PSCU. All primary schools will be connected to the national electricity grid by 2015.


APPENDICIS

APPENDIX 1: QUESTIONNAIRE FOR TEACHERS

INTRODUCTION
This is a study that seeks to establish the preparedness of Teachers in Integrating Information Communication Technology in Public Primary Schools in Thika West District, Kiambu County. Your school has been selected for this study and you are identified as one of the respondents. Your honest response to this questionnaire will make this study a success. Answer the questions objectively and provide accurate information to the best of your knowledge. Use a tick [✓] to show your response where applicable, please respond in a written form where required. NB: The information given will be very confidential and only used for the research.

Part A: Demographic information

1. Indicate your gender Male [ ] Female [ ]

2. Indicate your age bracket
   Below 20 years [ ] 21 – 25 years [ ] 26 – 30 years [ ]
   31 – 35 years [ ] 36 – 40 years [ ] Over 40 years [ ]

3. Indicate your highest professional qualification
   PhD [ ] PGDE [ ] MA [ ]
   DIP [ ] B.Ed [ ] P1 [ ]
   Others (specify) ........................................................................................................

4. Indicate your teaching experience
   1 – 5 years [ ] 6 – 10 years [ ] 11 – 15 years [ ]
   16 – 20 years [ ] Over 20 years [ ]

5. Are you teaching in upper or lower primary?
   Upper [ ] Lower [ ]
Part B: ICT Infrastructure in public primary schools

6. Please indicate with a tick [√] the availability or non availability of the following in your school

<table>
<thead>
<tr>
<th>Item</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Television</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video and Audio cassettes recorder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead projector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microphone for audio-recording</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photocopier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tape recorder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital camera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile phone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Film projector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash disks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVD player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scanner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculator(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others, (specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. (a) In your opinion, is the ICT equipment in 6 adequate to meet the needs of all the pupils and teachers?
   Yes [ ] No [ ]

   (b) List down the ICT equipment that are not adequate..........................

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

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

8. Is your school connected to the national electricity power grid?
   Yes [ ] No [ ]
9. Is there internet connectivity in your school?
   Yes [  ]    No [  ]

10. How many computers are available for teaching and learning? ...........................................

11. How many pupils are there per class? ......................................................................................

12. (i) Do you have safe and secure storage facilities for your ICT equipment?
   Yes [  ]    No [  ]

   (ii) Briefly explain your answer above ....................................................................................... 

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

13. Who maintains your ICT equipment?
   Teacher who is an ICT coordinator [  ]
   Hired consultant [  ]
   School technician [  ]
   Others (specify) ...........................................................................................................................

14. Please indicate how regular you use the following ICT equipment in the teaching 
    / learning process

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
</tr>
<tr>
<td>Television</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
</tr>
<tr>
<td>Internet</td>
<td></td>
</tr>
<tr>
<td>Overhead projector</td>
<td></td>
</tr>
<tr>
<td>Digital camera</td>
<td></td>
</tr>
<tr>
<td>Mobile phone</td>
<td></td>
</tr>
</tbody>
</table>
Part C: Teachers’ perceptions, attitudes and beliefs towards information and communication Technology and learning

15. Indicate the extent to which you agree with the following on ICT integration in teaching and learning

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers are difficult to use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computers need to be used only in Maths and Science subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT can help make difficult topics easy to understand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male teachers are better than female teachers in computers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT makes it easier to respond to the needs of the pupils</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT motivates pupils to learn more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT will make the work of teacher easier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT makes learning pupil-centered with the teacher being the facilitator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICT makes the lessons more interactive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICTs need to be used by newly graduated teachers only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The use of ICTs makes me a more effective teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anything that a computer can be used for, I can do just as well in another way</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part D: Teachers’ level of training in the use of ICTs

16. Are you trained in ICT? Yes [ ] No [ ]

17. If yes in 16 above, where did you receive your training?
   Commercial college [ ] School organized [ ]
   TTC/University [ ] Self taught [ ]
   Others (specify) ..................................................................................................................

18. What level of training did you receive?
   Computer packages [ ] Certificate level [ ]
   Diploma [ ] Degree [ ]
   Others (specify) ..................................................................................................................
19. How relevant can you rate the training in terms of equipping you with skills on lesson planning, lesson delivery and presentation using ICT tools?

Very relevant [ ] Relevant [ ]
Slightly relevant [ ] Not relevant [ ]

20. How would you rate your expertise in the use of the following ICT competencies?

<table>
<thead>
<tr>
<th>Competency</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can connect computer cables to electricity and switch ON or OFF a computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can open, close, save and rename a file</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can search the internet for educational reference materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use the internet for e-mailing other teachers, parents and pupils on issues related to teaching and learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can scan for viruses and fix basic faults (trouble shoot)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use Word Processor e.g. MS Word to type lesson notes, exam etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use Spreadsheets e.g. MS Excel to perform Arithmetical calculations and plot graphs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use Presentation software e.g. PowerPoint for class presentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use databases e.g. Access to store pupils personal and performance records</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use digital camera and a computer to produce a video for classroom presentation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART E: Initiatives taken by schools to integrate ICTs in Teaching and learning process

21. Please indicate with a tick [ √ ] your agreement or disagreement with the following statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>The school encourages teachers to acquire personal computers to aid in the teaching/learning process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The school encourages teachers to store their class work and exams in softcopy form e.g. a flash disk for easy and quick retrieval and to cut on costs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The school encourages teachers to use their mobile phones to access the current research and educational reference material from the internet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22. Does the school allow time to teachers to attend ICT seminars/Workshops?
   Yes [ ] No [ ]

23. Specify other initiatives your school has taken towards integrating ICTs in teaching and learning?

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

24. What challenges do you face in integrating ICTs in teaching and learning?

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

25. What possible recommendations would you make towards increasing the preparedness of schools in integrating ICTs in teaching and learning in public primary schools in Thika West District?

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

THANK YOU
APPENDIX 2: INTERVIEW GUIDE FOR HEADTEACHERS

Part A: Demographic Information
1. Gender  Male [  ]  Female [  ]

2. In which age bracket do you belong?
   Below 25 years [  ]  26 – 30 years [  ]  31 – 35 years [  ]
   36 – 40 years [  ]  Over 40 years [  ]

3. What is your highest professional qualification?
   PhD [  ]  MA [  ]  B.Ed [  ]
   PGDE [  ]  Dip [  ]  P1 [  ]
   Others (specify) .................................................................

4. How many years have you served as a headteacher in this school?
   1 – 5 years [  ]  6 – 10 years [  ]
   11 – 15 years [  ]  Over 15 years [  ]

5. Does your school have a school website?
   Yes [  ]  No [  ]

Part B: ICT Infrastructure in public primary schools
6. What ICT equipment does your school have? .............................................

7. Would you say that the ICT equipment available meets the needs of all the
   pupils and the teachers? ...........................................................................

8. Does your school have connectivity to:
   National electricity power grid?  Yes [  ]  No [  ]
   The internet?  Yes [  ]  No [  ]

9. Is safe and secure storage of the ICT equipment a challenge in your school?....
   ................................................................................................................

10. How are the computers in your school used?
    Administrative purposes [  ]  Teaching/learning [  ]
    Not applicable [  ]

11. Do you use timetabler software to make the school timetable?
    Yes [  ]  No [  ]
Part C: Teachers’ perceptions, attitudes and beliefs towards information and communication Technology and learning

12. To what extent do you agree with the following on ICT integration in teaching and learning?

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers are difficult to use</td>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICTs need to be used by newly graduated teachers only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. The government is emphasizing the integration of ICTs in the school curriculum, would you say that your teachers are prepared to roll out e-learning in schools?
PART D: Teachers’ level of training in the use of ICTs

14. Are you trained in ICT? Yes [ ] No [ ]

15. If yes in 14 above, where did you receive your training?
   - Commercial college [ ]
   - School organized [ ]
   - TTC/University [ ]
   - Self taught [ ]
   - Others (specify) ....................................................................................................................

16. What level of training did you receive?
   - Computer packages [ ] Certificate level [ ]
   - Diploma [ ] Degree [ ]
   - Others (specify) ....................................................................................................................

17. How relevant can you rate the training in terms of equipping you with skills on lesson planning, lesson delivery and presentation using ICT tools?
   - Very relevant [ ] Relevant [ ]
   - Slightly relevant [ ] Not relevant [ ]

18. (i). How many teachers are there in your school?
   (ii). How many of these teachers are trained in computer skills? .................................

19. How would you rate your expertise in the use of the following ICT competencies?

<table>
<thead>
<tr>
<th>Competency</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can connect computer cables to electricity and switch ON or OFF a computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can open, close, save and rename a file</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can use the internet for e-mailing other teachers, parents and pupils on issues related to teaching and learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can scan for viruses and fix basic faults (troubleshoot)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can search the internet for educational related issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident using MS Word and MS Excel application programs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART E: Initiatives taken by schools to integrate ICTs in Teaching and learning process

Please indicate with a tick [✓] your agreement or disagreement with the following statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I encourage my teachers to own personal computers to aid in the teaching/learning process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I encourage my teachers to store their class work in softcopy form.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I encourage my teachers to use their mobile phones to search for educational material from the internet.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>The school has an ICT policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The school has a provision for ICT budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The school has sought for donors to fund the ICT budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The school encourages teachers to attend ICT seminars/workshops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The school has sought for technical support from the government, ICT suppliers, consultants etc.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THANK YOU
## APPENDIX 3: OBSERVATION CHECKLIST

<table>
<thead>
<tr>
<th>Area of observation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use of ICTs in teaching and learning</strong></td>
<td></td>
</tr>
<tr>
<td>• Teachers use of ICT</td>
<td></td>
</tr>
<tr>
<td>• Pupils interaction with ICTs</td>
<td></td>
</tr>
<tr>
<td><strong>Infrastructure put in place</strong></td>
<td></td>
</tr>
<tr>
<td>• Power supply</td>
<td></td>
</tr>
<tr>
<td>• Presence of computer laboratory</td>
<td></td>
</tr>
<tr>
<td>• Number of computers available</td>
<td></td>
</tr>
<tr>
<td>• Internet connectivity</td>
<td></td>
</tr>
<tr>
<td>• Modernity of the computers</td>
<td></td>
</tr>
<tr>
<td>• Access to computers</td>
<td></td>
</tr>
<tr>
<td><strong>Storage and security of the ICT equipment</strong></td>
<td></td>
</tr>
<tr>
<td>• Secure and strong doors</td>
<td></td>
</tr>
<tr>
<td>• Burglary proofed windows</td>
<td></td>
</tr>
<tr>
<td>• Presence of an alarm</td>
<td></td>
</tr>
<tr>
<td><strong>Technical and maintenance of ICT equipment</strong></td>
<td></td>
</tr>
<tr>
<td>• Presence of a computer technical assistant</td>
<td></td>
</tr>
<tr>
<td>• Presence of an ICT – coordinator</td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX 4: WORK PLAN

<table>
<thead>
<tr>
<th>Activity</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Apr</td>
<td>May</td>
</tr>
<tr>
<td>Proposal writing</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Piloting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report writing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submission</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# APPENDIX 5: RESEARCH BUDGET

<table>
<thead>
<tr>
<th>ITEM</th>
<th>AMOUNT (KSHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 reams of foolscaps @ 400/=</td>
<td>1,200/=</td>
</tr>
<tr>
<td>4 spring files @ 50/=</td>
<td>200/=</td>
</tr>
<tr>
<td>10 biro pens @ 20/=</td>
<td>200/=</td>
</tr>
<tr>
<td>2 flash disks @ 1,000/=</td>
<td>2,000/=</td>
</tr>
<tr>
<td>Typesetting and printing services</td>
<td>15,000/=</td>
</tr>
<tr>
<td>Photocopy services</td>
<td>4,000/=</td>
</tr>
<tr>
<td>Binding services</td>
<td>3,000/=</td>
</tr>
<tr>
<td>Piloting instruments</td>
<td>4,000/=</td>
</tr>
<tr>
<td>Data collection and analysis</td>
<td>20,000/=</td>
</tr>
<tr>
<td>Miscellaneous expenses</td>
<td>4,000/=</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>53,600/=</strong></td>
</tr>
</tbody>
</table>
APPENDIX 6: RESEARCH AUTHORIZATION LETTER

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-316245, 316249
Email: secretary@nacost.go.ke
Website: www.nacost.go.ke
When replying please quote

Ref: No.

NACOSTI/P/14/7164/3579

Joseph Macharia Wanyoike
Kenyatta University
P.O. Box 43844-00100
NAIROBI

Date: 24th October, 2014

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Preparedness of teachers in integrating Information Communication Technology in public primary schools in Thika West District, Kiambu County, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Kiambu County for a period ending 31st December, 2014.

You are advised to report to the County Commissioner and the County Director of Education, Kiambu County before embarking on the research project.

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

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

Copy to:

The County Commissioner
The County Director of Education
Kiambu County.
APPENDIX 7: RESEARCH PERMIT

THIS IS TO CERTIFY THAT MR. JOSEPH MACHARIA WANJOIKE of KENYATTA UNIVERSITY, 0-1000 THIKA, has been permitted to conduct research in Kiambu County on the topic of PREPAREDNESS OF TEACHERS IN INTEGRATING TECHNOLOGY IN PUBLIC PRIMARY SCHOOLS IN THIKA WEST PRIMARY, KIAMBU COUNTY, KENYA for the period ending 31st December, 2014.

Permit No: NACOSTI/P/14/4564/579
Date Of Issue: 24th October, 2014
Fee Received: Ksh 1,000

Applicant:

Signature

Republic of KENYA
National Commission for Science, Technology & Innovation

RESEARCH CLEARANCE PERMIT

CONDITIONS:

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do this may lead to the cancellation of your permit.
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Video-taping, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two (2) hard copies and one (1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.

CONDITIONS: see back page