TEACHER-PREPAREDNESS IN INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGY IN INSTRUCTION IN LOWER PRIMARY SCHOOLS IN NYAMIRA COUNTY, KENYA

BY

HARRIET GESARE ISABOKE

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MAY, 2018
DECLARATION

I declare that this project is my original work and has not been presented in any other university/institution for consideration of any certification. This research project has been complemented by referenced sources duly acknowledged. Where text, data (including spoken words), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited using current APA system and in accordance with anti-plagiarism regulations.

Signature _____________________ Date _____________________

Harriet Gesare Isaboke
E55/OL/CTY/29911/14
Department of Early Childhood Studies

This project has been submitted for appraisal with my approval as University Supervisor.

Signature _____________________ Date _____________________

Dr. Hudson Ouko
Department of Early Childhood Studies
Kenyatta University
DEDICATION

I dedicate this research project to my Dad Omwoyo for his encouragement and support during my time of studies.
ACKNOWLEDGEMENT

I take this opportunity to acknowledge contributions by the Kenyatta University for offering me a conducive environment for learning and developing this research project.

I sincerely give my gratitude to my able supervisor Dr. Hudson Ouko for his academic guidance that was crucial to the writing of this research project.

My recognition also goes to my friends Rachael, Richard, Esther, Angela, Margret, Caro and Lillian who have always been there for me when I required their support.

I owe gratitude to my entire family members for the great inspiration and encouragement they accorded me. To all of the aforementioned, I say may God bless you abundantly.
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# Abbreviations and Acronyms

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<th>Abbreviation</th>
<th>Full Form</th>
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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>ICT</td>
<td>Information and Communication Technology</td>
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<tr>
<td>ITU</td>
<td>International Telecommunication Union</td>
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<tr>
<td>GoK</td>
<td>Government of Kenya</td>
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<tr>
<td>KICD</td>
<td>Kenya Institute of Curriculum Development</td>
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<td>KIE</td>
<td>Kenya Institute of Education</td>
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<tr>
<td>MDGS</td>
<td>Millennium Development Goals</td>
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<td>MoEST</td>
<td>Ministry of Education, Science and Technology</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Science</td>
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<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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The potential benefits of ICT integration in teaching and learning in schools have been extensively discussed in the academic literature worldwide. In recent years in Kenya, there has been rapid expansion in integration of ICT in primary school education. The Government of Kenya has further put in place many initiatives to enhance the same. However, studies show that ICT has not been fully adopted in the teaching and learning environment in most primary schools. Many researchers argue that installation of technological devices and infrastructure will not automatically lead to integration of ICT in schools unless we address the teacher-factor that largely influences integration of ICT in schools. It is on this premise that this study was based to investigate teacher-preparedness for the integration of ICT in teaching lower primary school pupils in Borabu sub-county. Technology acceptance model by Davis (1986) was used to guide the study. The study adopted a descriptive Survey design. The target population was 34 lower public primary schools in Borabu Sub-County, 34 head teachers and 102 lower school primary teachers. The study employed stratified random sampling technique to sample lower public primary schools. Purposive Sampling technique was used to sample head teachers and lower primary teachers. The sample size was 41 respondents comprising of 10 head teachers and 31 lower primary school teachers, all samples equivalent to 30% of their total population. Questionnaires and interview schedules were used as data collection instruments. Test-retest reliability was used to establish reliability of the instruments using Cronbach’s Alpha coefficient test. Quantitative data was analyzed using descriptive analysis such as means and standard deviations. The qualitative data collected from the interviews was analysed using content analysis technique and presented thematically. The study conducted a multiple regression analysis to test the relationship between independent variables and dependent variable. The study established that teachers’ attitude, teachers’ training, teachers’ teaching experience and teachers’ level of self efficacy had a positive and significant effect on the integration of ICT in teaching-learning. The study concluded that teachers had a low level of ICT use for educational purpose. The findings reveal that teachers had positive attitudes towards use of ICT but were not ready to use them due to lack of appropriate skills and knowledge. Majority of teachers had been trained in basic computer literacy at certificate level but lacked competence on how to use ICT in teaching-learning. Teachers with more teaching experience had low use of ICT in instruction. Teachers had low levels of self efficacy due to lack of ICT knowledge. The study recommends that there is need to train all teachers specifically on how to use ICT in instruction, this can be achieved by having teacher training curriculum with content on ICT pedagogy. Availability of ICT infrastructure will not automatically lead to ICT integration in schools, there is need for the Ministry of Education to address teacher’s attitudes toward ICT use in teaching. The Ministry of Education should provide in-service training programmes in ICT for teachers especially those with more working experience, this will help them change their attitudes, equip them with ICT skills and increase their levels of self efficacy in ICT. Teachers need to enhance their ICT skills regularly and stay up to date through continual professional development. Schools should play a leading role to implement ICT at the school with self help initiative. Further research is needed to establish how prepared the primary teacher trainers are in preparing primary school teachers in ICT integration in instruction.
CHAPTER ONE
INTRODUCTION AND CONTEXT OF THE STUDY

1.0 Introduction
This chapter entails the background of the study, statement of the problem, purpose of the study, study objectives, research questions, significance of the study, limitations and delimitations, study assumptions, theoretical framework, conceptual framework and operational definition of terms.

1.1 Background of the Study
The demand for Information and Communication Technology (ICT) integration in the curriculum has become a global concern and of great significance towards achieving the Millennium Development Goals (MDGs) and Education for All (EFA) goals. Kler (2014) described ICT as an effective medium with ability to improve instructive communication between the teacher and the learner in a classroom furnished with appropriate educational technologies. ICT is viewed as a major tool for building knowledge (UNESCO 2003) and particularly as a mechanism at the school education level that could provide a way to rethink and redesign the educational systems and processes thus leading to quality education for all.

Technology makes learning to be learner centered unlike traditional methods that are teacher centered by providing the learners with variety of involving activities which provides the platform for pupils to explore hence construct knowledge. Technology is flexible thus assisting teachers to easily make use of the information to achieve learning goals and meet every learner’s educational needs (Centre for Digital Education, 2010). Global investment in ICT to improve teaching and learning in schools have been initiated by many governments. For example in United Kingdom, the government
spending on educational ICT in 2008–09 in the UK was £2.5bn (Nut, 2010), in United States, the expenditure on K-12 schools and higher education institutions was $6 billion and $4.7 billion respectively in 2009 (Nut, 2010) and in New Zealand, the government spends over $ 410 million every year on schools ICT infrastructure (Johnson, Calvert & Raggert 2009). Despite all these investments on ICT infrastructure, equipment and professional development to improve education in many countries, Gulbahar (2007) claimed that huge educational investment have produced little evidence of ICT adoption and use in teaching and learning especially in African countries. Findings show that education sector is investing heavily on ICT but ICT adoption in education sector lagged behind (Leidner & Jarvenpaa, 1995).

In Kenya, the Government has substantially invested considerable resources in supplying primary schools with ICT facilities to enhance ICT integration in education for instance, a computer supply program to primary schools, secondary schools, colleges and public universities is among the ICT plans that the Government is committed to implement in its Vision 2030. Reports show that 200 schools received computers in financial year 2012/13, 400 schools also received computers financial year 2010/12 and 145 school received computers financial year 2009,(Government of Kenya, 2008).Kenya’s National ICT Policy envisages provision of affordable ICT services that are reliable and accessible to all Kenyans. The policy states that the use of ICT in Kenyan educational institutions will enhance equity and accessible education for all. Additionally, it states that the Government will emphasize and encourage adoption of ICT in all learning institution in Kenya in order to improve the quality of learning in the education system (MoCT, 2006). The National ICT strategic plan considers and proposes that ICT can contribute substantially towards realization of accessibility, quality, equity and relevance of education at all levels.
On 12th September 2011, Kenya Institute of Education launched a Curriculum digitization and e-Learning Strategy (KIE, 2011). The new plan aimed to boost e-Learning in public schools and give a guideline on how it would be conducted. The Strategy provides a blueprint on how learning using digital content like websites, DVDs and computers can be fast-tracked in Kenyan schools. The strategy calls for digitization of curriculum for primary, secondary, Teacher Training Colleges, Technical and Vocational Training Institutions, Adult and Early Childhood Education. It also calls for dissemination of digital content through various mechanisms namely radio, TV, DVDs, CDs, flash disks, mobile devices and internet.

The task-force on re-alignment of the education sector to the 2010 constitution recommended that ICT institutional framework needs to be strengthened to allow efficient integration of ICT in the entire education sector with enhanced ICT capacity at all levels. It also recommended the establishment of a National Centre for ICT Integration in Education (NACICTIE) as a semi-autonomous government agency (SAGA) which should be devolved to county levels.

The KIE launched a digital curriculum in 2011 which aims to promote e-learning in public primary school. The digital learning strategy entails dissemination of digital content to all public schools through technological devices like computers, Laptops and tablets. All public primary schools in Kenya have been encouraged to fast-track use of digital content in learning. The Constitution of Kenya 2010 gives a recommendation on establishment of NACICTIE in all counties and revision of ICT framework to make it more efficient for integration of ICT in learning institutions.

Integration of ICT being one of the main projects in Kenya Vision 2030 is in education sector. The government allocated Sh17.4 billion in years 2013/14 National Budget for
the schools’ laptops project which was used to develop digital content, building the capacity of teachers and setting up of computer laboratories in public schools throughout the country. The Kenya Institute of Curriculum development has developed digital content for standard 1-3 with conversion onto a universal platform in September 2015 and the Kenyan government already put out a tender to purchase about 1.3 million laptops for all standard one pupils. (Government of Kenya, 2013).

In its entirety, the project is to be implemented in all 23,951 public primary schools in the country, with over 1.2 million devices supplied to schools at a cost of KES29 billion (US$286 million). To facilitate this, the Government has also connected the schools to mains electricity, with the more remote areas receiving solar power kits and other off-grid power solutions. The project aims to integrate ICT into the teaching and learning process and management of education in lower primary schools by equipping public primary schools with appropriate ICT infrastructure to support teaching and learning process. All these initiatives indicate that Kenya is prepared to integrate ICT in its education curriculums.

In spite of the Government’s efforts of substantially investing considerable resources in enhancing ICT integration in primary schools, research has shown that ICT integration in public primary schools is going at a very slow and un-coordinated pace in most counties in Kenya, Nyamira County being one of them, (Angweyi, 2016). Researchers argue that mere installation of technological tools such as computers, laptops, hubs, routers, and the accompanying peripherals is not sufficient for educational reforms and may not automatically lead to integration of ICT in schools unless the government addresses teacher- factor that largely influence integration of ICT in schools, (Wanyoike, 2016). According to Laaria (2013), teachers are the key
players in implementing the ICT program but the ICT strategy adopted by the Kenya government did not factor in teachers’ levels of preparedness in readiness to integrate ICT in teaching-learning process in public primary schools and this could have a serious negative effect on the implementation process. It is against this background that this study sort to establish preparedness of public primary school teachers in integrating ICT in instruction processes.

1.2 Statement of the Problem

The Government of Kenya has put in place many initiatives to enhance ICT integration in primary education in order to address equity, access and quality of education offered by schools. Such Initiatives include provision of Laptop programme for class one (Ministry of Education, 2014), supply of computer supply to schools' programme (GoK, 2005) and provision of digital content to schools (KIE, 2013) among others. Institutions like longhorn, KICD and Kenya Literature Bureau have also worked hard and invested in development and dissemination of class 1-3 digital content to public primary schools.

Despite all these initiatives, studies show that ICT has not been fully adopted in most public primary schools in Kenya, Njagi, (2010), Begi (2007) Wafula (2014), Wambiri (2014), Begi (2014) Musyoka (2015), Wanyoike (2016), Angwenyi (2016).These Studies argue that installation of technological devices and putting in place ICT infrastructure in schools does not automatically lead to adoption and integration of ICT in schools unless teacher- factor that largely influence integration of ICT in schools is addressed. Teachers play a very vital role in ICT integration as they are the ones who blend all the educational components together to deliver environments for teaching-learning, yet their preparedness in integrating ICT is largely unknown in Kenya, especially in Nyamira County where no study had been conducted to establish the
preparedness of lower primary school teachers in integrating ICT in teaching-learning. It is against this backdrop that this study investigated preparedness of primary school teachers in integrating ICT in public primary schools in Borabu Sub-County, Nyamira County, Kenya.

1.3 Purpose of the Study

The purpose of this study was to establish whether primary school teachers are ready to integrate ICT in instruction in regard to their attitudes, levels of ICT skills, teaching experience and their level of self-efficacy.

1.3.1 Research Objectives

The objectives of the study were:

i. To establish the extent to which teachers’ attitudes influence ICT integration in teaching-learning.

ii. To find out the extent to which teachers’ training in ICT influence integration of ICT in teaching-learning.

iii. To determine the extent to which teachers’ teaching experience influence integration of ICT in teaching-learning.

iv. To establish the extent to which teachers’ levels of self-efficacy influence integration of ICT in teaching-learning.

1.4 Research Questions

i. To what extent do teachers’ attitudes influence ICT integration in teaching-learning?

ii. To what extent does teachers’ training influence integration of ICT in teaching-learning?

iii. To what extent do teachers’ teaching experiences influence integration of ICT in teaching-learning?
iv. To what extent do teachers’ levels of self-efficacy influence integration of ICT in teaching-learning?

1.5 Significance of the Study

The study findings may be of great significance to stakeholders in the education sector like the Ministry of Education, curriculum developers, policy makers and teacher trainers by revealing to them the level of preparedness of teachers in integrating ICT in teaching-learning, such information and recommendations from this study will inform their decisions.

Curriculum development process is normally informed by research, the stakeholders like Kenya Institute of Curriculum Development may use the relevant information from these study findings when initiating and formulating policies in regard to teacher training curriculum and professional development programs.

The findings from this study may help school management to know whether their teachers are ready and prepared to integrate ICT in teaching-learning. The study would expose teachers’ levels of ICT competence, self-efficacy and attitudes and how they influence integration of ICT in instruction. Information from this study would help school management to come up with appropriate strategies which can enhance integration of ICT in their schools, like encouraging and supporting teachers to attend ICT trainings and professional development programs that would equip teachers with ICT knowledge and skills which would lead to high levels of self-efficacy and positive attitude towards use of ICT as a teaching strategy.

The findings of this study may also benefit primary school teachers as it will help them understand the vital role they play in integrating ICT in curriculum delivery process and how their altitudes, levels of self-efficacy, teaching experience and competence in
ICT influence integration of ICT in instruction. From the study findings and recommendations they may embrace change which may enhance ICT integration in instruction.

1.6 Limitation and Delimitations of the Study

Limitations refer to influences, shortcomings, or conditions that were beyond the researcher’s control. While delimitations refer to choices or boundaries that the researcher set for the study.

1.6.1 Limitations of the study

The researcher got challenges accessing respondents in schools situated in distant remote areas due to poor infrastructure in those areas and bad weather due to heavy rains. In order to overcome this challenge, the researcher employed two research assistants who were familiar with the Sub-county schools to assist in administering of questionnaires and to conduct interviews to the respondents in some of the schools. This enabled the researcher to collect data within the stipulated time.

1.6.2 Delimitations of the study

This study was confined to public lower primary schools in Borabu Sub-county of Nyamira County, this was because the Government of Kenya has invested in ICT more in public lower primary schools. The proposed study was carried out in sampled public primary schools in Borabu sub-county due to time and financial constraints. Further the study was limited to the variables singled out for investigation, there were other factors affecting teacher-preparedness in ICT integration in public primary schools that this study could not explore which will be recommended for further research.
1.7 Assumptions of the Study

The study assumed that all respondents were willing to respond to the items in the instruments with honesty and that all lower public primary schools in the sub-county were equipped with ICT devices and infrastructure.

1.8 Theoretical and Conceptual Framework

1.8.1 Theoretical Framework

The study was guided by Technology Acceptance Model by Davis (1986). This model suggests that the acceptability of an information system is determined by two main factors: perceived usefulness and perceived ease of use. The Model postulates that the use of an information system is determined by the behavioral intention, but on the other hand, the behavioral intention is determined by the person’s attitude towards the use of the system and also by his perception of its utility. The theory further explains that the attitude of an individual is not the only factor that determines his use of a system, but is also based on the impact which it may have on his performance. Therefore, even if an employee does not welcome an information system, the probability that he will use it is high if he perceives that the system will improve his performance at work. Besides, the theory hypothesizes a direct link between perceived usefulness and perceived ease of use. With two systems offering the same features, a user will find more useful the one that he finds easier to use.

This study focused on perceived usefulness, perceived ease of use and person’s attitude towards use of a system as the aspects that will guide the study. Teachers are more likely to use ICT if they perceive it easy to use and if it satisfies their own needs or those of their learners. Teachers’ attitude towards use of ICT will determine their behavioral intention to integrate in teaching-learning process.
For this study, teacher- preparedness in ICT integration in public primary schools could be enhanced if teachers have positive attitudes towards use of ICT and if they believe that ICT integration could lead to quality learning and high performance in primary schools. From the theory, teachers would integrate ICT in instruction if they perceive that it is easy to use and would improve the quality of education offered.
1.8.2 Conceptual Framework

**Independent Variables**
- Teacher’s attitudes towards ICT
  - Positive attitudes and believes
  - Negative attitudes and believes
  - Resistance to change

**Teachers’ training on ICT integration**
- Professional development
- Teachers ICT knowledge and skills

**Teachers’ teaching experience**
- Low teaching experience
- High teaching experience

**Teachers’ level of self-efficacy**
- High levels of self-efficacy
- Low levels of self-efficacy

**Dependent Variable**
- Integration of ICT
  - Competent use of ICT in preparation and presentation of instructional materials
  - Use of ICT in assessment
  - Use of internet content
  - Designing Teaching/learning activities
  - Designing learning materials using ICT
  - Keeping electronic pupils personal and performance record
  - Learner-centered learning

**Expected Outcomes**
- Increased ICT use in learning
- Improved quality education
- High academic performance among learners
- High transition rates in schools
- Enhanced creativity and critical thinking of pupils.
- Low repeating rates among pupils
- Improved literacy competencies
- Improved learner-autonomy

**Figure 1.1 Conceptual Framework showing the relationship between independent and dependent Variables**

**KEY** - Study Variables ✅

Non-Study Variables ✅

The study employed the conceptual framework above which describes how the independent variables which include teachers’ attitudes, ICT training, teaching experience and levels of self-efficacy affect integration of ICT in instructional process and the outcomes. The conceptual framework postulates that if teachers have positive attitude towards ICT, are well equipped with ICT skills and they have
high levels of self-efficacy, they will competently use ICT in preparation and presentation of instructional materials, do electronic assessment of pupils, use internet to access e-content and other educational reference materials, use appropriate education software in teaching, designing technology-enhanced learning activities for pupils, use email to communicate with parents and other teachers, keep electronic records of pupils attendance and performance records.

As a result, there will be quality instruction, increased access to education, effective delivery of curriculum, high academic performance among learners, enhanced creativity and critical thinking of pupils, low repeating rates among pupils, quality learning, improved information literacy skills in pupils, improved learners’ autonomy, increased engagement with parents, innovative and pupil-centered learning environments in primary schools.
1.8 Operational Definitions of key Terms

**Information Communication and Technology (ICT)** It refers to all technological tools which are used to process, store, and disseminate information that support teaching-learning such as computers and laptops.

**Integration of ICT** Use of laptops and computers during instructional process with an aim of improving the quality of learning in a classroom.

**Preparedness** It refers teachers’ ability to use laptops and computers in classrooms.

**Attitude** Refers to teachers’ perception towards use of ICT when teaching.

**Self-efficacy** Refers to teachers’ confidence in their ability to use ICT in teaching.

**Lower Public Primary School** Refers to grade 1 to 3 levels funded and staffed by the government of Kenya in accordance with the Basic Education Act of 2013.

**Teacher Training** Refers to courses and qualifications that teachers undertake and receive at the outset of their careers.

**Teaching experience** Refers to the number of years teachers have been practicing teaching in schools.
CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.0 Introduction
This chapter entails related research on how teachers' attitudes affect integration of ICT as a teaching strategy, the extent to which teacher training affect the use of ICT in teaching, teacher teaching experience and use of ICT and how teachers’ levels of self-efficacy affect their use of ICT in instruction.

2.1 Teacher’s Attitudes towards ICT Integration in Teaching-Learning
Ndibalema (2014) study examined on teachers’ Attitudes towards the use of information communication technology (ICT) as a pedagogical tool in secondary schools in Kondoa district, Tanzania. The data collection methods involved questionnaire and interview. A total of 80 teachers, through random sampling in 10 schools were involved in this study at the first phase of data collection and 10 teachers were obtained through purposive sampling from 2 schools at the second phase. It was found that teachers have positive attitudes towards the use of ICT as a pedagogical tool but they did not integrate it in their teaching effectively.

Mustafina (2016) study examined the influence of teachers' Attitudes on technology integration in a Kazakhstani Secondary School. This study used mixed method design. A convenience non-probability sampling among secondary school teachers and their students was used for selecting the participants. Findings show that teachers possess positive attitudes toward ICT in school mostly due to the advantages that technology offers such as distant learning and visualization of the material.

Ayub, Bakar and Ismail (2015) study examined on factors predicting teachers’ attitudes towards the use of ICT in teaching and learning. A total of 187 mathematics teachers from the state of Selangor in Malaysia were randomly selected from a stratified cluster
sample. The findings showed that the teachers’ attitudes towards using ICT in teaching and learning were positively correlated. However, a negative relationship existed between years of teaching and attitudes towards using ICT in teaching and learning.

Sanchez, Marcos and GuanLin (2012) study examined on in service teachers’ attitudes towards the use of ICT in the classroom. One hundred and seventy in-service teachers from kindergarten to high school participated in the study. A quasi-experimental study with one non-randomized study group (n=85) was also conducted using a pre-and post-test design with the purpose of searching for differences before and after training. The results show that teachers’ attitudes towards ICT are highly positive but the use of them in class is scarce and it is subjected to innovative processes.

Research has shown that teachers are the kingpins to effective integration of ICT in schools therefore, the perceptions teachers have on use of ICT will influence their attitude on teaching with ICT which will have an impact on the implementation process hence affecting curriculum delivery process and performance Teo (2006). Teachers need to have positive attitudes towards ICT in order for them to successfully integrate it in instructional processes Woodrow (2010). According Mingaine (2013) teachers will adopt ICT if they perceive it as a very important teaching strategy which will help them improve their pedagogy and pupils’ performance.

In Germany, studies conducted on integration of ICT in classrooms indicated that the main factor that influences adoption and use of ICT by teachers is teacher’s attitudes towards ICT. The study recommends that teachers should be given opportunities to interact with technology and learn how they can teach using the technology since the effectiveness of the integration process will largely depend on the attitudes that teachers
have on ICT, Teo (2006). According to Afshari (2009) to cultivate positive attitudes among teachers, they need to be knowledgeable on how to use technology.

In contrast, Tan and Mishra (2001) states that teachers’ attitudes influence their willingness to use ICT in teaching and learning. He concluded that teacher’s attitudes and use of ICT are directly related. A study conducted by Andoh (2012) shows that teachers with positive perception that ICT will enable them teach with ease, provide an interactive platform with pupils, improve their pedagogy and performance were ready to integrate ICT in their teaching. If teachers have to develop positive attitudes towards integrating ICT as a teaching strategy, they need to be trained on how to use technology and perceive it as an important tool for them and their pupils, Nyambane & Nzuki, (2014)

Contrary, a study by Eugene (2006) which established the relationship between teachers’ attitudes and use of ICT found a lot of inconsistencies between use of ICT and teacher’s attitudes. The study named other factors which affect adoption and use of ICT including, school management support, ICT infrastructure, lack of ICT skills, and in availability of digital devices. The study concluded that all this factors should be put in place for effective integration of ICT regardless teachers’ attitudes.

Despite the fact that the Government of Kenya is committed in ensuring integration of ICT in primary school education by providing schools with ICT devices and infrastructure, teachers’ attitudes toward ICT use in classrooms remain largely unknown. It is therefore crucial to investigate teacher attitudes towards ICT to ensure effective integration of ICT in the primary curriculum.
2.2 Training and Integration of ICT in Teaching-Learning

Muriithi (2017) study examined on factors affecting implementation of ICT Education in Public Primary schools in Kajiado North Sub-County, Kenya. The target population included 399 teachers; 14 public primary school and 1545 pupils. Random sampling techniques were used to select 5 schools, 78 teachers and 155 pupils. Questionnaires were the main data collection instruments. The study established that More than half (53.9%) of the respondents indicated that good match of training and skills are important to support ICT implementation in schools and poor school ICT policies have negatively affected implementation ICT education.

Alazam, Bakar, Hamzah and Asmiran (2012) study examined teachers' ICT skills and ICT integration in the classroom: the case of vocational and technical teachers in Malaysia. The data of this study were collected using quantitative techniques, whereby the questionnaire was administered to 329 technical and vocational teachers who were teaching engineering subjects in Malaysian technical and vocational schools. The study has shown that teachers’ ICT skills were at moderate levels, and that a vast majority of teachers who participated in this study were moderate users of ICT in classroom teaching.

Twinomujuni, No and Kampala (2011) study looked at problems in ICT implementation in selected institutions of higher learning in Kabale District. A cross sectional survey design was employed a self administered questionnaire was administered to a sample of 60 lecturers and 173 students. Interviews were also carried out with 20 administrators from the four institutions. The study found out that most respondents had low levels of ICT competence. Recommendations were made to encourage stakeholders to explore the possibility of being trained on how to use computers in teaching rather than operating computers.
Ozen (2012) study looked at distance education for professional development in ICT integration: A study with primary school teachers in Turkey. The current study analyzes interviews held with 73 primary school teachers in the spring semester of the 2007-2008 academic year in Bolu, Turkey, who participated in local In-Service Training (INSET) programs to integrate ICT into their classroom practices. Content analysis and continuous comparison techniques were used to analyze the data. Teachers reported positive effects in their computer and internet knowledge, skills, opinions and classroom uses of these technologies and in their students’ academic achievement levels, use of these technologies and participation in classroom activities.

Quality professional development and ICT training is the root of any successful technology program. Many studies agree that teachers can successfully integrate ICT in teaching-learning process through professional development, Higgins (2011). Lack of professional development in ICT leads to lack of confidence and skills on how to use technology in schools. According to Berker (1999) teachers only give to pupils what they have acquired through their training, it is therefore important for teachers to undergo quality training and professional development for them to be at a position of using ICT in classrooms effectively.

Baylor and Ritchie (2002) carried out a quantitative study that looked at the factors facilitating teacher skills, teacher morale, and perceived student learning in technology-using classrooms. They found that professional development has a significant influence on how well ICT is embraced in the classroom. Despite the numerous plans to use technology in schools, teachers have received little training in this area in their teacher education programs Varsidas & McIsaac, (2001). According to Schaffer and Richardson (2004), when technology is introduced into teacher education programs, the
emphasis is often on teaching about technology instead of teaching with technology. Hence, inadequate preparation to use technology is one of the reasons that teachers do not systematically use ICT in their classes. Teachers need to be given opportunities to practice using technology during their teacher training programs so that they can see ways in which technology can be used to augment their classroom activities Rosentha (1999). Teachers are more likely to integrate ICT in their courses when professional training in the use of ICT provides them time to practice with the technology and to learn, share and collaborate with colleagues.

In Italy a study conducted by Quinn L. (2005) on teachers’ use of ICT when teaching mathematics indicated that technology training affect technology use. States that there is a p Training in technology largely affect how teachers embrace ICT in their classrooms. Rosentha (1999), ICT competence levels of teachers will impact their efficacy and determine how they will integrate ICT in schools. Mcalister (2005) conducted a study to establish the relationship between teacher’s use of ICT and training and found out that there is a positive relationship between ICT training and ICT use. He concluded that quality training should be offered to teachers as they are the key players in implementation efficient training and support in ICT should be given to teachers, and more considerations should be put in place on the teachers as they are role models for students.

According to Pelgrum (2001), the success of educational innovations depends largely on the skills and knowledge of teachers. Also, he found that teachers’ lack of knowledge and skills was the second most inhibiting obstacle to the use of ICT in schools. Similarly, in the United States, Knezek and Christensen (2000) hypothesized that high levels of skills and knowledge would produce higher levels of technology integration
that will reflect on student achievements positively. Their model postulated that educators with higher levels of skill, knowledge, and tools would exhibit higher levels of technology integration in the classroom. Moreover, Berner (2003) studied the relationship between ICT skills and computer use in the classroom. He found that the faculty’s belief in their computer competence was the greatest predictor of their use of computers in the classroom. Therefore, teachers should develop their competence based on the educational goals they want to accomplish with the help of ICT.

Studies urge that ICT teacher training should be relevant so that teachers can be well equipped with right skills of technology that will enable them to teach with a lot of ease. Research shows that training must be relevant if teachers are to be well equipped to use ICT. Andoh (2012) emphasizes that most teacher training institutions train teachers how to use technology in classrooms instead of training them about technology. These findings concur with Muriithi (2005) findings that most ICT training in Kenya are tied down to technology literacy as a result primary and secondary school teachers in Kenya do not have sufficient knowledge and skills on how to integrate ICT in the curriculum. Studies have also reported that 55% of teachers in primary schools do not have any ICT training, 51% had training which they acquired out of their own initiatives, Agak (2010). Consequently, most teachers in Thika West sub-county perceived themselves as ill prepared to integrate ICT in their various schools.

The Kenya Government has made efforts to equip primary school teachers with ICT skills by integrating ICT in the Kenya Primary Teacher Education (PTE) syllabus which was done in in 2008 however, research has shown that in most teacher training institutions emphasis is often on teaching about technology instead of teaching with technology hence, inadequate preparation to use technology is one of the reasons that primary teachers do not systematically use ICT in their classrooms. Therefore, there
remains the need to find out the extent to which teachers are prepared and ready to implement ICT in primary school teaching and learning based on their training.

2.3 Teachers’ teaching Experience and ICT Integration in Teaching-Learning

Kamaruddin, Abdullah, Idris and Nawi (2017) studied on Teachers’ level of ICT integration in teaching and learning: A survey in Malaysian private preschool. A total of 61 teachers from 10 private preschools in the district of Mualim in the state of Perak, Malaysia were randomly chosen in this survey research. The findings revealed that most of the experienced teachers were not knowledgeable about the educational ICT application. The findings revealed that the teachers' level of ICT integration is still at the low level. This is based on the results of a study that most of the experienced teachers are normal users of ICT and ICT application was used for their own work rather than using it in their teaching and learning in the classroom.

Wachiuri (2015) study examined how teachers’ experience and training affects implementation of information communication technology in public secondary schools in Nyeri, Central District, Kenya. The target population was 275 teachers working in 15 public secondary schools in Nyeri Central district. The sampling design was stratified random sampling and sample size was 82 teachers. His data collection tools were questionnaires, interview schedule and observation schedule. Data was analyzed quantitatively and qualitatively. The study found out that teaching experience was not consistent in affecting ICT implementation.

Mwangi and Khatete (2017) study examined the teacher Professional Development Needs for Pedagogical ICT Integration in Kenya: Lessons for Transformation. In this study, a cross-sectional and descriptive survey design was used where research data was collected through triangulation. Three key instruments namely; questionnaires,
interview guides and checklists were used to collect data. The study sample for the institutions was 30 secondary schools from Nairobi and Kiambu Counties. The study revealed a variance in the use of ICTs by experienced teachers especially between personal use and pedagogical use. Most teachers felt that the approaches used in professional development did not equip them adequately for independent ICT usage in schools.

Teaching experience influences computer adoption and use by teachers. Gill (2008) conducted a study on pre-service teachers’ preparedness to integrate ICT in their classrooms, the study found out that those teachers who had not taught for long had high confidence and willing to use ICT when teaching while the teachers who had served in teaching service for long were not willing to use computers as a teaching strategy. A similar study was conducted by Ruth (2004) to establish how work experience influences use of computers in organization, the study found out that employees who had worked in the organizations for long had difficulties in using computers to perform their duties unlike young employees.

Other studies have shown that many people who use ICT and especially the internet are the youth and young adults compared to the old generation, Times (1996). Contrary, some studies done by Harrison (1992) which examined respondents’ computer skills and teaching experience established that there is negative correlation between teaching experience and level of computer skills. A study conducted by Zeffane (1993) on age and computer usage of individuals working in organization found out that there is a negative relationship between working experience and computer usage. Wong & Li (2008) found out that teachers with high teaching experience showed less interest and were reluctant in integrating ICT in teaching and learning.
Gorder (2008) revealed that effective use of computer was related to technological comfort levels and the liberty to shape instruction to teacher-perceived student needs. Also, Baek, Jong & Kim (2008) claimed that experienced teachers are less ready to integrate ICT into their teaching. Similarly, in United States, the U.S National Centre for Education Statistics, (2000) reported that teachers with less experience in teaching were more likely to integrate computers in their teaching than teachers with more experience in teaching. According to the report, teachers with up to three years teaching experience reported spending 48% of their time utilizing computers, teachers with teaching experience between 4 and 9 years, spend 45% of their time utilizing computers, teachers with experience between 10 and 19 years spend 47% of the time, and finally teachers with more than 20 years teaching experience utilize computers 33% of their time.

Further, Lau and Sim (2008) conducted a study on the extent of ICT adoption among 250 secondary school teachers in Malaysia. Their findings revealed that older teachers frequently use computer technology in the classrooms more than the younger teachers. The major reason could be that the older teachers having rich experience in teaching, classroom management and also competent in the use of computers can easily integrate ICT into their teaching. The result is in agreement with Russell, Bebell, O’Dwyer, & O’Connor, (2003) who found that new teachers who were highly skilled with technology more than older teachers did not incorporate ICT in their teaching. The researchers cited two reasons: new teachers focus could be on how to use ICT instead of how to incorporate ICT in their teaching. Secondly, new teachers could experience some challenges in their first few years of teaching and spend most of their time in familiarizing themselves with school’s curriculum and classroom management.
In a survey of almost 3000 teachers, Russell, O'Dwyer, Bebell and Tao (2007) argued that the quality of ICT integration was related to the years of teacher service. However, Granger, Morbey, Lotherington, Owston and Wideman (2002) conducted a qualitative survey on factors contributing to teachers’ successful implementation of ICT in Canada. They interviewed 60 respondents from 12 schools. The findings found no relationship between teachers’ teaching experience and experience in the use of ICT implying that teachers’ ICT skills and successful implementation is complex and not a clear predictor of ICT integration and due to this contradicting research findings, it is necessary for this study to establish if teacher’s teaching experience affect their use of ICT.

2.4 Teachers’ Self-Efficacy and Integration of ICT in Teaching-Learning

Robertson and Al-Zahrani (2012) study examined Self-efficacy and ICT integration into initial teacher education in Saudi Arabia: Matching policy with practice. Participants were 325 Saudi pre-service teachers from the Faculty of Education at King Abdulaziz University. Findings reveal that participants have generally high skill levels with computing tasks and their perceptions of self-efficacy as university teachers increase with computer experience and computer qualifications. These findings imply that increasing Saudi pre-service teacher access, training, and exposure to computers and ICTs will contribute effectively to boosting their self-efficacy, motivation, and computing habits.

Kounenou, Roussos, Yotsidi and Toumpoulou (2015) study examined Trainee Teachers’ Intention to Incorporating ICT Use into Teaching Practice in Relation to their levels of Self efficacy: The Case of Group-based Intervention. The study employs a pre- and post- intervention research design, consisted of a training program in ICT in Education offered to a sample of 109 undergraduate trainee teachers which as divided
into experimental (homogenous & heterogeneous) and control groups based on their personality traits and psychological characteristics. The results revealed low levels of Self efficacy among trainee teachers in use of ICT in teaching practice.

Yamamoto and Yamaguchi (2016) did a study on Teacher’s Self-efficacy for promoting ICT integrated Education in primary school in Mongolia. The data were collected from 838 primary school teachers in Mongolia. The pair wise correlation coefficient was calculated to assess the relationships between three types of perceived self-efficacy (confidence, competency and satisfaction) and two education on aspects, teacher training activities and practical ICT experience at school level. The study found that perceived influence of school-based trainings had the strongest correlation among teacher training activities.

ELDaou (2016) study examined the Relationship between Teacher's Self-efficacy, Attitudes towards ICT Usefulness and Student's Science Performance in the Lebanese Inclusive Schools 2015. This study used qualitative and quantitative methods. Findings of this study revealed that teacher’s self-efficacy in the level of technology use, and attitudes have significant effects on the grades and interaction of students with special needs. The findings suggest that knowledge and beliefs can influence teacher’s intent to use technology in the classroom, especially as evidenced by the integration of ICT in their lesson plans. Moreover, results indicate a significant positive Pearson correlation r=0.6 between teacher’s self-efficacy, knowledge, attitudes and special education students’ science results.

Raphael and Mtebe (2017) study examined pre-service teachers’ self-efficacy beliefs towards educational technologies integration in Tanzania. The study was conducted in two university colleges: Dar es Salaam University College of Education (DUCE) and
Mkwawa University College of Education (MUCE), with a sample of 386 pre-service teachers. The Kaiser-Meyer-Olkin Measure of Sampling (KMO) was used to measure the sampling adequacy of the data. Using regression analysis, the study found out that the determinants of self- – efficacy beliefs among pre – service teachers towards educational technologies integration are support, perceived ease of use, performance expectancy, and social influence.

Literature shows that lack of self-efficacy among teachers negatively affect the adoption and use of ICT in classrooms. In education, self-efficacy of teachers has been linked to student outcomes that include increased academic achievement and intrinsic motivation, Feldlaufer, & Ecclesia (2010). Teacher’s self efficacy can predict their behaviour when using technology Koliadis (2010). According to Teo (2009) Teacher’s self efficacy influences teachers’ intention to use technology when teaching, this finding concurs with Higgins (2000) who reported that teachers with high levels of self efficacy used computers often than the teachers with low levels of self efficacy.

Teachers have indicated that early successful experiences have a strong influence on the subsequent development of their technology integration abilities York (2006). Unfortunately, learning about technology is an on-going process whereby new advances are constantly taking place and your knowledge base from yesterday can be rendered obsolete by tomorrow. This often results in teachers feeling like perpetual novices in the process of technology integration (Mueller et al., 2008), which suggests the need for teachers to have strong self-efficacy for teaching with technology if it is to be utilized regularly.
Farah (2011) suggested that even teachers who held strong beliefs regarding the value of technology in educating today’s learners could be slowed in their use of available tools due to fears of not being able to effectively troubleshoot technological issues if they were to arise.

According to Jones (2004), teachers who lack technology confidence will be reluctant to adopt and use technology devices in their classrooms. Lack of technology knowledge and skills and fear to attempt and failure are major reasons that make teachers to lack confidence. A study conducted by Becta (2004), reported that most teachers who lacked confidence hardly used computers in classrooms. Similarly, teachers who lacked computer knowledge and skills were anxious about using technology when teaching.

Benson (2004) found out that computer efficacy to correlate with the integration and development of modern technologies in educational practice. Most teachers however, are not innately familiar with these technologies. Helping teachers to feel comfortable utilizing these new instructional tools in a manner that both improves the effectiveness of instruction and keeps 21st century students fully engaged in the learning process is a challenge that school administrators continue to face. Integration of ICT in primary education is relatively new development in Kenya and not much has been done on teachers’ self-efficacy in regard to ICT use. Self-efficacy being a crucial variable in understanding teachers’ characteristics and their relation to teachers’ effective use of ICT in the classroom, there is need to establish teachers’ levels of self-efficacy in integration of ICT in primary schools.

2.5 Summary of Literature Review

From literature, the Government of Kenya has made initiatives to integrate ICT in primary education curriculum in order to meet the 21st century demands and to improve the quality of teaching and learning. Despite the availability of favorable conditions for
effective integration of ICT in schools including favorable policy environment, distribution of digital devices to schools, infrastructure, electricity and internet connectivity, technology use in primary schools is still surprisingly low and little has been done to evaluate how prepared lower primary school teachers are to implement ICT integration in classrooms, Mwangi (2016). Majority of studies that have been done, focus on ICT integration in secondary and tertiary levels. To fill the knowledge gap that exists in literature, this study was set out to investigate teacher-preparedness in integrating ICT as a teaching strategy in lower public primary schools.
CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter entails the methodology that will be used to carry out the study, it presents the following: Research design, study variables, location of the study, study population, sampling techniques and sample size, research tool, piloting, reliability, validity data collection techniques, data analysis and ethical and logistical issues.

3.1 Research Design

The study adopted a descriptive survey design. This design helped the researcher to collect both quantitative and qualitative data. The descriptive aspect provided an opportunity for the researcher to probe deep and obtain precise and concise information about the target organization, which enabled the researcher to gather information about the present and existing condition of phenomena under study, Orodho (2005). Therefore, this design suit the study as it aimed to investigate teacher-preparedness in ICT integration in public primary schools.

3.2 Variables

The variables of this study were teachers’ attitudes towards ICT, teachers’ training in ICT, teachers’ teaching experience, teachers’ levels of self-efficacy and integration of ICT in public primary schools. A questionnaire consisting of items measuring the four independent variables which are; teacher attitude, self efficacy, ICT training and teaching experience was used to collect data. Teachers’ attitudes were measured using a five likert scale with items assessing teachers’ way of thinking about ICT integration in instruction. ICT training was measured using two subscales with items relating to teachers’ levels of computer knowledge and skills and their ability to use ICT in teaching. Teaching experience was measured using items that assessed teachers’ use of
ICT in instruction in regard to their teaching experience. Self-efficacy was measured using a five likert scale with items relating to general use of ICT and confidence on their ability to use ICT in teaching-learning.

3.2.1 Independent Variables

Teacher factors affecting integration of ICT in teaching were the independent variables which included; teachers’ attitudes, teacher training, teachers’ teaching experience and teachers’ levels of self-efficacy which will indicate the level of teacher-preparedness to integrate ICT in teaching-learning.

3.2.2 Dependent Variable

The study had one dependent variable which was ICT integration in teaching-learning. It entailed investigation on teacher-preparedness in integrating ICT in lower public primary schools in Borabu Sub-county in regard to their attitudes, level of training, self-efficacy and their teaching experience.

3.3 Location of Study

The study was conducted in Borabu Sub-County of Nyamira County. This was because research had shown that all public primary schools in this county had received digital learning devices from the Government but they were yet to be adopted and integrated in instruction, (Angwenyi, 2016). He indicates that teachers play a vital role in integrating ICT in instruction but their preparedness remain unknown in this county as there was no research that had been conducted to establish this. The researcher narrowed down to Borabu Sub-county because it had more public primary schools compared to other sub-counties in the whole county which the researcher thought is appropriate in terms of representation.
3.4 Population of the Study

Borabu Sub County has 4 wards namely; Mekenene ward, Nyansiongo ward, Kiabonyoru ward and Esise ward. The target population was 136 respondents comprising of 34 head teachers and 102 lower primary school teachers from 34 lower public primary schools in the Sub-County. The study targeted only lower public primary schools since the Government of Kenya has given much attention in terms of ICT investment. The target population was presented in Table 3.1 as follows.

Table 3.1: Target Population

<table>
<thead>
<tr>
<th>Category</th>
<th>Schools</th>
<th>Head Teachers</th>
<th>Teachers</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mekenene ward</td>
<td>12</td>
<td>12</td>
<td>36</td>
<td>48</td>
</tr>
<tr>
<td>Nyansiongo ward</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Kiabonyoru ward</td>
<td>5</td>
<td>5</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Esise ward</td>
<td>7</td>
<td>7</td>
<td>21</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>34</strong></td>
<td><strong>34</strong></td>
<td><strong>102</strong></td>
<td><strong>136</strong></td>
</tr>
</tbody>
</table>

3.5 Sampling Techniques and Sample Size

3.5.1 Sampling Techniques

The study employed stratified random sampling technique to group lower public primary schools within Borabu Sub County into 4 strata namely; Mekenene ward, Nyansiongo ward, Kiabonyoru ward and Esise ward so as to ensure that each school had an equal and independent chance of being included in the sample. Schools were then selected from each stratum randomly to minimize the relevance of bias. Purposive sampling technique was used to sample head teachers and teachers of grade one, two and three who participated in the study from the sampled schools. The researcher purposively sampled grade 1-3 teachers because it is a practice in public primary schools that lower primary teachers teach pupils from when they join grade1 all up to
grade 3 after which they go back to teach another group of pupils in grade 1. It was assumed this group of teachers in lower primary school would be the first cohort of teachers to implement the government ICT laptop project. The preparation of these teachers is therefore critical for successful implementation of ICT in lower public primary schools.

3.5.2 Sample Size

A total of 10 head teachers and 31 lower primary teachers representing 30% of the total population of head teachers’ and lower primary teachers’ population were purposively picked from the sampled schools. According to Mugenda and Mugenda (2008), 10-30% of accessible population is enough for a descriptive study. Therefore, the sample size was 41 respondents. This is represented in Table 3.2.

Table 3.2: Sample Size

<table>
<thead>
<tr>
<th>Category</th>
<th>Population</th>
<th>Sample Size (30%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Teachers</td>
<td>34</td>
<td>10</td>
</tr>
<tr>
<td>Teachers</td>
<td>102</td>
<td>31</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>136</strong></td>
<td><strong>41</strong></td>
</tr>
</tbody>
</table>

3.6 Research Instruments

Questionnaires and interview schedules were used in this study to obtain data from the respondents on teacher-preparedness in integrating ICT in instruction in public primary schools in Borabu sub-county. Questionnaires were appropriate for this study because they were cost effective, provided adequate time for participants to answer the questions and free from the researchers’ biasness as answers are in respondents’ own words. The questionnaire for grade 1-3 lower primary teachers had sections marked alphabetically, mainly A to E consisting of items measuring the four independent variables which are;
teacher attitude, self efficacy, ICT training and teaching experience. Teachers’ attitudes were measured using a five likert scale with items assessing teachers’ way of thinking about ICT integration in instruction. ICT training was measured using two subscales with items relating to teachers’ levels of computer knowledge and skills and their ability to use ICT in teaching. Teaching experience was measured using items that assessed teachers’ use of ICT in instruction in regard to their teaching experience. Self efficacy was measured using a five likert scale with items relating to general use of ICT and confidence on their ability to use ICT in instruction. The questionnaires were administered to the respondents by one researcher and two research assistants with support from the school head teachers in the respective schools and this made it possible to realize a response rate of 93.3%.

An interview schedule was chosen to collect details of abstract information from headteachers that could not easily be brought out by the questionnaire. Interview schedule was more useful because of its ability to collect in-depth qualitative data based on questioning interviewees for verifications and clarifications of issues. The interview schedule intended to generate qualitative data for in-depth investigation from head teachers. The open-ended questions provided structured statements which required explanations, description and personal comments about an item of inquiry.

3.7 Pilot Study

The research instruments were pre-tested in two public primary schools in Borabu sub-County; the schools that were used in piloting were not included in the main study. This exercise assisted the researcher to ensure the tools were valid and reliable. It also helped the researcher to familiarize herself in administering tools before the actual study and ensured clarity and correct wording of the items.
3.7.1 Validity of the Study Instruments

According to Orodho (2005) validity entails the extent to which instruments used to collect data will measure what the researcher wants them to measure from the study objectives. In this case, Content Validity was used to ensure that the instruments were valid. This was done in two stages, first, a set of items were generated and arranged according to the study objectives. Secondly, the items were evaluated by going through each item one at a time to ensure that they were clear, expressed in simple language and that all the objectives of the study were covered. The best items that were believed to adequately measure the targeted construct were retained while some items were modified and some that were not relevant were deleted. This process ensured that the instruments had items which tapped into specific constructs in question.

3.7.2 Reliability of the study Instruments

Test-retest method was used to measure reliability of the instruments. The research tools were administered in two public primary schools outside the sampled schools. This exercise was repeated again after two weeks to the same respondents, and then the results obtained from test one and two were calculated using Cronbach’s Alpha. Coefficient of 0.7 is a commonly accepted rule of thumb that indicates acceptable reliability and 0.8 or higher indicate good reliability (Mugenda & Mugenda, 2003). Therefore, a coefficient of above 0.7 was obtained in each instrument which showed that the instruments were reliable. This is shown in Table 3.1.
Table 3.3 Reliability Test Results

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Cronbach's Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training in ICT.</td>
<td>.802</td>
<td>30</td>
</tr>
<tr>
<td>Self efficacy</td>
<td>.704</td>
<td>15</td>
</tr>
<tr>
<td>Attitude</td>
<td>.712</td>
<td>20</td>
</tr>
<tr>
<td>Teaching Experience</td>
<td>.800</td>
<td>29</td>
</tr>
</tbody>
</table>

3.8 Data Collection Procedure

**Stage one**- A research authorization from Graduate School Kenyatta University together with the Research permit from National Council of Science & Technology (NACOSTI) was sought.

**Stage two**- consent was sought to carry the study from the Borabu Sub-County Director of Education after which the head teachers of the sampled schools were contacted to seek permission to conduct the study in their schools and made arrangements when the exercise was done.

**Stage three**- On the scheduled dates the Head teachers and grade 1-3 teachers from the sampled schools were invited for a talk and addressed any concerns which they could have concerning the study. After which data collection process commenced Interviews were conducted to the Head teachers. Questionnaires were administered to grade 1-3 teachers and respondents were given a one week window period within which they were to fill in the questionnaire. The respondents were informed of the date the questionnaires were to be collected. After the agreed period elapsed the researcher and two research assistants revisited the schools and collected the questionnaires.
3.9 Data Analysis

Before processing the responses, the completed questionnaires were edited for completeness and consistency. The data was then coded to enable the responses to be grouped into various categories. Data collected was both qualitative and quantitative. The qualitative data collected from the interviews was analysed using content analysis technique and presented thematically. Qualitative content analysis involves a process designed to condense raw data into categories or themes based on valid inference and interpretation. The data obtained from the interviews was prepared where by the researcher decided to transcribe all the questions of the interviewers. The coding unit of analysis was defined which was individual themes then the data was coded into manageable content categories and broken down into meaningful and pertinent units of information for analysis and interpretation as per the study objectives.

On the other hand, quantitative data was analyzed by descriptive analysis such as means and standard deviations with the use of Statistical Package for Social Sciences (SPSS) version 17.0. The study conducted a multiple regression analysis to test the relationship between independent variables and dependent variable. The regression equation was in the following form:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \]

Where

- \( Y \) = Integration of ICT in instruction to enhance curriculum delivery
- \( X_1 \) = Teacher’s attitudes
- \( X_2 \) = Teachers’ training
- \( X_3 \) = Teachers’ teaching experience
- \( X_4 \) = Teachers’ level of self-efficacy
- \( \beta_1, \beta_2, \beta_3, \beta_4 \) and \( \beta_5 \) are coefficients of determination
- \( \varepsilon \) - Error term
3.10 Ethical and Logistical Considerations

The researcher obtained a research authorization letter from Graduate School Kenyatta University and a Research Permit from National Commission for Science Technology & Innovation (NACOSTI). Then the researcher sought consent to carry out a study from the Borabu Sub-County Director of Education. An informed consent was sought from all the respondents so that they participated voluntarily. The researcher assured all respondents of confidentiality, their names were not revealed and all information given was only used for the purpose of the study. The researcher also maintained the respondents’ privacy and ensured no infringing of respondents’ rights and freedom.
CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the results, their interpretations and discussions. The research was based on teacher- preparedness in integrating information and communication technology in instruction in lower primary schools in Nyamira County, Kenya.

The study objectives were:

i. To establish the extent to which teacher’s attitudes influence ICT integration in teaching-learning.

ii. To find out the extent to which teachers’ training in ICT influence integration of ICT in teaching-learning.

iii. To determine the extent to which teachers’ teaching experience influence integration of ICT in teaching-learning.

iv. To establish the extent to which teachers’ levels of self-efficacy influence integration of ICT in teaching-learning.

The demographic results are first presented followed by descriptive results and inferential statistics which are presented in tables, graphs, charts and figures.

4.2 Response Rate

The study sought to find out the response rate of the respondents. The results in Table 4.1 shows that out of 30 respondents, 28 filled in and returned the questionnaires making an overall response rate of 93.3%. Berg (2004) states that response rate of 70 per cent and above is good. Therefore the overall response rate was commendable at 93.3%. This was made possible mainly because the researcher had two research

38
assistants who were able to establish direct contact with the respondents and explaining to them the purpose of the study with the help of head teachers. Findings are presented in table 4.1.

Table 4.1: Response Rate

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent</td>
<td>28</td>
<td>93.3</td>
</tr>
<tr>
<td>Not Respondent</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

4.3 Demographic Information

4.3.1 Gender

The study sought to determine the gender of the respondents as presented in Figure 4.1 below

![Respondents' Gender](image)

Figure 4.1: Respondents’ Gender

According to the findings, majority of the respondents were female as represented by 64.29%. The rest of the respondents (35.71%) were female. This shows that both genders were well represented and the study could not suffer from gender bias.
4.3.2 Professional Qualification

The study sought to find out the level of education of the respondents as presented in Figure 4.2.

![Figure 4.2: Respondents’ Professional Qualification](image)

Majority of the respondents had attained a Diploma level of education as shown by 64.29%, 15.60% had attained certificate level of education and 20.11% had a Bachelor of Education Degree. This is an indicator that all the respondents had attained a good level of education and could respond to the study adequately.

4.3.3 Teaching Experience

The study sought to determine the numbers of years that teachers had practiced teaching in their schools. Findings are presented in Table 4.3.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 years</td>
<td>3</td>
<td>10.7</td>
<td>10.7</td>
</tr>
<tr>
<td>11 - 15 years</td>
<td>12</td>
<td>42.9</td>
<td>53.6</td>
</tr>
<tr>
<td>16 - 20 years</td>
<td>6</td>
<td>21.4</td>
<td>75.0</td>
</tr>
<tr>
<td>Over 20 years</td>
<td>7</td>
<td>25.0</td>
<td>55.0</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Majority of the respondents had worked in the organization for a period of between 11 to 15 years as shown by 42.9%, 25.0% of the respondents who had worked for 20 years, 21.7% had worked for a period of between 16 to 20 years and 10.7% had worked for a period of between 1 to 5 years. The cumulative frequency of 75.0% shows that majority of the respondents had a teaching experience of 16 years and above. These findings show that majority of the respondents had worked for a long period and so they had a wealthy experience on the teacher preparedness in integrating ICT in lower primary schools.

The findings are presented in Figure 4.3.

![Figure 4.3: Teaching Experience in the Current Station](image)

4.3.4 Introduction of Computers to the School

The study sought to establish the years that ICT were introduced for the first time in schools. The findings are presented in Table 4.4.
Table 4.3: Years Computers were introduced to the School

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>13</td>
<td>46.4</td>
<td>46.4</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>9</td>
<td>32.1</td>
<td>78.6</td>
</tr>
<tr>
<td>Over 20 years</td>
<td>6</td>
<td>21.4</td>
<td>42.2</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Majority of the respondents indicated that computers were introduced to their respective schools in between 1 to 5 years ago as presented by 46.4%, 32.1% between 6 to 10 years ago and 21.4% over 20 years ago. These findings show that ICTs have been in public primary school for while which creates the need to know if teachers are integrating them in instruction.

4.4 Descriptive Statistics

Descriptive statistics such as means and standard deviations were used to present quantitative data with the use of Statistical Package for Social Sciences (SPSS) version 17.0. It covers Teachers’ attitudes towards ICT integration, Teachers’ Training in ICT, Teachers’ teaching Experience and Teacher’s Levels of Self Efficacy as per the study objectives as discussed below:

4.4.1 Teachers’ Attitude towards ICT and Integration of ICT in teaching-learning

The study sought to establish the extent to which teacher’s attitudes influence ICT integration in teaching-learning. Under this objective there were twelve items which the study focused on to establish teachers’ attitudes towards ICT integration and the findings are presented in Table 4.5 below.
Table 4.4: Teachers’ Attitude towards ICT Integration

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of ICT can help make difficult topics easy to understand</td>
<td>1.86</td>
<td>1.008</td>
</tr>
<tr>
<td>Male teachers are better than female teachers in ICT</td>
<td>3.89</td>
<td>1.197</td>
</tr>
<tr>
<td>ICT tools are difficult to use</td>
<td>3.61</td>
<td>0.875</td>
</tr>
<tr>
<td>ICT makes it easier to respond to the needs of the pupils</td>
<td>2.54</td>
<td>1.261</td>
</tr>
<tr>
<td>Use of ICT motivates pupils to learn more</td>
<td>2.32</td>
<td>0.945</td>
</tr>
<tr>
<td>Use of ICT will make the work of teacher easier</td>
<td>2.57</td>
<td>1.260</td>
</tr>
<tr>
<td>Use of ICT makes learning pupil-centered with the teacher being the facilitator</td>
<td>2.54</td>
<td>1.170</td>
</tr>
<tr>
<td>Use of ICT makes the lessons more interactive</td>
<td>2.36</td>
<td>1.471</td>
</tr>
<tr>
<td>ICT need to be used by newly graduated teachers only</td>
<td>1.68</td>
<td>0.476</td>
</tr>
<tr>
<td>The use of ICT will make me a more effective teacher</td>
<td>2.73</td>
<td>0.985</td>
</tr>
<tr>
<td>I believe that I could be a better teacher with ICT tools</td>
<td>2.96</td>
<td>1.347</td>
</tr>
<tr>
<td>I don’t think I can use the ICT tools when teaching</td>
<td>2.39</td>
<td>1.449</td>
</tr>
<tr>
<td>Pupils performance can improve if I use ICT tools when teaching</td>
<td>2.29</td>
<td>0.713</td>
</tr>
<tr>
<td>I encourage my pupils to use ICT tools</td>
<td>2.14</td>
<td>1.079</td>
</tr>
<tr>
<td>Given an opportunity i will make an effort to upgrade my ICT skills</td>
<td>3.29</td>
<td>1.357</td>
</tr>
<tr>
<td>Use of ICT in the class is very frustrating</td>
<td>3.72</td>
<td>0.880</td>
</tr>
<tr>
<td>Use of ICT is relevant in teaching</td>
<td>2.65</td>
<td>1.887</td>
</tr>
<tr>
<td><strong>Aggregate Score</strong></td>
<td><strong>2.58</strong></td>
<td><strong>1.047</strong></td>
</tr>
</tbody>
</table>

From the results above, majority of the respondents strongly agreed that male teachers are better than female teachers in ICT, they believed that they could be better teachers with ICT tools and given an opportunity they will make an effort to upgrade their ICT skills with a mean score of 3.89, 3.61 and 3.29 respectively which varied significantly as indicated by standard deviation of 1.197, 0.875 and 1.357 respectively. This findings show that many teachers had the attitude that male teachers can teach using ICT better than female teachers findings that disagrees with the findings of Orduawah (2017) which showed that there was no significant difference between the mean scores of the male and female model primary school teachers in the use of ICT.
From the findings teachers believed that they could be better teachers with ICT tools if given an opportunity to upgrade their ICT skills. They agreed with the following statements; The use of ICT makes me a more effective teacher, Use of ICT will make the work of teacher easier, Use of ICT makes learning pupil-centered with the teacher being the facilitator and ICT makes it easier to respond to the needs of the pupils as presented by mean score of 2.96, 2.82, 2.73, 2.57, 2.54 and 2.54 respectively and with a significance variance of 1.347, 1.219, 0.985, 1.260, 1.170 and 1.261 respectively. This indicates that teachers are willing to integrate ICT but they are not doing it due to lack of ICT knowledge which concurs with the findings of Elsevier (2012) who found out that teachers’ attitudes towards ICT are highly positive but the use of them in class is scarce due to lack of ICT knowledge. It also concurs with the findings of Mingaine (2013) who observed that teachers will adopt ICT if they perceive it as a very important teaching strategy which will help them improve their pedagogy and pupils’ performance. Afshari (2009) also noted that to cultivate positive attitudes among teachers, they need to be knowledgeable on how to use technology.

Majority of the respondents agreed on the statements that ICT tools are difficult to use and very frustrating when using them in class with a mean score 3.61 and 2.72 respectively which varied significantly as indicated by standard deviation 0.875 and 0.880 respectively. It was established from the results that most teachers had positive perception towards use of ICT but they found them difficult to use and frustrating when teaching with them and this is as a result of lack of proper training on how to use ICT in instruction hence, they find it challenging. It was established that teachers’ attitudes towards ICT use among teachers influences integration of ICT in schools; this finding
is in line with the findings of Mishra (2001) who states that teachers’ attitudes influence their willingness to use ICT in teaching and learning.

Majority of the respondents strongly disagreed with that ICT need to be used by newly graduated teachers by a mean score of 1.86 and a standard deviation of 1.008. This result showed that teachers believed that any teacher can use ICT in teaching-learning process a finding that contradicts Tan (2012) who found that young teachers used ICT in classrooms more than older teachers. Respondents also indicated that they do not feel comfortable using the ICT and they do not encourage their pupils to use ICT tools in class. It was established that teachers did not feel comfortable to use ICT in class due to lack of skills to be able to teach with them, hence, they found it difficult to encourage learners to use ICT when themselves they were not able to model that.

The respondents also agreed on the following statements that Use of ICT makes the lessons more interactive, Use of ICT motivates pupils to learn more, Pupils performance can improve if I use ICT tools when teaching, ICT tools are very relevant as shown by a mean score of 2.39, 2.36, 2.32, 2.32, 2.29, 2.25, 2.14, 2.12 and 1.68 respectively which varied significantly as indicated by standard deviation of 1.449, 1.471, 0.945, 0.945, 0.713, 0.887, 1.079, 0.145 and 0.476 respectively. This results showed that majority of teachers had positive perceptions about integration of ICT in instruction.

It was established from the study that many teachers had positive attitudes towards ICT integration but they were not ready to adopt and use them. These findings contradicts with the findings of Andoh (2012) who shows that teachers with positive perception that ICT will enable them teach with ease, provide an interactive platform with pupils, improve their pedagogy and performance were ready to integrate ICT in their teaching.
It was established from the study that majority of teachers had positive attitudes towards ICT but were not be ready to integrate ICT in instruction due to lack ICT knowledge.

4.4.2 Teachers’ Training in ICT and Integration of ICT in Teaching-Learning

The study sought to find out the extent to which teachers’ training in ICT influence integration of ICT in teaching-learning. Under this objective there were five areas which the study focused on, this include; Trained teachers in ICT and their level of training, place of training, Attendance of teachers in workshops and in-service training, relevancy of the training in instruction and teachers’ ICT competency levels. The findings from each area are discussed below.

4.4.2.1 Trained teachers

The study established that few of the respondents were trained in basic ICT skills as shown by 46.43% while majority were not by 53.57% as shown in figure 4.4 below.

![Figure 4.4: Trained teachers in ICT](image)

The study established that majority of the respondents who had undergone training had basic ICT knowledge which they indicated were not good enough to help them integrate ICT in instruction. It was established that computer packages were the most level of training received by the respondents as presented by 25.0% and 17.9% certificate. None of the respondents had Diploma and Bachelor degree level of ICT training. These findings agree with Muriithi (2017) who found out that good match of training and
skills are important to support ICT implementation in schools and poor school ICT skills have negatively affected implementation ICT education.

### 4.4.2.2 Place of Training

The findings further established that majority of the respondents received basic ICT training through Teachers Training Colleges (TTC) by 32.1%, 25.0% through the organization by their schools and 17.9% through commercial colleges as shown in table 4.6 below.

#### Table 4.5: Place of ICT Training

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Commercial college</td>
<td>5</td>
<td>17.9</td>
<td>23.8</td>
</tr>
<tr>
<td>School organized</td>
<td>7</td>
<td>25.0</td>
<td>57.1</td>
</tr>
<tr>
<td>TTC</td>
<td>9</td>
<td>32.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>75.0</td>
<td></td>
</tr>
<tr>
<td>Missing System</td>
<td>7</td>
<td>25.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

This finding showed that teacher trainers do not go through training on how to integrate ICT in instruction when they are in training colleges, instead they receive basic computer knowledge on how to operate computers. This concurs with Wanyoike (2016) findings that most ICT training in Kenya are tied down to technology literacy as a result primary and secondary school teachers in Kenya do not have sufficient knowledge and skills on how to integrate ICT in the curriculum. These findings are shown in Table 4.6 below
4.4.2.3 Attendance of ICT training/workshops

Majority of the respondents indicated that ICT training and workshops rarely took place which respondents indicated once a year. It was established that not all the teachers attended the ICT trainings and workshops as presented by 60.7%, 25.0% were not sure and 14.3% agreed that teachers attended ICT training. This finding concurs with Angwenyi (2016) who found out that teachers did not enroll in in-service training and professional development courses which is a great set back to ICT integration. It also concurs with Rosentha (1999) study found that ICT competence levels of teachers will impact their efficacy and determine how they will integrate ICT in schools and also Knezek and Christensen (2000) hypothesized that high levels of skills and knowledge would produce higher levels of technology integration that will reflect on student achievements positively The findings are presented in Table 4.7 below

Table 4.6: Attendance of ICT Trainings/Workshops

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>4</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>17</td>
<td>60.7</td>
</tr>
<tr>
<td></td>
<td>Not sure</td>
<td>7</td>
<td>25.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>28</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Those respondents who disagreed said that teachers have not been given an opportunity to attend the workshop and those few who attend are chosen by the head teachers because of lack of funds.
4.4.2.4 Relevance of ICT training in instruction

Respondents indicated that ICT training was very relevant as shown by 42.86%, 25.0% relevant, 21.43% slightly relevant and 10.71% not relevant as shown in Figure 4.5 below. The findings show that those teachers who attended ICT training and workshops found the training very relevant in instruction, while few of them felt that the trainings were slightly relevant and a small number of the respondents who attended the ICT training found it not relevant in instruction. These findings disagrees with Alazam et al. (2012) which examined teachers’ ICT skills and ICT integration and found out that a vast majority of teachers who participated in ICT training indicated it as irrelevant in classroom teaching.

![Figure 4.5: Relevance of ICT Training](image)

The study established that most of the respondents who had training in ICT indicated that it had made their teaching more effective which led to improved performance among pupils in their class.

It was established that in-service training on ICT integration was rarely available for teachers in which majority attended ICT workshops/training once a year as indicated by 71.4% though 14.3% had not. This finding showed that there is not enough training that teachers are exposed to in order to help them upgrade and update their knowledge in ICT. Lack of appropriate ICT skills hinders integration of ICT in instruction. This is
in line with the study conducted by Baylor and Ritchie (2002); they found that professional development has a significant influence on how well ICT is embraced in the classroom. The respondents indicated that training helps to improve teachers to use ICT because it equips them with knowledge that helps them know how to use ICT equipment in class and improve their attitudes.

4.4.2.5 Teachers’ Competency in ICT

The respondents were further given a list of statements to rate their use of ICT competencies. The findings are presented in Table 4.8 below

Table 4.7: ICT Competency

<table>
<thead>
<tr>
<th></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>42.9</td>
<td>57.1</td>
</tr>
<tr>
<td>I can open, close, save and rename a file</td>
<td>67.9</td>
<td>32.1</td>
</tr>
<tr>
<td>I can search the internet for educational reference materials</td>
<td>50.0</td>
<td>50.0</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>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>I can scan for viruses and fix basic faults (trouble shoot)</td>
<td>53.6</td>
<td>46.4</td>
</tr>
<tr>
<td>I can use Word Processor e.g. MS Word to type lesson materials</td>
<td>17.9</td>
<td>82.1</td>
</tr>
<tr>
<td>I can use Spreadsheets e.g. MS Excel to perform Arithmetical calculations and plot graphs</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>I can use Presentation software e.g. PowerPoint for class presentation</td>
<td>21.4</td>
<td>78.6</td>
</tr>
<tr>
<td>I can use databases e.g. Access to store pupils personal and performance records</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>I can use digital camera and a computer to produce a video for classroom presentation</td>
<td>42.9</td>
<td>57.1</td>
</tr>
</tbody>
</table>

The findings indicates that all the respondents did not have the knowledge in the use Spreadsheets e.g. MS Excel to perform Arithmetical calculations and plot graphs and use of databases e.g. Access to store pupils personal and performance records. Majority of the respondents also indicated that they cannot use Word Processor e.g. MS Word to
type lesson materials, use Presentation software e.g. PowerPoint for class presentation and also cannot use digital camera and a computer to produce a video for classroom presentation as shown by 82.1%, 78.6% and 57.1% respectively. It was established that teachers lacked enough knowledge and skills on ICT and this largely hindered them from integrating ICT in instruction. This finding concurs with Pelgrum (2001), who indicates that success of educational innovations depends largely on the ICT skills and knowledge of teachers.

Majority of the respondents agreed that they can open, close, save and rename a file as shown by 67.9%. Also quite a number of the respondents agreed that they can search the internet for educational reference materials and can use the internet for e-mailing other teachers, parents and pupils on issues related to teaching and learning as presented by 50% respectively. From the findings, it was established that majority of teachers had very basic knowledge in ICT which is not good enough to help them integrate ICT in teaching. These findings are in line with findings of Rosentha (2000) who observed that ICT competence levels of teachers will impact their efficacy and determine how they will integrate ICT in schools. It also agrees with Muriithi (2017) who found that teachers’ lack of knowledge and skills was the most inhibiting obstacle to the use of ICT in schools. This can therefore be concluded that there is need to train more teachers in ICT in lower primary schools.

4.4.3 Teachers’ Teaching Experience and Integration of ICT in Teaching-Learning

The study sought to determine the extent to which teachers’ teaching experience influence integration of ICT in teaching-learning. Under this objective, the study had three items which it used to address the objective. The items include; Teachers’ use of ICT to prepare lessons, teacher’s use of ICT in monitoring students progress and
teachers’ use of ICT in setting exams and recording marks in regard to their teaching experience. The findings from the three items are discussed below:

### 4.4.3.1 Use of ICT in Setting Exams and Recording Marks

The respondents were asked to indicate whether they had used ICT in setting exams and recording marks.

**Table 4.8: Use of ICT in Setting Exams and Recording Marks**

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>25</td>
<td>89.3</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>20</td>
<td>71.4</td>
</tr>
<tr>
<td>11 - 15 years</td>
<td>12</td>
<td>42.9</td>
</tr>
<tr>
<td>16 - 20 years</td>
<td>6</td>
<td>21.4</td>
</tr>
<tr>
<td>Over 20 years</td>
<td>2</td>
<td>7.1</td>
</tr>
</tbody>
</table>

The study established that majority (89.3%) of the respondents who had a teaching experience of between 1 to 5 years had used ICT in setting exams and recording marks, followed by 71.4% with teaching experience of between 6 and 10 years and 42.9% with teaching experience of between 11 to 15 years. These findings show that teachers with less teaching experience use ICT more in schools compared to teachers with more teaching experience. The findings agree with Kamaruddin *et al.* (2017) which revealed that most of experienced teachers were not knowledgeable about the educational ICT application. This findings disagree with Gilbert(2017) Teachers with more than 30 years of teaching experience demonstrated higher usage of ICT tools but seemed to find difficulties in the use of ICT applications.
On the other hand, majority (92.9%) who had worked for more than 20 years had not used ICT in setting exams and recording marks and also quite a large number represented by 78.6% with teaching experience of 16 to 20 years had not used ICT in setting exams and recording marks as shown in Table 4.9 above. The findings agree with Kim (2008) who stated that experienced teachers are less ready to integrate ICT into their teaching. Gorder (2008) revealed that ineffective use of ICT by experienced teachers was related to high technological discomfort levels due to lack of computer skills.

4.4.3.2 Use of ICT in Monitoring Student Progress

The respondents were asked to indicate whether they had used ICT to monitor student progress in regard to their teaching experience. The findings are presented in Table 4.10 below

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>24</td>
<td>85.7</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>21</td>
<td>75.0</td>
</tr>
<tr>
<td>11 - 15 years</td>
<td>10</td>
<td>35.7</td>
</tr>
<tr>
<td>16 - 20 years</td>
<td>3</td>
<td>10.7</td>
</tr>
<tr>
<td>Over 20 years</td>
<td>1</td>
<td>3.6</td>
</tr>
</tbody>
</table>

The results in Table 4.10 indicates that majority (85.7%) with a teaching experience of between 1 to 5 years had used ICT in monitoring student progress and the respondents with a teaching experience of between 6 and 10 years accounted for 75.0%. Majority (96.4%) of the respondents with a teaching experience of over 20 years indicated that
they had not used ICT to monitor student progress and also a large number represented by 92.9% with a teaching experience of between 16 to 20 years had not. These findings concur with United States National Centre for Education Statistics report of (2000) which showed that teachers with less experience in teaching were more likely to integrate computers in their teaching than teachers with more experience in teaching.

4.4.4.3 Use of ICT in Preparing Lessons

The study sought to establish if teachers used ICT to prepare lessons in view of their teaching experience. These findings are presented in Figure 4.7 below.

![Figure 4.6: ICT in Preparing Lessons](image)

The findings in Figure 4.7 indicates that majority of the respondents with a teaching experience ranging from 1 to 5 years mostly prepared their lessons using research, assessment and photocopying as represented by 89.3%, 92.9% and 96.4% respectively. The study also established that majority of the respondents with a teaching experience of more than 16 years had not used ICT in preparing lessons. These findings contradicts with the findings of Lau and Sim (2008) who revealed that older teachers frequently use computer technology in the classrooms more than the younger teachers.
The study established that majority (75.0%) of the respondents with a teaching experience of between 6 to 10 years used a desktop in preparing lessons. The respondents who used laptop in preparing their lessons formed 67.9% and had a teaching experience of between 1 to 5 years. The study further established that none of the respondents with a teaching experience of 16 years and above had used ICT in teaching.

The respondents were given a list of statements to indicate their level of agreement regarding influence of teaching experience on the integration of ICT. The findings are presented in Table 4.11 below.

**Table 4.11: Teaching Experience and ICT Integration**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean (M)</th>
<th>Standard Deviation (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experienced teachers do not want to accept and adapt to the changes</td>
<td>4.00</td>
<td>1.022</td>
</tr>
<tr>
<td>Experienced teachers do not want to receive any training on ICT in order</td>
<td>4.17</td>
<td>0.963</td>
</tr>
<tr>
<td>to improve their ICT competence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The teachers with more experience in teaching do not prefer to use ICT</td>
<td>3.58</td>
<td>0.504</td>
</tr>
<tr>
<td>tools in the teaching and learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experienced teachers with training in ICT have greater confidence in their</td>
<td>4.00</td>
<td>0.000</td>
</tr>
<tr>
<td>ability to use them effectively</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aggregate Score</strong></td>
<td><strong>3.94</strong></td>
<td><strong>0.622</strong></td>
</tr>
</tbody>
</table>

Table 4.11 indicated that majority of the respondents strongly agreed that Experienced teachers do not want to receive any training on ICT in order to improve their ICT competence as shown by a mean score of 4.17 which varied significantly as indicated by a standard deviation of 0.963. This was followed by the statements that experienced teachers do not want to accept and adapt to the changes (M=4.00, SD=1.022), teachers with more experience in teaching do not prefer to use ICT tools in the teaching and
learning (M=3.58, SD=0.504) and experienced teachers with training in computers have greater confidence in their ability to use them effectively (M=4.00, SD=0.00). These findings contradict the findings of Wachiuri (2015) who found out that teachers’ training in ICT and teaching experience are not consistent in affecting ICT implementation. The study findings concur with Mwangi and Khatete (2017) who revealed a variance in the use of ICTs by experienced teachers especially between personal use and pedagogical use; Most experienced teachers felt that the approaches used in professional development did not equip them adequately for independent ICT usage in schools.

From the study findings, it was established that more experienced teachers are not ready to integrate ICT in instruction due to their believe in their rich experience which makes them think they can teach well even without ICT. Another reason that could make the experienced teachers not ready to use ICT is lack of knowledge, majority of these teachers went through a teacher training curriculum which does not have computer training therefore, they lack fundamental ICT skills which make them feel uncomfortable to use ICT when teaching. From the study it was established that teachers’ teaching experience affect ICT integration in schools, a finding that contradicts with Morbey et al. (2002) which found an insignificant relationship between teachers’ teaching experience and use of ICT.

4.4.4 Teachers’ Self-Efficacy in ICT and Integration of ICT in Teaching-Learning

The study sought to establish the extent to which teachers’ levels of self-efficacy influence integration of ICT in teaching-learning.

The respondents were given twelve items to indicate if they had confidence in their ability to use ICT in instruction. The findings are presented in Table 4.12 below.
Table 4.10: Teachers’ Level of Self-efficacy in ICT

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel confident that I can select appropriate software to use in my teaching</td>
<td>3.46</td>
<td>1.414</td>
</tr>
<tr>
<td>I feel confident that I can use ICT to help pupils understand concepts better</td>
<td>3.08</td>
<td>0.929</td>
</tr>
<tr>
<td>I feel confident that I can use Internet to access teaching and learning materials</td>
<td>1.79</td>
<td>4.19</td>
</tr>
<tr>
<td>I feel confident that I can use email to communicate with parents and other teachers.</td>
<td>2.14</td>
<td>0.946</td>
</tr>
<tr>
<td>I feel confident that I can design technology-enhanced learning activities for my pupils</td>
<td>1.89</td>
<td>1.049</td>
</tr>
<tr>
<td>I feel confident I can implement alternative teaching strategies in my classroom using ICT</td>
<td>1.80</td>
<td>0.714</td>
</tr>
<tr>
<td>I feel confident I can make pupils understand difficult areas using ICT tools in my school</td>
<td>2.58</td>
<td>1.216</td>
</tr>
<tr>
<td>I feel confident I can use ICT to adjust lessons to the proper level for individual pupils</td>
<td>1.88</td>
<td>1.025</td>
</tr>
<tr>
<td>I feel confident I can prepare teaching-learning materials for my class using ICT</td>
<td>2.16</td>
<td>1.573</td>
</tr>
<tr>
<td>I feel confident I can use ICT to help my pupils think critically</td>
<td>2.88</td>
<td>1.191</td>
</tr>
<tr>
<td>I feel confident I can foster my pupils’ creativity using ICT</td>
<td>2.53</td>
<td>1.264</td>
</tr>
<tr>
<td>I feel confident I can establish routines to keep activities running smoothly using ICT</td>
<td>2.13</td>
<td>0.612</td>
</tr>
<tr>
<td><strong>Aggregate Score</strong></td>
<td><strong>2.47</strong></td>
<td><strong>1.399</strong></td>
</tr>
</tbody>
</table>

The findings from the twelve items above show that majority of the respondents indicated confidence in four items which include; that they can select appropriate software to use in teaching, they feel confident they can make pupils understand difficult areas using ICT and they feel confident that they can use ICT to help pupils think critically and creatively as shown by a mean score of 3.46, 3.08, 2.88, and 2.58 respectively which varied significantly as indicated by a standard deviation of 1.414, 1.216, 1.191 and 1.264 respectively. From the findings, respondents indicated lack of confidence in majority of the items which include; I feel confident that I can use Internet to access teaching and learning materials, I feel confident that I can use email to communicate with parents and other teachers, I feel confident that I can design
technology-enhanced learning activities for my pupils, I feel confident I can implement alternative teaching strategies in my classroom using ICT, I feel confident I can use ICT to adjust lessons to the proper level for individual pupils I feel confident and I can establish routines to keep activities running smoothly using ICT as shown by a mean score of 1.79, 2.14, 1.89, 1.80, 1.88, 2.16, 2.13 respectively which varied significantly as indicated by a standard deviation of 4.19, 0.946, 1.049, 0.714, 1.025, 1.573 and 0.612 respectively.

The findings showed that respondents lacked confidence in their ability to use ICT in many areas of instruction and this influenced their willingness to use them when teaching, which concurs with a study by Teo (2009) who found out that Teacher’s self efficacy influences teachers’ intention to use technology when teaching. This finding also concurs with Higgins (2000) who reported that teachers with high levels of self efficacy used computers often than the teachers with low levels of self efficacy.

Majority of the respondents agreed that they do not feel confident that they can use Internet to access teaching and learning materials, they do not feel confident that they can use email to communicate with parents and other teachers, they do not feel confident that they can design technology-enhanced learning activities for pupils, they do not feel confident that they can implement alternative teaching strategies in their classrooms using ICT, they do not feel confident that they can use ICT to adjust lessons to the proper level for individual pupils’ development, and they do not feel confident that they can establish routines to keep activities running smoothly using ICT. These findings showed that majority of teachers in lower primary school had low levels of self efficacy in ICT use which made them reluctant to integrate ICT in instruction, which agrees with Jones (2004) who found out that teachers who lack
technology confidence will be reluctant to adopt and use technology devices in their classroom, lack of technology knowledge and skills and fear to attempt and failure are major reasons that make teachers to lack confidence in ICT use.

This study concludes that majority of teachers lack confidence in their ability in using ICT in teaching due to lack of appropriate ICT knowledge hence, teachers’ lack of confidence in ICT use hinders them from integrating ICT in instruction. This finding concurs with Farah (2011) who indicated that even teachers who held strong beliefs regarding the value of technology in educating today’s learners could be slowed in their use of available ICT tools due to fears of not being able to effectively troubleshoot technological issues if they were to arise.

4.5 Regression Analysis

In this study, a multiple regression analysis was conducted to establish relationship between the independent variables and the dependent variable.

Table 4.11: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R Square Change</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>F Change</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>df1  df2 Sig. F</td>
</tr>
<tr>
<td>1</td>
<td>.654&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.727</td>
<td>.856</td>
<td>1.171</td>
<td>.027</td>
</tr>
</tbody>
</table>

<sup>a</sup> Predictors: (Constant), teacher’s attitudes, teachers’ training, teaching experience, levels of self-efficacy

R-Square (coefficient of determination) is a commonly used statistic to evaluate model fit. R-square is 1 minus the ratio of residual variability. The adjusted $R^2$, also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables. 85.6% of the changes in the integration of ICT in teaching-learning variables could be attributed to the combined effect of the predictor variables.
Table 4.12: ANOVA Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1.771</td>
<td>4</td>
<td>.443</td>
<td>4.323</td>
<td>.001&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Residual</td>
<td>64.460</td>
<td>24</td>
<td>1.371</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>66.231</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Predictors: (Constant), teacher’s attitudes, teachers’ training, teaching experience, levels of self-efficacy

b. Dependent Variable: Integration of ICT in teaching-learning

The probability value of 0.001 indicates that the regression model was highly significant in predicting how teacher’s attitudes, teachers’ training, teaching experience, levels of self-efficacy influenced the integration of ICT in teaching-learning. The F calculated at 5% level of significance was 4.323 since F calculated is greater than the F critical (value = 0.443), this shows that the overall model was significant.

Table 4.13: Regression Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>.4896</td>
<td>1.106</td>
<td>4.426</td>
</tr>
<tr>
<td>Teacher’s attitudes</td>
<td>.761</td>
<td>.293</td>
<td>4.177</td>
</tr>
<tr>
<td>Teachers’ training</td>
<td>.896</td>
<td>.351</td>
<td>1.119</td>
</tr>
<tr>
<td>Teaching experience</td>
<td>.414</td>
<td>.225</td>
<td>3.022</td>
</tr>
<tr>
<td>Levels of self-efficacy</td>
<td>.521</td>
<td>.189</td>
<td>2.102</td>
</tr>
</tbody>
</table>
From the above regression model, holding teacher’s attitudes, teachers’ training, teaching experience and levels of self-efficacy, integration of ICT in teaching-learning would be 0.4896. The established regression equation by the study was:

\[ Y = 0.4896 + 0.761X_1 + 0.521X_2 + 0.896X_3 + 0.414X_4. \]

Where

- \( Y \) = Integration of ICT in teaching-learning
- \( X_1 \) = Teacher’s attitudes
- \( X_2 \) = Teachers’ training
- \( X_3 \) = Teaching experience
- \( X_4 \) = Levels of self-efficacy

The regression equation above has established that taking all factors into account (teacher’s attitudes, teachers’ training, teaching experience and levels of self-efficacy, integration) constant at zero integration of ICT in teaching-learning will be 0.4896. The findings presented also show that taking all other independent variables at zero, an increase in teacher’s attitudes would lead to a 0.761 increase in integration of ICT in teaching-learning. In addition, the findings show that an increase in Teachers’ training would lead to a 0.896 increase in integration of ICT in teaching-learning. The study also found that an increase in the scores of teaching experience would lead to a 0.414 increase in integration of ICT in teaching-learning and an increase in the scores of Levels of self-efficacy would lead to a 0.521 increase in integration of ICT in teaching-learning. Overall, teaching experience had the least (41.4%) effect on integration of ICT in teaching-learning and teachers training had the highest effect at 89.6% in ICT integration in instruction.
4.6 Qualitative Data from the Interviews

4.6.1 Teacher- Attitudes ICT integration

Through interviews, the head teachers revealed that that majority of teachers are interested to use ICT in teaching but due to lack of knowledge and appropriate skills they perceive it as time consuming. They indicated that with proper training in ICT, teachers will be ready to integrate ICT in instruction. This findings agree with Ndibalema (2014) who found that teachers have positive attitudes towards the use of ICT as a pedagogical tool but they did not integrate it in their teaching effectively due to lack of proper ICT training.

The study also established that teachers had negative attitudes and unwilling to embrace computer technology because they were anxious of dealing with ICT equipment, a sense of loss of control over the teaching situation using ICT and lack of time to manipulate ICT tools due to congested timetables. This finding concurs with Mustafina (2016) who states that teachers possess negative attitudes toward ICT in schools. However, Ayub, Bakar and Ismail (2015) study found a negative relationship existed between teachers’ attitudes towards using ICT and ICT integration in schools.

It was also revealed from this study that many teachers have a perception that the integration of ICT does not add much value in attaining educational objective and that are nonessential and supplemental to their teaching and classrooms, hence they had a negative attitude towards ICT. The study established that there is need to train more teachers to acquire skills of manipulating ICT equipment, encouraging teachers to use ICT in teaching, providing workshops more often were factors that were indicated by head teachers that could better modify teachers’ attitude towards ICT use in instruction.
Teachers’ Training in ICT

It was reported by head teachers that the Government through the ministry of education funds training of teachers though it rarely happened which respondents indicated once a year. It was reported that teachers who attended to in-service training lacked commitment due to financial challenges, it was indicated that during the trainings there is need for reimbursement of the transport and provision of lunch to teachers, this would encourage high turnout of teachers to attend the ICT workshops and trainings.

The study established that 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. Respondents reported that lack of enough skills in ICT affects teachers’ use of ICT in teaching-learning. These findings concur with Kampala (2011) who recommended that stakeholders should be encouraged to explore the possibility of being trained on how to use computers in teaching rather than operating computers. On the other hand, Ozen (2012) found that teachers reported positive effects in their computer knowledge, skills, and classroom uses of technologies and in their students’ academic achievement levels, use of these technologies and participation in classroom activities.

4.6.2 Teachers’ Teaching Experience

Majority of the head teachers agreed that teachers’ teaching experience affect the adoption and use of ICT in their schools, they explained that experienced teachers have the perception that the integration of ICT does not add much value in attaining educational objective compared to their rich experience that they have in teaching. It was established from the respondents that many years of teaching was one of the reasons that could make teachers not utilize ICT in teaching. This finding agrees with
that of Gill (2008) who found out that those teachers who had not taught for long had high confidence and willing to use ICT when teaching while the teachers who had served in teaching service for long were not willing to use computers as a teaching strategy.

Respondents indicated that ICT equipments are available in their schools such as tablets, laptops, desktops, projectors but they argued that availability of these equipments in schools will not automatically lead to ICT integration in primary school education; there is need for the Government to pay attention to primary school teachers’ ICT knowledge levels and attitudes especially those that experienced teachers have towards the use of technology in class

4.6.3 Teachers’ Self-Efficacy in ICT integration

Teachers’ level of self efficacy was indicated to have an influence in the use of ICT in classrooms. Regular in-service trainings to teachers, provision of more workshops and change of teacher attitude towards ICT integration, were indicated as the best strategies that can be done to enhance teachers’ self efficacy in ICT which concurs with Robertson and Al-Zahrani (2012) who carried out a study among pre-service teacher in Saudi Arabia established that there was increasing Saudi pre-service teacher access, training, and exposure to computers and ICTs will contribute effectively to boosting their self-efficacy, motivation, and computing habits.

Head teachers argued that even where teachers perceive themselves as knowledgeable in operating computers, they may not be able to integrate computers in teaching unless they receive specific training on how to teach using computers which agrees with Kamaruddin et al. (2017) in their study revealed that most of the teachers were knowledgeable about the educational ICT application however, the findings revealed
that the teachers’ level of ICT integration is still at the low level due to low levels of self-efficacy.

From the interviews, the study found out from head teachers that majority of lower primary teachers had low levels of self-efficacy due to lack of proper training on how to use ICT in instruction. Since teachers lack enough skills in using ICT, it lowers their confidence levels in their ability to use them in teaching which hinders them from integrating it in instruction. This findings agree with Eldaou (2016) who indicated that teachers’ self-efficacy can influence teacher’s intent to use technology in the classroom, especially as evidenced by the integration of ICT in their lesson plans. Raphael and Mtebe (2017) study found out that the determinants of self-efficacy beliefs among pre-service teachers towards educational technologies integration are training, perceived ease of use, performance expectancy, and social influence.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
The chapter presents a summary of the findings, conclusions and recommendations as per the research objective.

5.2 Summary of Findings

5.2.1 Teachers’ Attitude
The study established that teachers’ attitude had a positive and significant effect on the integration of ICT in teaching-learning as indicated by t-values (t=3.889, p < 0.05). From the findings, teachers’ attitude affected integration of ICT in teaching-learning to an extent as expressed by an aggregate score of 2.58 with a significance variance of 1.047. Majority of the respondents showed positive attitudes toward ICT use in teaching but they were not ready to integrate in instruction because they believed that were not competent in ICT therefore it could be difficult and frustrating using them in classrooms.

5.2.2 Teachers’ Training in ICT
The study established that teachers’ training in ICT had a positive and significant effect on the integration of ICT in teaching-learning as indicated by t-values (t=1.558, p < 0.05). The study established that majority of the respondents were trained in basic computer literacy which was done in Teachers Training Colleges (TTC). The respondents were mostly trained on computer packages at certificate level, these respondents indicated that computer training had made their teaching more effective which led to improved performance among pupils in their class. It was indicated that in-service trainings happened rarely once a year in which majority of teachers did not
attend. The study established that majority of the respondents indicated lack of ICT knowledge.

### 5.2.3 Teaching Experience in ICT

The study established that teaching experience in ICT had a positive and significant effect on the integration of ICT in teaching-learning as indicated by t-values \( t=4.094, p < 0.05 \). The study established that most of the respondents with a teaching experience of less than 10 years used ICT in setting exams and recording marks, monitoring student progress and preparing lessons through research, assessment and photocopying. Very few of the respondents with a teaching experience of more than 16 years had used ICT in various areas concerning teaching and learning. The study further established that experienced teachers do not want to receive any training on ICT in order to improve their ICT competence and are not ready to accept and adapt to the changes brought about by ICT in teaching and learning.

### 5.2.4 Teachers Level of Self-efficacy in ICT

The study established that teachers level of self-efficacy in ICT had a positive and significant effect on the integration of ICT in teaching-learning as indicated by t-values \( t=2.444, p < 0.05 \). The findings show that majority of the respondents to a moderate extent indicated that they feel confident they can make pupils understand difficult areas using ICT tools in their school, design technology-enhanced learning activities for their pupils, prepare teaching-learning materials in class using ICT, use ICT to help pupils think critically, select appropriate software to use in teaching, use ICT to adjust lessons to proper level for individual pupils and use email to communicate with other teachers and parents. Majority of the respondents disagreed that they feel confident that they can implement alternative teaching strategies in classroom using ICT, ICT will help pupils
understand concepts better, establish routines to keep activities running smoothly using ICT, foster their pupils’ creativity using ICT and use Internet to access teaching and learning materials. The study established that majority of the respondents had low levels of self efficacy in use of ICT in instruction.

5.3 Conclusions

The study concludes that teachers have low level of ICT use for educational purpose and there is a significant positive correlation between teachers’ level of ICT use and their attitudes towards integration of ICT. Teachers play an important role in the implementation of ICT in curriculum and their attitudes have proved to be significant predictors of technology use, in other words, teachers' attitude towards the use of ICT for educational purposes is one key factor for the success of the ICT utilization in schools.

The study concludes that both head teachers and teachers had been trained in basic computer literacy at certificate level and had no ICT training in their subject areas. This means they are limited in ICT competency, and therefore it can be concluded that there is need for in depth training of teachers in ICT in the respective subject areas in order to develop the competency and confidence needed to integrate ICT in teaching and learning. There is need for specific training on how teachers can use ICT in teaching and not general training on how to operate computers.

The study concludes that most experienced teachers do not want to receive ICT training in order to improve their ICT competence and are not ready to accept and adapt to the changes brought about by ICT in teaching and learning as they argue that they can do without ICT due to their rich experience in teaching.
The study concludes that teachers’ self efficacy has an important effect on ICT integration in teaching-learning process. The findings reveal that majority of teachers lack confidence in using ICT when teaching as they do not have enough knowledge on how to use ICT in instruction.

5.4 Recommendations

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

5.4.1 Recommendation to the Ministry of Education.

There is need by the Ministry of Education to organize seminars/workshop to sensitize teachers on the benefits of using ICTs in education in order to create a positive teacher attitude towards ICT. It is important for the Ministry of Education to address teachers’ attitudes towards ICT use in teaching-learning especially with long serving teachers who overly held negative attitudes towards ICT integration in education.

5.4.2 Recommendation to Teacher Training Colleges.

Teachers training colleges should ensure that all teachers train in ICT skills that are necessary for ICT integration in teaching and learning. Teacher trainees should be encouraged to acquire enough technological skills at the time they are in college. This can be achieved by including content on ICT pedagogy in the primary teachers’ curriculum.

5.4.3 Recommendation to Public Primary Schools’ Management

The study recommends that the ideal method for developing teachers' self-efficacy for computer use would be to provide them with training and support to work successfully with ICT equipment in their classrooms. Teacher professional development program which include regular workshops over an extended period could be effective for increasing both self-efficacy and ICT use.
Schools should play a leading role to implement ICT at the school with self help initiative. Teachers should show initiative and the school leadership should support and create an enabling teaching learning environment for teachers and students. Exposure to computers and ICTs will contribute effectively to boosting their self-efficacy.

5.4.4 **Recommendation to Lower Primary Teachers**

In order for teachers to acquire more experience and to remain confident in their knowledge of technology applications, they need to enhance their skills regularly and stay up to date through continual professional development and in-service training.

5.5 **Recommendation for Further Study**

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 ICT integration in their schools

ii. A study on how prepared the primary teacher trainers are in preparing primary school teachers in ICT use
REFERENCES


APPENDICES

Appendix 1: Questionnaire for Teachers

I am a post-graduate student undertaking Master of Education, specializing in Early Childhood Studies. I am currently carrying out a research project for the purpose of investigating teacher preparedness in Integration Information and Communication Technology (ICT) in Teaching and Learning in Public Primary Schools. I would wish to request for your co-operation and be assured that your identity will be kept confidential; all the information given shall remain confidential and will only be used for the purpose of this study.

PART A: Demographic Information

1. Indicate your gender: Male [ ] Female [ ]

2. Indicate your highest professional qualification: PhD [ ] PGDE [ ] MA [ ]
   DIP [ ] B.ED. [ ] P1 [ ] others (specify)

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

3. Indicate years of teaching experience in your current school: 1 – 5 years [ ] 6 – 10 years [ ] 11 – 15 years [ ] 16 – 20 years [ ] Over 20 years [ ]

4. How many years ago were computers introduced for the first time in your school? 1 – 5 years [ ] 6 – 10 years [ ] 11 – 15 years [ ] 16 – 20 years [ ] Over 20 years [ ]

5. Indicate how many computer labs are there in your school: 1 [ ] 2 [ ]
   More than 2 [ ]

6. How many ICT equipment available in the labs are there in each lab?
PART B: Teachers’ Attitudes towards ICT Integration

Indicate the extent to which you agree with the following statements on ICT integration in teaching and learning, please circle your correct choice. Key: SA – Strongly Agree  A – Agree  U – Undecided D – Disagree SD – Strongly Disagree

<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>Use of ICT can help make difficult topics easy to understand</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Male teachers are better than female teachers in ICT</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ICT tools are difficult to use</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ICT makes it easier to respond to the needs of the pupils.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Use of ICT motivates pupils to learn more</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Use of ICT will make the work of teacher easier</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Use of ICT makes learning pupil-centered with the teacher being the facilitator</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Use of ICT makes the lessons more interactive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ICT need to be used by newly graduated teachers only</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The use of ICT makes me a more effective teacher</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel comfortable using the computer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I believe that I could be a better teacher with ICT tools</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I don’t think I can use the ICT tools when teaching</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Pupils performance can improve if I use ICT tools when teaching</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I encourage my pupils to use ICT tools</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Given an opportunity i will make an effort to upgrade my ICT skills</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Use of ICT in the class is very frustrating</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>ICT tools are very relevant in teaching</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
PART C: Teachers’ Training in ICT

13. a) Are you trained in ICT?  Yes [ ]  No [ ]

   b) If yes in 1a above, where did you receive your training?
      Commercial college [ ]
      School organized [ ]  T.T.C [ ]  University [ ] Self-taught [ ]
      Others (specify)

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

14. 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 [ ]

15a). Did the training make your teaching more effective?
       a) Yes [ ]  b) No [ ]  c) Not Sure [ ]

   b) If yes, has this lead to improved performance among pupils in your class?
      a) Yes [ ]  b) No [ ]  c) Not Sure [ ]

16a) Are there in-service training on ICT integration available for teachers?
       Yes [ ]  b) No [ ]  c) Not Sure [ ]

   b) If yes, are there teachers in your school who attended ICT workshops/training?
      a) Yes [ ]  b) No [ ]  c) Not Sure [ ]

      If NO, why? ........................................................................................................

17. Do you have skills/training in ICT Integration in teaching and learning?
       a) Yes [ ]  b) No [ ]  c) Not Sure [ ]

18a. Do you believe that computer training of teachers will improve teachers’ ICT
       skills?
       a) Yes [ ]  b) No [ ]  c) Not Sure [ ]

   b) If YES, how would training helps improve teachers’ readiness to use ICT?
      .....................................................................................................................

   c) If NO, why? ........................................................................................................

19. Who finances ICT workshops/trainings in your Sub-County?
       National Government [ ]
       County Government [ ]
       Non-Governmental Organizations [ ]
       School [ ]
       Community [ ]
None of the above [ ]

20. Have all the teachers in your school attended ICT training?
   a) Yes [ ]         b) No [ ]         c) Not Sure [ ]
   b) If NO, why haven’t all teachers in your school attended ICT training?

21. In your opinion, does a teacher’s computer training influence teachers readiness to use ICT when teaching? a) Yes [ ] b) No [ ] c) Not Sure [ ]

22a. Have all the teachers in your school attended ICT training?
   a) Yes [ ]         b) No [ ]         c) Not Sure [ ]
   b) If NO, why haven’t all teachers in your school attended ICT training?

23. In your opinion, does a teacher’s computer training influence teachers readiness to use ICT in primary schools? a) Yes b) No [ ] c) Not Sure [ ]

24. How would you rate yourself in the use of the following ICT competencies? Circle the correct answer.

<table>
<thead>
<tr>
<th>Skill</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>1</td>
<td>2</td>
</tr>
<tr>
<td>I can open, close, save and rename a file</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I can search the internet for educational reference materials</td>
<td>1</td>
<td>2</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>1</td>
<td>2</td>
</tr>
<tr>
<td>I can scan for viruses and fix basic faults (trouble shoot)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I can use Word Processor e.g. MS Word to type lesson materials</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I can use Spreadsheets e.g. MS Excel to perform Arithmetical calculations and plot graphs</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I can use Presentation software e.g. PowerPoint for class presentation</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I can use databases e.g. Access to store pupils personal and performance records</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>I can use digital camera and a computer to produce a video for classroom presentation</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
PART D: Teachers ‘teaching Experience and ICT Integration

25. **Teaching Experience and Integration of ICT**

With respect to your teaching experience as indicated Part A No. 4, indicate whether you have used ICT in setting exams and recording marks?

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 – 10 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 – 15 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 – 20 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 20 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. With respect to your teaching experience as indicated Part A No. 4, indicate whether you have used ICT to monitor student progress.

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 – 10 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 – 15 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 – 20 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 20 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27. With respect to your teaching experience as indicated Part A No. 4, indicate how you have used ICT in preparing lessons (multiple choices allowed).

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>Research</th>
<th>Assessment</th>
<th>Photocopying</th>
<th>Not used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 – 10 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 – 15 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 – 20 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 20 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

28. With respect to your teaching experience as indicated Part A No. 4, indicate the form of ICT you often use in teaching (Multiple choices allowed).

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>Laptop</th>
<th>Desktop</th>
<th>Projector</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 – 10 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 – 15 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 – 20 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 20 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

29. Indicate the extent to which the following statements regarding influence of teaching experience on the integration of ICT. Key: SA – Strongly Agree  A – Agree  U – Undecided D – Disagree SD – Strongly Disagree
Experienced teachers do not want to accept and adapt to the changes

Experienced teachers do not want to receive any training on ICT in order to improve their ICT competence

The older teachers with more experience in teaching do not prefer to use ICT tools in the teaching and learning

Teachers with more experience with computers have greater confidence in their ability to use them effectively

30. Based on your opinion, how does teacher teaching experience influence integration of ICT in integration in teaching and learning?

PART E: Teacher’s Levels of Self Efficacy in ICT Integration

Circle the correct choice

<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>I feel confident that I can select appropriate software to use in my teaching</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident that ICT will help pupils understand concepts better</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident that I can Internet to access teaching and learning materials.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident that I can use email to communicate with other teachers and parents.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident that I can design technology-enhanced learning activities for my pupils</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident I can implement alternative teaching strategies in my classroom using ICT.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident I can make pupils understand difficult areas using ICT tools in my school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident I can use ICT to adjust lessons to the proper level for individual pupils</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident I can prepare teaching-learning materials for my class using ICT.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident I can use ICT to help my pupils think critically</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident I can foster my pupils’ creativity using ICT.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel confident I can establish routines to keep activities running smoothly using ICT.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix II: Interview Guide for Head Teachers

I am a master’s student in Kenyatta University undertaking Master of Education in Early Childhood Studies. I am currently carrying out a research project for the purpose of investigating teacher preparedness in Integrating Information and Communication Technology (ICT) in Teaching and Learning in Public Primary Schools. I humbly request for your co-operation and be assured that your identity will be kept confidential and all information obtained from this study will only be used for the purpose of this study.

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 head teacher in this school? 1 – 5 years [ ] 6 – 10 years [ ] 11 – 15 years [ ] Over 15 years [ ]

7. Briefly describe ICT equipment that are available in your school?

…………………………………………………………………………………………………………………………

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

…………………………………………………………………………………………………………………………

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

8. How would you summarize the attitude of teachers towards ICT use in your school? …………………………………………………………………………………………..

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

81
10. Do you think teachers’ teaching experience affect the adoption and use of ICT in your school?
..................................................................................................................................................

11. How frequent does training of teachers take place?
..................................................................................................................................................

12. Comment of teachers’ attendance to in-service trainings?
..................................................................................................................................................

13. Who funds training of teachers? ..............................................................................................

14. What criterion is used to invite teachers to training? ..............................................................

15. What is an estimate number of female teachers and male teachers attending the training?
..................................................................................................................................................

16. What are some motivating factors that influence teachers to attend to training?
..................................................................................................................................................

17. Briefly describe your teachers’ levels of self-efficacy and how that affect use of ICT in classrooms...........................................................................................................................................

18. In your opinion, what can be done to enhance ICT integration in primary schools?
.....................................................................................................................................................
Appendix III: Map of Nyamira City County