INFLUENCE OF TEACHER TRAINEE'S PERCEPTIONS ON ICT INTEGRATION IN PRIMARY SCHOOLS: A STUDY IN PUBLIC TEACHER TRAINING COLLEGES IN SELECTED COUNTIES IN RIFT VALLEY, KENYA

BY

LILIAN KIMAIYO

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DECLARATION

DECLARATION BY THE STUDENT

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Kimaiyo Lilian …….. ……

EDU/DPhil/P/02/12 Signature Date

DECLARATION BY SUPERVISORS

This thesis has been submitted for examination with our approval as the University supervisors.

Dr. Kisilu .M. Kitainge
Department of Technology Education
University of Eldoret, Kenya …….. ……
Signature Date

Prof. Jackson Too
Department of Curriculum Instruction and Educational Media
Moi University, Kenya …….. ……
Signature Date

DEDICATION

Dedicated to

My husband

James Kapkoi and

Our extra ordinary Children

Kibet, Jelagat and Kibiwot

ABSTRACT

The purpose of this study was to investigate the influences of teacher trainee's perceptions on prospective ICT integration in primary school education in Kenya. It was also aimed at assessing trainee teachers' perceived advantages and disadvantages of ICT integration. This was done in the light of the fact that the Kenya government will launch the national laptop project in public primary schools by April, 2016 after which it will be rolled out countrywide. Moreover, teachers are key to effective implementation of computer use in the educational systems and have tremendous potential to transmit beliefs and values to pupils. This study was based on the Technology Acceptance Model (TAM) proposed by Davis in 1986. The trainee teachers' philosophy about teaching and learning, attitude towards computers, their perceived competence about computers, perceived competence about teaching, subjective norms and gender were independent variables while prospective ICT integration in education was the dependent variable. This study employed mixed method research design. This study applied the concurrent nested design, which is used when the focus is on gaining a broader perspective of the topic in a single study. The researcher purposely selected five public TTCs in former Rift Valley Province for the study. Stratified simple random sampling was used to select a total of 357 participants. Data was collected from trainee teachers in five TTCs, using a teacher trainee questionnaire. Qualitative data was collected using an interview guide during focus group interviews of pre-service teachers. Descriptive statistics and inferential statistics were employed to analyze quantitative data. The descriptive statistics involved the use of frequencies, means and standard deviation, while the inferential statistics was Pearson Product Moment Correlation Coefficient and Multiple Regression. Qualitative data was analyzed thematically using data reduction, conclusion drawing and verification techniques. Data was presented in form of texts and tables. The findings showed that trainee teacher teaching and learning philosophies, computer attitudes and subjective norms significantly influenced ICT integration in teaching and learning at 0.05 level of significance. The study also revealed that trainee teacher perceived competence about computer and teaching and gender had no significant influence on ICT integration. The study also revealed that trainee teachers support integration of ICT in primary schools. Perceived advantages and disadvantages and suggested supports to ICT integration in primary schools were also established. Based on the findings of this study the researcher recommends that teacher trainers should promote student-centered teaching philosophies and positive teacher-trainee computer attitudes. The MoEST should sensitize education stakeholders and entire communities on potential benefits of ICT to create expectation and sense of ownership so as to enhance teacher ICT integration. Suggestions for further research on ICT integration were also made.

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LIST OF ABBREVIATIONS

ACE	Attitude to Computer in Education
BECTA	British Educational Communications and Technology Agency
DV	Dependent Variable
G O K	Government of Kenya
I C T	Information and Communications Technology.
IDCR	Inter Data Consulting
I S	Information system
I T	Information Technology
IV	Independent Variable
KICD	Kenya Institute of Curriculum Development
KMO	Kaiser-Meyer-Olkin measure of sampling adequacy
KNBS	Kenya National Bureau of Statistics
MoEST	Ministry of Education Science and Technology
NEPAD	New Partnership for Africas Development
OECD	Organization for Economic Corporation and Dev**el**opment
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
T T Cs	Teacher Training Colleges
UNDP	United Nations Development Program
UNESCO	United Nations Educational Scientific and Cultural Organization
USAID	United States Agency For International Development

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CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Overview

This chapter provides the background of the study, specifies the problem, purpose, states the objectives, and presents the research questions, hypotheses, significance, scope, limitations and assumptions of the study. It also outlines Theoretical framework and operational definition of key terms that were used in the study.

1.1 Background information of the Study

Information and Communication Technology (ICT) is one of the principal drivers of economic development and social change worldwide. Torero and Braun (2006) offered a broad definition of ICT which encompasses equipment and services. For them,

> ICT includes the computing industry (hardware, software, networks, the Internet, and related services); electronic data processing and display (such as photocopiers, cash registers, calculators, and scanners, as well as a myriad of less well-known machines specifically tailored to production and manufacturing. It also includes telecommunications and related services (such as fixed and cellular telephones, facsimile machines, instant messaging, teleconferencing among others.); and audiovisual equipment and services (including television, radio, video, DVDs, digital cameras, compact discs, MP3 players, etc).

Information and Communication Technology plays a key role in enhancing the quality of education. However, successful implementation of ICT requires strategic planning (Ngoma, 2010).

The role of electronic technology in promoting economic growth and development has gained prominence globally (Tinio, 2009). Economies are transforming from industrial to knowledge based-ones where knowledge is recognized as a driver of productivity and economic growth (Organization for Economic Corporation and Development, 2004; World Bank, 2010). Nations that succeed in harnessing the potential of electronic technology can look forward to a greatly expanded economic growth, dramatically improved human welfare and a stronger democratic government (Ngoma, 2010). ICT reduces transaction costs, increases labor productivity, and opens new trade opportunities, better communication and enhances overall efficiency.

ICTs have the potential to create job opportunities, improve delivery and access to education, among other key areas . ICT facilitates information sharing and knowledge creation which increases the transparency, accountability and effectiveness of government, business and non-profit making organizations all of which contribute to an enabling environment of socio-economic development (Morawaczynski & Ngwenyama, 2007). Elements such as rapid diffusion of digital platforms like internet, mobile telephony and broadband networks are all but examples that demonstrate how pervasive ICT has become with various implications on economic growth at the macro and national levels (Morawaczynski & Ngwenyama, 2007).

Education is one of the areas where use of electronic technology provides tangible benefits. Use of technology in and for education is now seen worldwide both as a necessity and an opportunity (UNESCO, 2009). It plays a great role in the three fundamental aspects of education policy that is, access, quality and cost. ICT increases access to education through distance learning. They provide new and innovative means to bring educational opportunities to a greater number of people of all ages, especially those who have historically been excluded such as the population

living in rural areas, women facing social barriers and students with disabilities (UNESCO, 2009). Computers are increasingly widespread, influencing many aspects of our social and work lives, as well as many of our leisure activities. As more tasks involve human-computer interaction, computer skills and knowledge have become more positively correlated with both occupational and personal success. Therefore, as the world moves into a technology based society, it is important that children's classroom experiences with technology be equitable.

One of the goals for integrating ICTs in education is to enhance teaching and learning practices thereby improving quality of education (Higgins, 2003: Madumere-Obike & Imgbi, 2012). ICT use in education encourages learners to move away from learning characterized only by memorization of facts towards a process of knowledge creation (Steyn & Van Gruene, 2014; UNESCO, 2011). According to Dede (2009) ICT skills prepare pupils for the workplace where they will be required to collaborate with peers across the world to produce new intellectual work that adds value to society. However, in most developing countries such as Kenya, the potential of ICTs to support pedagogy is yet to be fully realized. To date most of the attention both on policy and research has been on how the lack of infrastructure and access to technology affects the use of ICT in pedagogy (Koo, 2008). However, it has also been shown that even in cases where the infrastructure is available, few educators are effectively integrating ICTs in curriculum delivery (Mueller, Wood, Willoughby, Ross & Specht, 2008; Gedik & Baydas, 2013). It is clear, therefore, that there are also non-technical factors that affect the adoption of ICTs for curriculum delivery. *C*elik and Yeshlyt (2013) attributed non-use of computer by teachers to computer-phobia caused by:

a) psychological factors, for example, having little or no control over the activity or thinking that they might damage the computer, and feeling that one's self-esteem is threatened;
b) sociological factors such as ICT being regarded as a solitary activity, the perception that one needs to be clever to use one, and the fear of being replaced by the computer;
c) operational factors such as the technology being beyond one's abilities, having to cope with unfriendly jargon, and the likelihood of the technology going wrong.

ICT integration in schools is not simply the use of computers in the teaching and learning process, but is a complex procedure. In integrating, parts are combined together, so that they work together to make a whole (LeBaron & Mdonough, 2009). The ‘parts to be combined’ include the school context in which integration is to take place, the technologies provided, the technical skills of teachers, the technical support provided for the installation, maintenance and upgrading of hardware and software, the pedagogical preferences and skills of teachers, the availability of appropriate electronic resources and finally, the skills and motivation of students.

In addition, ICT Integration could be seen as a whole configuration of events, activities, contents, and interpersonal processes taking place in the context in which ICT is used (Mungai, 2011). However, in some instances in Kenya, integration has always been taken to mean to teach students basic computer skills (Chemwei, Njagi & Koech, 2014). The right conditions need to be in place before the educational benefits of ICT can be fully harnessed, and a systematic approach is required when integrating ICTs into the education system. This fact is often overlooked, and in their eagerness to jump onto the technology bandwagon, many education systems end up with technologies that are either unsuitable for their needs or cannot be used optimally due to teacher perceptions arising from inadequate training (Ng, Miao, & Lee, 2009).

In relation to ICT,the vision of the Government of Kenya is to facilitate ICT as a universal tool for education and training. Further The Ministry of Education Science and Technology (MOEST) mission is to facilitate effective use of ICT (Republic of Kenya, 2014). The development of the curriculum and training of teachers both at in-service and pre-service level is central to the government's efforts of achieving its ICT policy objectives (Republic of Kenya 2014 ; Farrel, 2007). In an effort to promote the development of content that will address the educational needs of primary, secondary, and tertiary institutions, the government came up with two ways in which the curriculum will be developed (Kenya, MoEST, 2012). One, by adapting existing educational materials and distributing them to the schools; and the second, by beginning the process of having schools create their own e-content. Besides, building capacity in Kenya to create instructional material for an increasingly digital world is noted as an important aspect of the curriculum that is expected to pay dividends in improving the quality of education (Farrel, 2007).

In order to achieve this policy objective, Kenya Institute of Curriculum Development (KICD) has been singled out as the sole government body charged with the responsibility of developing the ICT curriculum as well as distributing the educational materials. KICD would also be in charge of overseeing other institutions that develop appropriate e-content (Farrell, 2007). Objective number 10 of the MoEST strategic plan (running from 2006 to 2011) targets strengthening the capacity of Kenya Institute of Curriculum Development (KICD) to execute this mandate among others (Kenya. MoEST, 2006). This is a strong commitment in support of the National ICT policy.

Farrell (2007) asserts that while technicians can be employed to fix and maintain computers, teachers and educators must know how to exploit ICT for opening learners up to the world of knowledge. The author also noted that investment into upgrading

computer laboratories and building ICT capacity at the Teacher Training Colleges (TTCs) is an intervention which can quickly yield high returns. By providing adequate access to ICT, the TTCs can use it to achieve learning objectives at various levels. This point is also noted in the ICT in Education Options Paper (Kenya. MoEST, 2006) in which large-scale capacity building workshops for teachers have been suggested. MoEST (2006) observes that teacher training should be built on existing structures that support quality ongoing professional development for teachers (Hennessy, Onguko, Harrisson, Ang'ondi, Namalafe, Naseem, &Wamakote, 2010). The in-service program should be consistent with the workshops for pre-service teachers at teacher training colleges. Kenya MoEST (2014) further notes that the training of teachers should focus on increasing efficiency in the teachers' workload and integrating ICT to improve teaching and learning objectives.

The Kenya Primary Teacher Syllabus provides for (Kenya MoEST,2014):

i. Five core subjects that are compulsory for all students – English, Kiswahili, professional studies, physical education and information communication and technology (ICT).
ii. Two options each with four subjects for the student teachers to choose one of the options. Option A comprises science, home science, agriculture and mathematics while Option B comprises music, art and craft, social studies and religious education. In the first year, students study 10 subjects, mathematics, English, Kiswahili, science, social studies and religious education, professional studies, creative arts, physical education and ICT. In the second year, students take the five core subjects (English, Kiswahili, education, physical education and ICT) and the four subjects in either Option A or Option B.
iii. Professional studies, which includes the traditional education disciplines such as foundations of education (philosophy, history, sociology and comparative education), curriculum studies, education psychology including educational measurement and evaluation, and educational administration as well as Special

Needs Education (SNE), guidance and counseling and legal issues in education.

iv. Teaching practice there are three sessions – the first during the second term of the 6 terms in the programme, the second in the fourth term, and the third in the sixth term.

Recognizing that an ICT literate workforce is the foundation on which Kenya can acquire the status of knowledge based economy by 2030, the Government plans to make education the natural platform for equipping the nation with these skills in order to create a dynamic and sustainable economic growth (Kenya, MOEST, 2013). Laptops will be provided to primary school children to enable them acquire digital skills at a young age. These skills will be used to access information which they will turn into knowledge.

Consequently, the Kenyan ICT Cabinet Secretary(2015) has stated that the National Laptop Project is expected to run from April 2016 ((Musembi, 2015) by which time 50,000 teachers need to have been trained on ICT integration in the classroom, besides device assembly, applications uploading, content development and delivery of devices to schools among others. It was envisaged that the teachers training should be done by end of August 2013 before which there should have been induction workshops for technical teams, master trainers and training of trainers. A harmonization curriculum team has since been established, and comprises 30 key stakeholders (Britishcouncilhttp://www.britishcouncil.co.ke/kenyas-laptops-project-how-are-teachers-are-getting-involved, retrieved 10th August, 2014). It is envisaged that this team will address a number of key expectations mainly touching on: content format, identifying teachers for training of trainers and master trainers, structures for teacher management (support structure and types), consolidation of partners in curriculum harmonization, gap analysis, and wholesome retooling of the teacher.

Teachers are the implementers of the laptop project, and will actually do the groundwork in terms of equipping students with these very vital IT skills. By directly involving them in these preliminary stages, they have a great opportunity to exercise ownership of the project. In August, 2013, Education Cabinet Secretary, launched a harmonized curriculum guide for ICT integration in education as a preparatory measure towards the implementation of the government's one laptop per child initiative(http://www.jkuat.ac.ke/2013/08/curriculum-for-ict-integration-in-education-launched, retrieved 10th August, 2014).). The curriculum was developed out of a need to equip learners with modern ICT skills which is in line with one of the flagship projects in Kenya vision 2030 (MOEST, 2013). However, it is not clearly known what is being done in primary teacher training colleges to prepare pre-service teachers both psychologically and in terms of skills. This study investigates the influences of teacher trainee perceptions on ICT integration.

The curriculum guide that was launched has been assimilated into the teacher training programs so as to enhance teacher competency in ICT as Kenya braces to be one of the first African countries to entrench digital learning in its academic system. While presenting 2013/ 2014 national budget, finance cabinet secretary outlined one priority as "improving the quality of education through leveraging on ICT, starting with primary school level" (Institute of economic affairs, 2013). At the same time 53.2 billion Kenya shillings was allocated to deploy laptops to class one pupils, development of digital content, building capacity and rolling out computer laboratories. While this indicates serious commitment by the government, it is important to understand the influence of trainee teacher perceptions on prospective ICT integration in their classes.

1.2. Statement of the Problem

The educational potential of computer technology has been emphasized by many researchers (Chigona,Wallace & Zane, 2014; Hennessy et al, 2010). Hennesy et al (2010) stress the potential of computer technology to present rich learning environments, allowing learners to adopt multiple perspectives on complex phenomena, to foster flexible knowledge construction in complex learning domains, and to cater for individual differences. Further (Chigona et al, 2014) suggest that ICT facilitates the opportunity for more student-centered teaching, more self–learning and more peer teaching. It also provides greater opportunity for teacher to teacher and student to student communication.

Since the introduction of educational technologies into classroom settings, teacher education has faced the challenge of improving in-service teacher education and preparing pre-service teachers for successful integration of computer educational technologies into their teaching and learning practices. In recent years, teacher education colleges have made efforts preparing pre-service teachers to integrate computer technology into their future teaching practices (Ertmer & Ottenbrent-Leftwich, 2010; Angeli & Valanides, 2009). In Kenya Primary Teacher Training Colleges, for example, ICT is a core compulsory subject in both years of study though not examinable (Kenya. MoEST, 2014 ; Center for International Education, 2010).

Over the past seven years, there has been an ongoing pressure in Kenya led by Ministry of Education, with the intention to integrate computers and ICT in teaching and learning (Farrell, 2007). However, studies in Western Europe (Nivala, 2009; Teknikdelegatione, 2010) and in Kenya (Makewa, 2003) indicate that there is little evidence that ICT has actually enhanced education standards. This is despite

considerable effort and resources put into educational computing by governments worldwide. Rushby (2005) has described the situation in terms of waves where different technologies have promised to deliver a revolution in teaching and learning but after a period of time have resulted in disappointment and little substantial change.

Studies reveal that despite availability of hardware (Sang,Valke,VanBraak & Tondeur, 2009), school related support for ICT integration (Baylor & Ritchie, 2002) and teacher consciousness about benefits of ICT use (Pelgrum, 2001), a small number of teachers have chosen to use ICT in education while majority have not (Teknikdelegationen, 2010). Reporting reasons for slow integration, Ertmer (1999) categorized barriers to ICT integration into two: first order (external) and second order barriers (internal). He considered external barriers as issues related to access to technologies, training and school support, whose absence makes technology integration impossible. Ertmer (1999) goes further to suggest that even if the first order barriers are resolved, not all teachers integrate ICT. It is therefore important to consider the second order (internal barriers) discouraging computer technology integration by teachers. This includes teacher philosophy about teaching and learning, teacher perceived competence about computer, and about teaching, perceived usefulness (computer attitudes) and subjective norms (opinions and suggestions of people who are important to them). This study aims at examining the influence of these internal factors in computer technology integration in primary schools in Kenya.

Most studies on the impact of these internal barriers on ICT integration have been done outside Kenya,that is in China (Tondeur, VanKeer, VanBraak & Valcke, 2008) and (Wang, Ertmer & Newby, 2004). Besides, there was need for documented empirical evidence indicating the influence of teacher trainee perceptions on ICT

integration in primary schools in Kenya as the Government prepares to roll out the Laptop Project. This study is aimed at filling this gap.

1.3 Purpose of the Study

The main objective of this study was to examine the influence trainee teacher perceptions on integration of computer technology in primary education in Kenya. The factors include teacher philosophy about teaching and learning, teachers' perceived competence about computer and teaching, perceived usefulness (computer attitudes) and subjective norms (opinions and suggestions of people who are important to them) and teacher gender. This study aimed at examining the role of these teacher internal factors in computer technology integration in primary schools in Kenya. It also aimed at assessing student teachers perceptions on the introduction of computer technology in primary education in Kenya and the extent and nature of ICT use by students in the five TTCs.

1.4. Objectives of the Study

This study investigated the following objectives:

1. To establish the influence of trainee teacher philosophy about teaching and learning on integration of computer technology into future teaching practices.
2. To identify the relationship between trainee teachers perceived competence about computer and integration of computer technology into future teaching practices.
3. To identify the influence of teacher trainee perceived competence about teaching on integration of computer technology into future teaching practices.
4. To examine how student teachers' attitude toward computer in education influence integration of computer technology into future teaching practices.

5. To determine how student teachers' subjective norms influence their prospective computer technology integration into teaching practices
6. To examine the effect of trainee teachers' gender on prospective computer integration in instruction.
7. To asses trainee teachers' perceived advantages and disadvantages of the introduction of computer technology in primary education.
8. To establish trainee teachers' perceived barriers and supports required with the introduction of computer technology
9. To assess the extent and nature of trainee teachers' computer technology use in TTCs.

1.5 Research Questions

To provide direction to the study, the researcher developed research questions from the objectives of the study. By answering these questions, the objectives of this study were achieved:

Research questions are stated as follows

1. How does trainee teachers' philosophy about teaching and learning influence their integration of ICT into future teaching practices?
2. What influences does trainee teachers' perceived competence about computer have on integration of ICT into future teaching practices?
3. What influences does trainee teachers' perceived competence about teaching have on their prospective computer technology integration?
4. What is the relationship between the trainee teachers' attitudes toward computer in education and their prospective ICT integration?
5. What influences do trainee teachers' subjective norms have on integration of ICT into future teaching practices?

6. How does trainee teachers' gender influence their integration of ICT into future teaching practices?
7. What are the trainee teachers' perceived advantages, and disadvantages of computer technology in primary education.
8. What are the student teachers' perceived barriers and supports required with the introduction of computer technology in primary schools?
9. What is the extent and nature of student teachers' computer technology use in TTCs?

1.6 Research Hypothesis

To answer research questions and to achieve research objectives, the following null hypotheses were developed and statistically tested;

HO_1: The student teachers' philosophy about teaching and learning do not significantly influence the integration of computer technology.

HO_2: There is no significant relationship between student teachers' perceived competence about computer and integration of computer technology.

HO_3: There is no significant influence of student teachers' perceived competence about teaching on integration of computer technology.

HO_4: The student teachers' attitude toward computer in education does not significantly influence their integration of computer technology i3nto future teaching practices.

HO_5: The subjective norms of trainee teachers toward computer technology does not influence Prospective computer integration

HO_6: Student teachers' gender does not significantly influence the prospective computer integration in instruction.

1.7 Justification of the Study

Justification is the act of providing good reasons why a research study is carried out (Wehmeier & Ashby, 2012). Kenya has a sophisticated ICT in Education Strategy and Implementation Plan. It is embedded in the MOEST strategic plan 2013-2017 and was developed through a consultative process with stakeholders (Republic of Kenya, 2013).Key strategies are:

1. Developing digital content for education
2. Developing and implementing comprehensive legal, policy and institutional framework for ICT integration in education at all levels
3. Developing an enabling and robust ICT infrastructure for all education training and research institutions.
4. Facilitating provision of connectivity to enhance collaboration and information sharing in the sector.
5. Promoting public sector partnership for ICT in education resource mobilization including cost-sharing.
6. Providing of laptops in primary schools

The plan has costing estimates, time lines with measurable outcomes, and specified lead agencies. Support is widespread. Gender Equity of access is stressed in policy and implementation documents. While other countries have reported up to 41% of integration of ICT to teaching and learning, the proportion remains substantially low in Africa; Kenya included (MoEST, 2013).

Integration aims at the use of ICT to support teaching and learning in the delivery of the various curricula to achieve improved education outcomes (Ministry of Education, 2013). ICT integration has been associated with potential benefits thus being an interactive media; it facilitates students to develop diversified skills needed for industrialization and a knowledge-based economy. It also allows teachers and learners to proceed at different paces depending on the prevailing circumstances (Ngoma, 2010). The Kenyan Government recognizes that integration of ICT to teaching and learning also plays an important role in preparing students for the demanding job market. It recognizes further that the education sector needs to be proactive in meeting the requirements for ICT skills. It is one of the strategic objectives of Kenya's MoEST to build the capacity of universities and teacher training colleges to equip teachers with ICT skills up to certificate, diploma and degree level (Ministry of Education, 2013).

However , studies reveal that despite availability of hardware (Sang,Valke,VanBraak & Tondeur, 2010), school related support for ICT integration (Baylor & Ritchie, 2002) and teacher consciousness about benefits of ICT use (Pelgrum, 2001), a small number of teachers have chosen to use ICT in education while majority have not (Teknikdelegationen, 2010). Reporting reasons for slow integration, Ertmer (1999) categorized barriers to ICT integration into two: first order (external) and second order barriers (internal). Ertmer (1999) posits that internal barriers are more difficult to overcome than first order barriers because they are more tacit and personal. There is a growing concern among scholars and researchers that the rate at which these technologies are transferred and integrated into the teaching and learning process is slow (Migwi, 2009; Chemwei, Njagi & Koech 2014). Many teachers shy away from incorporating technology into their teaching and learning process despite the

availability of computers in schools. There are also fears that many teacher-educators in primary school teacher training colleges are not yet incorporating these technologies into their instruction in ways that make a difference in student-teachers' learning leading to low integration by trainee graduates (Chemwei et al., 2014). Teacher training should be conducted in the same manner that the teachers are expected to integrate ICTs (Davis, 2009). Training should challenge teacher beliefs regarding teaching and learning and address teacher perceptions and attitudes (Martinovic & Zhang, 2012).

Moreover, teachers are role models, and both girls and boys benefit from having competent and motivated role models when computers are integrated in the classroom (Muller, Wood, Willoughby, Ross & Specht, 2008). Therefore, it is important to have a gender perspective on teachers' trainee perceptions on ICT integration in primary schools in Kenya. Besides, the Kenyan Government is planning to introduce IT curriculum implementation to primary schools which is a key development pillar in line with Vision 2030. The intended introduction of laptops to primary schools in Kenya; a project embedded in the Jubilee government's manifesto will be rolled out within the next 18 months (Aine, 2015). Teacher trainees in TTCs are expected to implement this new development. The study sought to establish the influences of teacher trainee perceptions on ICT integration, perceived advantages of ICT integration and barriers as perceived by teacher trainees.

1.8 Significance of the Study

The study focused on how trainee teachers' philosophy about teaching and learning, teacher perceived competence about computer, teaching competence, attitude, subjective norms and trainee teacher gender influences their intention to integrate

computer technology into future teaching practices in public Teacher Training Colleges in Rift Valley**.** The study also assessed trainee teachers' perceived potential advantages and disadvantages of introducing computer technology in primary education. Further, the study assessed the extent, nature and use of computer resources in the public TTCs. Kombo and Tromp (2006) explain significance as the relevance of the study in terms of academic contribution and use of the findings and recommendations from the study.

The significance of this study therefore is couched on the following premises:

1. The study provides evidence of the influence of teacher trainee perceptions on ICT integration in primary schools in Kenya. The results may be used by the MoEST to improve teacher training.

2. The findings may help the Government in its efforts to achieve knowledge-based economy by 2030 through education.

3. Given the fact that the government, through MoEST is in the process of rolling out the one laptop per child project in primary schools, the findings will help in programme planning.

4. Policy makers may use the findings to strengthen and achieve the objectives of Sustainable Development Goals (SDGs) particularly in improving the quality of teaching and learning through ICT integration in primary schools.

5. The findings of the study may be used by Government and other stakeholders to examine access, actual levels of use and types of uses of ICT facilities in public TTCs.

6. The findings and recommendations of the study will add to new knowledge as well as lead to further research on ICT integration in teaching and learning.

1.9 Scope of the Study

The study examined the effect of trainee teachers' philosophy about teaching and learning, teacher perceived competence about computer and teaching, subjective norms and gender, on their intention to integrate computer technology into future teaching practices. The study also assessed trainee teachers' perceived potential advantages and disadvantages of introducing computer technology in primary school education. Further, the study assessed the extent, nature and use of computer resources in five TTCs in former Rift Valley Province. The study was done in Mosoriot, Kericho, Baringo, Narok and Tambach Teachers Training Colleges, in former Rift valley Province**.** The five TTCs are found in present day Nandi, Kericho, Baringo, Narok and Elgeiyo Marakwet counties respectively. The counties of Kenya are geographical units envisioned by the 2010 Constitution of Kenya as the units of devolved government (GOK, 2010). The powers are provided in Articles 191 and 192, and in the Fourth Schedule of the Constitution of Kenya and the County Governments Act of 2012. The geographical scope of the study is Teacher Training Colleges, in former Rift Valley province, Kenya.

1.10 Limitations of the Study

Given that the study was conducted among sampled student teachers in five TTCs in former Rift Valley out of twenty one public TTCs in Kenya, generalizations of the findings may not apply to all public TTCs in Kenya. This is because the five may not be representative of all TTCs.

The study is also limited by the fact that it is focused on trainee teacher's intentions and not actual usage. Although intentions are a predictor of usage, their intentions might change as they start teaching in schools.

1.11 Assumptions of the Study

The following assumptions were made by the researcher during the study:

1. That the trainee teachers were honest in their responses to items in the questionnaire so that they are a reflection of their perceptions.

2. That trainee teacher's intentions to use computer are a predictor of actual usage, when they start teaching in schools.

1.12 Theoretical Framework

This study is based on the Technology Acceptance Model (TAM) F. 3.1. TAM is theoretically customized for the study of computer-technology acceptance with a high research significance in the information systems discipline (Straub, Keil, & Brenner, 1997). TAM was chosen because it is capable of explaining user behavior across a broad range of end-user computing technologies and user populations (Lee, Cheung, & Chen, 2005). TAM states that Perceived Usefulness and Perceived Ease of Use determine an individual's intention to use a system, with intention to use serving as a mediator of actual system use. Perceived Usefulness is also seen as being directly impacted by Perceived Ease of Use (Davis, 1989). Davis (1989) concluded that people tend to use or not to use a system to the extent that they believe it will help them perform their job better (perceived usefulness), and also that the believes of the efforts required to use a system can directly affect system usage behaviour (perceived ease of use). Davis (1989) defined perceived usefulness as "the degree to which an individual believes that using a particular system would enhance his or her job

performance". He further defined perceived ease of use as "the degree to which an individual believes that using a particular system would be free of physical and mental effort".

Researchers have simplified TAM by removing the attitude construct found in Theory of Reasoned Action from the current specification (Venkatesh, Morris, Davis, & Davis, 2003). Attempts to extend TAM have generally taken one of three approaches: by introducing factors from related models, by introducing additional or alternative belief factors, and by examining moderators of Perceived Usefulness and Perceived Ease of Use (Wixom & Todd, 2005).

This research introduces gender as a determinant of belief factors because gender has been found to play a role in actual computer integration (Panteli, Stack, & Ramsay, 1999). The study also introduces alternative belief factors such as trainee teacher philosophy about teaching and learning, trainee teacher perceived competence about teaching and learning, and Subjective Norms in addition to TAM's Perceived Usefulness (educational computer attitudes) and Perceived Ease of Use (perceived competence about computer). The constructs introduced by the researcher are considered as external variables determining individual use technology as suggested by Davis (1989), for purposes of this research.

Later developments of TAM would include behavioral intention as a new variable that would be directly influenced by perceived usefulness of a system (Davis Bagozzi & Warshaw, 1989). They suggested that there would be cases when, given a system which was perceived useful, an individual might form a strong behavior intention to use the system without forming an attitude thus giving rise to a modified version of TAM that eliminated need for attitude.

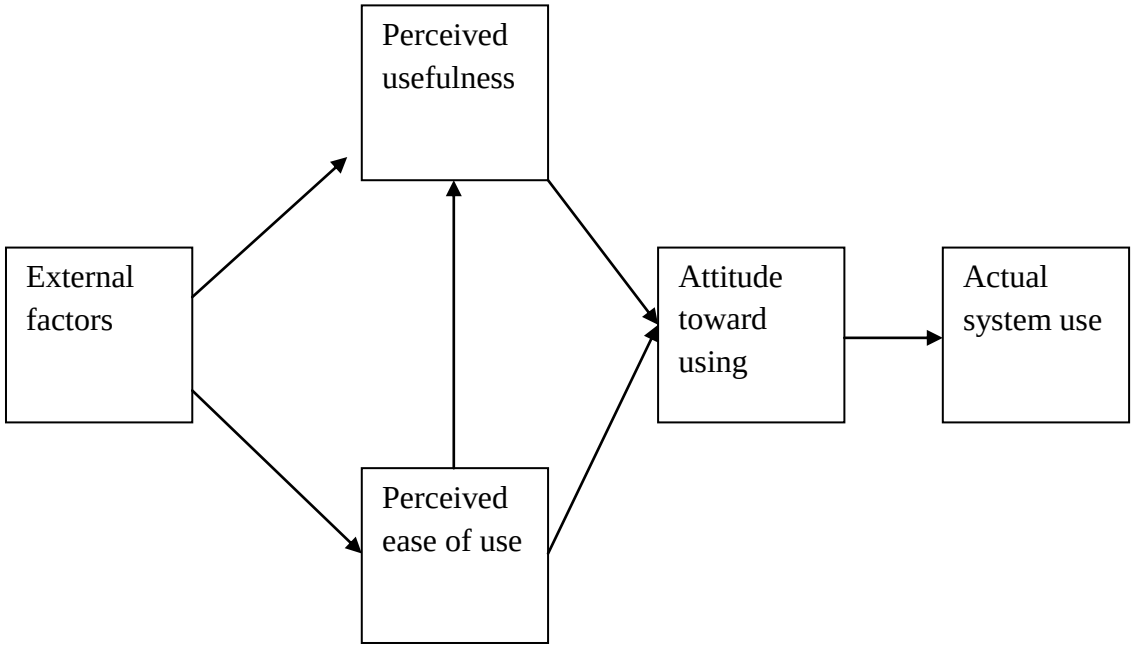

Fig.1.1: Original TAM proposed by Fred Davis (1989, P.24)

1.13 Conceptual Framework

A conceptual framework indicates the effects of independent variable on the dependent variable (Kombo & Tromp, 2006). The researcher of this study designed a conceptual framework based on extended TAM theory that demonstrates the relationships between the teacher trainee perceptions and future computer integration as shown below:

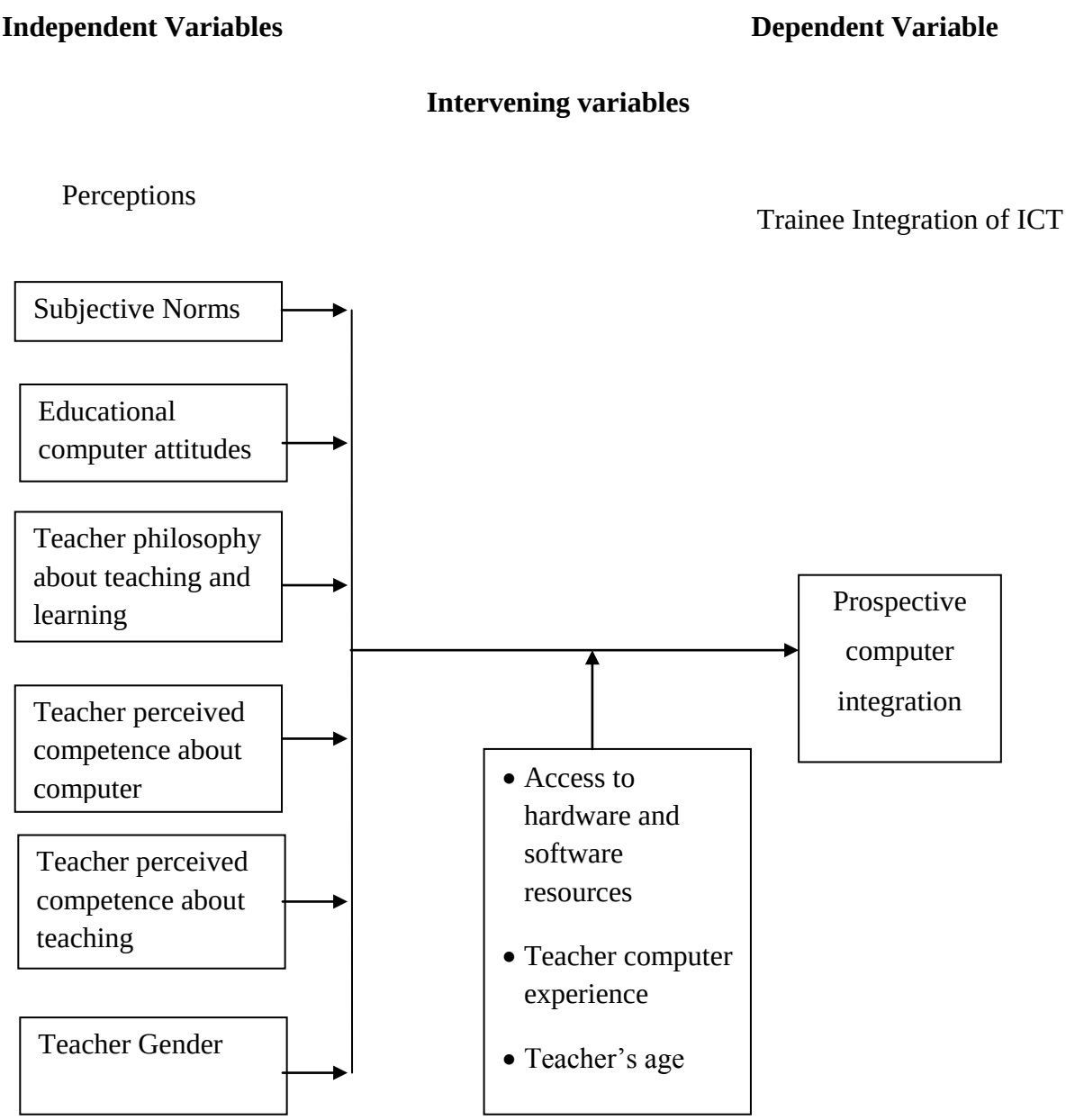

Fig.1. 2: Conceptual frame work

The study tested the model which suggests that the independent variables trainee teacher gender, philosophy about teaching and learning, trainee teacher perceived competence about computer, perceived competence about teaching abilities, attitude towards computer and subjective norms influence prospective computer integration.

1.14 Operational Definition of Terms

Teacher Trainee

This is a person who is being taught how to teach. In this study it refers student teachers in the five training teacher Colleges in Rift Valley being prepared to teach in primary schools in Kenya. It will be used interchangeably with student teachers.

Teacher philosophy about teaching and learning

In this study it refers to teacher's believes about teaching and learning. There are those who believe that a learner constructs his/her own knowledge for which scaffolding is initially required and this may be provided by the computer. However, there are those who believe that the teacher is the source of knowledge and may feel threatened by computer use for teaching and learning.

Teachers perceived competence about teaching

Tschannen-Moran and WoolfolkHoy (2001) defined teacher self-confidence as ‘a teacher’s judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated’ (p. 783). In this study it means the trainee teachers self-assessment of their abilities to teach well.

Teachers perceived competence about computers. This refers to a person's perceptions of their capabilities to apply computers (Compeau & Higgins, 1995). In this study it means teachers' self-assessment of their abilities to use computer for teaching.

Computer attitudes

Ajzen (1988) described an attitude as a predisposition to respond favorably or unfavorably to an object, person, or event. In this study it means the trainee teachers' perception on the usefulness of the computer in promoting teaching and learning.

eLearning

Maldonado, Khan, Moon, and Rho (2011) define eLearning as the delivery of education and training through information and communication technologies. In this study, eLearning is the employment of advancements in electronic technology to create, deliver, and manage learning content, to facilitate communication and collaboration between parties involved, and to manage the learning activity itself.

Subjective Norms

Subjective norms describe a person's perceptions of whether other people believe they should or should not perform a particular behavior (Ajzen, 1991). Within a school environment, teachers' decisions to integrate computer technology might be affected by the opinions and suggestions of other people who are important to them (Ma et al., 2005). In this study Subjective norms are opinions and suggestions of superiors (administrators), peers (colleagues), and pupils about computer use.

Student teachers' perception: Worthen and Sanders (1987) defined perception as a process that allows one to make judgment about desirability or value of something. In

this study perception is operationalized as student teachers' views on advantages and disadvantages of computer integration. It also includes their judgment on possible barriers to computer use and the supports they think are required for successful implementation.

Computer Technology: In this study it means computer equipment and services. It includes computer hardware, software, networks, the internet, and audio visual equipment such as television, radio, video and related services. It is used interchangeably with ICT.

Integration of Computer Technology: Is use of ICT for teaching and learning and includes in class activities, delivery of content and student self learning through the internet. In this study it specifically refers to the introduction of laptops to primary schools in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter provides review of studies done by other people related to the research problem. The researcher identified, critically evaluated and summarized findings of various studies covering gender and ICT use, attitude and ICT use, teaching philosophy and ICT use, teacher perceived competence about computers and use, teacher perceived competence about teaching and computer use, and subjective norms and ICT use. This chapter also provides a review of studies on ICT integration in education, perceived advantages and disadvantages of computer use and nature and extent of use of computers for education purposes.

2.1 Policies and Trends related to ICT use in Education in Kenya

The Kenya National ICT policy was adopted in 2006 after several years of effort in trying to put it in place. The aim of the policy was to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services as reported in the ICT in Education options paper (Kenya. MoEST, 2005). Although the national ICT policy has several sections, objectives and strategies regarding ICT in education are spelt out in the information technology section. In this section, the objective regarding the use of ICT in schools, colleges, universities and other educational institutions to improve the quality of teaching and learning is spelt out as documented by Farrell in the Survey of ICT in Africa Report (2007). One important strategy outlined in this report is the promotion and development of specific e-learning resources that would address the educational needs of primary, secondary and tertiary institutions. A significant step in this direction is the digitization of the

curriculum which is ongoing at the Kenya Institute of Education (Ratemo, 2009). Under the subtitle ‘E-learning’, the ICT policy goes on to outline the strategies that will be used in the promotion and development of ICT in teaching and learning. Other strategies outlined in The National Information & Communications Technology Strategy for Education and Training (Kenya. MoEST, 2006) include to:

1. Promote the development of e-learning resources;
2. Facilitate public-private partnerships to mobilize resources in order to support e-learning initiatives;
3. Promote the development of an integrated e-learning curriculum to support ICT in education;
4. Promote distance education and virtual institutions, particularly in higher education and training;
5. Promote the establishment of a national ICT centre of excellence;
6. Provide affordable infrastructure to facilitate dissemination of knowledge and skills through e-learning platforms;
7. Promote the development of content to address the educational needs of primary, secondary, and tertiary institutions;
8. Create awareness of the opportunities offered by ICT as an educational tool to the education sector;
9. Facilitate sharing of e-learning resources between institutions;
10. Exploit e-learning opportunities to offer Kenyan education programmes for export
11. Integrate e-learning resources with other existing resource.

Teacher training colleges have been great beneficiaries of donations and investments of ICT equipment (Chemwei et al, 2014). Besides, most of the trainers in these

colleges have been inducted on ICT integration in instruction (Nyaga & Getuno, 2005). In spite of these developments in teacher education, there is a growing concern among scholars and researchers that the rate at which these technologies are transferred and integrated into the teaching and learning process is slow (Migwi, 2009; Chemwei et al, 2014). Many teachers shy away from incorporating technology into their teaching and learning process despite the availability of computers in schools. There are also fears that many teacher-educators in primary school teacher training colleges are not yet incorporating these technologies into their instruction in ways that make a difference in student-teachers' learning.

Perhaps that is why most new teacher education graduates still have limited knowledge of how ICT can be used in their professional activities (Kinuthia, 2009). This is happening notwithstanding, the belief of policy makers that integrating ICT in the educational system will lead to improved outcomes for the students. It therefore follows that placement of ICTs in classrooms is not equal to the effective integration for teaching and learning (Earle, 2002). Teacher-training is one essential requirement for successful use of ICT in education. This means that teacher preparedness and professional development is not only desirable but also necessary for the success of learners, school and educational systems. It is obvious that teachers cannot be prepared at one go. Teacher-educators need to be effective teachers and good role models for teaching practices because it is not possible to prepare a new generation of teachers who can effectively use new tools for learning unless teacher-educators themselves are models for effective use of technology in their own classes (UNESCO, 2007; Steketee, 2005).

Thus, if student teachers are to become confident users of technology in their own classes, then they need to see their tutors use them in instruction. This is because

teacher-educators cannot model the use and integration of technology in their teaching if their knowledge, skills, and attitudes towards technology integration are low. While the potential benefits of ICT integration have been promoted by a number of international organizations such as InterData Consulting (IDCR), Intel, Nepad, UNDP, and USAID, research is needed to ensure that such organizations can benefit from practical information related to effective integration. Information on influence teacher-trainees' perceptions on ICT integration in Kenya is scanty. Without such information, the Kenyan government may not develop a realistic plan to achieve its dream of having a technologically literate workforce and being industrialized by 2030 (Kinuthia, 2009). It is on the basis of this background that this study was designed to establish the influence of teacher trainees' perception on ICT integration in public TTCs in Kenya.

2.2 The Teacher Gender and ICT use

Studies by Hatlevic Og and Arsenth (2012) and Fey (2011) have indicated that females have always lagged behind males in their willingness to learn about and use technology in schools. Female students were thought to have more negative attitudes and perceptions about using computers than their male counterparts. Females have also traditionally been less interested than males in pursuing careers in highly technical areas (DiSabatino, 2000).

However, more recent studies indicate the gender disparity that once existed may have narrowed substantially (Sang, Valcke, Van Braak & Tondeur, 2010). Fey (2011) contented that male students showed a greater sense of self-confidence and displayed less anxiety in their ability to use computers than females did. Studies also showed that male students tended to exhibit greater interest in learning about and

using computers than female students, largely due to a perception by female students that computers were "nerdy" (Rahimi & Yadollai, 2011). However more studies that took place after 2000 indicated the differences between males' and females' attitudes about and confidence in using computers had narrowed (Rahimi & Yadollai, 2011; Rainer, Laosethakul, & Astone, 2003). However, the few recent studies related to the topic make it difficult to definitively state that there is no longer a gender disparity in computer use. More research on the topic is definitely needed especially in the Kenyan set up. As a teacher, the researcher was interested in finding out whether gender disparity in computer use existed among the student teachers who will soon come out to implement the one laptop per child project by the government.

Gender differences with regard to teacher beliefs, teacher self-efficacy and teacher attitudes toward computers represent an important research area. The literature on educational computing abounds with conflicting findings about the impact of gender (Teo, 2008). Since the introduction of computers, ICT related activities have been viewed as a 'male domain' (Centre for Educational Research and Innovation and Organisation of Economic Co-operation and Development, 2010). There is a significant body of evidence supporting the notion that gender plays a role in actual computer integration. For instance, Loyd and Gressard (2006) found male teachers to be more confident and less anxious toward computers compared to their female counterparts. A study of Blackmore (Hermans, Tondeur ,Van Braak & Valcke ,2008) found similar findings – males appear to be more positive in their attitudes toward computers than females. As predicted, a study of Liao (2012) in Chinese Taiwan showed that male teachers scored significantly higher than females. Significant differences between males and females were observed for technical ICT capabilities, and situational and longitudinal sustainability (Markauskaite, 2006). Since

technologies have become a normal part of the workplace setting, a number of researchers argue that computing should no longer be regarded as a male domain (King, Bond, & Blandford, 2012; North &Noyes, 2002).

Elsaadani (2012), concluded from his study among teaching staff of Egyptian higher education that there is no relationship between teaching staff gender and their attitude towards ICT. Further, a similar study by Yusuf and Balogyn (2011), among Ilorin University Trainee teachers found no significant influence of gender on the attitude towards ICT use. This emphasizes the need to reconsider the potential impact of gender in the context of educational ICT use. Since these studies were done outside Kenya there is need to examine the role of gender in the integration of computer technology in primary education in Kenya.

2.3. Teacher philosophy about teaching and learning

Philosophy is the psychological state in which an individual holds a proposition or premise to be true. Contemporary analytic philosophers generally use the term "belief" to refer to the attitude one has, roughly, whenever they take something to be the case or regard it as true (Schwitzgebel, 2011). In this context teacher philosophy refers to beliefs about teaching and learning.

According to Lui (2011) in Steyn and Van Greunen (2014), each teacher enters the teaching setting with their personal theories about teaching and learning. Teachers might perceive teaching situations differently and based on their beliefs, they make judgments and decisions on how to act, which strategies to implement, and which materials to use. The decision to use and how to use technology in the classroom depends on the teachers' beliefs about teaching and learning and the role of technology (Chen, 2008).

Actual influences of teachers' philosophy about teaching and learning on classroom activities with or without ICT integration have also been explored by Badia, Meneses and Sigales, 2013). When considering the interrelationship between teacher beliefs and ICT integration, there is evidence that teachers' philosophy about teaching and learning are a significant factor in determining patterns of classroom computer use by in-service teachers and pre-service teachers (Ertmer, 2005; Sang et al, 2010). They found that teachers with student-centered pedagogical beliefs were successful at integrating computer use. As Hsu,Wu and Hwang (2007) pointed out , with computer use, teachers' role should no longer be that of a traditional lecturer, rather be a coach or co-learner.

Moreover, activities in the class should become learner-centered and flexible in order to help learners undergo self-initiated exploratory learning processes. The introduction of ICT in the Kenyan primary education system would call for a re-definition of the role of teachers. With ICT, teachers can no longer be "the transmitters of knowledge" but rather "the facilitators" of the learning process. Tinio (2009) notes that "As learning shifts from the "teacher-centered model" to a "learner-centered model", the teacher becomes less the sole voice of authority and more the facilitator, mentor and coach from "sage on stage" to "guide on the side". This may be easier said than done. This study seeks to examine how student teacher beliefs about teaching and learning in the five Teacher Training Colleges in Rift Valley influence their future computer use in the classroom.

2.4. Teacher perceived competence about teaching

Teacher perceived competence about teaching sometimes referred to as teacher efficacy is related to teacher classroom behaviors. Teacher self-efficacy has been identified as a crucial variable that accounts for individual differences in teaching

effectiveness (Hennessy et al., 2010). Teachers with a strong sense of self-efficacy are open to new ideas and more willing to experiment with new strategies, seek improved teaching methods, and experiment with instructional materials (Fanni, Cantoni, Rega, Tardini & Vanzy, 2010).

Teacher self-efficacy has also been found to be correlated to ICT integration in classroom (Park, 2009; Hasan, 2003; Potosky, 2002). Adeyemi (2014) in his study found a strong influence of teachers' self-concept about teaching on acquisition of ICT competence. However, a study by Goldwin, Low, Ng, Yeng and Cai (2015) among student teachers in Singapore found no significant relationship between trainee teachers teaching self-concept and ICT use

2.5 Teachers perceived competence about computers.

Teachers' perceived competence about computers in this study refers to teachers' assessment of their knowledge of computers and their use. Sang,Valcke, Van Braak, Tondeur and Zhu (2011) refer to it as teachers' self-efficacy in the use of computer. Inan and Lower (2010) said that teachers who reported feeling well-prepared to use technology were more likely to integrate computers in their teaching practices as compared to teachers who felt unprepared. Donovan, Hartley and Strudler (2007) attributed the confidence with equipping of teachers with proper skills and knowledge. Mueller, Wood, Wiloughby, Ross and Specht (2008) suggested that teachers with higher levels of confidence about computers used computers more often and experienced less computer-related anxiety. On the other hand, teachers with lower levels of confidence about computers become more frustrated and more anxious, and hesitate to use computers when they encounter obstacles. Howards (2011) conducted a longitudinal study to test the influence of computer self-efficacy beliefs, outcome

expectations and on computer use. Howards(2010) research findings point out that computer self-efficacy beliefs have a significant positive influence on computer use.

A study by Mingaine(2013) in Meru County found that supply of qualified ICT teachers was a major challenge in the process of implementing ICT in secondary schools. Most of the schools did not have enough staff competent in ICT and therefore were not able to effectively implement ICT. He recommended that More ICT teachers should be employed and be trained on basics of ICT use in teaching and learning. This study seeks to find out if trainee teachers feel well prepared to use computer technology and whether their perceived competence influences their future computer use in the classroom.

2.6 Computer Attitudes

Attitude is a predisposition to respond favorably or unfavorably to something (Ajzen, 1988). Sang, Valcke, Van Braak, Tondeur and Zhu (2011) consider attitude a major predictor of future classroom computer use. According to Baek, Jung and Kim (2008) and Hsu,Wu and Hwang (2007), a positive attitude on the part of the teacher encourages use of computer for various purposes:

1. To improve learners performance.
2. To promote efficiency in the learning process
3. To increase pupil motivation
4. To increase pupil creativity
5. To achieve better writing abilities
6. To improve student-teacher interaction.

Teacher's attitude toward computers will influence the way computer-based technology is used in instruction. Teachers' positive feelings about computers will help generate or reinforce positive feelings in the students (Hsu, wu & Hwang, 2007). Miranda and Russel (2012) found that younger teachers, with more experience in computer use had a more positive attitude towards computers which then suggests that exposure to computer promotes a positive attitude towards them. Research of Sang, van Braak, Tondeur, &Valcke (2009) also supported that class use of computers was strongly affected by attitudes toward computers in education. These conclusions were supported by Yueng, Taylor, Hui, Lam-Chieng and Low (2012) who established that given a good sense of competence, teachers are more likely to use ICT for teaching.

2.7 Subjective Norms

Ajzen and Fishbein (1977) defined subjective norms as a person's perception that most people who are important to them think they should or should not perform the behavior in question. People will generally intend to perform a behavior when they have a positive attitude toward it and when they believe that important individuals think they should do so (Ajzen, 1988). Subjective Norms and image are important determinants of behavioral intentions because they reflect the influence of others and the importance of having others think positively of them.

If conscientious personalities think that significant others believe that the technology should be used, they will form stronger intentions to use the technology (Devaraj, Easley, & Crant, 2008). Within a school environment, teachers' decisions to integrate technology might be affected by the opinions and suggestions of other People who are important to them (Ma et al., 2005). This study identifies Subjective norms as superiors (administrators), peers (colleagues), and pupils. In this study, the subjective

norms are based on the assumption that administrators and colleagues might feel that the adoption of computer technology improves students' learning (Ajjan & Hartshorne, 2008). Similarly, pupils may also influence the adoption of technology because they are comfortable using it and might expect its integration into their Classroom environment (Sadaf, et al., 2012; Shihab, 2008). Earlier studies have found subjective norms to be a key factor affecting teachers' intentions to use technology (Sugar, Crawly, & Fine, 2004; Teo, 2009). It is expected that the subjective norms of pre-service teachers are positively related to their intentions to integrate computer technology in primary education in Kenya.

Subjective Norm refers to a person's perception of normative beliefs (for example, perceived pressures and motivation to pursue) and how most people who are important to him/her think he/she should or should not perform the behavior in question (Fishbein & Ajzen, 1975, p. 302; Huang, Davison, & Gu, 2008). According to TRA, a person's performance of a specified behavior is determined by his or her Behavioral Intention (BI) to perform the behavior, and BI is jointly determined by the person's Attitude towards using and Subjective Norm concerning the behavior in question. If a teacher thinks his/her family, education officials, the head teacher and friends accept and appreciate him/her using computer technology, he or she is likely to use it.

2.8 Teacher Perceptions

Most research exploring the implications of integrating computers in the Classroom in western countries targets elementary and secondary schools (Rosen Weil, 1995; Ross, Hogabaum-Gray & Hannay, 2001). No research in Kenya has examined their effect

from the perspective of prospective teachers, that is, those who will be involved in the implementation of the laptop project.

Because teachers serve a pivotal role in determining just how much advantage can be gained from using computers, it is critical that we understand their perspective. This study will also examine issues facing student teachers as they consider integrating technology in their curriculum in line with government policy of one laptop per child. The introduction of computer technology for very young learners in western countries has met with both support (Shade & Watson, 1990) and concern (Barnes & Hill, 1983; Elkind, 1996). Initially, there were fears that using computers with preschoolers would result in poorer social skills, less active learning opportunities, and fewer age-appropriate play activities (Barnes & Hill; Kaden, 1990; Zajonc,1994). More recent research suggests that computers can facilitate social, cognitive, and play development among very young learners when handled appropriately (Kelly & Schorger, 2001; Ko, 2002; Sandberg, 2002). However, debates about the value and desirability of computers for young learners continue (Plowman& Stephen, 2003). This researcher found it important to investigate the perceptions of the primary school student teachers who will experience the effects of computers directly.

Research with elementary and secondary school educators points to a number of potential variables that can affect the integration of computers in the higher grades, and some of these variables may be important in class one education environments as well (Wood, Specht & Willoughby, 2008). Both barriers and supports for integrating computer technology in the classroom have been identified. For example, barriers include equipment-related issues such as limited access, technical problems, and malfunctions (Hadley & Sheingold, 1993; Rocheleau, 1995); skill-related concerns such as lack of educator training and limited knowledge (Becker & Ravitz, 2001); and

attitudinal issues such as educator anxiety and concerns about the change to the social structure in classrooms (Rosen & Weil, 1995; Schofield, 1995). Supports include access to in-house specialists, technical support, administrative support, and opportunities for training (Tsitouridour &Vryzas, 2003).

The relevance and the relative importance of each of these factors in early primary education in Kenya, will be established by this study through focus group interviews. In addition, the early primary education environment has features that make it distinct from higher-grade contexts (e.g., level of independence and basic skills in young children), and these unique elements may require supports and produce barriers that are not found in higher-grade environments. This study is expected to fill this gap.

2.9 Computer use in Education

Researchers have come up with a range of definitions, classifications and typologies about educational computer use. For instance, Educational computer use has been categorized as "computers as information resource tools", "computers as authoring tools" and "computers as knowledge construction tools" (Ainley, Banks, & Fleming, 2002). On the base of an empirical study, involving a large number of teachers, Tondeur, Van Braak, and Valcke (2007) have delineated two main categories of ICT use by teachers: supportive ICT use and classroom ICT use; these categories replicate in an empirical way typologies developed by e.g., Hogarty, Lang, & Kromrey (2003), and van Braak *et al*., (2004).

The first category, supportive ICT use, refers to the use of ICT for pro-active and administrative teaching tasks, such as student administration, preparing worksheets, developing evaluation activities, keeping track of pupils' learning progress, etc. The second, classroom ICT use, aims to support and enhance the actual teaching and

learning process, such as the use of computers for demonstration purposes, drill and practice activities, modeling, representation of complex knowledge elements, discussions, collaboration, project work, etc. (Hogarty *et al*., 2003). To study the relationship between both categories, it is interesting to build on the study of Wozney, Venkatesh and Abrami (2006). They found that supportive use of ICT was the most significant predictor of classroom use of ICT.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Overview

This chapter presents procedures and methods that the researcher used to meet the objectives of the study. The chapter gives a detailed description of the study area, theoretical perspective and methodology, the research design, the sampling procedure and sample size, research instruments, pilot study, data collection procedures, scoring of questionnaires, data analysis,presentation and interpretation. Furthermore, it shows how the instruments were developed and how validity and reliability were determined.

3.1 Geographical Location of the Study

This study was carried out in five public TTCs in the former Rift Valley Province. The TTCs were Kericho, Mosoriot, Tambach, Narok and Baringo Teachers Training Colleges (Appendix V). The TTCs are five out of the 21 public and 41 private teacher colleges in Kenya that have been offering candidates for Kenya National Examination Councils summative evaluation after a two year study (Softkenya.com, 2015). The study aimed at examining the influence of teacher trainee perceptions on prospective ICT integration in primary schools in Kenya and to understand perceived advantages and disadvantages of computer technology in primary education. The five TTCs had a total population of about 5,075 student teachers.

The choice of TTCs in former Rift Valley was prompted by findings of a study by Galabawa (2003) which showed that although TTC lecturers were fond of talking of the use of interactive technologies in pedagogy, the situation on the ground showed

that they lacked a strategic plan of ICT use, development and utilization. The study further found that literaly there was no capability and capacity for ICT at Mosoriot T.T.C which was picked to represent the Rift Valley in the study. One of his recommendation was that all departments take concrete measures to ensure that ICT is actively used to support teaching, research, management, library services and in outreach activities. The researcher was keen to find out if these were put in place in Mosoriot and other colleges in Rift Valley, especially in the wake of the government's one laptop per child project. The time scope of this study was six months.

Private TTCs in Kenya were beyond the scope of this study because studies indicate that mushrooming private TTCs lack proper infrastructure, personnel, supervision and quality assurance mechanisms to properly deliver curriculum requirements (Likoko, Wasike, & Ndinyo, 2013). It was the view of this researcher that another study be done to establish influence of teacher trainee perceptions on ICT integration in private TTCs.

Former Rift Valley province of Kenya was one of Kenya's eight provinces before the general elections in 2013. It was the largest province with the highest number of public TTCs in Kenya. It was dominated by the Kenya Rift Valley, which passes through it and gives the province its name. The former Rift Valley province had a population of 10,006,805 making it the most populous province in the country then (KNBS, 2009). After the Kenyan general election in 2013, the province was divided into 14 counties and the province was no more. The counties are Turkana, West Pokot, Samburu, Trans-Nzoia, Uasin Gishu, Laikipia, Nakuru, Bomet Elgeyo-Marakwet in which Tambach TTC is found, Nandi in which Mosriot TTC is found, Baringo in which Baringo TTC is found, Narok in which Narok TTC is found and

Kericho in which Kericho TTC is found. The population is multi-ethnic which provides an opportunity for different perceptions about ICT.

3.2 Philosophical Research Paradigm

Theoretical perspective is the philosophical stance behind the chosen methodology (Crotty 1998). This study employed pragmatist theoretical perspective. Pragmatism is derived from the Greek word pragma, which means action, from which the words 'practice' and 'practical' come (James, 2000). Pragmatism was first introduced into philosophy by Peirce in 1878 (Sudin & Johannisson, 2006). The pragmatist epistemology stands in contrast to prevailing positivist (objectivist) and anti-positivist (constructionist and subjectivism) views of scientific discovery (Freeman, 1998; Martin, 1990; Feilzer, 2010). As such, the pragmatist proposes to reorient the assessment of theories around a third criterion: the theory's capacity to solve human problems (Rallis & Rossman, 2003).

To a pragmatist, the mandate of science is not to find truth or reality, the existence of which are perpetually in dispute, but to facilitate human problem-solving. According to pragmatist philosopher John Dewey, science should overthrow "'the notion, which has ruled philosophy since the time of the Greeks, that the function of knowledge is to uncover the antecedently real, rather than, as is the case with our practical judgments, to gain the kind of understanding which is necessary to deal with problems as they arise'" (Powell, 2001, p. 884). Pragmatists maintain that a true proposition is one that facilitates fruitful paths of human discovery, and should be retained, deployed and improved only as long as it provides a profitable leading (Powell, 2001).

In classical Peirce pragmatism, the way to understand these issues is through a process of enquiry through scientific investigation. In terms of the mode of enquiry,

pragmatism embraces the two extremes normally espoused by positivism/post-positivism (who emphasize quantitative methods) and those supported by interpretivists (who emphasize qualitative method) (Paul, 2005).

3.3 Methodology

Crotty (1998) defines methodology as the strategy, plan of action, process, or design lying behind the choice and use of particular methods and linking the choice and use of particular methods to the desired outcomes. This study employed a mixed method research methodology. Mixed methods research is defined as a class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study (Creswell, 2013 ; Onwuegbuzie &Combs 2010). Mixed methods research also is an attempt to legitimate the use of multiple approaches in answering research questions, rather than restricting or constraining researchers' choices (Johnson and Onwuegbuzie, 2004).The rationale for mixing both forms of data in a single study was to extend the breadth or range of inquiry components as suggested by Green and Caracelli (2003).

3.4 Research Design

According Kothari (2004), research design informs the arrangement of the conditions for the collection and analysis of the data in a manner that aims to combine relevance to the research purpose. Research designs determine procedures for collecting, analyzing, interpreting, and reporting data in research studies. They represent different models for doing research, and these models have distinct names and procedures associated with them (Cresswell, 2013).

Specifically, this study applied the concurrent nested design, which is used when the focus is on gaining a broader perspective on the topic of study (Creswell, 2013; Johnson, 2005). Qualitative and quantitative data were collected concurrently, such that weaknesses of one kind of data were ideally offset by strengths of the other kind (Tashakkori , 2003).Both quantitative and qualitative data were analyzed at the same time. However, priority was given to quantitative data. Qualitative data, which was embedded, was given less priority. The reason for this was that qualitative data was used to help answer different sets of questions from those answered by quantitative data. The qualitative and quantitative data were analyzed separately, and mixing took place when the findings were interpreted (Cresswel, 2013; Johnson & Onwuegbuzie, 2004).

Important strengths of this approach were the ability to maximize the information provided by a single study, and a shorter data collection period compared to the sequential data collection approaches which was the case in this study (Cohen et al, 2007). The design was used to examine the effect of trainee teachers gender, attitude, teacher philosophy about teaching and learning, teacher perceived competence about computer and teaching and subjective norms on their intention to integrate computer technology into future teaching practices in Mosoriot, Kericho, Baringo, Narok and Tambach Teachers Training College, in former Rift valley Province. The study also assessed trainee teachers' perceived potential advantages and disadvantages of introducing ICT in primary school education. Further, the study assessed the extent, nature and use of computer resources in the five TTCs.

To establish student teachers perception on the introduction of computer in primary education this study used qualitative research strategy. Focus group discussion was applied as it is an effective method for gathering a wealth of information through an

organized, open-ended, and flexible discussion (Marshall &Rossman, 1989). The combination of these two methods allowed for specific questions to be addressed and quantified while also providing a context-rich qualitative understanding of issues identified by the teachers themselves (Clark, Carlson, & Polkingholme, 1997).

3.4 The Target Population

This study was done in five public Teacher Training Colleges in former Rift Valley Province of Kenya. The research population for the study was all teacher trainees in pubic teacher training colleges in Rift Valley. The colleges had a total population of 5,075 student teachers. Out of the total population 2,458 were female while 2,617 were male. Student teachers were divided into two major categories: those in first year of study and those in the second year of study (Research data,2015). The distribution of students in these categories is as shown in Table 3.1.

Table 3. 1: Shows the Study population

Institution	Year of Study	Male	Female	Total
Kericho	1	334	320	654
	2	360	280	640
Tambach	1	263	270	533
	2	253	243	496
Mosoriot	1	325	325	650
	2	302	298	600
Baringo	1	200	200	400
	2	140	180	320
Narok	1	200	232	432
	2	300	290	590
Total		**2,617**	**2,458**	**5,075**

Source: Research Data,2015.

3.5 Sample size and sampling procedure

The study purposely selected all the five public TTCs in Rift Valley province, Kenya. These are Kericho, Mosoriot, Baringo, Narok and Tambach. The choice of the colleges took into account the fact that admission into public teacher colleges in Kenya is done jointly through a computerized system therefore likely to have trainee teachers from all counties in Kenya. Former Rift valley was considered as a case for the study. Robson (2002) defines case study as a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence. The case(s) are bounded by individuality (T.T.Cs in former Rift Valley Province), time and activity and

researchers collect detailed information using a variety of data collection procedures over a sustained period of time (Stake, 1994). This design was used because the researcher wished to gain a rich understanding of the context of the research and the processes being enacted (Morris and Wood, in Saunders, Lewis & Thornhill 2003).

The ever increasing need for a representative statistical sample in empirical research has called for an effective method of determining sample size. To determine sample size in the study Krejie and Morgans' table (1970) of determining sample size was used. Accordingly a sample size for a population of 5000 was 375. To obtain a representative sample from the five TTCs the researcher used stratified simple random sampling. This is a process in which certain sub-groups or strata are selected from the sample in the same proportion as they exist in the population (Fraenkel & Wallen, 2000). The target population was identified as all student teachers enrolled in public Teacher Training Colleges in former Rift Valley Province. To ensure that all subgroups of student teachers were represented in the sample, the researcher identified the number of student teachers in every subgroup.

Using a table of random numbers, the researcher then selected proportional sample from each strata in every TTC to ensure that there was uniform representation of the different groups. From Kericho TTC 25 males and 20 females in first year of study and 24 males and 20 females in the second year of study were selected. The total sample from Kericho was therefore 89 trainee teachers. From Mosoriot TTC, 22 males and 22 females in first year of study and 21 males and 20 females in the second year of study was selected giving a total sample of 85 trainee teachers. From Tambach TTC, 16 males and 20 females in first year of study and 22 males and 10 females in the second year of study was selected giving a total sample of 68 trainee teachers. From Narok TTC, 10 males and 19 females in the first year of study and 18

males and 20 females in the second year of study were selected giving a total of 67 trainee teachers. From Baringo TTC, 13 males and 14 females in the first year of study and 10 males and 11 females in the second year of study were selected giving a total of 48 trainee teachers. The total sample from the four TTCs was 357 trainee teachers as shown in table 3.2.

Table 3. 2 Shows the Sample population

Institution	**Year of Study**	**Female**	**Male**	**Total**
Kericho	1	20	25	89
	2	20	24	
Tambach	1	20	16	68
	2	10	22	
Mosoriot	1	22	22	85
	2	20	21	
Baringo	1	14	13	48
	2	11	10	
Narok	1	19	29	67
	2	20	38	
Total		**176**	**181**	**357**

3.6 Research Variables

3.6.1 Independent and dependent variables

The study investigated how independent variables affect dependent variable. In this study the effect of independent variables, teacher philosophy about teaching and learning, teacher gender, teacher perceived competence about teaching, teacher perceived competence about computer, educational computer attitudes, and subjective norms on dependent variable prospective computer integration were investigated.

Prospective computer integration was the dependent variable. This is because the effects of independent variables, teacher beliefs about teaching and learning, teacher gender, teacher perceived competence about teaching, teacher perceived competence about computer, educational computer attitudes, and subjective norms on it were investigated.

3.6.2 Intervening Variables

Intervening variable is a variable that provides a causal link between other variables (Cresswell, 2013). In this study access to ICT hardware and software resources, teacher computer experience and trainee teachers' age mediate the relationship between teacher perceptions and ICT integration. To control the influence of intervening variables, the researcher standardized the conditions under which the study was done (Franenkel & Wallen, 2000). The study was conducted in public TTCs which had close to similar access to ICT resources and among teacher trainees majority of whom were aged between twenty one and thirty years of age.

3.7 Research Instruments

This section describes instrumentation and the administration of the instruments. This study used questionnaire, focus group discussions and observation for in-depth data collection and triangulation. The use of a variety of data collection techniques enabled the researcher to have a rich data base to tell the story (Simons, 2009). The primary data was collected using a questionnaire consisting of six scales. Six existing scales were utilized in this study. Each scale was studied in detail to ensure their reliability and validity.

3.7.1 The Questionnaire

The selection of the questionnaire as a tool for data collection was guided by the nature of data to be collected and objectives of the study. The questionnaire was used since the study was concerned with variables that cannot be directly observed. The questionnaire was a convenient tool because it facilitated easy and quick derivation of information within a short time (Kombo & Trump, 2006; Borg & Gall, 2007). A self–administered questionnaire was used by the researcher as it is less expensive in terms of time. The student teacher questionnaire (Appendix 11) was used to gather information as follows.

3.7.1.1 Background information of teacher trainees

In section A, there were five items that sought to find personal information of the respondents. The information was used to identify year of study of the respondent, the respondent's gender, respondent's experience in computer use, teaching experience and age.

3.7.1.2 Teacher philosophy about teaching and learning

Student teachers' philosophy about teaching and learning were measured through the 'Teacher philosophy about teaching and learning' scale (Appendix 11, section B) of Woolley, Benjamin, and Woolley (2004) and used by Sang, Valcke, VanBraak and Tondeur (2009). The participants were asked to rate their level of agreement with specific statements (from 1– strongly disagree, 2- disagree, 3- undecided, 4- agree, to 5 – strongly agree). Internal consistency was measured with Cronbach's alpha.

3.7.1.3 Teacher perceived competence about teaching

Student teachers' teaching self-confidence were determined using a modified 'Ohio State teacher efficacy scale' (Appendix 11, section C) (Tschannen-Moran &Woolfolk Hoy, 2001) adopted from Sang, Valcke, Van Braak and Tondeur (2009). The scale contains 12 items. The scale is a 5-point Likert scale (from 1 – strongly disagree, 2-disagree, 3-undecided, 4- agree to 5 – strongly agree). Internal consistency was measured with Cronbach's alpha.

3.7.1.4 Perceived competence about Computer

The Computer Self-confidence Scale consisting of nine items was utilized to explore student teachers' perceived competence about computers (Appendix 11, section D). It was adopted from Enochs, Riggs, & Ellis, in Sang, Valcke, Van Braak and Tondeur (2009). A 5-point Likert scale format (from 1 – strongly disagree to 5 – strongly agree) was utilized. Since items were negatively worded they were scored in the opposite direction with strongly agree receiving 1. Cronbach's alpha was calculated to determine internal consistency.

3.7.1.5. Computer attitudes

The eight-item Attitudes toward Computers in Education Scale in, Appendix 11, section E, designed by Van Braak (2001) was used in this study. The ACE measured teachers' attitudes toward the effects of computer adoption in the classroom. The scale uses 5-point Likert scale format (from 1– strongly disagree to 5–strongly agree). The internal consistency was measured with Cronbach's alpha.

3.7.1.6 Subjective Norms

In Appendix II, section F, student teachers were presented with subjective norms statements about computer as a tool of instruction adapted from a previous study by Sadaf, Newby and Ertmer (2012). The scale uses a 5-point Likert scale format (from 1-strongly disagree to 5-strongly agree). Cronbach's alpha was calculated to determine internal consistency.

3.7.1.7 Prospective computer use

Teacher education programs in Kenya require student teachers to be involved in teaching practices for four weeks in the first year and two sessions of four weeks each during their second-year academic career (Government of Kenya, 2004). Since this offers limited opportunities for student teachers to actually experience classroom computer use, and also due to the fact that the computer project is not yet fully in place in most schools, student teachers' reported prospected educational computer use was examined as a dependent variable. The Prospective Computer Use Scale in Appendix II, section G was used that was derived from the 'Computer Use Scale' of van Braak et al. (2004). The scale uses a 5 point Likert scale format from strongly disagree 1 to strongly agree - 5. Cronbach's alpha was calculated to determine internal consistency.

3.7.2 Student teacher perception interview schedule

In order to gauge the perceptions of the student teachers on the introduction of computer technology in primary schools in Kenya accurately and comprehensively, the present study used focus group interview. Focus group interview refers to a group interview on a specific topic. It is an open-ended group discussion guided by the researcher (Robson, 2002). Its use is relatively inexpensive and flexible. Participants who may be reluctant to be interviewed on their own are likely to participate. An interview guide (Appendix, III) developed by the researcher was used during focus group in-depth interview. The interviewer used the interview guide to follow up answers given in the questionnaire (Alvenson, 2002). The interview guide was considered appropriate because of its potential to generate detailed and relevant responses to important questions of the study. Reliability of the interviews was enhanced by careful piloting of interview schedule, careful training of interviewers and use of closed questions as suggested by Silverman in Cohen et al (2007).

The responses to the interview schedule were recorded by audio tape recording and taking notes. Tape recording made it possible to re analyze the data in order to test the objectives, establish reliability, speed up data collection and limit interruptions in communication (Rubbin & Rubbin, 2005). The researcher combined note taking during the interview and digital recording of the interview for permanent record and to capture non verbal cues.

3.7.3 Observation Schedule

The observation schedule designed by the researcher was used to assess the extent, use and nature of ICT resources in the five teacher Colleges. The observation schedule was used during institutional visits to verify the information collected through interview on the number of computer laboratories, Personal computers (PCs), connectivity to the internet, and how students and tutors in the college are using technology in learning (Marby, 2008). Observation promoted holistic appreciation and understanding of extent, use and nature of ICT resources in teacher training colleges. Kombo (2006) and Maruti (2010) observe that Observation schedule is used as a checklist to record what the researcher observes during data collection. Observation is the systematic observation, recording, description and analysis of peoples' behavior (Saunders, Lewis & Thornhill, 2003). It has the advantage of taking account of events which are not verbalized but are important in understanding the extent, use and nature of ICT resources in the teacher training colleges (Cohen, Manion & Morrison, 2007).

3.8 Piloting

The researcher sought to verify the reliability and validity of the research instruments through piloting. Orodho (2005) observes that, piloting helps to detect deficiencies in research instruments. Piloting was done in Eregi Teachers Training College which is in Kakamega County and the responses were checked against the research objectives (Hull, 2009). According to Polit, Beck and Hungler (2001) a pilot study is a small scale version in preparation for a major study with its main purpose being to check the validity and reliability of the research instruments.

3.8.1 Validity of Research Instruments

Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. Validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested (Kothari, 2004). Golafshani (2003) describes validity as the accuracy and meaningfulness of inferences based on the research results. The test must produce information that is not only relevant but free from systematic errors. According to Alvesson and Skoldberg (2000), validity means that we are measuring what we want to measure.

This validity is a function of how well the dimensions and elements of a concept have been delineated (Brewer, 2000; Ross, 2005). There are four main types of measurement validity: face validity, which considers how well the measurement of an indicator "makes sense" as a measure of the construct in the judgment of others. Face validity will be done by ascertaining whether at face value, the questions appear to be measuring the construct as per the research objectives. Face validity indicates that the items that are intended to measure a concept on the face of it look like they measure the concept. When the measures in the instruments provide adequate coverage of the concept, a measure of face validity is achieved. The researcher observed this to ensure that the instruments provided adequate coverage of the study concepts. This was largely a common sense assessment, but also relied on knowledge of the way people respond to survey questions (Brewer, 2000; Ross, 2005).

Content validity is the extent to which a measuring instrument provides adequate coverage of the topic under study. If the instrument contains a representative sample of the universe, then content validity is good (Kothari, 2004). The content validity of a measuring instrument is the extent to which it provides adequate coverage of the

investigative questions guiding the study. If the instrument contains a representative sample of the universe of subject matter of interest, then the content validity is good. In order to evaluate the content validity of the instruments, the researcher came up with dimensions and elements that constituted adequate coverage as per the study objectives. Further with regard to face validity and content validity, this study selected variables based on their importance in previous studies. Definitions of the variables from previous studies were used and existing measuring instruments was adopted that have been shown to produce measures that have satisfactory face and content validity. Also, a focus group during piloting was used to examine the variables included in the model, their definitions, their proposed relationships, and especially the questionnaire items designed to measure the variables.

According to Borg and Gall (2007) and Robson (2002) content validity of an instrument is improved through expert judgment. As such, the researcher sought assistance from her supervisors, who are experts in research, to improve content validity of the instrument. To establish the validity of the research instrument for this study, the researcher gave copies of the questionnaire to the supervisors of the department of Education Psychology at University of Eldoret to check if it represents all the objectives of the study. Several typographical errors and omissions detected were corrected in the instrument.

3.8.2 Reliability of Research Instruments

Reliability refers to the dependability or consistency of the measurement of a variable. It is a measure of the degree to which a research instrument yields similar results after repeated trials (Ross, 2005). Reliability was used to measure precision and accuracy. An attitude scale is considered reliable, for example, to the degree to which the same

respondents, or very similar respondents, receive the same or very similar score upon repeated testing (Ross, 2005).

There are 3 types of measurement reliability: stability reliability, which examines the reliability of measures across time; representative reliability, which examines the reliability of measures across different groups of subjects; and equivalence reliability, which examines the internal consistency with which a set of indicators measure a latent variable (Neuman, 2006). For stability and representative reliability in this study, existing measurement instruments reported in the literature was used to measure the variables, and these instruments have demonstrated both of these forms of reliability across studies conducted at different times, in different contexts, and with different subjects. The purpose of this measure was to determine if the scales which were employed provided consistent results across repeated measure hence it showed how well the instruments measure each of the constructs of this study.

The researcher piloted the instruments in Eregi TTC which is not part of the study sample. Questionnaires were given out to sixty student teachers in the pilot college. The answered questionnaires were scored. The same questionnaires were administered to the same group after a period of two weeks. For the assessment of equivalence (internal consistency) Cronbach Alpha coefficient was employed.

Cronbach Alpha is a coefficient of reliability commonly used as a measure of internal consistency. Higher values of Alpha are more desirable. Some scholars as a rule of thumb require a reliability of 0.70 or higher before they use an instrument (Nunnally, 1978). Cronbach Alpha generally increase as the inter correlation among test items increase, and is thus known as an internal consistency estimate of reliability of test

scores. Because inter correlations among test items are maximized when all items measure the same construct, Cronbach Alpha is widely believed to indirectly indicate the degree to which a set of items measures a single one-dimensional latent construct (Joppe, 2000) as quoted by Golafshani (2003). The results from the piloting assisted in the instruments' revisions and improvement for its content validity as well as questions, format and scales reliability (Ross, 2005). The Cronbach's alpha coefficient of the variables had varied consistency between each variable as shown in (Table 3.3).

Cronbach's Coefficient Alpha was used to establish the reliability of the research instrument. A reliability coefficient of 0.7 and above was assumed to reflect the internal reliability of the instruments (Fraenkel & Wallen, 2000). The Cronbach's Alpha coefficient for Computer integration in education was 0.889, with teaching philosophy scale having 0.665, perceived competence about teaching was 0.880, teacher perceived competence about computer was 0.882, attitude towards the use of computer in education was 0.844, social norms of computer as a tool of instruction was 0.884 and teacher's perceptions on the introduction of computer technology 0.676. This indicates a high overall internal consistency among the 58 statements used in the questionnaire was reliable. The reliability was calculated and result of Cronbach's coefficient for the whole items was .901 and since the value obtained for all values were above 0.7, the questionnaires were deemed reliable after several typographical errors and omissions detected were corrected in the instrument confirming that it was sufficient to be used in the main study.

Table 3. 3: Cronbach's alpha coefficient Reliability Statistics

Variable	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Computer Integration in Education	.885	.889	11
Teaching Philosophy scale	.662	.665	7
Perceived competence about teaching	.878	.880	12
Teacher Perceived competence about computer	.882	.882	9
Attitude towards the use of computer in Education	.838	.844	8
Social Norms of Computer as a tool of instruction	.883	.884	5
Teacher's perceptions on the introduction of computer technology	.652	.676	6
Overall Reliability	.890	.901	58

3.9 Scoring of the Questionnaire

The questionnaire was serialized and the items coded appropriately. In section A, there are five items that sought to find personal information of the respondents. The information was used to identify year of study of the respondent, the respondent's gender, respondent's experience in computer use, teaching experience and age.

In section B student teachers' beliefs about teaching and learning were measured through the 'philosophy about teaching and learning scale' (in section B), a modified

version of Woolley, Benjamin, and Woolley (2004). The participants were asked to rate their level of agreement with a specific statement (from 1– strongly disagree to 5 – strongly agree). The scores ranged from seven (lowest score) to 35 (highest score).

In section C, student teachers' perceived competence about teaching was determined using student teacher perceived competence about teaching scale which is a modified version of the 'Ohio State teacher efficacy scale' (in section C) (Tschannen-Moran &Woolfolk Hoy, in Sang, Valcke, Van Braak & Tondeur, 2009). It contains 12 items and is a 5-point Likert scale (from 1–strongly disagree to 5–strongly agree). The scores ranged from 12 (lowest score) to 60 (highest score).

In section D the trainee teacher perceived competence about Computer Scale (with 9 items) was utilized to explore student teachers' self-confidence about computers (Enochs, Riggs, & Ellis, 1993). A 5-point Likert scale format (from 5–strongly disagree to 1–strongly agree) was utilized. Items were negatively worded therefore were scored in the opposite direction with strongly agree receiving 1.The scores ranged from nine (lowest score) to 45 (highest score).

In section E the 8-item Attitudes toward Computers in Education Scale, designed by Van Braak (2001) were used in the present study. The scale measures teachers' attitudes toward the effects of computer adoption in the classroom. The scale uses 5-point Likert scale format (from 1–strongly disagree to 5–strongly agree). The scores ranged from eight (lowest score) to 40 (highest score).

In section F, student teachers were presented with five social norms statements about computer as a tool of instruction adapted and modified from a previous study by Sadaf, Newby and Ertmer (2012). The scale uses a 5-point Likert scale format (from

1-strongly disagree to 5 -strongly agree). The scores ranged from five (lowest score) to 25 (highest score).

In section G, student teachers' reported prospected educational computer integration was examined as a dependent measure. The Prospective Computer Use Scale (PCU, Section G) used were derived from the 'Computer Use Scale' of Van Braak et al. in Sang, Valcke, Van Braak and Tondeur (2009). The Likert items of computer use were scored from, (1=strongly disagree, 2=Disagree, 3=Undecided, 4=Agree and 5=strongly agree). Scores ranged from ten (lowest score) to 50 (highest score).

In Appendix 111, in order to gauge the perceptions of the student teachers and college administrators and tutors on the introduction of computer technology in primary schools in Kenya accurately and comprehensively, the present study used focus group method. An interview guide (see Appendix III) was used during focus group in-depth interview. The data was analyzed qualitatively.

3.10 Data Collection Procedures

Once questionnaires were prepared and tested for validity and reliability, the researcher sought permission to conduct the study from the National Council for Science and Technology Innovation (NACOSTI) at the Ministry of Education Science and Technology (See letter Appendix V and VI). Permission was sought from County Directors of Education and the Principals of the TTCs. Consent letter (Appendix I) was prepared and sent to Principals to inform them about the objective, nature and significance of the study. After sending the letters, the researcher visited the colleges in person to explain how the study was to be conducted. During data collection, the researcher made clarifications and respondents were assured that their responses were only for purposes of research and were treated with confidentially. In the first phase

of the study, questionnaires were given to sampled student teachers to fill. The researcher collected the completed questionnaires on the same day.

Once the questionnaires were filled, in every institution, twenty of the sampled student teachers were requested to attend the focus group interview the following day. Of these ten were first year's five males and five females. The second group consisted of second years, five males and five females. These twenty respondents were randomly selected from the participants of the survey. At the outset it was made clear that there is no right or wrong answers and that all the comments provided would be helpful toward increasing our understanding of the use of computers with young learners.

Specifically, the researcher used focus groups as an opportunity to determine how computers will be used in primary education environments, and how the use of computers might or might not fit within existing pedagogical beliefs or other constraints in primary school education environment. The student teachers were asked to explain what in their view would be the advantages and disadvantages of integrating computer technology in primary education. Further, student teachers were encouraged to explore barriers or reasons for opting not to use computer technology, when computers become available. After this brief introduction, the tape-recorder and video-camera were turned on, and the researcher and two assistants began the session by asking questions in the interview guide.

The researcher visited the same college the following day for observation. The researcher used the observation schedule to observe the extent, and nature of use of computer technology in the colleges. This study employed structured observation

which is concerned with frequency of computer use (Saunders, Lewis & Thornhill, 2003). The same process was repeated in the five TTCs.

3.11 Data Analysis and Presentation

After data collection, the data obtained from student teacher sample was cross-examined to facilitate coding and entry into the computer in preparation for analysis. Data processing exercise commenced with the coding of all the responses obtained to facilitate easy analysis using computer Statistical Programme for Social Sciences (SPSS) package. A master codebook was designed to ensure that all the questionnaires were coded uniformly. The second stage involved tabulating the obtained scores. This assisted the researcher to determine the level of significance of differences of effects of the independent variables on dependent variable (prospective computer integration in primary school).

To determine this correlation coefficient, $\alpha<0.05$ level of significance was used. All data was analyzed at a level of 95% or $\alpha = 0.05$ and degree of freedom depending on the particular case as was determined. Bivariate correlation analysis procedures were applied to explore the interrelations between the different research variables.

3.12 Quantitative analysis

Saunders et al. (2009) stated that quantitative method of conducting research includes steps like designing sampling techniques and analyzing the data by using various quantitative and statistical techniques. Also it involves presenting the research result in quantitative manner and making inferences on the basis of data analyses. Generally, the researcher used descriptive statistics for analyzing the distribution of observations while inferential statistics were used for understanding the relationship between variables. The quantitative data was analyzed using various statistics including

measures of central tendency and dispersion. Simple descriptive statistics was employed to analyze quantitative data. The descriptive statistics involved the use of frequency, means and standard deviation, while the inferential statistics was Pearson Product Moment Correlation Coefficient and Multiple Regression. The use of descriptive statistics described the demographic characteristics and perceptions of respondents towards the ICT integration.

3.12.1 Pearson Product-Moment Correlation

The Pearson Product Moment correlation was used to determine whether there is a significant relationship between two variables. The Pearson Product Moment Correlation Coefficient was used to establish the relationship between independent and dependent variables and multiple regressions were used to test the study hypothesis. The Pearson Correlation Coefficient was used since the data in this study adhered to the following assumptions or parameters (Field, 2009; Kothari, 2004):

a) Data must be on Interval level

b) A linear relationship must exist (can be indicated by means of a scatter plot)

c) The distributions must be similar (Thus, if they are skewed, they must be skewed in the same direction), but preferably normal.

d) Outliers must be identified and omitted from the computation.

e) There is homoscedasticity of the data.

The study also used Pearson product –moment correlations to determine the extent of correlation between independent and dependent variables.

3.12.2 Multiple Regression

Multiple regression analysis was used to explore the relationship between one continuous dependent variable and a number of independent variables or predictors. Multiple regression is based on correlation and but allow more sophisticated exploration of the interrelationship among a set of variables. This makes it ideal for the investigation of more complex relationships. Multiple Regression analysis was carried out using a model, which combines selected independent variables and dependent variables.

It established the influence of trainee teachers' gender, computer attitudes, teacher philosophy about teaching and learning, teacher perceived competence about computer, teacher perceived competence about teaching and subjective norms on prospective ICT integration in primary education. The prospective ICT integration in education was the dependent variable, while the variables such as trainee teacher gender, computer attitudes, teacher philosophy about teaching and learning, teacher perceived competence about computer, teacher perceived competence about teaching and subjective norms represent the independent variable. There are four assumptions for Multiple Regression analysis that must not be violated.

(1) Variables are Normally Distributed

Regression assumed that variables have normal distribution. However non normality of distributed variables (highly skewed or kurtotic variables or variables with substantial outliers) can distort relationships and significant tests. In this study outliers were identified through visual inspection of histograms or frequency distributions. Bivariate/multivariate data cleaning was important in multiple regression (Tabachnick and Fidell, 2001). Analysis by Osborne (2001) show that the removal of univariate

and bivariate outliers reduced the probabilities of type I and type II errors being committed and improve accuracy of estimate.

(2) Assumption of a linear relationship between independent and dependent variable(s)

Standard Multiple Regression was only able to accurately estimate the relationship between dependent and independent variables if the relationships are linear in nature. In case of existence of non-linear relationships, it is essential to examine analysis for non-linearity. If the relationship between IV and DV is not linear, the results of the regression analysis underestimate the true relationship (Kothari, 2004).

(3) Variables are measured without Error (Reliability)

In simple correlation and regression, unreliable measurement causes relationships to be under-estimated increasing the risk of type II errors. In this case of multiple regressions, effect sizes of the other variables were over-estimated if the covariate is not reliably measured as the full effect of the covariate(s) would not be removed (Field, 2009). Thus researchers were corrected for low reliability to obtain a more accurate picture of the "true" relationships in the population in the case of multiple regression to avoid over-estimating the effect of another variable.

(4) Assumption of Homoscedasticity

Homoscedasticity means that the variance of errors is the same across all levels of the IV. When the variance of errors differs at differed values of the IV, heteroscedasticity is marked. It can lead to serious distortion of findings and seriously weaken the analysis, thus increasing the possibility of Type I error. This assumption was checked by visual examination of plot of the standardized residual (the errors) by the

regression standardized predicted value. Generally, checking these assumptions was of significant benefit for the researcher. Making sure an analysis meets the curvilinearity and non-normality often boosts effect sizes, usually a desirable outcome (Field, 2009)

Model specification

Multiple regression analysis was used to test Hypotheses. These included the trainee teacher gender, teacher philosophy about teaching and learning, teacher perceived competence about teaching, Teacher competence about computer, attitudes toward computers in education and subjective norms. The multiple regression equation was as follows:

$$y=\beta_0+ \beta_1x_1+ \beta_2x_2+ \beta_3x_3+ \beta_4x_4 +\beta_5x_5+\beta_6x_6 +c+e$$

Where:-

y= prospective ICT integration in education.

x_1 = is gender

x_2 = is subjective norms

x_3 = teacher philosophy about teaching and learning.

x_4 = teacher perceived competence about teaching

x_5 = teacher perceived competence about computer

x_6= attitudes toward computers

c = is the control variables (ICT policy)

e = is the error term

$\beta_{0=}$ intercept

β_1,……., $\beta_{7=}$ coefficients of independent variables.

3.12.3. Qualitative Analysis

Data analysis in qualitative research is an interactive, ongoing process in which data collection and analysis influence each other. As data was being collected, it was being analyzed. The evolving field text revealed emerging patterns or further questions that needed exploration (Denzin & Lincoln, 2005). Data collection continued until existing themes accounted for all variation in the data and no new information was being collected as suggested by Miller, in Hanley-Maxwell, et al. (2007).

To ensure trustworthiness of the data, iterative questioning as proposed by Shenton (2004) was employed as a means of verifying information being provided by participants. Questions were rephrased and re-presented so that answers could be compared for consistency. Moreover, the researcher relied on actual words of participants when analyzing and coding the data in order to ensure that the meanings derived remained true to the voice of participants. As suggested by Taylor- Powell and Renner (2003), this allowed the themes and categories to emerge from the data rather than having the researcher impose preconceived notions on the data. Peer review, which provides an external check on the research process, was also used to ensure credibility and trustworthiness of the findings. These codes derived during analysis as well as the preliminary interpretations were critiqued by peers from the department of Educational Psychology (Onwuegbuzie & Combs, 2010; Cresswell, 2007).

Qualitative analysis commenced on collected data through interview schedule with key respondents. The audio-taped data was transcribed and recorded in written form (Onwuegbuzie & Combs, 2010). The data was edited and a more formalized analysis process subsequently commenced where the data was re-grouped according to research questions(see appendix V11). Data was examined sentence by sentence

while defining ideas that are explicit. This allowed the researcher to build ideas inductively while preventing imposition of existent theories and researchers own beliefs on the data (Chamaz, 2000). In this research the researcher used analysis techniques such as data reduction, data display, and conclusion drawing and verification. Data reduction was the process of identifying relevant data to the study. These were then organized and the various themes were identified and coded as suggested by Marshall and Rosman, (1999) (See Appendix VII). Conclusion drawing involved considering the larger meanings and implications of the data as they relate to the purpose of the study. Excerpts of verbatim texts from the data were lifted and placed according to their specific themes while using pseudo names for purposes of confidentiality. Another data analysis technique that was employed was memo writing which was carried out throughout the process. In the memo, the researcher wrote down thoughts, interpretations and hypotheses about observations in the field and emerging categories, themes and theories. According to Saunders et al (2003) this helped in later stages of qualitative analysis.

The thematic analysis was used where the responses were arranged according to the various themes as per the research questions (see Appendix VII). As observed by Gray (2004) qualitative data provides rich descriptions and explanations that demonstrate the chronological flow of events as well as often leading to chance findings.

The results of data analyzed in the study were presented in three ways and in accordance to the American Psychological Association (APA) publication guidelines (APA, 2010). First, is textual presentation which is in form of descriptions. Second is the use of tables which has the advantage to show exact numerical values and that data can be arranged in an orderly display of columns and rows thus aiding

comparison (Saunders et al., 2003). Results from descriptive analysis, correlation as well as multiple regression was presented in form of tables.

3.13 Ethical considerations

Despite the high value of knowledge gained through research, knowledge cannot be pursued at the expense of human dignity. The major ethical issues of concern are; informed consent, privacy and confidentiality, anonymity and researcher's responsibility. In this study, the researcher informed the institutions' administration and participants of the purpose of the research. Participants and administrations were assured of the confidentiality of the information given and that they remain anonymous. Pseudo names were used to ensure anonymity. They were also informed that their participation was voluntary (BERA, 2004).Permission to use actual words of participants during presentation of the findings was also sought.

3.14 Chapter Summary

This chapter has dealt with all aspects relating to how the study was undertaken. This section on methodology being the heart of this study, was given due attention to ensure that data collection was as accurate as possible. The sampling procedures have been explained well to show that the sample selected was not biased. The instrument was piloted to establish its validity and reliability and data collected analyzed both qualitatively and quantitatively and hypothesis tested by use of correlation analysis and multiple regression.

CHAPTER FOUR

DATA PRESENTATION, ANALYSES AND INTERPRETATION

4.0 Introduction

In this chapter the data generated from the respondents is presented, analyzed and interpreted. This study investigated the influence of teacher trainee perceptions on prospective ICT integration in public primary schools in Kenya. It specifically investigated the influence of teacher trainee philosophy about teaching and learning, perceived competence about computer, perceived competence about teaching, trainee teacher attitude, subjective norms and trainee teacher gender. The study also investigated trainee teachers' perceived advantages and disadvantages and perceived barriers and supports. It also assessed the nature and extent of trainee teachers' computer technology use in TTCs. The data collected was analyzed using both descriptive and inferential statistics. Descriptive statistics enable a reader to examine characteristics of individual variables before looking at the results of inferential statistics.

The descriptive statistics that were used were frequencies, means and standard deviations. Inferential statistics used were Pearson Product Moment Correlation and Multiple Regression. After the questionnaire was completed, each variable was analyzed separately. Item responses were summed to create a mean score for a group of items since Likert scales are often called summative scales. When the responses to several Likert items were summed, they were treated as interval data measuring a latent variable. The reporting of the results in this chapter follows a fairly consistent pattern. The subtitles are derived from themes underlying the objectives and research hypotheses. The chapter opens with demographic description of respondents. The results of reliability and factor analysis are presented. The pertinent descriptive

statistics, inferential statistics and appropriate interpretation are then presented for each variable

4.1 Demographic Information of the Respondents

A total of 357 questionnaires were administered to trainee teachers and only 311 were returned and were used in the analysis. This accounted for a response rate of 87.36%, which was adequate for analysis. During the study, the demographic information sought from the respondents included the year of study, gender, age, personal computer experience and duration the teachers have taught as untrained teachers before joining Teachers Training Colleges.

4.1.1 Year of study

From the study majority of the respondents (n= 182, 58.5%) were in year two of the study and (n=129, 41.5%) in their year one of study as shown in Table 4.1. This is because during the time of data collection in March, 2015, the first years were on their teaching practice. Many did not return their questionnaires because they were too busy to respond to them.

Table 4. 1: Year of study

	Frequency	Percent	Cumulative Percent
Year 1	129	41.5	41.5
Year 2	182	58.5	100.0
Total	311	100.0	

4.1.2 Gender of Respondents

The gender of teachers in TTCs who participated in the study showed that (n=160, 51.4%) were female while (n= 151, 48.6%) were male as shown in Table 4.2. This showed that the ratio of male to female teachers in TTCs were similar, even though more female teachers than males returned their questionnaires.

Table 4. 2: Gender

	Frequency	Percent	Cumulative Percent
Male	151	48.6	48.6
Female	160	51.4	100.0
Total	311	100.0	

4.1.3 Age of Respondents

The age of the teachers involved in the study was summarized in table 4.3. Majority (n= 266, 85.5%) of teachers were aged between 21 and 30 years, with (n=25, 8.2%) of them aged below 20 years and (n=20, 6.3%) aged between 31 and 40 years. These findings indicate that majority of the teachers were in their youthful age and may be efficient in the integration of computer technology in primary education.

Table 4. 3: Age

	Frequency	Percent
Less than 20 years	25	8.2
21-30 years	266	85.5
31-40 years	20	6.3
Total	311	100

4.1.4 Personal computer experience

The more a teacher is experienced the more he or she knows how to handle the learners. The more experienced teachers have with computers, the more likely that they will show positive attitude towards computers and therefore its integration (Van Braak, Tondeur & Valcke, 2004). The personal computer experience of teachers was varied, as shown in the table 4.4. Most (n= 197, 63.3%) of the pre-service teachers had less than 1 year computer experience, with (n=92, 29.6%) having experience of between 1 and 4 years, while (n=13, 4.2%) had 5 to 9 years. A further (n=9, 2.9%) had above 10 years computer experience. The findings indicate that most of the teachers (63.3%) had some form of personal computer experience; therefore they were in a good position to provide information on prospective ICT integration in primary education.

Table 4. 4: Personal computer experience

	Frequency	Percent	Cumulative Percent
Less than 1 year	197	63.3	63.3
1-4 years	92	29.6	92.9
5-9 years	13	4.2	97.1
Over 10 years	9	2.9	100.0
Total	311	100.0	

4.1.5 Teaching experience before joining Teachers Training College

The researcher sought to investigate the teaching experience of pre-service teachers before joining TTCs and the responses to part 1, question 5, were scored. From the

results of the study the duration the respondents taught as untrained teacher before joining Teacher Training College varied as summarized in table 4.5. Most (n= 173, 55.7%) of the respondents had not taught before joining the TTC, (n=69, 22.4%) had taught for between one and four years, while (n= 59, 19.5%) had taught for less than one year. A further (n=7, 2.4%) had taught for more than five years. These findings showed that most of the teachers had less than one year teaching experience before joining the TTCs.

Table 4. 5: Teaching experience before joining Teachers Training College

	Frequency	Percent
Not taught	173	55.70
Less than 1 year	59	19.50
1-4 years	69	22.40
Over 5years	7	2.40
Total	311	100.0

4.2. Factor Analysis

Factor analysis was employed in this regard to help in identifying the actual number of items that actually measured each construct as perceived by the respondents. In this case, the component factor analysis with varimax rotation was conducted on philosophy about teaching and learning, teacher perceived competence about teaching and computers, attitude toward computer in education on prospective computer integration in instruction, perceptions on the introduction of computer technology in primary education and computer integration variables to extract factors from each construct. Based on the previous works of (Hair, Black, Anderson and Tatham, 2006; Hui, Juan & Jun, 2009) all items loading below 0.50 were not retained and those

having a loading factor limit of above 0.50 and Eigen value larger than 1 were used to choose factors (Daud, 2004, Hui *et al*., 2009). The variables in this study were validated through factor analysis. Before performing the analysis, the suitability of the data was assessed through two tests; Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's Test of Sphericity. The KMO has to be more than 0.50 and Bartlett's Test of Sphericity has to be significant. All the research variables had Eigen values larger than 1 and the items for each research variable exceeded factor loadings of 0.50 (Hair *et al*., 2006).

4.3 Influence of trainee teacher philosophy about teaching and learning on integration of computer technology

The first objective of the study was to establish the influence of trainee teacher philosophy about teaching and learning on integration of computer technology into future teaching practices. This was established using both descriptive and inferential statistics. This was done by first computing values of dependent variable, computer integration, beginning with results of reliability and factor analysis

4.3.1 Factor analysis for Computer integration in early primary education

From the factor analysis of computer integration in early primary education, the KMO was found to be 0.899 and the Bartlett's Test of Sphericity was significant ($p<.05$). The principle component analysis and Varimax rotation were performed. Items that had factor loadings lower than 0.50 were eliminated as postulated by Hair *et al*., (2006). The Varimax rotated principle component factor analysis applied resulted in two factor loading in computer integration variables that explained 56.91 percent of the variance with Eigen values larger than 1 (Table 4.6).

Only statements with a loading value of above 0.50 were considered, and therefore one item in computer integration was deleted. Almost all the statements used in the computer integration were retained except the statement that "teachers encourage pupils to work collaboratively when using a computer". The retained statements were computed and named computer integration and used in the subsequent analysis.

Table 4. 6: Factor Analysis of Computer integration scale

Rotated Component Matrix[a]	Component	
	1	2
I would use the computer as a tool for demonstration working with existing presentations, or those that someone else has made for me.	.510	
I would use the computer as a tool to teach new subject knowledge, i.e. the pupils acquire knowledge directly from the computer.	.725	
I would encourage pupils in class to search for relevant information on the Internet.	.743	
I would use educational software with my pupils for learning subject knowledge through drill and practice.	.795	
I would teach pupils to consider the implications and opportunities of computer use.	.794	
I would use the computer as a tool for demonstration working with presentations I have made myself (e.g., PowerPoint).		.556
I would ask pupils to undertake tasks or follow up class work at home on the computer.		.794
I would be pleased to use computer in my classroom instruction in future		.673
I would use the computer to assist with differentiation or implementing individual learning plans.		.647
I would use e-mail to communicate with pupils out of school (or class time) .		.734
KMO= .899 Bartlett's Test of Sphericity=.000 Eigen value=1.00 Percentage of variance Explained=56.91		

4.3.2 Descriptive statistics of Computer Integration in primary Education

The respondents were required to give their views regarding their prospective ICT integration in early primary education and their views were varied as summarized in Table 4.6. The descriptive statistics was used to establish the intention to integrate ICT in primary education. On whether they would use the computer as a tool for demonstration while working with existing presentations already made, majority (n=169, 54.3%) agreed, (n=110, 35.4%) disagreed while (n=32, 10.2%) were undecided. This was supported by a mean score of 3.22, indicating that trainee teachers intend to use computer as a tool for demonstration for working with existing presentations. On whether trainee teachers would use the computer as a tool to teach new subject knowledge, majority of the respondents (n=198, 63.7%) agreed, (n= 84, 27%) disagreed and (n= 29, 9.3%) were undecided. This was supported by a mean score of 3.51, indicating that trainee teachers intend to use computer as a tool to teach pupils new subject knowledge .

From table 4.7, majority of the respondents (n= 233, 74.9%) agreed that they will encourage pupils in class to search for relevant information on the internet, (n= 57, 18.4%) disagreed while (n= 21, 6.8%) were undecided. This was supported by a mean score of 3.81 showing that trainee teachers recognize that computer is important in pupil learning through searching for relevant information from the internet. This implies that most of the student teachers would encourage student centered forms of learning. From the results, most of the respondents (n= 222, 71.4%) agreed that they would use educational software with their pupils for learning subject knowledge through drill and practice, (n= 61, 19.6%), disagreed while (n= 28, 9%) were undecided. This was supported by a mean of 3.73 that indicated that trainee teachers would use educational software while teaching pupils subject knowledge through drill

and practice using educational software. This implies that if software is available, most trainee teachers would easily integrate it, while teaching subject knowledge.

On whether the integration of computers in education would enable teachers teach pupils to consider the implications and opportunities of computer use, most (n= 253, 81.3%) agreed,(n= 37, 11.9%) disagreed, while (n= 21, 6.8%) were undecided. This was supported by a mean score of 4.03, which indicates that trainee teachers would not only integrate computer use but would also influence their pupils to consider its use, its implications and opportunities offered by computer use. Most of the respondents (n= 225, 72.4%) agreed that they would use the computer, as a tool for demonstration when working with presentations they have made for themselves, (n= 63, 20.2%) disagreed, while (n= 23, 7.4%) were undecided. This finding was supported by a mean score of 3.75 showing that trainee teachers given an opportunity would use the computer as a tool for demonstration in class such as PowerPoint.

Majority of the respondents (n=239, 76.9%) agreed that they would be pleased to use computer in their classroom instruction in future, (n=46, 14.8%) disagreed, while (n= 26, 8.4%) were undecided. This finding was supported by a mean score of 3.88, indicating that trainee teachers would be pleased to use and integrate the computer in their classroom instruction in future. On whether the respondents would ask pupils to undertake tasks or follow up class work at home on the computer, most (n= 185, 59.5%) agreed, (n= 46, 14.8%) disagreed, while (n=23, 7.4%) were undecided. This was supported by a mean of 3.34 showing that trainee teachers would apart from using computer for instruction give pupils assignments or follow up class work at home on the computer.

On whether the trainee teachers would use the computer to assist with differentiation or implementing individual learning plans for their learners, most(n= 217, 69.8%) agreed,(n= 57, 18.3%) disagreed while (n= 37, 11.9%) were undecided. This translated to a mean score of 3.69, indicating that student teachers would use the computer to assist with differentiation or implementing individual learning plans for their pupils. From the findings, (n=232, 74.6%) of the respondents agreed that integration of computers would encourage pupils to work collaboratively, (n= 52, 16.7%) disagreed, while (n= 27, 8.7%) were undecided. This was supported by a mean score of 3.82 .This indicates that trainee teachers see computer technology as promoting peer teaching and information sharing among pupils. From the results, it is clear that majority of the respondents (n=166, 53.4%) agreed that they would use e-mail to communicate with pupils out of school, (n= 117, 37.6%) disagreed, while (n= 28, 9.1%) were undecided. This was supported by a mean score of 3.14. This may indicate that trainee teachers perceive the internet particularly e-mail, as an important learning tool (Buabeng-Andoh, 2012).

From the findings, it is clear that majority of trainee teachers would use the computer as a tool for demonstration while making presentations and for teaching new subject knowledge. They also intent to encourage pupils in class to search for relevant information on the internet and use educational software for learning subject knowledge through drill and practice. They also hopped to teach pupils to consider the implications and opportunities offered by computer use. Most trainee teachers expressed that they would be pleased to use computer in their classroom instruction in future. Findings also indicated that pre-service teachers would ask pupils to undertake tasks or follow up class work at home on the computer .Most believed that computer use would assist with differentiation or implementing individual learning plans for

their pupils. The results also indicated that most trainee teachers would encourage pupils to work collaboratively when using a computer and would frequently use e-mail to communicate with pupils out of school.

Table 4. 7: Descriptive statistics table of Computer Integration in Education

Statement I would.....	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
Use the computer as a tool for demonstration working with existing presentations,	60	19.3	109	35.0	32	10.3	59	19.0	51	16.4	3.22	1.39
Use the computer as a tool to teach new subject knowledge, directly from the computer.	72	23.2	126	40.5	29	9.3	58	18.6	26	8.4	3.51	1.26
Encourage pupils in class to search for relevant information on the Internet.	102	32.8	131	42.1	21	6.8	31	10.0	26	8.4	3.81	1.23
Use educational software with my pupils for learning subject knowledge through drill and practice.	92	29.6	130	41.8	28	9.0	36	11.6	25	8.0	3.73	1.23
Teach pupils to consider the implications and opportunities of computer use.	121	38.9	132	42.4	21	6.8	20	6.4	17	5.5	4.03	1.10
Use the computer as a tool for demonstration working with presentations	105	33.8	120	38.6	23	7.4	30	9.6	33	10.6	3.75	1.30
Ask pupils to undertake tasks or follow up class work at home on the computer.	77	24.8	108	34.7	23	7.4	50	16.1	53	17.0	3.34	1.44
Be pleased to use computer in my classroom instruction in future	102	32.8	137	44.1	26	8.4	24	7.7	22	7.1	3.88	1.16
Use the computer to assist with differentiation or implementing individual learning plans.	82	26.4	135	43.4	37	11.9	29	9.3	28	9.0	3.69	1.21
Encourage pupils to work collaboratively when using a computer.	104	33.4	128	41.2	27	8.7	22	7.1	30	9.6	3.82	1.24
Use e-mail to communicate with pupils out of school	72	23.2	94	30.2	28	9.0	41	13.2	76	24.4	3.14	1.52

4.3.3 Factor analysis of Teaching Philosophy scale

From the factor analysis of teaching philosophy, the KMO was found to be 0.730 and the Bartlett's Test of Sphericity was significant ($p<.05$). The principle component analysis and Varimax rotation were performed and statements with factor loadings lower than 0.50 were eliminated as postulated by Hair *et al*., (2006). The varimax rotated principle component matrix resulted in two factor loading in teaching philosophy that explained 48.93 percent of the variance with Eigen values larger than 1 (Table 4.8). Only statements with a loading value of above 0.50 were considered, and no item in teaching philosophy was deleted. The retained statements were computed and named philosophy so as to be used in the subsequent analysis.

Table 4. 8: Teaching Philosophy scale

Rotated Component Matrix[a]	Component	
	1	2
I make it a priority in my classroom to give pupils time to work together when I am not directing them		.831
I involve pupils in evaluating their own work and setting their own goals		.747
I believe that expanding on pupils' ideas is an effective way to build my curriculum	.625	
I prefer to cluster pupils' desks or use tables so they can work together.	.547	
I prefer to assess pupils informally through observations and conferences.	.688	
I often create thematic units based on the pupils' interests and ideas.	.619	
I invite pupils to create many of my teaching aids.	.641	
KMO= .730;		
Bartlett's Test of Sphericity=.000		
Eigen value=1.00		
Percentage of variance Explained=48.93		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.
Source : Research Data (2015)

4.3.4 Descriptive statistics of Teaching and learning philosophy

The respondents were requested to give their views with respect to teaching and learning philosophy and the results were as summarized in Table 4.9. On whether they will make it a priority in the classroom to give pupils' time to work together while not directing them,(n= 154, 49.5%) of the respondents agreed,(n= 139, 44.7%) disagreed while (n= 18, 5.8%) were undecided. This represents a mean score of 2.96. This means that although majority of trainee teachers would encourage pupils to work together without guidance, a similar number either disagreed or were undecided.

This implies that while slightly over half of trainee teachers have embraced student-centred teaching practices, a significant number still hold onto traditional teacher-centred teaching methods and beliefs. From the results in table 4.14,(n= 186 , 59.8%) of the respondents agreed that they will involve pupils' in evaluating their own work and setting their own goals, (n= 109, 35.1%) disagreed and (n= 16, 5.1%) were undecided. This is supported by a mean score of 3.34. This means that while majority of trainee teachers will involve learners in evaluating their own work, a good number of them still belief in teacher-centred evaluation and goal setting.

Results of this study further show that most of the respondents (n= 259, 83.3%) agreed that they believe expanding on pupils ideas is an effective way to build their curriculum, (n= 33, 10.6%) disagreed, while (n= 19, 6.1%) were undecided. This was supported by a mean score of 4.1. This implies that majority of teacher trainees belief in incorporating student ideas into the curriculum and therefore likely to successfully integrate computer use in the classroom. It should be noted however that 10.6% do not agree that expanding on pupils' ideas is an effective way to build their curriculum and teacher trainers should seriously look into this.

On whether teachers prefer to cluster pupils' desks or use tables so they can work together (n= 192, 61.7%) agreed, (n=87, 28%) disagreed, while (n= 32, 10.3%) were undecided as shown in table 4.14. This was supported by a mean of 3.42. Also, (n=184, 59.1%) agreed that they prefer to assess pupils informally through observations and conferences, (n= 99, 31.9%) disagreed while (n= 28, 9.0%) were undecided. Most of the respondents (n=197, 63.3%) agreed that they would create thematic units based on the pupils' interests and ideas, (n= 76, 24.5%) disagreed, while (n= 38, 12.2%) were undecided. This was supported by a mean score of 3.53, (n =136, 44.3%) of the respondents agreed that they would invite pupils to create many of their teaching aids, (n= 160, 41.4%) disagreed while (n= 13, 4.2%) were undecided. This was supported by a mean score of 2.9.

From the study about half of sampled trainee teachers would involve pupils in evaluating their own work and setting their own goals, and would prefer to cluster pupils' desks or use tables so they can work together. About an average number of them preferred to assess pupils' informally through observations and conferences and would create thematic units based on the pupil's interests and ideas. The implication is that while about half of sampled trainee teachers have embraced learner-centered teaching and learning philosophies, almost a similar number are still stuck in teacher-centered philosophies which are a hindrance to ICT integration (Ertmer, 2005). There is need for teacher trainers to foster learner-centered philosophies if integration of ICT in primary schools is to succeed. However most of trainee teachers believed that expanding on pupils ideas is an effective way to build their curriculum.

Table 4. 9: Descriptive statistics table of Teaching and learning philosophy

Statement	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
I make it a priority in my classroom to give pupils' time to work together when I am not directing them	48	15.4	106	34.1	18	5.8	65	20.9	74	23.8	2.96	1.46
I involve pupils' in evaluating their own work and setting their own goals	84	27.0	102	32.8	16	5.1	54	17.4	55	17.7	3.34	1.48
I believe that expanding on pupils'' ideas is an effective way to build my curriculum	134	43.1	125	40.2	19	6.1	16	5.1	17	5.5	4.10	1.09
I prefer to cluster pupils'' desks or use tables so they can work together.	66	21.2	126	40.5	32	10.3	46	14.8	41	13.2	3.42	1.33
I prefer to assess pupils' informally	52	16.7	132	42.4	28	9.0	54	17.4	45	14.5	3.30	1.33
I often create thematic units based on the pupils'' interests and ideas.	81	26.0	116	37.3	38	12.2	40	12.9	36	11.6	3.53	1.31
I invite pupils' to create many of my teaching aids.	58	18.6	80	25.7	13	4.2	9	29.9	67	21.5	2.90	1.47

4.3.5 Correlation between Trainee teacher philosophy about teaching and learning and integration of computer technology

Pearson Product Moment Correlation was used to establish the influence of trainee teacher philosophy about teaching and learning on integration of computer technology. There was a positive correlation between trainee teacher philosophy about teaching and learning on integration of computer technology (r=.296, *n*=311, p<.05) as shown in Table 4.10. This implies that as the trainee teacher philosophy about teaching and learning improved the intention to integrate computer technology increased. Teacher training colleges and institutions should inculcate teaching philosophies that promote learner construction of their own knowledge among trainee teachers. This will promote ICT integration in teaching and learning.

Table 4. 10: Correlation between Trainee teacher philosophy about teaching and learning on integration of computer technology

		Integration	Philosophy
Integration	Pearson Correlation	1	.296**
	Sig. (2-tailed)		.000
Philosophy	Pearson Correlation	.296**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

b. Listwise N=311

4.4 Relationship between trainee teachers' perceived competence about computer and integration of computer technology

The second objective of the study was to identify the relationship between trainee teacher's perceived competence about computer and integration of computer technology into future teaching practices. This was obtained using the both descriptive and inferential statistics. The descriptive statistics involved the use of frequency, percentages, mean and standard deviation, while Pearson product moment was used to establish the relationship between trainee teachers' perceived competence and integration of computer technology.

4.4.1 Factor analysis for Teacher Perceived competence about computer

From the factor analysis of teacher perceived competence about computer, the KMO was found to be 0.891 and the Bartlett's Test of Sphericity was significant at ($p<.05$). The principle component analysis and Varimax rotation were performed and statements with factor loadings lower than 0.50 were eliminated as postulated by Hair *et al*., (2006). The varimax rotated principle component matrix resulted in one component loading in teacher perceived competence about computer that explained 51.77 percent of the variance with Eigen values larger than 1 (Table 4.11). All the statements had a loading value of above 0.50 and no item was deleted. The retained statements were computed and named computer competence to be used in the subsequent analysis.

Table 4. 11: Teacher Perceived competence about computer

Rotated Component Matrix[a]	Component 1
When pupils have difficulty with the computer, I am usually at a loss as to how to help them	.609
I wonder if I have the necessary skills to use the computer for instruction.	.692
I may not be able to employ the computer in my classroom ineffectively.	.791
Whenever I can, I avoid using computers in my classroom.	.658
I am not very effective in monitoring pupils' computer use in my classroom.	.789
Even when I try very hard, I may prefer to use other instructional resources other than the computer	.694
I may not know what to do to turn pupils' onto computers.	.749
I may find it difficult to explain to pupils' how to use the computer.	.785
Given a choice, I would not invite the head teacher to evaluate my computer-based instruction.	.685
KMO= .891	
Bartlett's Test of Sphericity=.000	
Eigen value=1.00	
Percentage of variance Explained=51.77	

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Source :Research Data (2015)

4.4.2 Descriptive statistics of Perceived competence about computer

The study sought to establish trainee teachers perceived competence about computer and the findings varied as summarized in table 4.12. On whether they would be at a loss on how to help pupils' having difficulty with the computer, majority (n= 195,

62.7%) disagreed, (n=87, 28.6%) agreed, while (n=27, 8.7%) were undecided as supported by a mean score of 2.47. On whether they wondered if they had the necessary skills to use the computer for instruction, (n= 184, 59.2%) of the respondents disagreed, (n=98, 31.5%) agreed while (n= 29, 9.3%) were undecided. These findings indicate that while more than half of trainee teachers were confident that they had the necessary computer skills for instruction, over 40% were not certain of their computer skills. This was evident with a mean score of 2.56. Becta (2004), attributed teacher anxiety in integrating ICT to lack of confidence. Teacher training colleges need to allocate longer hours of practice so as to promote trainee teacher computer competence.

On whether they may not be able to employ the computer in their classroom effectively, (n= 186, 59.8%) of the respondents disagreed, (n=103, 33.1%) agreed while (n=22, 7.1%) were undecided. This was evident with a mean score of 2.61. On whether they would avoid using computers in classroom, (n=208, 66.9%) of the respondents disagreed, (n=82, 26.3%) agreed while (n=21, 6.8%) were undecided as supported by a mean score of 2.32. Responses to the statement, that trainee teachers were not very effective in monitoring pupils computer use in classrooms (n=200, 64.3%) of the respondents disagreed, (n= 91, 29.2%) agreed while (n=20, 6.4%) were undecided as supported by a mean score of 2.43.

Majority of the respondents (n=176, 53.4%) disagreed that even when they try very hard, they prefer to use other instructional resources other than the computer, (n=121, 38.9%) agreed while (n=24, 7.7%) were undecided as shown in table 4.16 with a mean of 2.68. However, (n= 209, 67.2%) of the respondents disagreed that they may not know what to do to turn pupils' towards computers as shown with a mean score of 2.28. Most of the respondents (n= 225, 72.3%) disagreed that they find it difficult to

explain to pupils' how to use the computer, (n=65, 20.9%) agreed while (n=21, 6.8%) were undecided as shown by a mean of 2.16. Finally, (n= 209, 67.2%) of the respondents disagreed that given a choice, they would not invite the head teacher to evaluate their computer-based instruction, (n=72, 23.1% agreed while (n=30, 9.6%) were undecided as supported by a mean of 2.26.

Table 4. 12: Descriptive statistics table of Perceived competencies about computer

Statement	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
When pupils have difficulty with the computer, I am usually at a loss as to how to help them	29	9.3	60	19.3	27	8.7	108	34.7	87	28.0	2.47	1.33
I wonder if I have the necessary skills to use the computer for instruction.	25		73	23.5	29	9.3	107	34.4	77	24.8	2.56	1.30
I may not be able to employ the computer in my classroom effectively.	32	10.3	71	22.8	22	7.1	115	37.0	71	22.8	2.61	1.33
Whenever I can, I avoid using computers in my classroom.	29	9.3	53	17.0	21	6.8	92	29.6	116	37.3	2.32	1.37
I am not very effective in monitoring pupils' computer use in my classroom.	30	9.6	61	19.6	20	6.4	101	32.5	99	31.8	2.43	1.36
Even when I try very hard, I may prefer to use other instructional resources other than the computer	42	13.5	79	25.4	24	7.7	69	22.2	97	31.2	2.68	1.47
I may not know what to do to turn pupils towards computers.	27	8.7	47	15.1	28	9.0	94	30.2	115	37.0	2.28	1.33
I may find it difficult to explain to pupils how to use the computer.	25	8.0	40	12.9	21	6.8	98	31.5	127	40.8	2.16	1.30
Given a choice, I would not invite the head teacher to evaluate my computer-based instruction.	30	9.6	42	13.5	30	9.6	85	27.3	124	39.9	2.26	1.36

From the findings the perceived competencies about computer were found to be low with an average mean of 2.41. About half of trainee teachers expressed having no difficulty assisting pupils having problems with computer, would not avoid using computers in classroom and were very effective in monitoring pupils' computer use in classrooms.

Slightly over half of trainee teachers knew what to do to turn pupils towards computers and found no difficulty explaining to pupils how to use them. Moreover about over half of trainee teachers given a choice, would invite the head teacher to evaluate their computer-based instruction. Slightly over half of trainee teachers reported having the necessary skills to use the computer for instruction and may be able to employ them in their classroom effectively, since even if it was very hard, they would not prefer to use other instructional resources other than the computer. The implication is that while slightly over half of trainee teachers felt competent about computer, a good number felt quite incompetent. Teacher trainers need to foster computer competence among trainees through intensive practice.

4.4.3 Correlation between trainee teachers perceived competence about computer and integration of computer technology

There was a weak negative relationship between trainee teacher's perceived competence about computer and integration of computer technology ($r= -.225$, $n=311$, $p<.05$) as shown in Table 4.13. This implies that as the trainee teachers perceived competence about computer decreased the integration of computer technology declined. The TTC should enhance trainee teacher's perceived competence about computer by allowing plenty of time to work with and practice ICT in order to boost integration of computer technology.

Table 4. 13: Correlation between trainee teachers perceived competence about computer and integration of computer technology

		Integration	Computer competence
Integration	Pearson Correlation	1	-.225**
	Sig. (2-tailed)		.000
Computer competence	Pearson Correlation	-.225**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
b. Listwise N=311
Source: Research Data (2015)

4.5 Relationship between teacher trainee perceived competence about teaching and integration of computer technology

The third objective of the study was to identify the influence of teacher trainee perceived competence about teaching on integration of computer technology into future teaching practices. This was achieved through the use of descriptive statistics such as frequencies, percentages, mean and standard deviation. Pearson product moment correlation was used to establish the relationship between teacher trainee perceived competence about teaching and integration of computer technology.

4.5.1 Factor analysis for Perceived competence about teaching scale

From the factor analysis of teaching philosophy, the KMO was found to be 0.896 and the Bartlett's Test of Sphericity was significant ($p<.05$). The principle component analysis and Varimax rotation were performed and statements with factor loadings lower than 0.50 were eliminated as postulated by Hair *et al*., (2006). The varimax rotated principle component matrix resulted in one component loading in perceived competence about teaching that explained 43.41 percent of the variance with Eigen

values larger than 1 (Table 4.14). All the statements had a loading value of above 0.50 and no item was deleted. The retained statements were computed and named teaching competence to be used in the subsequent analysis.

Table 4. 14: Perceived competence about teaching

Rotated Component Matrix[a]	Component 1
I can do much to motivate pupils who show low interest in schoolwork.	.671
I can do much to control disruptive behavior in the classroom.	.690
I can do much to calm a student who is disruptive or noisy.	.628
I can use a variety of assessment strategies on my pupils	.711
I can easily craft good questions for my pupils.	.628
I can easily get children to follow classroom rules.	.721
I can easily get pupils to believe they can do well in schoolwork.	.695
I can easily establish a classroom management system with each group of pupils.	.665
I usually assist families in helping their children do well in school.	.525
I implement alternative strategies in my classroom very well	.600
I do much to help my pupils value learning	.684
I usually provide an alternative explanation or example when pupils are confused.	.664
KMO= .896	
Bartlett's Test of Sphericity=.000	
Eigen value=1.00	
Percentage of variance Explained=43.41	

Extraction Method: Principal Component Analysis.
a. 1 components extracted.
Source : Research Data (2015)

4.5.2 Descriptive statistics of Perceived competence about teaching scale

The study sought to establish the trainee teachers' perceived competence about teaching and findings varied as summarized in table 4.15. Most of the respondents (n=285, 91.7%) agreed that they can do much to motivate pupils who show low interest in schoolwork, (n=18, 5.8%) disagreed while (n=8, 2.6% were undecided as shown by the mean of 4.43. On whether, teachers can do much to control disruptive behavior in the classroom, most of them (n= 293, 94.2%) agreed, (n=12, 3.8%) disagreed, while (n=6, 1.9%) were undecided as supported by a mean 4.36. Most of the respondents (n= 282, 90.7%) agreed that they can do much to calm a student who is disruptive or noisy, (n= 15, 4.8%) disagreed, while (n=14, 4.5%) were undecided as supported by a mean score of 4.24.

On whether the trainee teachers can use a variety of assessment strategies on pupils, most of the respondents (n=291, 93.6%) agreed, (n=15, 4.9%) disagreed, while (n=5, 1.6%) were undecided as shown by a mean score of 4.4. It is also clear from the results that majority of the respondents (n=282, 90.7%) agreed that they can easily craft good questions for their pupils, (n= 8, 2.6%) disagreed, while (n=21, 6.8%) were undecided as shown by a mean score of 4.29. On whether teachers can easily get children to follow classroom rules, most of the respondents (n=264, 84.9%) agreed, (n= 26, 8.4%) disagreed while (n=21, 6.8%) were undecided as supported by a mean of 4.13. Most of the respondents (n= 286, 91.95%) agreed that they easily get pupils to believe they may do well in schoolwork, (n=11, 3.5%) disagreed while (n= 14, 4.5%) were undecided as indicated by a mean score of 4.39.

Most of the respondents (n=254, 81.7%) agreed that they can easily establish a classroom management system with each group of pupils, (n= 24, 7.7%) disagreed

while (n=33, 10.6%) were undecided as indicated by a mean score of 4.09. On whether trainee teachers could assist families by helping their children do well in school, most of the respondents (n= 230, 74%) agreed, (n= 40, 12.9%) disagreed, while (n= 14, 13.2%) were undecided as indicated by a mean score of 3.86. On whether trainee teachers could implement alternative strategies in their classroom very well, most of the respondents (n= 260, 83.6%) agreed, (n= 17, 5.4%) disagreed, while (n=34, 10.9%) were undecided as indicated by a mean score of 4.08. Most of the respondents (n= 277, 89.1%) agreed that they could do much to help pupils value learning, (n=13, 4.2%) disagreed, while (n=21, 6.8%) were undecided as indicated by a mean score of 4.3. Finally, majority of respondents (n=277, 89%) agreed that they usually provide an alternative explanation for example when pupils' are confused, (n=13, 4.2%) disagreed, while (n=21, 6.8%) were undecided as shown by a mean score of 4.33.

From the findings on the perceived competencies about teaching, it is clear that most trainee teachers felt that they could do much to motivate pupils who show low interest in schoolwork, control disruptive behavior in the classroom and to calm a student who is disruptive or noisy. Most trainee teachers felt that they could use a variety of assessment strategies on pupils and easily craft good questions for their pupils. Moreover teachers could easily make children to follow classroom rules, believe they may do well in schoolwork, and establish a classroom management system with each group of pupils. Teachers usually assist families by making their children do well in school. They implemented alternative strategies in their classroom very well, do much to help pupils value learning and usually provide an alternative explanation for example when pupils are confused. The implication is that most trainee teachers perceived themselves to be highly competent in teaching.

Table 4. 15: Descriptive statistics table of Perceived competence about teaching

Statement	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
I can do much to motivate pupils who show low interest in schoolwork.	188	60.5	97	31.2	8	2.6	7	2.3	11	3.5	4.43	0.93
I can do much to control disruptive behavior in the classroom.	149	47.9	144	46.3	6	1.9	6	1.9	6	1.9	4.36	0.79
I can do much to calm a student who is disruptive or noisy.	125	40.2	157	50.5	14	4.5	10	3.2	5	1.6	4.24	0.81
I can use a variety of assessment strategies on my pupils	165	53.1	126	40.5	5	1.6	8	2.6	7	2.3	4.40	0.84
I can easily craft good questions for my pupils.	131	42.1	151	48.6	21	6.8	4	1.3	4	1.3	4.29	0.76
I can easily get children to follow classroom rules.	119	38.3	145	46.6	21	6.8	19	6.1	7	2.3	4.13	0.94
I can easily get pupils to believe they can do well in schoolwork.	163	52.4	123	39.5	14	4.5	5	1.6	6	1.9	4.39	0.81
Establish a classroom management system.	116	37.3	138	44.4	33	10.6	16	5.1	8	2.6	4.09	0.95
I usually assist families in helping their children do well in school.	87	28.0	143	46.0	41	13.2	32	10.3	8	2.6	3.86	1.02
I implement alternative strategies in my classroom very well	99	31.8	161	51.8	34	10.9	11	3.5	6	1.9	4.08	0.86
I do much to help my pupils value learning	147	47.3	130	41.8	21	6.8	7	2.3	6	1.9	4.30	0.85
I usually provide an alternative explanation for example when pupils are confused.	159	51.1	118	37.9	21	6.8	4	1.3	9	2.9	4.33	0.89

4.5.3 Correlation between the teacher trainee perceived competence about teaching and integration of computer technology

There was a positive relationship between teacher trainee perceived competence about teaching and integration of computer technology(r=.215, *n*=311, p<.05) as shown in Table 4.16. This implies that as the teacher trainee perceived competence about teaching improved the integration of computer technology increased. Trainee teachers with confidence in their abilities to teach well scored highly on intention to integrate ICT in their teaching. The TTCS should promote teacher trainee perceived competence about teaching in order to enhance integration of computer technology into future teaching practices. This can be done through longer periods of teaching practice and tutor encouragement.

Table 4. 16: Correlation between the teacher trainees perceived competence about teaching and integration of computer technology

		Integration	Teaching competence
Integration	Pearson Correlation	1	.215**
	Sig. (2-tailed)		.000
Teaching competence	Pearson Correlation	.215**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

b. Listwise N=311

4.6 Relationship between student teachers' attitude toward computer in education and integration of computer technology

The fourth objective of the study was to identify the influence of student teachers attitude toward computer in education on integration of computer technology. This was achieved through the use of descriptive statistics (frequencies, percentages, mean and standard deviation) as well as Pearson product moment correlation to establish the influence of student teachers attitude on integration of computer technology

4.6.1 Factor analysis for Attitude towards the use of computer in Education

From the factor analysis of teaching philosophy, the KMO was found to be 0.853 and the Bartlett's Test of Sphericity was significant ($p<.05$). The principle component analysis and Varimax rotation were performed and statements with factor loadings lower than 0.50 were eliminated as postulated by Hair *et al*., (2006). The varimax rotated principle component matrix resulted in two factor loading in attitude towards the use of computer in Education explained 62.81 percent of the variance with Eigen values larger than 1 (Table 4.17). Only statements with a loading value of above 0.50 were considered, and no items in attitude towards the use of computer in Education were deleted. The statements were computed and named attitude to be used in the subsequent analysis.

Table 4. 17: Attitude towards the use of computer in Education

Rotated Component Matrix[a]	Component	
	1	2
The computer provides opportunity for improving the learning performance.		.863
The efficiency of the learning process is increased through the use of computers.		.800
The computer used as a learning tool, increases student motivation.		.801
Pupils with learning difficulties can strongly benefit from the didactic possibilities which the use of computers entail.	.632	
The computer increases the level of creativity of pupils.	.690	
The use of computer helps pupils to achieve better text writing.	.794	
Computer knowledge and practical experience should be more integrated in the curriculum.	.594	
Computers can help improve pupil-teacher interaction.	.803	
KMO= .853		
Bartlett's Test of Sphericity=.000		
Eigen value=1.00		
Percentage of variance Explained=62.81		
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

4.6.2 Descriptive statistics for Attitude toward computers in education

The study sought to establish the attitudes of teachers toward computers in education and the findings varied as summarized in table 4.18. From the study (n= 263, 84.5%) agreed that computer provides opportunity for improving the learning performance, (n=43, 13.9%) disagreed and while (n=5, 1.6%) were undecided as supported by a mean score of 4.03. Majority of the respondents (n= 259, 83.3%) agreed that the

efficiency of the learning process is increased through the use of computers,(n= 40, 12.8%) disagreed, while (n= 12, 3.9%) were undecided as shown with a mean of 4.08. On whether the computer was used as a learning tool to increase student motivation, most of the respondents (n=265, 85.3%) agreed, (n= 21, 9.9%) disagreed while (n=15, 4.8%) were undecided as shown by a mean of 4.14. Most of the respondents (n= 182, 58.5%) agreed that pupils with learning difficulties strongly benefit from the didactic possibilities which the use of computers entails, (n= 99, 31.9%) disagreed, while (n= 30, 9.6%) were undecided as shown by a mean of 3.41.

Majority of the respondents (n= 227, 73%) agreed that computer use increases the level of creativity of pupils, (n= 68, 21.9%) disagreed, while (= 16, 5.1%) were undecided as shown with a mean of 3.8. On whether the use of computer helps pupils to achieve better text writing, (n=138, 44.4%) agreed, (n= 156, 50.1%) disagreed, while (n= 17, 5.5%) were undecided as shown by a mean of 2.84. Most of the respondents (n=239, 76.8%) agreed that computer knowledge and practical experience should be more integrated in the curriculum, with (n= 54, 17.4%) disagreeing while (n= 18, 5.8%) were undecided as shown by a mean of 3.92. Finally, (n=196, 63%) agreed that computers can help pupil-teacher interaction, (n= 101, 32.4%) disagreed, while (n= 14, 4.5%) were undecided as shown by a mean of 3.43.

Table 4. 18: Descriptive statistics table of Attitudes toward computers in education

Statement	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
The computer provides opportunity for improving the learning performance.	123	39.5	140	45.0	5	1.6	21	6.8	22	7.1	4.03	1.15
The efficiency of the learning process is increased through the use of computers.	129	41.5	130	41.8	12	3.9	29	9.3	11	3.5	4.08	1.07
The computer used as a learning tool, increases student motivation.	137	44.1	128	41.2	15	4.8	16	5.1	15	4.8	4.14	1.05
Pupils with learning difficulties can strongly benefit from the didactic possibilities which the use of computers entail.	79	25.4	103	33.1	30	9.6	64	20.6	35	11.3	3.41	1.36
The computer increases the level of creativity of pupils.	116	37.3	111	35.7	16	5.1	41	13.2	27	8.7	3.80	1.30
The use of computer helps pupils to achieve better text writing.	59	19.0	79	25.4	17	5.5	66	21.2	90	28.9	2.84	1.54
Computer knowledge and practical experience should be more integrated in the curriculum.	121	38.9	118	37.9	18	5.8	33	10.6	21	6.8	3.92	1.22
Computers can help pupil-teacher interaction.	88	28.3	108	34.7	14	4.5	53	17.0	48	15.4	3.43	1.44

From descriptive statistics, majority of trainee teachers had positive attitude towards computer as it provided opportunity for improving the learning performance, efficiency of the learning process was increased through the use of computers and as a learning tool to increase student motivation. Pupils with learning difficulties strongly benefit from the didactic possibilities which the computer entails. It increases the level of creativity of pupils as the use of computer helps pupils to achieve better text writing. Computers help enhance pupil-teacher interaction. Most trainee teachers agreed with the statement that computer knowledge together with practical experience should be more integrated in the curriculum. The implication is that most trainee teachers had a positive attitude towards computer as a tool of instruction therefore will support integration of ICT in primary schools in Kenya as suggested by San, Van Braak,Tondeur and Valcke (2009).

4.6.3 Correlation between the student teachers attitude toward computer in education and integration of computer technology

There was a strong positive relationship between student teachers attitude toward computer in education and integration of computer technology ($r=.635$, $n=311$, $p<.05$) as shown in Table 4.19. This implies that as the student teachers attitude toward computer in education improved, trainee teachers' intention to integrate computer technology increased. This agrees with Keengwe and Onchwari (2008) who stated that "if teachers' attitudes are positive toward the use of educational technology then they can easily provide useful insight about the adoption and integration of ICT into teaching and learning processes". The TTCs should enhance student teachers attitude toward computer in education by promoting teacher experience with the computer. According to Van Braak, Tondeur & Valcke (2004) positive computer attitudes promote computer integration.

Table 4. 19: Correlation on how the student teachers attitude toward computer in education influences integration of computer technology

		Integration	Teacher attitude
Integration	Pearson Correlation	1	.635**
	Sig. (2-tailed)		.000
Teacher Attitude	Pearson Correlation	.635**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

b. Listwise N=311

4.7 How trainee teachers' subjective norms influences their prospective computer technology integration into teaching practices

The fifth objective of the study was to determine how trainee teachers' subjective norms influence their prospective computer technology integration into teaching practices. This was achieved through the use of descriptive statistics and Pearson product moment correlation

4.7.1 Factor analysis for Social Norms of Computer as a tool of instruction

From the factor analysis of social norms of computer as a tool of instruction scale, the KMO was found to be 0.859 and the Bartlett's Test of Sphericity was significant ($p<.05$). The principle component analysis and Varimax rotation were performed and statements with factor loadings lower than 0.50 were eliminated as postulated by Hair *et al.*, (2006). The varimax rotated principle component matrix resulted in one component loading in social norms of computer as a tool of instruction that explained 68.47 percent of the variance with Eigen values larger than 1 (Table 4.20). All the statements had a loading value of above 0.50 and no item was deleted. The statements were computed and named social norms to be used in the subsequent analysis.

Table 4. 20: Social Norms of Computer as a tool of instruction

Rotated Component Matrix[a]	Component 1
My peers will be using computer technology in their classrooms	.805
My peers think I will benefit from using computer technology in my future classroom	.768
My head teacher will think it is important to use computer technology in my classroom	.835
My pupils will think it is important to use computer technology in my classroom	.840
My district education officer will think it is important to use computer technology in my classroom	.885
KMO= .859	
Bartlett's Test of Sphericity=.000	
Eigen value=1.00	
Percentage of variance Explained=68.47	

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Source: Research Data (2015)

4.7.2 Descriptive statistics of Social norms about computer as tool of instruction

During the study, the teachers' perception on social norms about computer as tool of instruction varied as summarized in Table 4.21. On the statement that peers will be using computer technology in their classrooms (n= 204, 65.6%) agreed, (n= 73, 23.5%) disagreed, while (n= 34, 10.9%) were undecided. This was supported by a mean score of 3.5. Most of the respondents (n=236, 72.7%) agreed that peers think they will benefit from using computer technology in classroom, (n= 54, 17.3%) disagreed while (n= 31, 10%) were undecided. This was supported by a mean score of 3.76.

During the study majority of the respondents (n= 221, 71.1%) agreed that the head teacher thought it was important to use computer technology in their classroom, (n= 60, 19.3%) disagreed while (n= 30, 9.6%) were undecided as shown with a mean of 3.7. Most of the respondents (n= 243, 78.1%) agreed that pupils will think it is important to use computer technology in their classroom, (n= 48, 15.4%) disagreed, while (n= 20, 6.4%) were undecided as shown with a mean of 3.85. Most of the respondents (n= 232, 74.6%) agreed that the county education officer thought it was important to use computer technology in their classroom, (n= 51, 16.4%) disagreed, while (n= 28, 9%) were undecided. This was supported by a mean score of 3.81.

Table 4. 21: Descriptive statistics of Subjective norms about computer as tool of instruction

Statement	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
My peers will be using computer technology in their classrooms	61	19.6	143	46.0	34	10.9	36	11.6	37	11.9	3.50	1.26
My peers think I will benefit from using computer technology in my future classroom	83	26.7	143	46.0	31	10.0	34	10.9	20	6.4	3.76	1.15
My head teacher will think it is important to use computer technology in my classroom	79	25.4	142	45.7	30	9.6	38	12.2	22	7.1	3.70	1.18
My pupils will think it is important to use computer technology in my classroom	90	28.9	153	49.2	20	6.4	28	9.0	20	6.4	3.85	1.13
My county education officer will think it is important to use computer technology in my classroom	96	30.9	136	43.7	28	9.0	32	10.3	19	6.1	3.83	1.16

From the descriptive statistics, trainee teachers' felt significant others, for example peers, head teacher, pupils and County Education Officer would wish them to use computer technology in their classrooms.

4.7.3 Correlation of scores of trainee teachers subjective norms and their prospective computer technology integration

Results of the study indicate that there was a strong positive correlation between student teachers subjective norms and their prospective computer technology integration ($r=.573$, $n=311$, $p<.05$) as shown in Table 4.22. This implies as the student teachers subjective norms improved, the integration of computer technology increased. The implication is that the four significant others, members of the environment, who were identified impacted on the teachers intent to use computers in teaching. Subjective norms reflect a person's choice to behave based on the influence of others. Policy makers in education should enhance integration of computer technology into teaching practices by sensitizing other stakeholders on its importance as their expectations, as this will influence teachers' actual use.

Table 4. 22: Correlation between student teachers subjective norms and prospective computer technology integration

		Integration	Norms
Integration	Pearson Correlation	1	.573**
	Sig. (2-tailed)		.000
Norms	Pearson Correlation	.573**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
b. List wise N=311

4.8. Effect of trainee teacher's gender on integration of computer technology

The sixth objective was to examine the effect of trainee teacher's gender on integration of computer technology. This was achieved through the use of Pearson

Product Moment Correlation. There was no effect of trainee teacher's gender on integration of computer technology(r= -0.099, *n*=311, p>.05) as shown in Table 4.24. This implies that trainee teacher's gender had no influence on integration of computer technology. This confirms a report by Yukselturk and Bulut (2009) that the gender gap has reduced over the past years in ICT use in teaching and learning processes.

Table 4. 23: Correlation of trainee teacher's gender and integration of computer technology

		Integration	Gender
Integration	Pearson Correlation	1	-.099
	Sig. (2-tailed)		.081
Gender	Pearson Correlation	-.099	1
	Sig. (2-tailed)	.081	

a. Listwise N=311

Source: Research Data (2015)

4.9 Influence of teacher trainee perceptions on ICT integration in primary schools in Kenya

The purpose of the study was to examine the influence of trainee teacher perceptions on integration of computer technology in primary education in Kenya. The perceived factors included , teacher philosophy about teaching and learning, teachers' perceived competence about computer and teaching , perceived usefulness (computer attitudes), subjective norms (opinions and suggestions of people who are important to them) and gender. In order to establish the interrelationship between these factors Pearson Product Moment Correlation was used as shown in Table 4.24.

Table 4. 24: Interrelationship between factors influencing trainee teacher integration of computer technology

		Integration	Gender	Philosophy	Teaching competence	Computer competence	Teacher attitude	Norms
Integration	Pearson Correlation	1						
	Sig. (2-tailed)							
Gender	Pearson Correlation	-.099	1					
	Sig. (2-tailed)	.081						
Philosophy	Pearson Correlation	.296**	-.058	1				
	Sig. (2-tailed)	.000	.310					
Teaching competence	Pearson Correlation	.215**	-.087	.429**	1			
	Sig. (2-tailed)	.000	.124	.000				
Computer competence	Pearson Correlation	-.225**	.112*	-.083	-.094	1		
	Sig. (2-tailed)	.000	.048	.143	.098			
Teacher attitude	Pearson Correlation	.635**	-.127*	.240**	.286**	-.366**	1	
	Sig. (2-tailed)	.000	.026	.000	.000	.000		
Norms	Pearson Correlation	.573**	-.140*	.308**	.328**	-.191**	.620**	1
	Sig. (2-tailed)	.000	.013	.000	.000	.001	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

c. List wise N=311

There was a positive influence of philosophy **(**r=.296), Teaching competence (r=.215) and Teacher attitude (r=.635) and subjective norm (r=.573) on integration of computer technology. This implies as the philosophy**,** Teaching competence and Teacher attitude and subjective norms improved the integration of computer technology increased. The teaching competence negatively influenced the integration of computer technology while teacher trainee gender had no relationship with ICT integration.

4.9.1 Multiple Regression

The multiple regression was used to predict the influence of teacher trainee perceptions and gender on the integration of computer technology in primary education in Kenya. Multiple regression analysis was used to explore the relationship between one continuous dependent variable and a number of independent variables or predictors. Multiple Regression analysis was carried out using a model, which combines selected independent variables and the dependent variable. A Multiple linear regression model was used to predict integration of computer technology. The prediction was carried out basing on the effect of the six independent variables, thus teacher gender, teacher philosophy about teaching and learning, teachers perceived competence about computer, teacher perceived competence about teaching, perceived usefulness (computer attitudes in education) and subjective norms.

Model Summary

R^2 represents the values of multiple correlation coefficients between the predictors used in the model and integration of computer technology. All the predictors used in the model represent only a simple correlation between the predictors and integration of computer technology. The R^2 represented the measure of variability in integration

of computer technology that is accounted for by the predictors (independent variables which include gender, philosophy, computer competence, teaching competence, teacher attitude and subjective norms). From the model, (R^2 = .468) shows that all the predictors account for 46.8% variation in integration of computer technology (Table 4.25).

Therefore, the predictors used in the model have captured the variation in the integration of computer technology. The adjusted R^2 gave the idea of how well the model generalizes the prediction of integration of computer technology by the independent variables. The value of adjusted R^2 was .468, showing that the prediction of integration of computer technology account for approximately 46.8% less variance. The change statistics were used to test whether the change in adjusted R^2 is significant using the F ratio. The model caused adjusted R^2 to change from zero to .468 and this change gave rise to an F ratio of 44.61, which is significant at a probability of .05.

Table 4. 25: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.684[a]	.468	.458	.65268	.468	44.617	6	304	.000

a. Predictors: (Constant), Gender, Philosophy, Computer competence, Norms, Teaching competence, Teacher attitude

Dependent Variable: Computer integration

Significance :P< O.O5

Source : Research Data (2015)

The analysis of variance was used to test whether the model could significantly fit in predicting the outcome than using the mean as shown in (Table 4.26). The F- ratio represents the ratio of improvement in prediction that results from fitting the model, relative to the inaccuracy that exists in the model. The F- ratio was 44.62 which is likely to happen by chance and was significant at (P<.05). The model significantly improved the ability to predict the integration of computer technology. Thus the model was significant leading to rejection of the null hypotheses. This represented the effect size of the regression model and was significant with a p-value of 0.000.

Table 4. 26: Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	114.041	6	19.007	44.617	.000[b]
	Residual	129.502	304	.426		
	Total	243.543	310			

a. Dependent Variable: Computer Integration

b. Predictors: (Constant), Gender, Philosophy, Computer competence, Norms, Teaching competence, Teacher attitude

Source: Research Data (2015).

4.9.2 Coefficients of integration of computer technology

In addition, the β coefficients for each independent variable generated from the model was subjected to a t-test, in order to test each of the hypotheses under study. Table 4.28 shows the estimates of β values and gives an individual contribution of each predictor to the model. The β value explains the relationship between integration of computer technology and each predictor. The positive β values indicate the positive relationship that exists between the predictors and the outcome. The t- test was used

as a measure to identify whether the predictors were making a significant contribution to the model. When the t-test associated with b-values is significant the predictor is making a significant contribution to the model. The smaller the value of significance (the larger the value of t), the greater is the contribution of that predictor.

The β value for philosophy, norms and teacher attitude had a positive coefficient thus positive relationship while gender, computer competence and teaching competence had negative relationship with integration of computer technology. The formula showing the model is as summarized below;

Integration=0 .885k+0.124P + -0.089Tc + -0.002Cc + 0.457Ta + 0.248Sn + -0.002G

Where;

k= constant

P=Philosophy

TC=Teaching competence

Cc=Computer competence

Ta=Teacher attitude

Sn= Norms

G= Gender

To test whether there was colinearity, tests were carried out using tolerance and Variance Inflation Factor (VIF) statistics as shown in Table 4.27. For this model, VIF values are all below 10 and tolerance statistics are all well above 0.2. It is therefore concluded that there is no Collinearity within the data (Bowerman & O'Connell, 1990). This implies that the variation contributed by each of the independent factors was significantly independent and all the factors were included in the prediction model.

Table 4. 27: Regression model between teacher trainee perceptions and prospective ICT Integration

Model		Un standardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.885	.353		2.504	.013	.189	1.580					
	Philosophy	.124	.053	.110	2.360	.019	.041	.252	.296	.155	.114	.784	1.276
	Teaching competence	-.089	.072	-.059	-1.235	.218	-.231	.053	.215	-.071	-.052	.766	1.306
	Computer competence	-.002	.041	-.002	-.055	.956	-.084	.079	-.225	-.003	-.002	.859	1.164
	Teacher attitude	.457	.057	.451	7.956	.000	.344	.570	.635	.415	.333	.545	1.836
	Norms	.248	.050	.272	4.924	.000	.149	.347	.573	.272	.206	.574	1.743
	Gender	-.002	.075	-.001	-.032	.974	-.150	.145	-.099	-.002	-.001	.971	1.030

a. Dependent Variable: Integration

b. Predictors : (Constant), Teaching Philosophy ,Computer competence, Teaching Competence ,Trainee Teacher attitude, Subjective norms and Gender.

Significance: $p < 0.050$

Source: Research Data 2015

4.9.3 Testing of hypotheses

The regression results for all the six hypothesis is as shown in table 4.27 above.

Relationship between teachers' philosophy about teaching and learning and integration of computer technology

In order to test the above relationship, the following null hypothesis was formulated;

$H0_1$: Trainee teachers' philosophy about teaching and learning do not significantly influence integration of computer technology.

From the results of regression, the p value of student teachers philosophy about teaching and learning is ($p=0.019 <0.05$). This implies that we reject the null hypothesis, therefore, trainee teachers' philosophy about teaching and learning significantly influences integration of computer technology.

$\beta_1= 0.124$ ($p < 0.05$), indicates that for each unit increase in the student teachers philosophy about teaching and learning, there is 0.124 units increase in integration of computer technology. Furthermore, the influence of student teachers philosophy about teaching and learning was stated by the t-test value = 2.36 which implies that the parameter is over 2.4 times that of the error associated with it.

Relationship between trainee teachers' perceived competence about computer and computer integration

In order to test the above relationship the following null hypothesis was formulated;

$H0_2$ There is no significant influence of trainee teachers' perceived competence about computer on integration of computer technology.

From the results, the p value of trainee teachers computer competence is ($p=0.956 >0.05$), which indicates that we fail to reject the null hypothesis stating that there is no significant influence of student teachers' perceived competence about computer on integration of computer technology. Therefore trainee teachers perceived

competence about computer has no significant influence on integration of computer technology.

The findings also showed that $\beta_2 = -0.002$ ($p > 0.05$) implying that for each unit decrease in teachers' perceived competence, there no significant (- 0.002) unit decrease in integration of computer technology. Also the influence of teachers' perceived competence about computer is shown by the t-test value of 0.055 which implies that the effect of teachers' perceived competence about computer surpasses that of the error by over 0.06 times.

Relationship between trainee teachers perceived competence about teaching and integration of computer

In order to test the relationship above, the following null hypothesis was formulated;

$H0_3$ There is no significant influence of student teachers' perceived competence about teaching on integration of computer technology.

From the results, the p value of trainee teachers competence about is ($p=0.218 >0.05$), which indicates that we fail to reject the null hypothesis stating that there is no significant influence of student teachers' perceived competence about teaching on integration of computer technology. This implies that there is no significant influence of trainee teachers' perceived competence about teaching on integration of computer technology.

The findings also showed that $\beta_3 = -0.089$ ($p > 0.05$). This implies that for each unit decrease in student teachers' perceived competence about teaching, there no significant (- 0.089) unit decrease in integration of computer technology. Also the influence of student teachers' perceived competence about teaching is shown by the t-test value of -1.23 which implies that the effect of student teachers' perceived competence about teaching surpasses that of the error by over 1.23 times.

Relationship between trainee teachers' attitude toward computer in education and integration of computer

In order to test the relationship above, the following null hypothesis was formulated;

$H0_4$. The trainee teachers' attitude toward computer in education does not significantly influence their integration of computer technology into future teaching practices.

From the results, the p value of trainee teachers' computer attitude is ($p=0.000 < 0.05$) which implies that we reject the null hypothesis stating that The student teachers attitude toward computer in education does not significantly influence their integration of computer technology into future teaching practices. Therefore there is a statistically significant influence of trainee teachers' attitude toward computer in education on integration of computer. The findings also showed that $\beta_4= 0.457$ ($p < 0.05$). This indicates that for each unit increase in the teachers' attitude toward computer, there is 0.457 units increase in integration of computer technology. Furthermore, the influence of teachers attitude toward computer was stated by the t-test value = 7.96 which implies that the standard error associated with the parameter is over 8 times that of the error associated with it.

Relationship between subjective norms of trainee teachers and integration of computer

In order to test the relationship above, the following null hypothesis was formulated;

$H0_5$: The subjective norms of trainee teachers toward computer use in education do not significantly influence their integration of computer technology into future teaching practices.

From the results, the p value of trainee teachers' subjective norms is ($p=0.000 < 0.05$) which implies that we reject the null hypothesis stating that "The trainee teachers'

subjective norms toward computer use in education do not significantly influence their integration of computer technology into future teaching practices". Therefore there is a statistically significant influence of trainee teachers' subjective norms on trainee teacher integration of computer. Results also indicate that β_5= 0.248 ($p < 0.05$). This indicates that for each unit increase in the subjective norms of pre-service teachers, there is 0.248 unit increase in integration of computer technology. Furthermore, the influence of subjective norms on pre-service teachers computer integration was stated by the t-test value = 4.92 which implies that the standard error associated with the parameter is over 5 times that of the error associated with it.

Relationship between gender of trainee teachers and integration of computer technology

In order to test the relationship above, the following null hypothesis was formulated;

$H0_6$: The trainee teachers' gender does not significantly influence prospective integration of computer technology in instruction.

From the results, the p value of trainee teachers' gender is ($p=0.974 > 0.05$) which implies that we fail to reject the null hypothesis stating that "The trainee teachers' gender does not influence integration of computer technology into future teaching practices". Therefore there is no significant influence of trainee teachers' gender on trainee teacher integration of computer.

The findings also showed that β_6 = -0.002 ($p > 0.05$). This implies that for each unit change in student teachers gender, there no significant (0.002) unit decrease in integration of computer technology. Also the influence of student teachers gender is shown by the t-test value of 0.032 which implies that the effect of student teachers gender surpasses that of the error by over 0.03 times.

4.9.4 Factor analysis for teacher trainee perceptions on the introduction of computer technology in early primary education

From the factor analysis of teacher's perceptions on the introduction of computer technology in early primary education, the KMO was found to be 0.755 and the Bartlett's Test of Sphericity was significant ($p<.05$). The principle component analysis and Varimax rotation were performed and statements with factor loadings lower than 0.50 were eliminated as postulated by Hair *et al*., (2006). The varimax rotated principle component matrix resulted in two factor loading in teacher's perceptions on the introduction of computer technology explained 60.67 percent of the variance with Eigen values larger than 1 (Table 4.13). Only statements with a loading value of above 0.50 were considered, and no item in teacher's perceptions on the introduction of computer technology was deleted. The retained statements were computed and named perception and used in the subsequent analysis.

Table 4. 28: Teacher's perceptions on the introduction of computer technology in early primary education

Rotated Component Matrix[a]	Component	
	1	2
Student teachers support introduction of computer technology in primary schools		.617
Our college offers theoretical and pedagogical model training	.719	
An introduction of computer technology fit theoretical framework, approaches or orientation of my training	.769	
There are potential advantages of computer use	.683	
I obtain the supports required by teachers for effective use of computer	.758	
I have fears about introduction of computer technology in primary school		-.818
KMO= .755		
Bartlett's Test of Sphericity=.000		
Eigen value=1.00		
Percentage of variance Explained=60.67		

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations

Source : Research Data (2015)

4.10 Trainee teachers' perceptions on the introduction of computer technology in primary education

This section presents the perceptions of trainee teachers on the integration of ICT popularly known as the laptop project in primary schools in Kenya. It presents views on advantages and disadvantages of the ICT introduction in primary schools in Kenya, likely barriers to implementation of the ICT and the supports required to make it successful. The section also explains extent and nature of trainee teachers'

computer use in T.T.Cs and their fears related with the introduction computer use in primary schools. The findings are based on quantitative data from responses to teacher trainee questionnaire section (g) triangulated with qualitative data from focused group interviews with twenty trainee teachers in every T.T.C, and researcher's observation of trainee teachers computer use in the sampled TTCs.

4.10.1 Descriptive statistics of teacher trainee perceptions on ICT integration

From the findings in table 4.25, most of the respondents (n= 231, 74.3%) agreed that trainee teachers supported introduction of computer technology in primary schools, (n= 53, 17%) disagreed, while (n= 27, 8.7%) were undecided as shown with a mean score of 3.84. On whether the college offered theoretical and pedagogical model training, most (n= 198, 63.7%) of the respondents agreed, (n= 78, 25%) disagreed while (n= 35, 11.3%) were undecided as supported by a mean score of 3.49. On whether the introduction of computer technology will fit theoretical framework, approaches or orientation of their training most trainee teachers (n= 229, 70.2%) agreed that it fitted, (n= 50, 16.1%) disagreed, while (n= 42, 13.5%) were undecided as shown by a mean score of 3.75.

From the study most of the respondents (n=273, 87.8%) agreed that there were potential advantages of computer use, (n= 22, 7.1%) disagreed, while (n= 16, 9.9%) were undecided as summarized with a mean score of 4.22. On whether trainee teachers obtain the supports required for effective use of computer, majority (n=232, 71.4%) agreed, (n= 54, 17.4%) disagreed, while (n=35, 11.3%) were undecided as supported by a mean score of 3.73. Finally, at least (n= 173, 55.7%) of the respondents disagreed that they had fears about introduction of computer technology

in primary school, (n= 116, 34.1%) agreed, while (n= 32, 10.3%) were undecided as shown by a mean score of 2.64.

From the descriptive statistics of the study, it is clear that most trainee teachers support introduction of computer technology in primary schools, TTCS offered theoretical and pedagogical model training favorable to computers and the introduction of computer technology fit theoretical framework, approaches and orientation of their training. Most of the respondents agreed that there were potential advantages of computer use and that trainee teachers obtained the supports required for effective use of computer. Results further indicate that most of the trainee teachers had no fears about introduction of computer technology in primary schools in Kenya.

Table 4. 29: Descriptive statistics of Student teachers perceptions on the introduction of computer technology

Statement	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**		
Student teachers support introduction of computer technology in primary schools	115	37.0	116	37.3	27	8.7	20	6.4	33	10.6	3.84	1.28
Our college offer theoretical and pedagogical model training	65	20.9	133	42.8	35	11.3	44	14.1	34	10.9	3.49	1.27
An introduction of computer technology fit theoretical framework, approaches or orientation of my training	87	28.0	132	42.4	42	13.5	27	8.7	23	7.4	3.75	1.17
There are potential advantages of computer use	142	45.7	131	42.1	16	5.1	9	2.9	13	4.2	4.22	0.98
I obtain the supports required by teachers for effective use of computer	92	29.6	130	41.8	35	11.3	22	7.1	32	10.3	3.73	1.25
I have fears about introduction of computer technology in primary school	56	18.0	50	16.1	32	10.3	72	23.2	101	32.5	2.64	1.51

4.10.2 Student teachers perceived advantages and disadvantages of ICT use in primary schools in Kenya

The seventh objective was to asses student teachers perceived advantages and disadvantages of ICT use in primary schools in Kenya. Realizing the effects of ICT on the workplace and everyday life, the Kenyan Government has introduced one laptop per child project in order to bridge the existing technology gap, promote meaningful learning and enhance skills that will in future promote professional productivity (Tomei, 2005). Understanding trainee teacher's perceptions on advantages and disadvantages of the laptop project is key to successful adoption as suggested by Watson (2006).

Advantages of ICT use

Majority of the respondents agreed that there were advantages associated with the introduction of ICT in primary schools in Kenya. Most trainee teachers interviewed indicated they will be able to access a wider range of resources online which promote accuracy of information being taught to learners.

> There is lots of information in the internet … I think I will google to verify information before I go to class to teach, besides more current information is available online"

Trainee teachers were of the opinion that integration of ICT will ensure that learners will acquire computer skills.

> Pupils will be able to learn how to use computers, use internet to find information , …use e-mail and social media and create documents with a word processing program

Most trainee teachers agreed that the acquisition of ICT skills not only improve the learning process but will prepare young learners for the labor market, careers and future lives.

Trainee teachers opined that ICT would make learning easy. More subject content would be delivered quickly. One said

> ...I think ICT use will get across content easily and quickly. More of the syllabus will be covered.

Trainee teachers viewed ICT as an excellent tool for managing information on pupils work and analysis of their work.

> … I will be able to keep records of pupils' performance analyze and draw graphs. That way it will be easy to track how they are performing

Trainee teachers agreed that ICT use is likely to create interest to learn subject content. This interest will translate into increased participation and better positive behavior in the classroom.

> … I think the pupils will want to learn, they ...want to participate, they will pay more attention than when I am talking and writing on the board, they will be more interested in what is being taught.

Most trainee teachers were of the opinion that ICT integration will promote greater flexibility in teaching. Teachers and learners will be able to communicate beyond class time over the internet. They hoped to communicate with learners through social network sites such as Whats up and Face book to keep classroom discussions going as well as give assignments.

> …the learners are digital. They will be interested to use face book and Whats up to post their contributions to a topic… and I will just post a topic to be

> discussed and await their comments which I will then compile…that way learning will go on outside class...

Moreover trainee teachers foresaw the possibility of using e-mail facilities to give assignments to learners and receiving feedback on assignments from learners.

> …It will be possible to give and receive assignments and also be able to give feedback to learners trough e-mail.

Trainee teachers foresaw learning shifting from teacher – centered to learner- centered approach.

> … the teacher will introduce a topic …put learners in groups and allow them to search information from the internet… then just visit each group in turns to find out what is going on,… direct them,.. then visit the next group …that way the teacher will do less and talk less… That will lessen teachers' work.

Student teachers expressed the view that through better data analysis, classes can be tailored to learners' strengths and weakness. Teachers can use ICT to vary their approach in order to cater for the different types of learners in class.

> ...learners who easily get bored with just books, talking and chalk board will be visually stimulated…the weak will get individual attention ...this is not possible if I am just dictating notes…

Disadvantages of ICT use

In addition to benefits of ICT integration, trainee teachers cited some disadvantages of ICT use .The most commonly cited disadvantage was the high cost of acquisition of hardware and soft ware.

> …ICT integration is valuable but the cost of acquisition of hard ware and software is prohibitive …the government may spend a lot of money which could otherwise be useful for other projects…

In addition learners are likely to stray away from educational purposes of ICT. Learners may use the machines to visit social sites which can lead to harmful exposure.

> ... ICT can be a source of distraction to young learners… they can get excited with technology and lose sight of the purpose of learning …it can be entertainment rather than education … some sites may be harmful to them

Some trainee teachers noted with concern that ICT use may cause eye problems and may affect pupil –teacher relationship. In fact it was reported by one

> …computer may cause eye problems to both learners and teachers … there might be situations when learners get used to learning through ICT … so when you have a different type of lesson where ICT is not involved …they will not listen to you… they may even disrupt the class...

One said,

> … pressure to complete syllabus on time may hinder ICT use… setting up ICT classroom and clearing after, before the other teacher gets in … it may take up valuable lesson time…

Frequent ICT use may promote individualism among pupils. Learners may get too engaged with computers and in the process forget to interact with their peers.

> ... i think pupils' interaction with one another will be affected...they may not play with friends... they may prefer computer games.

The implication of this is that teacher trainees are well aware of challenges associated with ICT integration in primary schools and they will be able to handle them as they come.

4.10.3 Likely Barriers to the implementation of ICT integration in primary schools

Barriers

Barriers are challenges which have to be overcome in order to attain a goal (Bromme, Hesse and Spada (2005). Working with ICTs in primary schools is new and teachers and learners have to establish new ways of doing things. Ertmer (1999) classified barriers to ICT integration into two categories; extrinsic and intrinsic. Balankat, Blamire & Katal (2007) outlined teacher level barriers as lack of teacher ICT skills, lack of teacher confidence, lack of pedagogical teacher training programs.

Teacher trainees in this study cited lack of electricity in most primary schools in Kenya as a likely barrier.

> ...there is no electricity in most primary schools .... in remote areas.. How will teachers use ICT in such areas?

Trainee teachers also noted the Possibility of theft of computers from school labs and stores and likelihood of damage while on transit. This may lead to huge losses being incurred by schools. One of the trainee teachers, Paul said the following concerning challenges:

> ...laptops issued to class one pupils are likely to be damaged while on transit between home and school… It may fall down or be rained on … If they are stored in school, they may be stolen from the store, like happens to textbooks.

The view that lack of ICT skills among teachers and therefore were not adequately prepared was expressed by teacher trainees.

Jane said:

> ...Some of us may not be ready to teach using laptops because we feel inadequately trained… you see all computers are in the laboratory yet every time there is a lesson in the computer laboratory or it is locked ... there is little time to practice applying skills taught

Lack of time was another issue identified by trainee teachers as a likely barrier. Most respondents felt that thirty five minute lesson time was inadequate for ICT use.

Ben said,

> It is difficult to set up and use ICT in the 35 minutes allocated for one lesson ... especially with pressure to complete the syllabus.

Other likely barriers to ICT use expressed by student teachers were negative teachers attitude, unreliability of power sources, high cost of repair and maintenance, limited access to lCT hardware by teachers and pupils, lack of appropriate administrative support and crowded classrooms.

Grace said,

> well...there will be problems you know.....especially if the school administration does not purchase replacement of hardware or does not repair broken down computers on time...at times the classes may be too overcrowded to allow all students to access the few computers available.

It is the view the researcher that teacher trainees perceive real barriers to ICT integration that need to be addressed before the program is rolled out.

4.10.4 Likely supports to ICT integration in primary schools

Focused group interview results concerning possible supports yielded the following suggestions from trainee teachers; improving access to computer by allocating more money, offering more ICT related courses to teacher lesson teaching such as Maths, Social studies, Science etc, during teaching practice. Other trainee teachers suggested

in- services training for teachers, provision of technicians in every school to repair and maintain hardware, personal computers be provided for teachers to be used for lesson preparation. Other trainee teachers suggested more computer laboratories be made available in TTCs to improve access and practice.

One of the trainee teachers, Dan said

> All trainee teachers should sit for ICT proficiency exam at the end of their training.

4.10.5 Extent and nature of trainee teacher ICT use in T.T.Cs

This section looks at the nature of ICT facilities. These findings were based on focus group interview of trainee teachers in sampled T.T.Cs in the North Rift. These findings were triangulated with findings from observation by the researcher Data from these colleges indicated that ICT facilities are inadequate as shown in table 4.30.

Table 4. 30: Extent and nature of student Teachers ICT use

College	Number of computer labs	Total number of computers in lab	No. of computer technicians	Connection to internet
Kericho	3	120	1	Sometimes
Tambach	2	150	1	Sometimes
Mosoriot	2	135	1	Sometimes
Baringo	2	100	1	Sometimes
Narok	2	90	1	Sometimes

From table 4.30 the five TTCs have an average of 118 computers and two computer laboratories. All colleges have a qualified computer technician. This shows that T.T.Cs are moderately equipped with ICT hardware when compared with student

teacher population. Trainee teachers in the T.T.Cs reported lacking appropriate software for course content. Moreover tutors in the TTCs rarely integrated ICT in their classroom so as to serve as models to trainee teachers.

One trainee teacher, Otieno said:

> Most tutors do not use ICT in their classrooms due to lack of interest and skills. ... It is only the ICT teacher who may present his lesson in power point form.

The ICT tutor is the one charged with teaching the teacher trainees basic Microsoft office packages and basic computer skills. This is a compulsory course though not examinable.

Further observation by the researcher indicated that it is only the ICT lessons done in computer laboratories that integrate ICT. Teachers expressed the fact that every time the computer lesson is completed the laboratory is locked therefore there is little time for practice. This is one factor that could have contributed to negative trainee teacher computer competence and attitude. Teacher trainees need to apply ICT skills during their training in order to be able to apply it in their future teaching. Levin & Wadmay (2008), suggested that, teacher trainees, when given time to practice with technology, learn, share and collaborate with peers, it is likely that they will integrate ICT into their teaching.

4.10.6 Common uses of I.C.T

From the data collected, most trainee teachers reported that the common uses of computers in TTCs by them was for learning ICT lessons. These further proofs that trainee teachers have limited use of ICT while undergoing training and this may inhibit their integration into future teaching.

4.10.7 Fears related with introduction of computer technology in primary schools

Findings of this study indicate that all teacher trainees in the focus groups indicated that they supported the government one laptop per child project. Most of them however expressed their fears about the success of the project and the effects of implementing ICT learning in all public primary schools. Some of their fears were:

> ...it is a giant project that is not priority when the schools are faced with many other needs… Pupils may get exposed to sites on the internet that are not relevant to learning… Computers may be stolen from pupils on their way home or from school stores... Not all teachers have skills to teach using computer. There is need for intense training for both in service and trainee teachers.

It is clear that trainee teachers interviewed feared the high cost of soft ware and hardware, teacher's lack of skills to update course content and teach with computer, fear for safety of computers and fear of exposure to sites not relevant to learning. Others feared that the computer may affect the relationship between the teacher and their pupils. Pupil to pupil interaction may also be limited leading to development of individualism.

This agrees with views of Barners and Hill (1990) and Zajonc (1993) who feared that using computers with pre-schoolers would result in poorer socialization and fewer age appropriate play activities. These findings are key to understanding perceptions of teacher trainees about ICT in primary schools, as this is key to successful adoption (Watson, 2006). It is recommended by this researcher that the MOEST should move fast to allay these fears before rolling out the project.

4.11 Summary of the Findings

The data analysis showed that, trainee teacher philosophy about teaching and learning influences integration of ICT and that there is a statistically significant influence of

trainee teachers' subjective norms on integration of ICT. The study further revealed that there is a statistically significant influence of trainee teachers' attitude towards computer on computer integration. However data analysis revealed that teacher trainee perceived competence about computer and perceived competence about teaching has no significant influence on ICT integration. The study also revealed that teacher trainee gender has no significant influence on ICT integration. Qualitative data analysis revealed that teacher trainees supported integration of ICT in primary education in Kenya. They perceived clearly that there were advantages and disadvantages of ICT use in primary schools. They also suggested ways of addressing perceived barriers.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the discussion of findings of the study. In the discussion, findings of this study were integrated with the findings from other related studies. The chapter opens with a summary and discussion of results of the study on influence of trainee teacher perceptions on prospective ICT integration in primary schools in Kenya. The presentation of the discussion and findings follows the study objectives, followed by results of data analysis. The interpretation and the implication of each finding were then presented. The chapter ends with conclusions of the study, recommendation for policy makers and suggestions for further research.

5.1 Validation of TAM theory and Conceptual framework

As a first step to hypothesis testing it was important to establish the validity of TAM and concepts employed in the study. The study adopted the use of TAM theory which has largely been used in the study of computer technology acceptance (Staub, Keil & Brenner, 1997). However this theory has been developed and largely used in the western world. There was need to validate the theory based on the findings of this study in developing countries such as Kenya.

Findings of the study indicated that the major constructs of Technology Acceptance Model theory and extensions used in this study i.e perceived usefulness, perceived ease of use, subjective norms, perceived competence about teaching, philosophy about teaching and learning and gender either influenced or did not influence trainee teacher intentions to integrate ICT primary schools in Kenya.

Perceived Usefulness

TAM posits that perceived usefulness which in the study was operationalized as Computer Educational Attitudes is the strongest predictor of an individual's intention to use an information technology (Davis, 1989; Venkatesh & Davis, 2000). This study found empirical evidence to support this view. Results of this study showed that there was significant influence of trainee teachers' educational attitudes on intentions to integrate ICT in primary schools in Kenya. The results of this study are corroborated by Yueng, Taylor, Hui, Lam-Chiang and Low (2012) and Petco (2012) .

Perceived ease of use

TAM posits that perceived ease of use has significant influence on behavior intention and actual technology usage. This study operationalized perceived ease of use as perceived competence about computer. This study however found no significant influence of perceived computer competence on teacher trainee intentions to integrate ICT in primary schools in Kenya. While this finding contradicts TAM, it agrees with earlier findings by Chau (1996) and Chau and Spitler (1999) who found no relation between perceived ease of use and behavior intention. However these findings contradict Sang et al (2010) who reported that teachers with higher self-efficacy about computers tend to use computers more often and experience less computer related anxiety.

Subjective norms

This construct borrowed from the Theory of Reasoned Action (TRA) by Fishben and Ajzen (1975) for this study was used by Venkatesh and Davis (2000) to capture social influences in model two of TAM. They suggested that in mandatory contexts, social

influences have a direct effect on intention to use technology. The study found significant influence of trainee teachers' subjective norms on prospective ICT integration in primary schools. This support earlier findings by Lucas and Baek , Jung & Kim (2008) and Badia, Menesses, and Sigales (2013) who found subjective norms as strongly influencing intention to use technology.

Perceived competence about teaching

This construct was got from social cognitive theory of Albert Bandura (1986) which suggested that an individual's cognitive competences influence the behavior of using a technology. It gives prominence to self-efficacy defined as ones judgment of their ability to perform a task in this case teaching. This study found no significant influence of trainee teacher perceived competence about teaching on intention to integrate ICT in primary schools in Kenya. These findings contradict suggestions that self-efficacy influences personal and performance-related outcome expectations (Hennesy, Harrison & Wamakote, 2010).

Teacher philosophy about teaching and learning

Many studies have linked teaching approaches to successful ICT integration

(Hermans et al, 2008; Lui, 2011). Teachers that utilize inquiry model where the teacher acts as the designer, manager and facilitator while pupils are actively engaged in the learning process have been known to successfully integrate ICT (Honey & Moeller, 1990). This study found significant influence of teacher philosophy about teaching and learning on prospective ICT integration in primary schools in Kenya. This supported earlier findings by Sang, Valcke, Van Braak and Tondeur (2010).

Teacher trainee gender

This construct was brought in as an external factor influencing technology acceptance according to TAM theory (Davis, 1989). Studies have indicated that ICT use in

education is a gendered terrain with most science and computer technology teachers being male in Kenya and Uganda (Kidombo, 2010). This study found no significant influence of gender of teacher trainee on prospective ICT integration. These findings agree with views of Rahimi and Yadollai (2011) that computing is no longer a male domain.

5.1.1. Influence of trainee teacher philosophy about teaching and learning on integration of computer technology

The first objective of the study was to establish the influence of trainee teacher philosophy about teaching and learning on integration of computer technology into future teaching practices. From the study, descriptive results in table 4.14 indicate that most trainee teachers agreed that they would involve pupils in evaluating their own work and setting their own goals, believed expanding on pupils ideas is an effective way to build their curriculum and that they would prefer to cluster pupils' desks or use tables so they can work together. This implies that most trainee teachers would apply student -centered pedagogical approach in their teaching in future. Studies show that teachers who practice student -centered philosophy innovatively use ICT in their teaching (Drent & Meelisen, 2008).

These trainee teachers are therefore likely to innovatively use computers being introduced in Kenyan primary schools by the Government. Also, Hsu, Wu and Hwang (2007) pointed out that, with computer use, teachers role should no longer be that of a traditional lecturer, rather be a coach or co-learner. Moreover activities in the class should become learner-centered and flexible in order to help learners undergo self-initiated exploratory learning processes. The introduction of ICT in the Kenyan primary education system would call for a redefinition of the role of teachers. Most

trainee teachers agreed that they preferred using student-centered approaches to learning such as assessing pupils informally through observations and conferences and creating thematic units based on the pupil's interests and ideas.

Correlation analysis further indicate that there was a weak positive relationship of trainee teacher philosophy about teaching and learning and integration of computer technology ($r=.296$, $n=311$, $p<.05$).As the value of trainee teacher philosophy about teaching and learning improved the integration of computer technology increased. From the results of regression, the p value of student teachers philosophy about teaching and learning is ($p=0.019 <0.05$).This implies that trainee teacher philosophy about teaching and learning significantly influences integration of computer technology. $\beta 1= 0.124$ ($p < 0.05$) , indicates that for each unit increase in the student teachers philosophy about teaching and learning, there is 0.124 units increase in integration of computer technology. Furthermore, the influence of student teachers philosophy about teaching and learning was stated by the t-test value = 2.36 which implies that the parameter is over 2.4 times that of the error associated with it. These are statistically significant.

The finding agrees with Badia, Meneses and Sigal'es (2013) that there are actual influences of teachers' philosophy about teaching and learning on classroom activities with ICT integration. When considering the interrelationship between teacher beliefs and ICT integration, there is evidence that, teachers' philosophy about teaching and learning are a significant factor in determining patterns of classroom computer use by in-service teachers and pre-service teachers (Ertmer, 2005) .He found that teachers with student-centered pedagogical beliefs were successful at integrating computer use. The findings agree with Tinio (2009) that "As learning shifts from the "teacher-centered model" to a "learner-centered model", the teacher becomes less the sole

voice of authority and more the facilitator, mentor and coach from “sage on stage” to “guide on the side”.

5.1.2 Relationship between trainee teachers perceived competence about computer and integration of computer technology

The second objective of the study was to identify the relationship between trainee teacher’s perceived competence about computer and integration of computer technology into future teaching practices. From the descriptive findings of the study, the trainee teachers' perceived competencies about computer were found to be moderate (mean= 2.42). Most however disagreed with the statements that they will be unable help pupils having difficulty with the computer , will avoid using computers in classroom and not being very effective in monitoring pupils computer use in classrooms .These findings indicate that most trainee teachers were undecided about their ICT competence . This is a cause for concern for education stakeholders since the Government of Kenya is soon rolling out the one laptop per child project in all primary schools in Kenya to be implemented by trainee teachers once out of TTCs. These findings could suggest that trainee teachers have not had enough practice and experience with computers while in college because most computer laboratories are always locked and only opened for ICT lessons as mentioned by most interviewees during the study.

Peralta and Costa (2007), noted that teachers computer competence is a major predictor of likelihood of integrating ICT in teaching. A later study by Howards (2011) in Europe showed that teachers with more experience with computers have greater confidence in their ability to use them effectively. Yet teachers’ competence has been linked to their confidence. Further, findings by Mueller, Wood, Wiloughby,

Ross and Specht (2008) suggested that teachers with higher levels of confidence about computers used computers more often and experienced less computer-related anxiety. On the other hand, teachers with lower levels of confidence about computers become more frustrated and more anxious, and hesitated to use computers when they encountered obstacles.

Descriptive findings also indicated that (67.2 %) of trainee teachers felt they knew what to do to turn pupils towards computers and had no difficulty explaining to pupils how to use it. If teachers were given a choice, they would invite the head teacher to evaluate their computer-based instruction. A further 69.2% of trainee teachers felt they had the necessary skills to use the computer for instruction and may be able to employ it in their classroom effectively, since even if it was very hard, they would not prefer to use other instructional resources other than the computer. This also indicates that while most trainee teachers are confident about their computer competence, a good number are unsure about their computer competence and there is need to boost their confidence through regular practice while they are still in TTCs in readiness for the implementation of the laptop project in primary schools in Kenya.

There was a weak negative correlation between trainee teacher's perceived competence about computer and integration of computer technology ($r= -.225$, $n=311$, $p<.05$). This implies that as the values of trainee teacher's perceived competence about computer decreased the integration of computer technology increased. Regression analysis results indicated that, the p value of trainee teachers computer competence is ($p=0.956 >0.05$). Therefore trainee teachers perceived competence about computer has no significant influence on integration of computer technology.

The findings also showed that $\beta 2 = -0.002$ ($p > 0.05$) implying that for each unit decrease in teachers' perceived competence, there no significant (- 0.002) unit decrease in integration of computer technology. Also the influence of teachers' perceived competence about computer is shown by the t-test value of 0.055 which implies that the effect of teachers' perceived competence about computer surpasses that of the error by over 0.06 times. This contradicts findings by Yuen and Ma (2008) which showed that Hong Kong teachers' implementation of ICT depended on simplicity and perceived teacher competence. Moreover innovative teachers in Portugal linked the perception of confidence in using ICT with the loss of fear of damaging and possessing absolute control over the computer (Buabeng-Ando, 2012).

The findings of this study also contradict Becta (2004) who said that "many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who know more than they do". Inan et.al (2010) also stated that teachers who reported feeling well-prepared to use technology were more likely to integrate computers in their teaching practices as compared to teachers who felt unprepared. Most of the schools did not have enough staff competent in ICT and therefore were not able to effectively implement ICT. He recommended that more ICT teachers should be employed and be trained on basics of ICT use in teaching and learning. There is need to investigate why findings of this study contradict earlier results in Asia and the western world .It is the feeling of this researcher that contradiction could be arising from the fact that the study was done among teacher trainees who may not be sure about their own abilities to integrate ICT in their teaching in future. Contradictions could also be arising from the fact that accessibility to computers in third world countries, Kenya included, is still limited

therefore teacher trainees were unable to make informed decision about their own abilities to integrate computer in their future teaching.

5.1.3 Influence of teacher trainee perceived competence about teaching on integration of computer technology

The third objective of the study was to identify the influence of teacher trainee perceived competence about teaching on integration of computer technology into future teaching practices. From descriptive statistics, the findings indicated that trainee teachers perceived themselves to be highly competent in teaching (mean= 4.24).Most agreed with statements that they could do much to motivate pupils who showed low interest in schoolwork, control disruptive behaviour in the classroom, do much to calm a student who is disruptive or noisy, used a variety of assessment strategies on pupils and could easily craft good questions for their pupils.

Majority of trainee teachers agreed that they easily made children to follow classroom rules and believe they may do well in schoolwork, and could establish a classroom management system with each group of pupils. Most of the trainee teachers also agreed that they usually assisted families by making their children do well in school. They implemented alternative strategies in their classroom very well, did much to help pupils value learning and usually provided an alternative explanation for example when pupils' are confused. Teachers' perceived competence about teaching has been associated with successful integration of ICT in the classroom (Adeyemi, 2014). This could be explained by the fact that teachers with a strong sense of self-efficacy are open to new ideas and more willing to experiment with new strategies, seek improved teaching methods, and experiment with instructional materials (Park, 2009).The perceived high competence about teaching among trainee teachers

evidenced by the findings of this study is therefore an indicator that they will successfully implement ICT project in primary schools in Kenya.

Correlation analysis indicated that there was a weak positive relationship between teacher trainee perceived competence about teaching on integration of computer technology($r=.215$, $n=311$, $p<.05$). This implies that as teacher trainee perceived competence about teaching improved the integration of computer technology increased. From regression analysis results, p value of trainee teachers competence about teaching was ($p=0.218 >0.05$). This implies that there is no significant influence of trainee teachers' perceived competence about teaching on integration of computer technology. The findings also showed that $\beta 3 = -0.089$ ($p > 0.05$). This implies that for each unit decrease in student teachers' perceived competence about teaching, there no significant (- 0.089) unit decrease in integration of computer technology. Also the influence of student teachers' perceived competence about teaching is shown by the t-test value of -1.23 which implies that the effect of student teachers' perceived competence about teaching surpasses that of the error by over 1.23 times. The findings of this study disagree with Park (2009) and Teo (2009) who reported that teacher perceived competence about teaching influences the frequency and success of computer use in education. It was not clear to the researcher why findings of this study contradict those earlier reported. The findings of this study however corroborate Godwin et al (2015) who found no significant relationship between trainee teachers teaching self-concept and ICT use.

5.1.4 Influence of student teachers attitude toward computer in education on integration of computer technology

The fourth objective of the study was to identify the influence of student teachers attitude toward computer in education on integration of computer technology. From the results of the study shown in table 4.20, trainee teachers had a positive attitude towards computer use in education (mean= 3.7). Descriptive results indicate that most trainee teachers agreed with statements that the computer provided an opportunity for improving the learning performance, efficiency of the learning process was increased through the use of computers and that use of computer as a learning tool increased student motivation. Teacher trainees also agreed that pupils with learning difficulties strongly benefit from the didactic possibilities which using of computers entails. It increases the level of creativity of pupils as the use of computer helped pupils' to achieve better text writing. They also concurred that Computers help enhance pupil-teacher interaction and that computer knowledge together with practical experience should be more integrated in the curriculum.

These results of the study (that trainee teachers have a positive attitude towards computer assisted education) should raise hopes among education stakeholders in Kenya because this is a strong indicator that trainee teachers will readily embrace ICT integration in primary schools in Kenya. Hew and Brush (2007) suggested that to successfully initiate and implement educational technology in schools, depends strongly on the teachers support and attitudes because if teachers perceived technology programs as neither fulfilling their needs and those of learners, it is likely that they will not integrate the technology. It should be noted however that results indicate that a small number of trainee teachers 23.8% had a negative attitude towards computer use in education. There is need for education stakeholders to change this

attitude through TTCs by enabling longer trainee teacher experiences with computers as suggested by Rozell and Gardner (1999).

Correlation analysis results indicated that there was strong positive relationship between teachers attitude toward computer in education and integration of computer technology(r=.635, *n*=311, p<.05).This implies that as the student teachers attitude toward computer in education improved, the intention to integrate computer technology increased. Moreover regression analysis results indicated that the p value of trainee teachers' computer attitude was ($p=0.000 < 0.05$) which implies that the student teachers attitude toward computer in education does strongly influence their integration of computer technology into future teaching practices. The findings also showed that $\beta 4= 0.457$ ($p < 0.05$). This indicates that for each unit increase in the teachers' attitude toward computer, there was 0.457 units increase in integration of computer technology. Furthermore, the influence of teachers attitude toward computer was stated by the t-test value = 7.96 which implies that the standard error associated with the parameter is over 8 times that of the error associated with it.

The findings agree with Sang, Valcke, Van Braak, Tondeur & Zhu (2011) that attitude is a major predictor of future classroom computer use. According to Baek, Jung and Kim (2008) and Hsu, Wu and Hwang (2007) a positive attitude on the part of the teacher encourages use of computer for various purposes. The findings agree with Sang, van Braak, Tondeur, &Valcke (2009) that class use of computers by teachers was strongly affected by attitudes toward computers in education.

Teacher's attitude toward computers will influence the way computer-based technology is used in instruction. The results of the study also agree with suggestions by Hsu, wu & Hwang, (2007) that teachers' positive feelings about computers will help generate or reinforce positive feelings in the students

5.1.5 Influence of student teachers subjective norms on prospective computer technology integration into teaching practices

The fifth objective of the study was to identify the influence of student teachers subjective norms on prospective computer technology integration into teaching practices. Descriptive results of the study as shown in table 4.22 showed that the subjective norm average mean was 3.73 which is above average. It is expected that the subjective norms of pre-service teachers are positively related to their intentions to integrate computer technology in primary education in Kenya. If a teacher thinks his or her family, education officials, the head teacher pupils and friends accept and appreciate him or her using computer technology, he or she is likely to use it. Results from the study indicate that trainee teachers agreed with the statements that their peers will be using computer technology in their classrooms and that their peers will think they will benefit from using computer technology in future classrooms. They also agreed that the head teacher will think it is important to use computer technology in their classroom and that pupils thought it is important to use computer technology in their classroom. The prospective teachers also agreed that the county education officer will think it is important to use computer technology in their classroom.

Correlation analysis results indicate that there was a strong positive relationship of student teachers subjective norms and their prospective computer technology integration ($r=.573$, $n=311$, $p<.05$). Moreover Regression analysis results indicate ($P=0.00<0.05$).This implies that as the student teachers subjective norms improved the integration of computer technology increased. People will generally intend to perform a behavior when they have a positive attitude toward it and when they believe that important individuals think they should do so (Ajzen, 1988). The results indicate that the subjective norms are predictive of teachers' levels of computer use. These

results support the theories which suggested the strength of it(subjective norm) being an indicator of behavior —the theory of reasoned action (Ajzen 1988).

It is important that TTCs while designing instruction for computer use, should also address trainee teachers' subjective norms. It is also important to consider that the construct of subjective norms is based on one's perceptions of the expectations of others. In light of this assumption, it can be inferred that the expectations of computer use from among teachers' significant others' - Headteachers, colleagues, pupils, and the professional supervisors are influential in developing teachers' own expectations of computer use.

The findings agree with (Sugar, Crawly, & Fine, 2004 and Teo, 2009) that subjective norms are a key factor affecting teachers' intentions to use technology. Results indicate that the subjective norms of pre-service teachers are positively related to their intentions to integrate computer technology in primary education in Kenya. If a teacher thinks his or her family, education officials, the head teacher and friends accept and appreciate him or her using computer technology, he or she is likely to use it.

Similarly, pupils may also influence the adoption of technology because they are comfortable using it and might expect its integration into their classroom environment (Sadaf, et al., 2012; Shihab, 2008). Within a school environment, teachers' decisions to integrate technology might be affected by the opinions and suggestions of other people who are important to them (Ma et al., 2005). If conscientious personalities think that significant others believe that the technology should be used, they will form stronger intentions to use the technology. Subjective Norms and image are important

determinants of behavioral intentions because they reflect the influence of others and the importance of having others thinks positively of them.

5.1.6 Effect of trainee teacher's gender on integration of computer technology

The sixth objective was to examine the effect of trainee teacher's gender on integration of computer technology. There was no effect of trainee teacher's gender on integration of computer technology(r= -0.099, *n*=311, p>.05). Regression analysis results of gender (p = 0.974>0.05) implied that trainee teachers' gender has no significant influence on integration of computer technology. This agrees with, (Sang, Valcke, Van Braak & Tondeur, 2010; Solvberg, 2003) that the gender disparity that once existed may have narrowed substantially. However more studies that took place after 2000 indicated the differences between males' and females' attitudes about and confidence in using computers had narrowed (Sang et al , 2010 ; Solvberg, 2003). However, the few recent studies related to the topic make it difficult to definitively state that there is no longer a gender disparity in computer use. The findings disagree with Fey (2011) and Hatlevic og and Arseth (2012) that females have always lagged behind males in their willingness to learn about and use technology in schools. Significant differences between males and females were observed for technical ICT capabilities, and situational and longitudinal sustainability (Markauskaite, 2006). This findings agree with (King, Bond, & Blandford, 2012; North &Noyes, 2002) that technologies have become a normal part of the workplace setting. A number of researchers argue that computing should no longer be regarded as a male domain (Elsaadani, 2012; Yusuf & Balogyn, 2011).

5.1.7 Student teachers perceived advantages, disadvantages and fears of computer technology in primary education

The seventh objective was to asses student teachers perceived advantages, disadvantages and fears of computer technology in primary education. This researcher found it important to investigate the perceptions of the primary school trainee teachers who will experience the effects of computers directly. From the study most teachers support introduction of computer technology in primary schools

Advantages of ICT use

Majority of the respondents agreed that there were advantages associated with the introduction of ICT in primary schools in Kenya. Some of the advantages given by respondents include;

It makes learning and teaching easy

Accurate information is given

Computer literacy is promoted

Makes work easy

Enhances teachers research

Makes analysis of pupils' work easy.

That ICT use may promote motivation to learn among learners,

Promotes more positive management of pupils' behaviour by teachers.

Trainee teachers expressed that ICT use by teachers for instruction would promote better skills among teachers,

Will enhance research for information anytime,

Will promote greater flexibility in teaching away from school.

ICT was also seen to promote pupil- centered learning (independent and active learning). Through better data analysis, classes can be tailored to students' strengths and weaknesses (Individualized planning)

Disadvantages of ICT use

Respondents cited the main disadvantages of ICT use as

The high cost of acquisition of hardware and software

Likelihood of learners straying away from educational purposes of ICT and using their machines to visit social sites which can lead to harmful exposure.

Fear of the computer causing eye problems.

May affect teacher pupil relationship with computer acting as a barrier

May promote feelings of loneliness and individualism

The high cost of management and maintenance

Fears related with introduction of computer technology in primary schools

Findings of this study indicate that all teacher trainees in the focus groups, indicated that they supported the government one laptop per child project. Most of them however expressed their fears about the success of the project and the effects of implementing ICT learning in all public primary schools.

Trainee teachers interviewed feared the high cost of soft ware and hardware which may divert resources from other more urgent education needs, teacher's lack of skills to update course content and teach with computer, fear for safety of computers and exposure to sites not relevant to learning. Others feared the computer may affect the

relationship between the teacher and the pupils. Pupil to pupil interaction may also be limited leading to development of individualism.

This agrees with views of Barners and Hill (1990) and Zajonc (1994) who feared that using computers with pre-scholars would result in poorer socialization and fewer age appropriate play activities. These findings are key to understanding perceptions of teacher trainees about ICT in primary schools, as this is key to successful adoption (Watson, 2006). It is recommended by this researcher that the MOEST should move fast to allay these fears before rolling out the project.

5.1.8 Likely Barriers and supports to the implementation of the laptop project

The eighth objective of the study was to establish trainee teachers perceived barriers and supports required for computer technology implementation in primary schools.

Barriers

Barriers are challenges which have to be overcome in order to attain a goal (Bromme, Hesse and Spada (2005). Working with ICTs is new because individuals have to establish new ways of doing things. Ertmer (1999) classified barriers to ICT integration into two categories; extrinsic and intrinsic. Balankat, Blamire & Katal (2007) outlined teacher level barriers as lack of teacher ICT skills, lack of teacher confidence, lack of pedagogical teacher training programs.

Teacher trainees in this study cited the following as likely barriers to ICT integration in Kenyan primary schools.

Lack of electricity in most primary schools

Possibility of theft of computers from school labs and stores

Unreliability of power sources

High cost of repair and maintenance

High cost of purchasing software and hardware

Likelihood of damage while on transit

Limited access to lCT hardware by teachers and pupils

Inadequate time for lesson preparation and presentation

Lack of appropriate administrative support

Crowded classrooms

Other likely barriers to ICT use expressed by student teachers were negative teachers' attitude, lack of teacher skills which may make it uncomfortable for them to use for instruction.

Likely supports to ICT Integration in primary schools

Focused group interview results concerning possible supports yielded the following suggestions from trainee teachers;

Improving access to computer by allocating more money,

Offering more ICT related courses to teacher lesson teaching such as maths, social studies, science etc, during teaching practice

In services- training for teachers

Provision of technicians in every school to repair and maintain hardware

Personal computers be provided for teachers to be used for lesson preparation.

More computer laboratories be made available in TTCs to improve access and practice.

ICT proficiency exam for trainee teachers at the end of their training.

5.1.9 Extent and nature of student teacher ICT use in T.T.Cs

Findings indicated that the five TTCs have an average of 118 computers and two computer laboratories. All colleges have a qualified computer technician. This shows that TTCs are moderately equipped with ICT hardware when compared with student teacher population. Trainee teachers in the TTCs reported lacking appropriate software for course content. Moreover tutors in the TTCs rarely integrated ICT in their classroom so as to serve as models to trainee teachers.

Further observation by the researcher indicated that it is only the ICT lessons done in computer laboratories that integrate ICT. Teachers expressed the fact that every time the computer lesson is completed the laboratory is locked therefore there is little time for practice. This is one factor that could have contributed to negative trainee teacher computer competence . Teacher trainees need to apply ICT skills during their training in order to be able to apply it in their future teaching. Levin & Wadmay (2008) suggested that, teacher trainees, when given time to practice with technology, learn, share and collaborate with peers, it is likely that they will integrate ICT into their teaching.

Common uses of I.C.T

From the data collected, most trainee teachers reported that the common uses of computers in TTCs by them was for learning ICT lessons. This further proof that trainee teachers have limited use of ICT while undergoing training and this may inhibit their integration in future teaching.

5.2 Conclusions of the Study

The research study investigated the influence of teacher trainee perceptions on integration of computer technology in primary schools in Kenya. This was done in

light of the fact that the Kenyan government has launched the one laptop per child project which was expected to run from January 2014. The role of ICT in transforming economies and societies as whole and the key role teacher trainees will play in implementing ICT integration in primary school education necessitated this study.

The study established that trainee teacher's philosophy about teaching and learning, attitude toward computer and subjective norms had significant influence on intention to integrate ICT. The study however established that trainee teacher perceived competence about computer, perceived competence about teaching and gender had no significant influence on trainee teacher intention to integrate ICT. The study also established that trainee teachers perceived ICT use as having potential advantages, disadvantages and challenges. Trainee teachers also suggested ways of solving potential challenges. In view of these findings the researcher made the following conclusions:

1. The study established that there was a statistically significant influence of trainee teachers' philosophy about teaching and learning on prospective ICT integration. Trainee teachers who believed that learners construct their own knowledge with the teacher as a guide scored highly on intentions to integrate ICT in the classroom than those who believed that the teacher is the source of knowledge. Trainee teachers who intended to use child- centered teaching practices viewed ICT integration positively. It is therefore important that teacher trainers in TTCs emphasize learner- centered teaching methods in order to promote ICT integration.

2. The study found that there was no statistical significant influence of trainee teacher perceived competence about computer on ICT integration. Trainee teachers who scored highly on computer competence did not necessary score high on intention to integrate ICT. In view of this finding the study concluded that teachers who perceived themselves as highly competent in computer skills did not necessarily intent to use these skills for teaching purposes. It is important therefore that as teacher trainers emphasize on the very necessary computer skills they should impress upon trainees that they should be applied during teaching of course content. It is also important to note that most teacher trainees scored very low on computer competence. The implication of this finding is that most teacher trainees lack crucial computer skills and therefore feel ill-equipped to integrate ICT.

3. The study established that there was no statistically significant influence of trainee teachers' perceived competence about teaching on intention to integrate ICT. Those trainee teachers who scored highly on teaching competence did not score highly on ICT integration. The study established that those trainees who felt were highly competent to teach saw no need of integrating ICT in their teaching. The implication of this finding is that trainee teachers have not embraced the advantages brought about by ICT in teaching and learning even when they are highly skilled in ICT. The researcher concluded that perhaps these teacher trainees believe in being the source of all knowledge therefore are threatened by computer use for teaching and learning. It is not necessarily true that the more confident trainee teachers are about their capacity to teach the more likely they will be interested to teach with computers as available literature suggests.

4. The study established there was statistically significant influence of trainee teacher's computer attitudes on integration of ICT. Trainee teachers who scored high on attitude towards computer use in education scored highly on intention to integrate ICT. Trainee teachers, who had a positive attitude towards ICT and its uses, had high intentions to integrate it in their teaching.

5. The study established that there was statistically significant influence of trainee teachers' subjective norms on intention to integrate ICT. Trainee teachers who perceived that significant people in their work and life expected them to use ICT in their teaching had intentions to integrate it. Opinions of Education officers, head teachers, pupils and fellow teachers affect trainee teachers' prospective ICT behavior. It is therefore important to include all stakeholders in ICT workshops or seminars so that all people are sensitized about their importance. Their expectation of teachers to use ICT, will promote teacher use. Steyn and Van Greunen (2014) emphasized the importance of creating ownership and buy-in from not only the headteachers, and staff members but from parents and school management committees for sustainability of ICT projects in schools.

6. The study established that there was no statistically significant influence of teacher trainees' gender on ICT integration. In view of this finding, the study concluded that intention to integrate ICT did not depend on whether one was male or female. The implication of this finding is that ICT training programmes to develop teachers competencies in computer use should target all irrespective of gender.

7. The study established that teacher trainees support introduction of ICT in Kenyan primary schools because it has potential advantages. Perceived advantages include promotion of computer literacy for both teachers and pupils, access to wider range and accurate information, teaching and learning is made easy, promote flexibility in teaching and learning among others. In view of this finding, the researcher can predict great success in ICT integration in primary schools in Kenya. This is because understanding teacher trainees' perceptions of computer which is an innovation, is key to successful adoption as suggested by Watson (2006).

8. The study established that teacher trainees foresee real challenges that may affect implementation of ICT integration. They include lack of electricity in some schools, concern over security of computers, high cost of repair and maintenances, restrictive curriculum and limited teacher ICT skills. It is the view of this researcher that some of these challenges need to be tackled before the project is fully rolled out.

9. The study sought to find out the extent and nature of trainee teacher ICT use in TTCs. This study established that TTCs have inadequate ICT hardware and soft ware for students use. On average TTCs had two computer labs that were locked most of the time unless there was an ICT lesson going on. This limited trainee teachers' access to ICT resources for practice. In view of this finding, the researcher has fears that trainee teachers may not be adequately skilled to implement ICT integration in primary schools in Kenya.

5.3 Implications of the study for policy makers

The results of this study have significant implications for policy makers about integration of ICT in primary schools in Kenya.

1) The results of the study indicated that trainee teachers who believed that learners who construct their own knowledge while the teacher acted as guide favored ICT integration. There is need for teacher trainers to emphasize teaching philosophies that are learner-centered. Teacher training should challenge traditional pedagogical beliefs which require the teacher to be the main transmitter of information in the classroom.

2) The results of the study established that there was no significant influence of trainee teacher perceived competence about computer on ICT integration. In view of this finding, primary teacher syllabus, should in addition to the very necessary ICT skills, introduce ICT course that should be integrated with subject content during teaching practice. This will link ICT skills and subject content therefore promote integration

   Teacher training should be conducted in the same manner that the teachers are expected to integrate ICTs with teacher educators actually integrating ICTs in their classes. In addition every subject in Kenya primary Teacher Syllabus should include ICT integration section which is compulsory. This will encourage teacher trainees to marry computer skills and course content leading to effective ICT integration in teaching and learning.

3) The study also established that there is significant influence of trainee teacher's computer attitude on integration of ICT. To prepare trainee teachers for teaching in this technology age, we need to raise their perception of the importance of ICT and sense of competence in it. This study recommends that

the MOEST should organize in-service training and teacher-trainee workshops that increase teacher knowledge and skills which in turn will promote positive attitude towards ICT as the first step towards implementation of the laptop project in primary schools. This is because the findings of this study and available literature suggest that teacher's positive attitude towards ICT is the most important determinant to successful integration.

4. Owing to significant influence of subjective norms on ICT integrations, this study recommends that besides teachers and teacher trainees, other stakeholder's such as teacher trainers (tutors), education officers at county level, primary school head teachers and pupils should be aware of benefits of ICT. This will ensure that they will expect and demand that teachers integrate ICT in teaching and learning. Their expectation of teachers to use ICT, will promote teacher use. Steyn and Van Greunen (2014) emphasized the importance of creating ownership and buy-in from not only the head teachers, and staff members but from parents and school management committees for sustainability of ICT projects in schools.

5. To promote student teacher access to computer hardware and software the researcher recommends that more computer laboratories should be established and equipped and this will call for more budgetary allocations by the Government and TTCs. These ICT laboratories should be open all the time to allow trainee teachers time to practice and apply ICT skills. This will promote ICT competence and ICT integration in Primary schools in Kenya.

6. Teacher trainers (tutors) should be encouraged to use ICT in their teaching so as to act as role models for teacher trainees. Tutors who integrate ICT should

be given incentives while those who lack computer skills should undergo ICT in-service training.

7. To overcome some of the disadvantages of ICT integration this researcher recommends that teacher trainees and in-service teachers should:
   a. Choose content and control pupil usage of ICT. Learners' time using ICT should be regulated to reduce possibilities of exposure to harmful sites.
   b. Explain concept of ICT to the child so as to promote responsible use while on their own now and in the future.
   c. Ensure there is balance between child's activities where there is equal distribution between child's play indoors and between individual play and group play.

8 .In view of the fact that security of ICT hardware and software was a major concern of the respondents, this research recommends that schools construct secure stores to ensure safety of the computers once the programme is rolled out.

5.4 Recommendations for further research

The researcher recommends the following topics for further research:

1. There is need to study other factors influencing integration of ICT other than teacher perceptions, for example the influence of teacher workload, accessibility to ICT resources, Administrative support, technical support and technological characteristics on ICT integration.
2. Studies on the influence of teacher perceptions on ICT integration among teachers who are already teaching in primary schools should be carried out
3. Studies on the Influence of teacher trainee perceptions on ICT integration in private teacher training colleges should be carried out

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APPENDICES

APPENDIX I: CONSENT LETTER

Department of Education Psychology

University of Eldoret

Dear Participant,

I am a Post graduate student in the Department of Education Psychology, University of Eldoret. I am pursuing a Doctorate Degree in Education Psychology. I hereby kindly request you to participate in my study. The main objective of this study is to examine the factors influencing teacher trainee integration of computer technology in primary education in Kenya.

You are requested to provide sincere and accurate responses to all the items in the research questionnaire. The information you give will be kept confidential and will not be used for any other purpose, which is not related to the objectives of the study.

Please do not write your name. You may contact the researcher for more information about the study and to communicate to you the findings of this study.

Thank you for volunteering to participate.

Researcher's Name: Lilian Kimaiyo

APPENDIX II: TRAINEE TEACHER QUESTIONNAIRE

The objective of the study is to provide the researcher with information for purely academic purposes. The main objective of this study is to examine the effect of student teachers' gender, philosophy about teaching and learning, teacher perceived competence about teaching , teacher perceived competence about computers, attitude towards computers in education and subjective norms on prospective ICT integration in education. It will also asses student teachers perceptions on the introduction of computer technology in early primary education (in terms of advantages, disadvantages, barriers and supports required).

You have been selected to participate in the study and we would like to ask for your honest response. All information provided by you would be kept strictly confidential. Do not put any name or identification on this questionnaire. Answer all questions as indicated by either filling in the blank spaces or ticking the option that applies.

SECTION A : Demographic Information of the Respondents

1: What is your year of study?

YEAR 1 ☐ YEAR 2 ☐

2: What is your gender? Male ☐ Female ☐

3. What is your age?

4. How long have you had personal computer experience?

Less than 1 Year ☐ 1-4 years ☐ 5-9 years ☐ Over 10 years ☐

5. How long have you taught as untrained teacher before coming to TTC?

SECTION B

Teaching and learning philosophy scale

	Statement	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
1.	I make it a priority in my classroom to give pupils time to work together when I am not directing them					
2.	I involve pupils in evaluating their own work and setting their own goals					
3.	I believe that expanding on pupils' ideas is an effective way to build my curriculum					
4.	I prefer to cluster pupils' desks or use tables so they can work together.					
5.	I prefer to assess pupils' informally through observations and conferences.					
6.	I often create thematic units based on the pupils' interests and ideas.					
7.	I invite pupils to create many of my teaching aids.					

SECTION C

Perceived competence about teaching scale

	Statement	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1.	I can do much to motivate pupils who show low interest in schoolwork.					
2.	I can do much to control disruptive behavior in the classroom.					
3.	I can do much to calm a pupil who is disruptive or noisy.					
4.	I can use a variety of assessment strategies on my pupils					
5.	I can easily craft good questions for my pupils.					
6.	I can easily get children to follow classroom rules.					
7.	I can easily get pupils to believe they can do well in schoolwork.					
8.	I can easily establish a classroom management system with each group of pupils.					
9.	I usually assist families in helping their children do well in school.					
10.	I implement alternative strategies in my classroom very well					
11.	I do much to help my pupils value learning					
12.	I usually provide an alternative explanation or example when pupils are confused.					

SECTION D

Teacher perceived competence about computer scale.

Given the fact that the Kenyan government is rolling out the one laptop per child project in class one indicate

	Statement	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
1.	When pupils have difficulty with the computer, I may be at a loss as to how to help them					
2.	I wonder if I have the necessary skills to use the computer for instruction.					
3.	I may not be able to employ the computer in my classroom effectively.					
4.	Whenever I can, I will avoid using computers in my classroom.					
5.	I may not be very effective in monitoring pupils' computer use in my classroom.					
6.	Even when I try very hard, I may prefer to use other instructional resources other than the computer					
7.	I may not know what to do to turn pupils onto computers.					
8.	I may find it difficult to explain to pupils how to use the computer.					
9.	Given a choice, I would not invite the head teacher to evaluate my computer-based instruction.					

SECTION E

Attitudes toward computers in education scale

	Statement	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
1.	The computer provides opportunity for improving the learning performance.					
2.	The efficiency of the learning process is increased through the use of computers.					
3.	The computer used as a learning tool, increases pupil motivation.					
4.	Pupils with learning difficulties can strongly benefit from the didactic possibilities which the use of computers entail.					
5.	The computer increases the level of creativity of pupils.					
6.	The use of computer helps pupils to achieve better writing abilities.					
7.	Computer knowledge and practical experience should be more integrated in the curriculum.					
8.	Computers can help improve pupil-teacher interaction.					

SECTION F

Subjective norms statements about computer as a tool of instruction

	Statement	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1.	My peers will be using computer technology in their classrooms					
2.	My peers think I will benefit from using computer technology in my future classroom.					
3.	My head teacher will think it is important to use computer technology in my classroom.					
4.	My pupils will think it is important to use computer technology in my classroom					
5.	My district education Officer will think it is important to use computer technology in my classroom.					

SECTION G

Computer Integration scale

	Statement	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1.	I would use the computer as a tool for demonstration working with existing presentations, or those that someone else has made for me.					
2.	I would use the computer as a tool to teach new subject knowledge, i.e. the pupils acquire knowledge directly from the computer.					
3.	I would encourage pupils in class to search for relevant information on the Internet.					
4.	I would use educational software with my pupils for learning subject knowledge through drill and practice.					
5.	I would teach pupils to consider the implications and opportunities of computer use.					
6.	I would use the computer as a tool for demonstration working with presentations I have made myself (e.g., PowerPoint).					
7.	I would ask pupils to undertake tasks or follow up class work at home on the computer.					

8.	I would be pleased to use computer in my classroom instruction in future					
9.	I would use the computer to assist with differentiation or implementing individual learning plans.					
10.	I would encourage pupils to work collaboratively when using a computer.					
11.	I would use e-mail to communicate with pupils out of school (or class time).					

The following are student teachers perceptions on the introduction of computer technology in early primary education. Please rate them according to your opinion using the following scale.

	Statement	**Strongly Disagree**	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**
1.	Student teachers support introduction of computer technology in primary schools.					
2.	Our college offers theoretical and pedagogical model training					
3.	An introduction of computer technology fit theoretical framework, approaches or orientation of my training					
4.	There are potential advantages of computer use					
5.	I obtain the supports required by teachers for effective use of computer					
6.	I have fears about introduction of computer technology in primary school					

Th*ank you for taking your time to fill this questionnaire*

APPENDIX III: INTERVIEW SCHEDULE FOR TRAINEE - TEACHERS

1. How many computer laboratories are found in the college?
2. How many personal computers are found within college?
2 What is the average age and speed of computers?
3 Are college computers connected to the internet?
4 How accessible are ICT facilities?
5 How many computer technicians does the college have?
6 How often do you use e-learning?
7. .How frequently do you integrate ICT in teaching and learning?
8. What is the speed of internet connection?
9. What are the common uses of computers in college by students and tutors?
10. Do you support introduction of computer technology in class one?
11. Describe the theoretical and pedagogical model you are being trained on.
12. Does introduction of computer technology fit in the theoretical framework approaches or orientation of your training?
13. What do you think are the potential advantages and disadvantages of computer use?
14. What do you think are the likely barriers to be encountered?
15. What are the likely supports required by teachers for effective use of computer in teaching and learning?
16. Do you have any fears about introduction of computer technology in primary school? If yes name them.

APPENDIX IV: OBSERVATION SCHEDULE

1. Number of computer laboratories ……..……
2. Number of Personal Computers …….……
3. Average age and speed of computers ……..……
4. Connection of college computers to the internet.

   ……..……...

5. Accessibility to ICT facilities …….

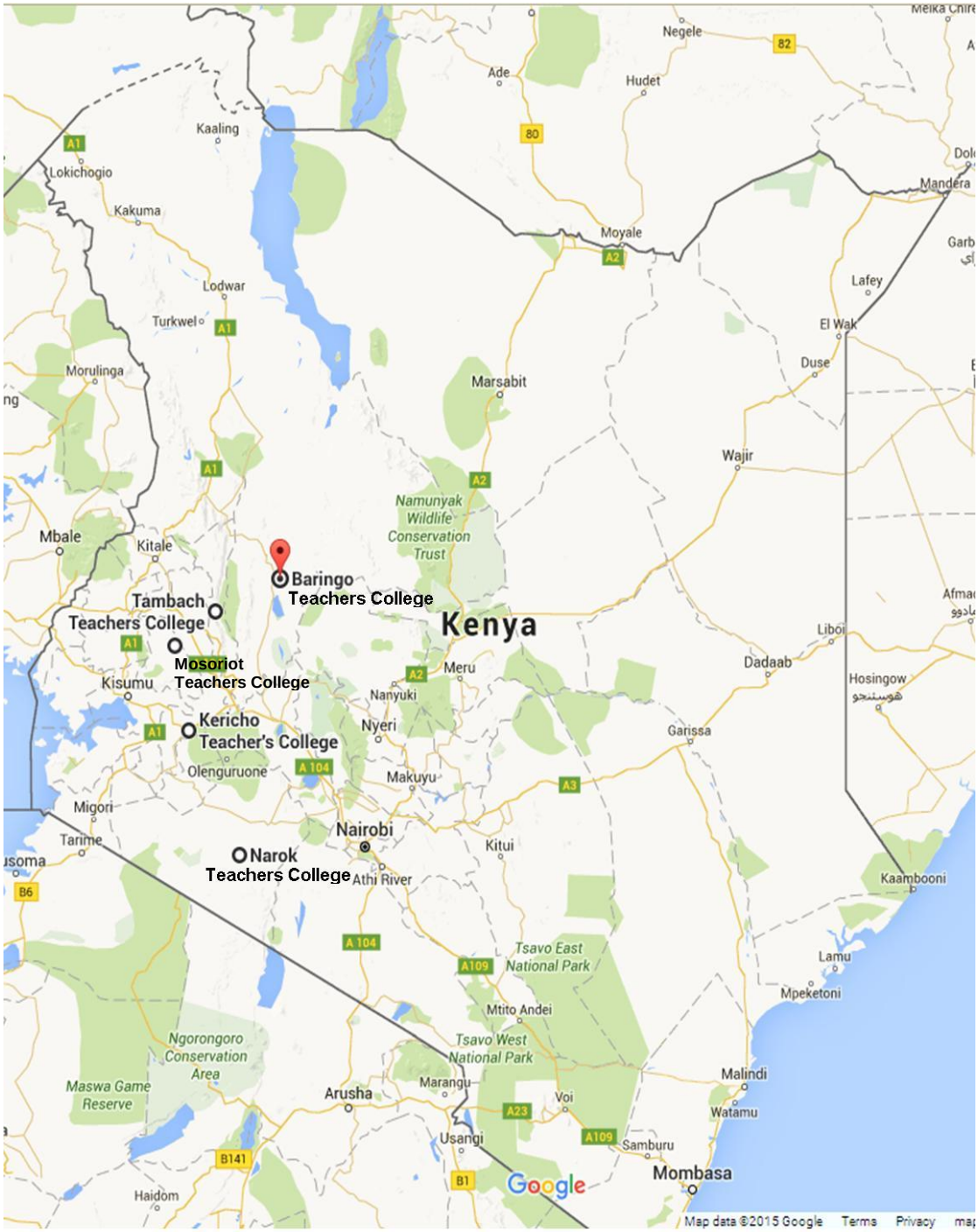
…….…….

6. Number of computer technicians ……
7. Use of e-learning by the college ……
8. Level of integration of ICT in teaching and learning ……

   ……

9. Speed of internet connection ……...
10. Different uses of computers by students and tutors ……

APPENDIX V: MAP OF STUDY AREA



Map Of Kenya Showing Teachers Training Colleges in Rift Valley

APPENDIX VI: RESEARCH PERMIT

THIS IS TO CERTIFY THAT:
MS. LILIAN CHEMUTAI KIMAIYO
of UNIVERSITY OF ELDORET, 0-30100
eldoret,has been permitted to conduct
research in *Baringo , Elgeyo-Marakwet , Kericho , Nandi , Narok Counties*

on the topic: *EVALUATION OF FACTORS INFLUENCING PREPAREDNESS OF TEACHER TRAINEES TO INTEGRATE COMPUTER TECHNOLOGY IN PRIMARY SCHOOLS IN KENYA*

for the period ending:
4th December,2015

Permit No : NACOSTI/P/15/3023/6100
Date Of Issue : 28th July,2015
Fee Recieved :Ksh 2,000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

CONDITIONS

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

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 5960

CONDITIONS: see back page

APPENDIX VII: EMERGENT THEMES BY RESEARCH QUESTIONS

RESEARCH QUESTION	CATEGORY	EMERGENT THEMES
1. What are the trainee teachers' perceived advantages and disadvantages of ICT integration in primary schools?	Advantages	Wider range of resources Acquisition of computer skills More content coverage Eases learning Management of pupil information Stimulate interest to learn subject content Teaching flexibility Assignments and feedback Pupil centered learning Individualized learning
	Disadvantages	High cost of hard ware and software Exposure to harmful sites Eye problems Pupil –teacher relationship Individualism Time wastage.
2. What are trainee teachers perceived barriers and supports with integration of ICT in primary education	Perceived barriers	Lack of electricity Theft of laptops Unreliable power sources High cost of repair and maintenance High cost of hardware Damage on transit Ill trained teachers Inadequate time Lack of appropriate administrative support. Crowded classrooms.
	Perceived supports	Allocating more money. More ICT related courses during teacher training. In service training for teachers Personal computers for teachers. More computer labs in TTCs.